Université de Neuchâtel-Faculté des Sciences

The families Tipulidae, Limoniidae, Cylindrotomidae, Trichoceridae and Ptychopteridae in Lithuania: an eco-faunistic approach

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INTRODUCTION

The families Limoniidae, Tipulidae, Cylindrotomidae, Trichoceridae and Ptychopteridae belong to the suborder Nematocera*. They are among the most primiöve and oldest Diptera (the oldest Tipuloidea date from the Lower Jurassic), so the organisation of their bodies still shows many primitive features common to their ancestral forms. The contemporary classification of these families requires not only morphological studies, but also ecological and biological ones of such groups. This is actually true for all the Diptera, since the phylogeny of the order is not yet clearly understood. The Limoniidae and Tipulidae are among the largest families of Nematocera (about 11000 and 4000 species respectively have been described), whereas the Cylindrotomidae, Trichoceridae and Ptychopteridae are small families (about 70, 123 and 64 species are known).

Their larvae usually feed on dead organic material, so they are important as decomposers in natural cycles. They have a great influence on soil formation processes. Only a few groups are predators and only very few species feed on living plants and can be considered serious agricultural pests.

Faunistic inventories are very important for the comprehensive study of the entomofauna of a region. Two-winged insects have been very little studied in Lithuania, and till the beginning of the 90s, only 11 species of Tipulidae were known from all these families. Of course, some allusions did exist in scientific literature about their ecology and biology. So detailed investigations of these insects are very important, because they may help to solve a number of theoretical and practical questions.

This work is the result of ten years of faunistic and ecological investigations about these insects (1983-1993). The aim was to give as complete an image as possible of the species composition of Tipuloidea in Lithuania, and of their biology and ecology. The main purposes were:

1. To catalogue the Lithuanian Limoniidae, Tipulidae, Cylindrotomidae, Trichoceridae and Ptychopteridae.
2. To investigate their biology, and their biotopical and zoogeographical distribution.
3. To analyse the seasonal activity of individual species and their complexes, and its dependence on biotopical distribution and climatic conditions.
4. To estimate the efficiency of different methods of collecting crane flies.
5. To detect potential pests for Lithuanian agriculture.

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* The systematics of these families is still in dispute. We followed here the classification given by P. Oosterbroek (1992).

1.1. SURVEY OF THE RESEARCHES CONCERNING ECOLOGICAL EVOLUTION AND ECOLOGY

In many cases, the study of the ecology of insects is as important as research on their morphology. When building phylogenetic systems, the ecology of all the stages of development must be taken into account (Giliarov 1977). Sometimes, ecological similarities in different groups of insects are clearer than the morphological ones.

The question of the aquatic or terrestrial origin of the primary Diptera is one seriously discussed by scientists today (Kovalev 1979). It was raised because Tipuloidea were recognised as the oldest Diptera and the group contains species both with aquatic larvae and with terrestrial ones.

The hypothesis that primitive Diptera first had aquatic habitats appeared after the discovery of the oldest two-winged flies dating back to the Trias and resembling Tanyderidae (Kovalev 1983). This opinion was based on the fact that the larvae of the recent species of the family Tanyderidae are closely connected with water. They live in the riverside zone or in the upper layers of submerged wood (Crosskey 1980; Wood 1952), so are amphibiotic. When claiming that the anteriority of the aquatic habitats of the oldest Diptera is a new conception and giving the Tanyderidae as an example, V. G. Kovalev really only confirms the earlier hypothesis about the amphibiotic habitats of the oldest Diptera.

The fact that a very large group of nematocerous flies (Trichoceridae, Tanyderidae, Ptychopteridae, Cylindrotomidae, Psychodidae, Ceratopogonidae, Chironomidae), and mainly very ancient ones, are very closely connected with shore habitats rich in organic material proves the priority of water habitats among the oldest Diptera (Krivosheina, Zaitsev 1989).

The representatives of the Tipulidae evolved as sapro- and saproxylophagous insects and therefore have well developed mouth parts of the gnawing type. Tipulidae were not xylophagous in the first stages of their evolution, despite the fact that some of them feed on wood now (Krivosheina 1969). This is proven mainly by the metapneustic character of the larval tracheal system. There is no doubt that such a tracheal system, which is characterisdc of all three families of the Tipuloidea, was formed in the ancestral groups of all of these insects in moist or semi-aquatic habitats poor in oxygen. This can be proved by studying the inner phylogenetic family ties. The most plesiomorphic features are found among the species of the subfamily Dolichopezinae (Savchenko 1983), whose larvae usually develop in water or in semi-aquatic and land mosses with varying degrees of moisture. It is possible that other recent groups of Tipulidae also originated from ancestral amphibiotic forms. Some archaic features of the xylophagous Tipulidae show that they were closely connected to plesiomorphic hydrobiontic groups in the course of their development. So xylophagous crane flies are only one of the branches of the ancestral amphibiotic forms. The bristles on the stigmoidal plate of the larvae of some xylophagous Ctenophorinae confirm this fact: they are characteristic only of hydrobiontic forms (Savchenko 1983).

Obviously, the passage from an aquatic habitat to a wooded one meant some modifications in the organisation of their larval bodies. A very strong mouth apparatus of the gnawing type was developed, with strongly sclerotised mandibles and maxillae. The digestion system became more complicated, the typical blind guts appeared after they began to feed on wood (Krivosheina 1969 1979).

The larva of *Epiphragma* is an example of this analogous specialisation. Its strong head capsule is very different from the head capsules of its closely related Limoniidae cousins which feed in other habitats (Krivosheina 1969).

The appearance of the Limoniidae was followed by the specialisation of different nutritional types: from predators (in many amphibiotic species) to sapro-, saproxylo- and xylophagous forms.

Species of Cylindrotomidae adapted to feeding off aquatic and semi-aquatic plants, mosses and other vegetation covering rotting trunks lying on the ground.

The larvae of Trichoceridae develop in rotting materials - wood, fungi, even in the corpses of large dead animals. Ptychopteridae develop in calm or slowly running water, often very near the bank, buried in the silt. They can also complete their development in rather dry silt, if its particles are small enough and so retain sufficient moisture to keep them from drying out.

E. N. Savchenko (1983 1986) fully described the general ecology of the Tipulidae and Limoniidae families. He studied individual species (Savchenko 1961 1964 1973 1982 1983 1985 1986). The ecology of the small families (Cylindrotomidae, Trichoceridae, Ptychopteridae) will mostly be found in separate works (Krivosheina, Zaitsev 1989; Lantsov, Chernov 1987; Mattingly 1987; McAlpine 1981; Noll 1985).

Two important aspects remain to be investigated. First, to assess the value as bioindicators of the larvae of the nematocerous Diptera and especially of those of primitive groups such as the Tipuloidea and the Ptychopteridae. Second, following M. S. Gilliarov 's principles of zoological soil investigation (1965 1987), to estimate the role in bio-geocenotic cycles of soil Diptera, as well as of those species that develop in decaying habitats, such as fungi, wood etc., or in coastal zones rich in organic material.

1.2. STATE OF THE FAUNISTIC AND ECOLOGICAL INVESTIGATIONS IN LITHUANIA

Before the middle of the nineties, very few investigations on the fauna and ecology of Tipuloidea and Ptychopteridae insects in Lithuania existed. Only two species of crane flies (*Tipula paludosa* Mg. and *T. oleracea* L.) were mentioned in publications on plant protection (Lesinskas, Pileckis 1968; Pileckis et al. 1975 1983; Pileckis, Vengeliauskaite 1977; Pileckis, Zuklys 1974; Rimkus, Zievyte-Kulvietiene 1964; Surkus, Kulvietiene 1984; Zuklys and others 1971). They were referred to only as pests of forest plantations and of agricultural and decorative plants. Some data about their phenology and frequency and some methods for their extermination were included. This information was mostly incorrect, since these species were confused with other crane flies. All this was due to the fact that hardly any studies of Lithuanian crane flies existed.

Nine other species, collected in 1904-1911, are kept in the Museum of the St. Petersburg's Institute of Zoology : *Tipula grisescens* Zett. (Vilnius, 13.4.1911, 1 ♂, Rydzevsky */all description labels in Russian - S. Podenas/*), *T. pruinosa pruinosa* Wied. (Jurburg */probably Jurbarkas - S. Podenas/*, 31.6.1904, 2 ♂♂, Vinogradov-Nikitin), *T. couckei* Tonn. (Jurburg, 30.4.1904, 1 ♂, Vinogradov-Nikitin), *T. unca unca* Wd. (Vilnius, 27.4.1907, 1 ♀, Makarov), *T. scripta scripta* Mg. (Vilnius, 2.7.1907, 2 ♀♀, Makarov), *T. nubeculosa* Mg. (Kaunas, 6.5.1904, 2 ♀♀, Vinogradov), *T. vernalis* Mg. (Jurbarkas, 15.5.1904, 5 ♂♂, Vinogradov-Nikitin), *T. nodicornis* Mg. (Jurbarkas, 3.6.1904, 1 ♀, Vinogradov-Nikitin), *Tanyptera atrata atrata* L. (Kaunas, 1 ♂, 1 ♀, Vinogradov */no collection data - S. Podenas/*). All these specimens are also mentioned in E. N. Savchenko's works (Savchenko 1961 1964 1973).

The published material concerning the families Limoniidae, Cylindrotomidae, Trichoceridae and Ptychopteridae was non-existent until our research in Lithuania (Pakalniskis 1989).

We found all the above-mentioned species and many more. In all, 85 species of Tipulidae, 181 of Limoniidae, 4 of Cylindrotomidae, 10 of Trichoceridae and 6 of Ptychopteridae were found in the course of our investigations in Lithuania.

2.1. COMPARISON AND EVALUATION OF THE DIFFERENT METHODS FOR THE COLLECTING AND QUANTITATIVE REGISTRATION OF CRANE-FLIES

Different methods of registration and collection are needed for the complete investigation of all the trophic and ecological specificities of insects.

The adults of crane flies, as well as those of other insects, were mostly collected with a standard entomological net. So as to obtain not only qualitative but also quantitative data about the groups of insects under investigation, each collecting session lasted for a determined amount of time.

Our experiments showed that if one wants to get undamaged specimens, the number of net waves should not exceed 15-30 (depending on the abundance of insects). In damp weather the entomological net should not pass over vegetation, because the material will be seriously damaged by molluses from *Succinea* and *Helix hortensis* which fall into the net during the collection. Insects should even be taken out after 1-3 net waves when there is rain or fog.

Meteorological and subjective factors, as well as the season and the time of day or night, or also other phenomena greatly influence the results of a collection.

A collecting session should never last less than 1 hour. This may not be practical if it is necessary to evaluate the insect fauna of some place very rapidly. However, during 1 hour's collecting (when the weather is good), one will find only about 55-65% of the species of crane flies that are flying at that time.

We preferred collecting for a determined time to simple net-waving and counting the gestures, because it was then possible to catch a greater number of bigger insects. Collecting by counting net-waves is better for catching smaller insects. Bigger specimens are caught rather rarely. Collecting for a

specified time is better, because it is possible to pay more attention to such places where crane flies may concentrate - among the tangled twigs of bushes, near the trunks and crowns of trees. On the other hand, even very long collecting periods with the entomological net (2-3 weeks in the same place) do not allow to catch all the species actually living in this place.

The entomological net can be well supplemented by light-traps. For example, in the summer of 1989, insects were collected with a net for three weeks in the same place. *Dictenidia bimaculata* was never found during the day with the entomological net, whereas it was rather abundant during night hunts with a lamp (500 W). One catches fewer species if one hunts only with lamps. They amount to only about 34% of all the species found by net-collecting in the middle of the season. On the other hand, very early in spring and late in autumn collecting by lamplight catches more species than with the entomological net (fig. 2.1).

The ordinary pooter is an effective method for collecting small insects on a screen during night hunts with lamplight or on the outside of lighted windows. As a rule gnats are not damaged when collected with it.

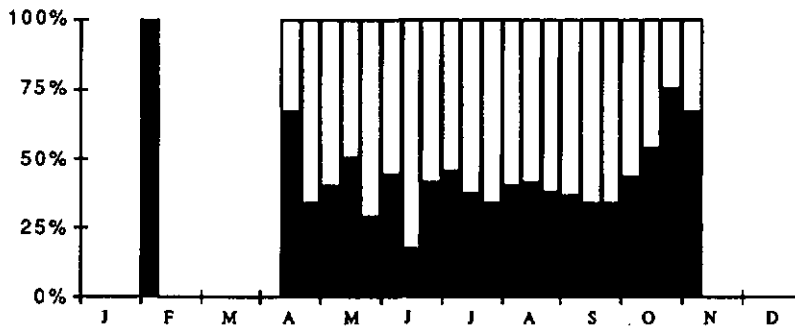

Fig. 2.1. Comparison of the number of species, collected with: ■ - light traps and □ - entomological nets during the season (1982-1992) (J-D - months).

Merike plates (yellow dishes 21 cm in diameter and 9 cm high, filled with fixing liquids) and yellow tables with sticky covering were not effective. The material obtained by these methods was not suitable for museum collections, and determination of this material was also more complicated, because the wings, legs and antennae of the insects were glued together. Also, many insects on the yellow tables with sticky covering were damaged by birds.

All insects caught with a net and light were killed with diethyl-ether and with chloroform. The biggest insects were sometimes killed by dissolved nicotine: a drop of the liquid from boiled cigarettes was injected into the insect's body with a small needle.

Special investigations were carried out to estimate the percentage of the total number of insects flying in an area that are caught with by entomological net. Insects were collected in a pine forest (*Pinetum myrtillo-oxolidosum*) in June 1989. During 1 hour, we collected about 66% of the total number of crane flies flying in a given place (65.82.6%). The same investigations in the floodland alder grove (*Alnetum fluviole urticosum*) in September of the same year gave nearly the same proportion of flying species: 62.04.8% of the total number of species was found in 1 hour.

Investigations were carried out in the Varena district in July 1989, among the shrubs and grassy vegetation of a riverbank. This is the type of environment where the crane flies are always most numerous, because these conditions suit them best. About 53% of the active insects were found in one hour, 73% in two hours, 89% in three and 96% in four hours of collecting. The dime needed to catch the remaining 4% of the species then increases. It is practically impossible to catch all the species flying at one time in a given territory. However, it is possible to discover all the abundant species, that is, those which have the greatest influence on the ecosystems in one hour's collection (fig. 2.2) (nearly the same data was obtained in the same place in 1990).

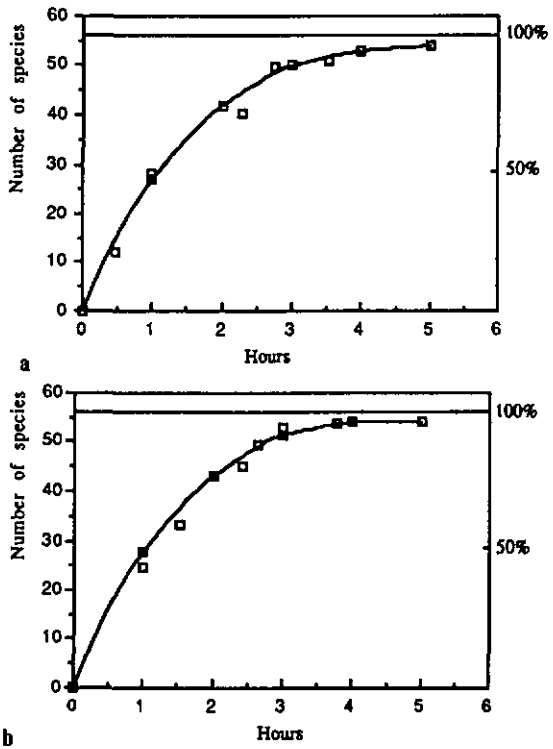

Fig. 2.2. Dependence of the increase of new species upon collecting time (entomological net): a) in July, 1989 (Varena district, the bank of the river Gruda), b) in July, 1990 (the same place).

The increase in number of species during the first hour is almost linear (fig. 2.2). This was confirmed during shorter hunting sessions of 5 min. each, for a total of 30 minutes (fig. 2.3). In different biotopes the increase remains linear, but the slope of the curve varies. This can be explained by the difference in number of active species in the two biotopes. If one replaces the absolute number of species by their corresponding percentages of the total, the two diagrams become nearly identical. In this way it is possible to estimate the entomofauna in a given place, and approach the abundance of local species even during short collecting trips (one hour or even 15-30 min.). Since 55% of the active species can be collected in one hour and the number of species caught is proportional to the time spent hunting, one can conclude that 27% can be collected in half an hour and 13% in 15 minutes.

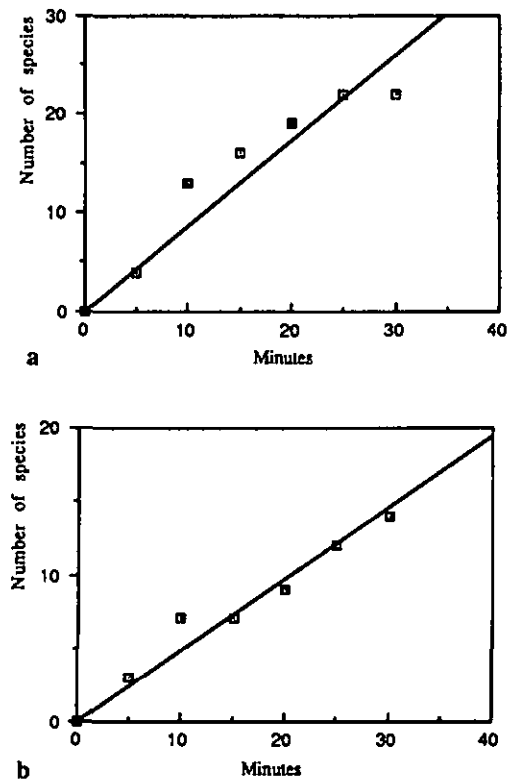

Fig. 2.3. Increase with time of the number of species collected (entomological net): a) in June 1988 (Varena district, the bank of the river Gruda), b) the same date and district - *Alnetum fluviale urticosum*.

That is, by multiplying the number collected by 4 or 8, one can approximately calculate the total number of active species, or more exactly of active species in that place at that particular time. Prolonged collecting periods are necessary for precise and exact investigations, but shorter ones may be used in bad weather or other exceptional cases. However, when working in nature, the data obtained is usually scattered and these short periods of collecting might give results far from reality if used in further calculations and comparative works.

When insects are collected in the same place over a longer period of time (about 3 months) (fig. 2.4), the number of species found increases constantly, since new ones appear during this time. In this case results can be achieved only after a total of 20 hours of collecting.

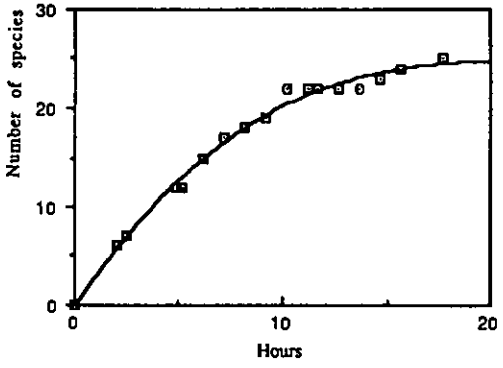

Fig. 2.4. Dependence of the increase of new species upon collecting time (light traps), when insects are collected in 1-2 hours intervals during a long period (Vilnius district, Nemencine, pine forest, from July to September, 1990).

2.2. METHODS OF INVESTIGATIONS INTO SEASONAL AND CIRCADIAN ACTIVITY

Seasonal activities of separate species were examined with the purpose of obtaining a global view of the seasonal activities of all Lithuanian crane flies. When the data was as complete as possible, it was assembled and compared.

The data collected in different biotopes were pieced together so as to draw a complete picture of the environment of a given area. Collecting trips were planned so as to obtain information about the seasonal activity of separate species and their complexes in the biotopes chosen. These trips lasted from 1 to 5 days depending on weather conditions, and the results gathered were averaged. To determine the seasonal activity, the collecting trips lasted at least one hour. The results of the longer trips were used to evaluate the average data of one hour periods.

The collecting trips mostly took place during the day, especially in the evening just before and during sunset when the maximum activity was observed, so as to obtain the best possible image of the seasonal activity of these insects.

Circadian activity was mainly studied so as to learn how collecting at different times of day may influence the whole picture of seasonal activity. It was also necessary to pinpoint which species are mainly active during the day and which in the evening. For these studies, material was collected during one hour investigations and then processed mathematically.

All these investigations were carried out from 1982 to 1993.

2.3. TREATMENT OF THE RESULTS. SPECIFICITIES OF INSECT DETERMINATION. MATHEMATICAL ANALYSIS OF THE DATA

Generally accepted entomological methods were used for the treatment of collected material. Dried and pinned material was mostly used and after determination it was labelled. When necessary, preparations of male and sometimes female genitalia were made in the following way: the end of a specimen's abdomen was cut with small scissors and after this it was boiled in 10% KOH for about 5 or 10 min. depending on the size, or was soaked for a longer period (from 5 to 24 hours - also depending on the specimen's size) without boiling. After that, the genitalia were spread on a small plate, washed with distilled water and placed for a very short period in acetic acid to neutralize the KOH. After this, the material was determined and, when necessary, drawn and photographed. After determination, the genitalia were kept in small tubes on the same pin, either in a glucose solution with a small amount of glycerine, or in glycerine only.

Part of the material collected was kept in 70° alcohol.

The material identified was compared with the specimens from the Zoological Institute of the St. Petersburg Museum and from the Zoological Museum of the University of Riga.

The information about the abundance of species, their active periods, biology, distribution and other data was filed in the systematical card index. The greatest part of the material collected is kept in the Zoological Museum of the University of Vilnius. Some of the specimens are in the Kaunas Zoological Museum. Part of the Trichoceridae insects were given to the Zoological Museum of the Krakow Institute of Ecology and Animal Evolution.

The following method, was used. It gives a more precise description of the type of activity of every species, as well as their degree of abundance and sex ratio in percent: the total number of captures of a given species is divided by the number of collectings when thia species was caught:

$$G=\frac{n}{k},$$

where: G - the grouping of insects,

n - the number of insects,

k - the number of collectings where n>0.

Cluster analysis of the biotopes was performed to obtain dendrograms of similarity (chapter 7.1). The cluster analysis and coefficients of correlation were calculated according to J. Davis (1990).

When dendrograms were drawn, they were analyzed statistically. The statistically reliable divergence between the different branches was calculated by:

$$r'_{\alpha=0.05} = \pm \left(\frac{-\sqrt{N} + \sqrt{N+4t^2}}{2t} \right),$$

where $r'_{\alpha=0.05}$ are the limits of reliability when the level of significance is 0.05 (α=0.05),

N - number of biotopes,

t - student's test.

First of all, the divergence of all 45 biotopes was evaluated and statistically reliable groups were formed. This was repeated with each group and subgroups were formed. These evaluations were continued until the smallest statistically reliable groups were reached.

This analysis of biotopes was made for each family separately, because their biology and ecological requirements are different.

3. NATURAL HISTORY OF THE REGION INVESTIGATED

The species composition of a region, the biology and ecology and distribution of separate species as well as their abundance are all closely connected with the natural history of the region these species populate.

The Lithuanian Republic lies to the east of the Baltic sea, between 53°54' and 56°27' latitude North and 20°56' to 26°51' longitude East. In the north, Lithuania touches the Latvian Republic, in the east and south the Bielorussian Republic, in the Southwest Poland and the region of Kaliningrad (Russia).

The topography of Lithuania is not very complex. Hills and lowlands parallel to the meridians are typical. The average altitude is 99 m. The highest hill is Juozapyne (altitude 292 m) on the highland of Medininkai.

3.1. CLIMATIC CONDITIONS

The territory of Lithuania is situated in the intermediate zone between the oceanic climate of western Europe and the continental climate of eastern Europe (Styra 1955). Changing wet air masses from the Atlantic Ocean and of dry continental air from Eurasia pass over its territory. The cold Arctic weather masses and the damp and warm Mediterranean ones come much more seldom. The most characteristic features of the Lithuanian climate, and of the whole South Baltic coast as well, are its rather warm winters with heavy thaws, its chilly springs, moderately warm summers and warm and rainy autumns. The instability of the climate is caused by the alternation of cyclones bringing rainy weather and clouds and anticyclones bringing dry weather.

Table 3.1., drawn from works published by Styra, Grabliauskas and Buzas in 1958 and by Kadziulyte in 1977, proves that polar continental and polar sea oceanic masses are most frequent. The oceanic climate of the Republic depends on the polar oceanic air masses from the Atlantic Ocean.

Table 3.1. Frequence of different air masses in Lithuania (in %)

	The names of air masses			
Season	arctic	polar continental	polar oceanic	tropical
Winter	20	38	41	1
Spring	22	42	35	1
Summer	10	38	49	3
Autumn	21	41	36	2
During the year	18	40	40	2

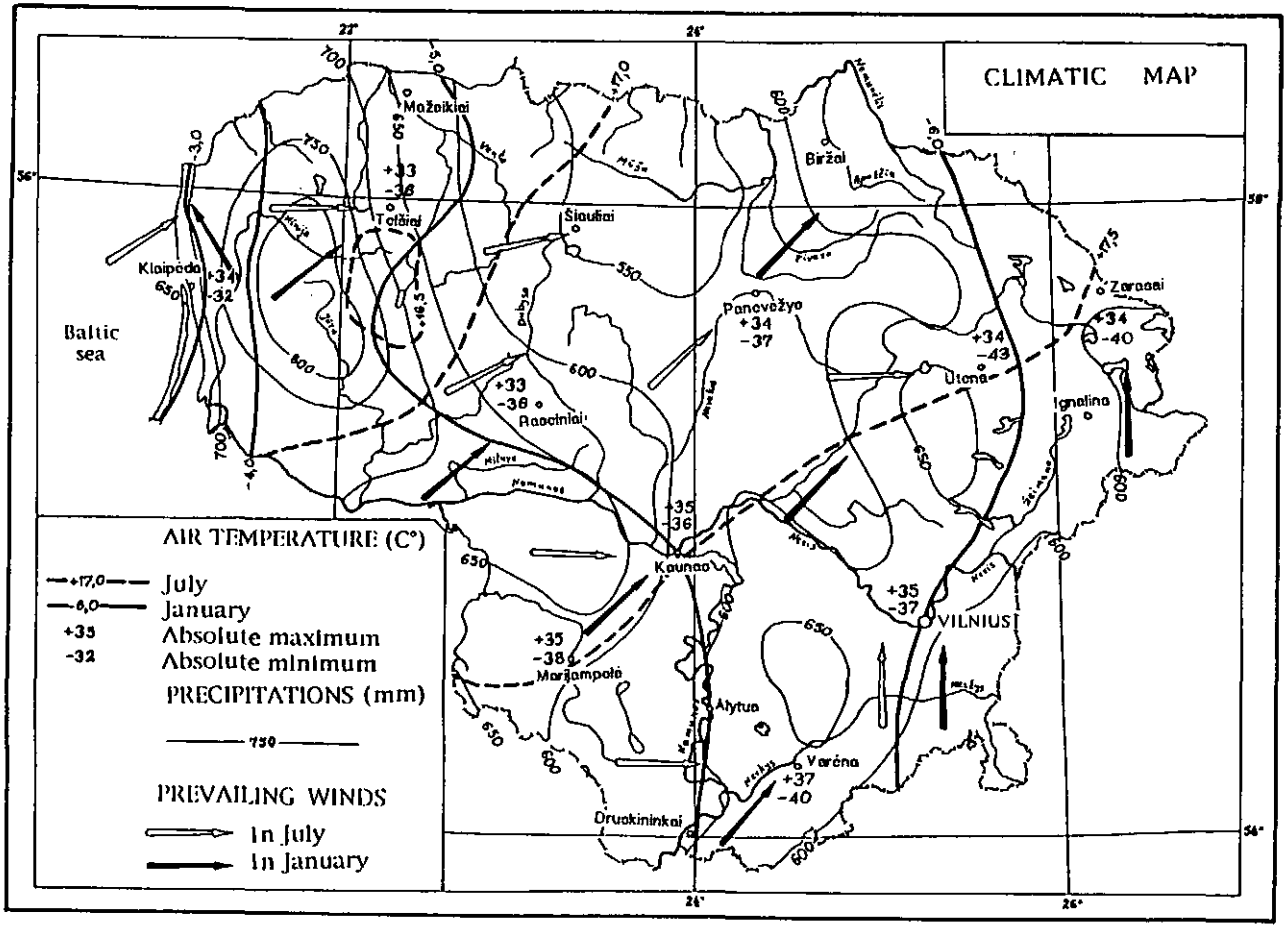

Fig. 3.1. Climatic map of Lithuania

The Baltic Sea interferes in the transition of the oceanic weather from western Europe to the continental climate of Russia. The average annual weather temperature in Lithuania is 6°C, with fluctuations of 1.6°C. The average temperature is 6.5°C on the sea coast and +5.5°C in the eastern part of the Republic (fig. 3.1). The total sum of degrees of the average daily temperatures during the period when the temperature is higher than 10°C is between 1950 and 2300°C, but it varies in individual years from 1400 to 2750°C (Dorfman 1968). Compared with the north-eastern part of the Republic, the total sum of temperatures in the southern part is higher. The coldest month is January, when the average temperature fluctuates between -3°C in the western part and -6°C in the eastern part. The lowest temperature can reach -35-40°C (even -42°C), but such low temperatures are quite rare and do not occur every year. The warmest month is July when the average temperature is about +17°C.

The annual sun radiation is 80-90 kcal per cm^2. South-western winds prevail. The annual average wind speed varies from 2.9 m/s (in Druskininkai) to 5.6 m/s (in Nida).

In Lithuania it rains nearly every second day. The average yearly amount varies between 550 and 700 mm. The further from the sea (from the west to the east), the less rain: in Palanga 700 mm, in Kaunas 612 mm, in Vilnius 559 mm (Dorfman 1968). In Lithuania it rains most during the warmest time of the year, especially in August. In Klaipeda, about 11% of the yearly norm falls during that month, in Kaunas 14% and in Vilnius 16%.

The average amount of relative air humidity is maximal between September and January (at 1 p.m.) - i. e. during the coldest period. In May, the relative air humidity is between 51-63%, and in summer, in individual years, it can even fall to 20% (Dorfman 1968).

Snow makes up 8 to 14% of the annual rainfall. Snow falls earlier in the eastern part of the Republic, around the 15th of November, and later in the south-western parts, in the third decade of November. On the sea coast the number of days with snow-covering is about 80 and in the eastern parts about 110. On average, the snow totally thaws on the biggest part of the territory between the 15th and the 20th of March and around the 25th of March in the furthest north-eastern corner. The geomorphology of the land also has a great influence on the Lithuanian climate (Styra 1955).

The vegetation period (when the temperature is higher than 0°C) becomes slightly shorter as one moves from west to east. If in Klaipeda for example it lasts about 261 day, it averages 234-249 days in the eastern districts. The shortest period without frosts (145 days) is registered in Varena and it reaches 185 days near the sea coast (Styra, Grabliauskas and Buzas 1958).

3.2. SOIL CONDITIONS

Very different types of top-soil are found in Lithuania. They were formed under the influence of climate, maternal rocks, relief, vegetation and human activity. The greatest part of the top-soil was formed on the remnants of the last Nemunas ice formation. There are much older deeply-alkaline remnants of the Medininkai ice formation distributed in the south-eastern part. The origin of the maternal rocks is very varied: morainic (60%), fluvio-glacial (23%), limno-glacial, alluvial, and

organogenic (Vaicys 1972; Forest monitoring in Lithuania 1991; Garmus 1958). Soil-forming rocks differ in their physical and chemical characteristics and determine the diversity of soils. The absolute age of the Lithuanian soils reaches 8 to 10'000 years. Younger soils occur on alluvial and eolian rocks.

Sod-podzol soils formed on smaller highlands prevail in Lithuania (45%). Sod-gley soil containing carbonate were formed in the plains of the middle lowlands (18%) and sod-calcareous soils (8%) occur in the drier plains. Podzol-boggy soils constitute 17% of the territory, while podzol-pine forest soils make up only 4% (they are found in the plains of south-eastern Lithuania).

3.3. FORESTS

The territory of Lithuania is in the zone of mixed forests (coniferous - broad-leafed). Paleogeobotanic research has shown that naturally heat-loving trees, such as beech, sequoia, yew-tree, magnolia and edible chestnut, used to grow there at the beginning of the Neocene (Stancevicius 1965).

In the second half of the Neogene, the top-soil gradually changed as a result of the colder climate. Moreover, when the glacial period started, it destroyed the vegetation which used to grow there. A completely sub-arctic climate with tundra vegetation appeared when the Valdaiski glacier, which covered nearly the whole of Lithuania, retreated. The dwarf birch (*Betula nana* L.), which is found now only in swampy places is one of the representatives of this period. After the gradual rise in temperature in the Subarctic and Boreal periods, first birch and then pine and alder forests developed on the Baltic coast. Forest-steppe vegetation prevailed during the Boreal period. The boreal climate was replaced by a warmer and damp Atlantic climate, where the broadleaf trees lime, oak and elm prevailed. Firs began to dominate in Lithuania during the Sub-boreal period, when the climate became warmer and drier. In the last 200 years, the climate of Lithuania has gradually changed into an oceanic one, with warmer winters and lower summer temperatures, along with increasing rainfall (Styra, Slezevicius, Kausyla 1949).

In the remote past, forests covered almost the whole of Lithuania. From the 15th century on, the area of forests began to decrease, because of the development of agriculture, industry and building. The average forest coverage of the three former provinces, Kaunas, Vilnius and Gardinas, was 58% in 1666, but at the beginning of the 20th century it had fallen to 30% (Stancevicius 1965).

Fig. 3.2. Species composition of forests in different districts: 1 - coniferous, 2 - deciduous hardwoods, 3 - deciduous softwoods.

The total forest coverage of Lithuania today (data of January 1, 1988) is 27.9%, an area of 21 452 km^2. It is divided into various regions. The biggest forests are Kazlu-Rudos (530 km^2), Jurbarko-Smalininku (280 km^2), Rudninku (600 km^2), Varenos-Druskininku (106 km^2) etc. Forests are mostly concentrated on the poor sandy soils in the southeast and southwest. Only Birzu Giria is situated in the northern part of the Republic, on the lowlands of the basic moraine with rich loamy soil. Pine and fir-trees prevail in the forests (fig. 6.2). Pine forests prevail in the eastern, south-eastern and western parts of Lithuania (Dudelis 1973; Jankauskas 1962) and fir-tree forests in the south-western and north-eastern part of Lower Lithuania: the area of Zagare, the basin of the river Susve and in Birzu Giria (Kairiukstis 1962). The prevailing deciduous forests are birch forests (Table 3.2).

The most widespread forest types (% of the total forest area) are: *vaccinium-myrtillosum* - 23.0, *myrtillosum* - 15.1, *aegopodiosum* - 14.1 and *oxalidosum* - 14.0.

Table 3.2. The areas occupied by different species of trees in Lithuanian forests (January 1, 1988) (according to Verbyla, 1991)

Species of trees	Totally in Lithuania	
	in sq. km	in %
Pine (*Pinus sylvestris* L.)	6 942	38.08
Spruce (*Picea abies* L.)	3 782	20.74
Larch (*Larix* Mill.)	6	0.03
Oak (*Quercus robur* L.)	353	1.94
Ash (*Fraxinus excelsior* L.)	391	2.14
Other hard deciduous trees	34	0.19
Birch (*Betula* L.)	3 845	21.09
Asp (*Populus tremula* L.)	578	3.17
Black alder (*Alnus glutinosa* /L./)	1 053	5.78
White alder (*Alnus incana* /L./)	1 186	6.51
Other soft deciduous trees	61	0.33
Totally	18 231	100.00

3.4. TYPOLOGY OF THE BIOTOPES

Various biotopes have been regularly studied. The more common ones fall into the following groups (the typology of forests is given according to "Forestry" 1979 and Verbyla 1991):

1) Forests:

1. Pine forests (*Pinetum*):
   a) with lichens (*P. cladoniosum*),
   b) with red bilberry (*P. vacciniosum*),
   c) with red bilberry and bilberry (*P. vaccinio-myrtillosum*),
   d) with bilberry (*P. myrtillosum*),
   e) with wood sorrel (*P. oxalidosum*),
   f) with bilberry and wood sorrel (*P. myrtillo-oxalidosum*),
   g) with violet and wood sorrel (*P. hepatico-oxalidosum*);
2. Spruce forests (*Piceetum*):
   a) with bilberry (*P. myrtillosum*),
   b) with wood sorrel (*P. oxalidosum*);
3. Oak forests and groves (*Quercetum*);
4. Ash forests and groves (*Fraxinetum*);
5. Birch forests and groves (*Betuletum*):

a) with wood sorrel (*B. oxalidosum*),

b) other types of birch forests;

6. Black alder (*Alnus glutinoso fL.f*) groves (*Alnetum*):

a) with meadowsweet (*A. filipendulosum*),

b) with nettle (*A. urticosum*),

c) black-alder groves in flooded lands (*A. fluviale urticosum*),

d) black-alder groves with springs;

7. White alder (*Alnus incana fL.f*) groves (*Incanetum*):

a) with dwarf elder (*I. aegopodiosum*),

b) other types of *Incanetum* forests and groves;

8. Wood-felled areas in coniferous forests.

2) Shrubs:

1. Comparatively dry and growing far away from open water,
2. Swampy.

3) Riverbanks:

1. Covered with shrubs and trees,
2. Open,
3. Swampy.

4) Lakeshores:

1. Covered with shrubs and trees,
2. Open,
3. Swampy.

5) Land improvement canals.

6) Peat bogs.

7) Low-lying marshy lands.

8) Upland moors.

9) Meadows:

1. Cultivated meadows (later on, for the sake of convenience simply referred to as meadows, because no natural meadows exist in Lithuania).
2. Meadows in flooded lands in the upper reaches of the Nemunas river,
3. Meadows near (or among) forests.

10) Karst caves.

11) Sandy dunes on the sea coast.

The next group consists of areas that have been modified by man:

1. Gardens, orchards,
2. Crop fields,
3. Parks,
4. Territories of big cities (Kaunas, Klaipeda, Vilnius),

5. Gravel pits.

When we began our work in 1982, we divided the biotopes into much smaller classes. However, an analysis of the results obtained then showed that since most crane flies did not feed on living plants but on their dead and rotten remnants, such a detailed division was unnecessary. Very ofteo the main limiting factor affecting the distribution range of a species is moisture and not some particular species of plants. As a result, after a detailed analysis of the fauna of various biotopes, we sometimes collected them into larger groups, either because there were no differences between the fauna at all, or these were too slight to be taken into account.

3.5. ZOOGEOGRAPHICAL DISTRICTS

Lithuania belongs to the European Forest zone, a subzone of mixed forests. The territory of the Republic can be divided into the Sea-coast, Baltic and South-Eastern Lithuanian Provinces (Gvozdeckiy N. I. 1967; Kazlauskas 1984 - fig. 3.3).

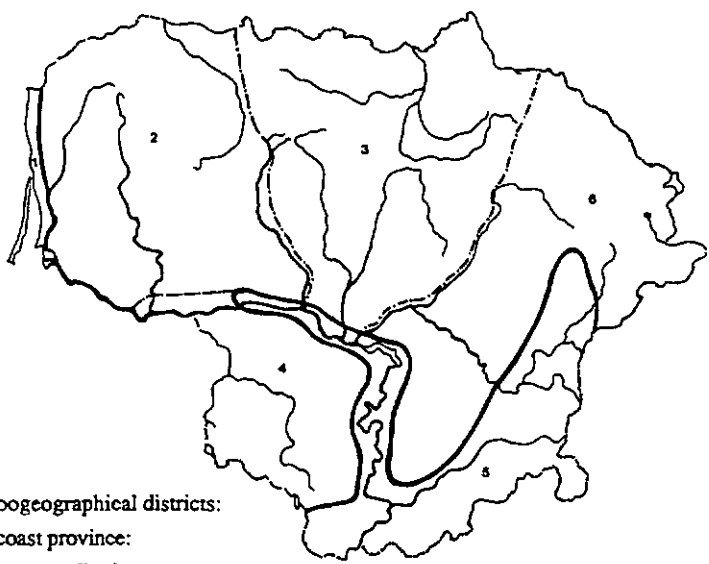

Fig. 3.3. Zoogeographical districts:

Sea-coast province:

1. Sea-coast district,

Baltic province:

2. Lower Lithuanian district,
3. Mid-Lithuanian district,
4. Suduva district,
6. Upper Lithuanian district,

South-Eastern Lithuanian province:

5. Hills of South-Eastern Lithuania.

The Sea-coast Province is characterized by sandy dunes partly covered with pines.

The Baltic Province is the biggest one and comprises most of the zoogeographical districts of the Republic. Broadleaf deciduous forests prevail in the southern Lithuania and especially in the central Lithuanian plain. Spruce forests with broadleaf trees are mostly distributed in Lower Lithuania. Many taiga floristic elements are found in these forests. The sub-district of Lower Lithuania extends over the hills. The biggest part of the Central Lithuanian Plain is characterized by a fertile loamy soil and is mostly covered with cultivated fields. Broadleaf deciduous forests, or the same mixed with spruce, prevail here. Pine woods are mostly concentrated in the eastern part. The central Lithuanian plain is divided into two districts: Suduva in the south-west, where many southern species of western Europe are found, and Central Lithuania with boreal species. Mixed broadleaf and spruce forests are common in the Upper Lithuanian hilly district. As for its fauna, this district is transitional between the partly steppe South-Eastern Lithuanian districts and the central-northern ones.

The province of South-Eastern Lithuania is mostly covered with pine forests growing on sandy soil. It is here that one finds the greatest number of southern species.

3.6. COLLECTING SITES

The material was collected in all zoogeographical districts of Lithuania. The greatest attention was paid to the margins of the Republic, especially south-western, southern, south-eastern, eastern and northern because central Lithuania is heavily farmed and fertile soils prevail.

Fig. 3.4. Administrative districts of Lithuania.

All collecting places were divided into groups, according both to their zoogeographical and their administrative distribution. The territory of Lithuania is divided into 44 administrative districts, each of which has its administrative centre (fig. 3.4).

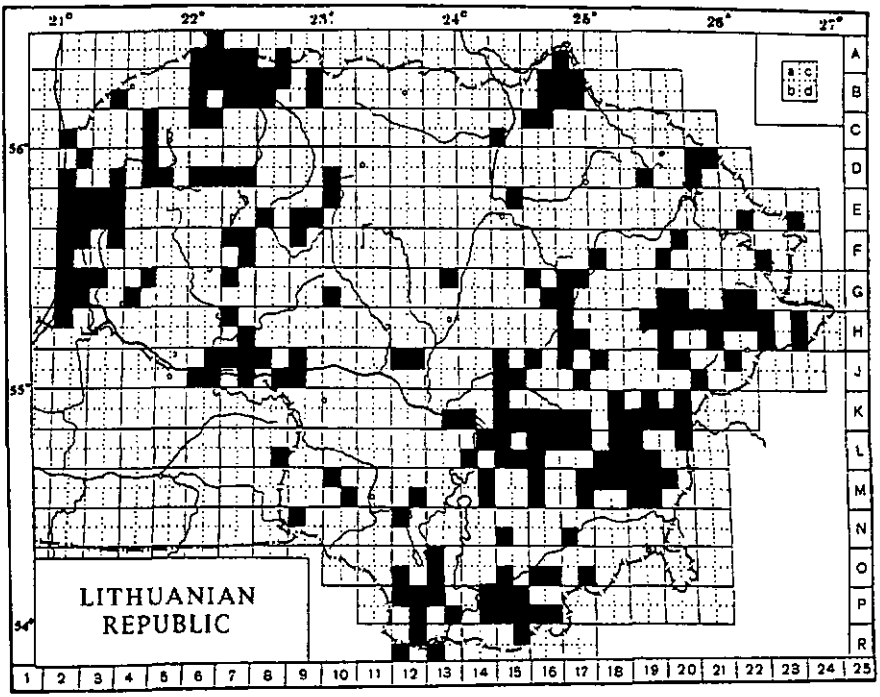

Fig. 3.5. Co-ordinates of the collecting sites.

4. CATALOGUE OF LITHUANIAN CRANE FLIES

All the species of the families Limoniidae, Tipulidae, Cylindrotomidae, Trichoceridae and Ptychopteridae that have been found in Lithuania are included. The following features are presented here: the distribution of these species in Lithuania, their flight periods, the total number of specimens collected, their sex ratio and its changes during the season, the number of occurrences, the ratio of all the specimens collected per number of occurrences, their distribution in the separate zoogeographical areas of Lithuania, an analysis of the collecting methods and a detailed biotopical analysis.

COMPOSITION OF THE CATALOGUE

List of species

All species of the families Limoniidae, Tipulidae, Cylindrotomidae, Trichoceridae and Ptychopteridae known in Lithuania are included here (Pakalniskis, Podenas 1992; Podenas 1986-1992; Valenta, Podenas 1985-1988). Species are arranged in systematical order according to the "Catalogue of Palaearctic Diptera" vol. 1 (1992).

Analysis of separate species

The following features are presented here: the abundance of the species, some brief characteristics of their distribution in Lithuania, the exact known flying period (the earliest and the latest dates when specimens of some species were caught are also presented here), the number of generations, a detailed biotopical analysis, places, the sites where the larvae develop (if they were found), the collecting methods and the sex ratio. Some interesting observations connected with the biology of certain species are given here, e.g.: feeding habits, parasites, predators, abnormal cases of copulation, etc.

The total distribution of the species and their synonymy is not given here, because it was presented in the "Catalogue of Palaearctic Diptera" vol. 1 (1992).

Synthetical card-index (appended)

The card-index presents the data graphically in a vivid manner and also allows us to show all the necessary features in detail. These include: the distribution of species, their flight periods, sex ratio and the changes throughout the season, their biotopical distribution, a comparison of the efficiency of different collecting methods. The exact number of specimens studied, the sex ratio, the number of occurrences and the ratio of all collected specimens / number of occurrences are presented here.

We used the following graphical signs and abbreviations for the presentation of our data:

In the maps of distribution:

- 1 specimen,
- 2-10 specimens,
- >10 specimens.

In the phenological graph:

abscissa axis: J-D - months,
ordinate axis: number of specimens;
- males,
- females.

Quantitative symbols for ZR (Zoogeographical Districts), C (a collecting method) and B (biotopes):

Symbols for ZR (abundance groups):

1	2	3	4	5	6	7	8	9	groups
0	1-2	3-4	5-8	9-16	17-32	33-64	65-128	>128	specimens

Symbols for C and B (percentage groups of abundance):

1	2	3	4	5	6	7	8	9	groups
0	<1	1-5	5-15	15-25	25-55	55-75	75-95	95-100	%

Abbreviations:

ZR - Zoogeographical Districts (the map is given in chapter 3.5):
SC - Sea Coast district,
LL - Lower Lithuanian district,

ML - Middle Lithuanian district,
S - Suduva district,
SE - Hills of the South-Eastern Lithuania,
UL - Upper Lithuanian district.

C - mode of collecting:
EN - by entomological net,
LT - by light trap,
u - unknown.

B* - biotopes (detailed classification in chapter 3.4):
Pc - *Pinetum cladoniosum*,
Pv - *P. vacciniosum*,
Pvm - *P. vaccinio-myrtillosum*,
Pm - *P. myrtillosum*,
Po - *P. oxalidosum*,
Pmo - *P. myrtillo-oxalidosum*,
Pho - *P. hepatico-oxalidosum*,
Sm - *Piceetum myrtillosum*,
So - *P. oxolidosum*,
Q - *Quercetum*,
F - *Fraxinetum*,
Bo - *Betuletum oxalidosum*,
B - other types of *Betuletum*,
Af - *Alnetum filipendulosum*,
Au - *A. urticosum*,
Afu - *A. fluviale-urticosum*,
As - *Alnetum* with springs,
Io - *Incanetum oxalidosum*,
Ia - *I. aegopodiosum*,
I - other types of *Incanetum*,
wfa - wood-felled area in coniferous forest,
S - shrubs (rather dry),
Ss - swampy shrubs,
Rv - riverbanks, covered with shrubs and trees,

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* The same abbreviations are also used for the figures in Chapter 7.1.

Ro - open riverbanks,

Rs - swampy riverbanks,

Spr - springs,

Lk - lakeshores, covered with shrubs and trees,

Lo - open lakeshores,

Ls - swampy lakeshores,

LIC - land improvement canals,

PB - peat bogs,

LM - low-lying marshy land,

UM - upland moors,

M - meadows,

MN - floodland meadows in the lower reaches of the river Nemunas,

MF - meadows near (or among) forests,

MS - meadows with shrubs or small trees,

G - gardens,

C - crop fields,

P - parks,

City - central parts of the cities (Kaunas, Klaipeda and Vilnius),

GP - gravel pits,

CC - karst caves,

SD - sandy dunes on the sea coast.

4.1. LIST OF SPECIES

Family L I M O N I I D A E

Subfamily PEDICIINAE

1.* *Ula bolitophila* Loew, 1869
2. *U. mollissima* Haliday, 1833
3. *U. sylvatica* (Meigen, 1818)
4. *Dicranota (Dicranota) bimaculata* (Schummel, 1829)
5. *D. (D.) guerini* Zetterstedt, 1838
6. *D. (Paradicranota) gracilipes* Wahlgren, 1905
7. *D. (P.) pavida* (Haliday, 1833)
8. *D. (P.) robusta* Lundström, 1912
9. *D. (P.) subtilis* Loew, 1871
10. *D. (Rhaphidolabis) exclusa* (Walker, 1848)
11. *Pedicia (Crunobia) straminea* (Meigen, 1838)
12. *P. (Pedicia) rivosa* (Linnaeus, 1758)
13. *Tricyphona (Tricyphona) immaculata* (Meigen, 1804)
14. *Tr. (Tr.) livida* Madarassy, 1881
15. *Tr. (Tr.) unicolor* (Schummel, 1829)

Subfamily HEXATOMINAE

16. *Paradelphomyia (Oxyrhiza) fuscula* (Loew, 1873)
17. *Austrolimnophila (Archilimnophila) unica* (Osten Sacken, 1869)
18. *A. (Austrolimnophila) ochracea* (Meigen, 1804)
19. *Epiphragma ocellare* (Linnaeus, 1761)
20. *Adelphomyia punctum* (Meigen, 1818)
21. *Eloeophila apicata* (Loew, 1871)
22. *E. maculata* (Meigen, 1804)
23. *E. submarmorata* (Verrall, 1887)
24. *E. trimaculata* (Zetterstedt, 1838)
25. *E. verralli* (Bergroth, 1912)
26. *Euphylidorea dispar* (Meigen, 1818)
27. *E. meigeni* (Verrall, 1887)
28. *E. phaeostigma* (Schummel, 1829)
29. *Eutania barbipes* (Meigen, 1804)
30. *Idioptera linnei* Oosterbroek, 1992
31. *I. macropteryx* (Tjeder, 1955)
32. *I. pulchella* (Meigen, 1830)
33. *Limnophila (Limnophila) picripennis* (Meigen, 1818)
34. *L. (L.) schranki* Oosterbroek, 1992
35. *Neolimnomyia (Brachylimnophila) nemoralis* (Meigen, 1818)
36. *N. (Neolimnomyia) batava* (Edwards, 1938)
37. *N. (N.) filata* (Walker, 1856)
38. *Phylidorea (Macrolabina) nigronatata* (Siebke, 1870)
39. *Ph. (Paraphylidorea) fulvonervosa* (Schummel, 1829)
40. *Ph. (Phylidorea) abdominalis* (Staeger, 1840)
41. *Ph. (Ph.) bicolor* (Meigen, 1804)
42. *Ph. (Ph.) ferruginea* (Meigen, 1818)
43. *Ph. (Ph.) longicornis* (Schummel, 1829)

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* The same numbers were used in this description of species and in the synthetical card-index.

44 *Ph. (Ph.) nervosa* (Schummel, 1829)
45. *Ph. (Ph.) squalens* (Zetterstedt, 1838)
46. *Pilaria discicollis* (Meigen, 1818)
47. *P. fuscipennis* (Meigen, 1818)
48. *P. meridiana* (Staeger, 1840)
49. *P. nigropunctata* (Agrell, 1945)
50. *P. scutellata* (Staeger, 1840)
51. *Pseudolimnaphila lucorum* (Meigen, 1818)
52. *Ps. sepium* (Verrall, 1886)
53. *Hexatoma (Eriocera) cimicoides* (Scopoli, 1763)
54. *H. (Hexatama) vittata* (Meigen, 1830)

Subfamily ERIOPTERINAE

55. *Crypteria limnophiloides* Bergroth, 1913
56. *Neolimnophila carteri* (Tonnoir, 1921)
57. *Arctocanopa melampodia* (Loew, 1873)
58. *A. zonata* (Zetterstedt, 1851)
59. *Erioptera (Erioptera) divisa* (Walker, 1848)
60. *E. (E.) flavata* (Westhoff, 1882)
61. *E. (E.) fuscipennis* Meigen, 1818
62. *E. (E.) griseipennis* Meigen, 1838
63. *E. (E.) limbata* Loew, 1873
64. *E. (E.) lutea* Meigen, 1804
65. *E. (E.) sordida* Zetterstedt, 1838
66. *E. (E.) squalida* Loew, 1871
67. *E. (Mesocyphona) fossarum* (Loew, 1873)
68. *Gonempeda flava* (Schummel, 1829)
69. *Scleroprocta pentagonalis* (Loew, 1873)
70. *S. sororcula* (Zetterstedt, 1851)
71. *Symplecta (Psilaconapa) stictica* (Meigen, 1818)
72. *S. (Symplecta) hybrida* (Meigen, 1804)
73. *S. (Trimicra) pilipes* (Fabricius, 1787)
74. *Cheilotrichia (Cheilotrichia) imbuta* (Meigen, 1818)
75. *Ch. (Empeda) affinis* (Lackschewitz, 1927)
76. *Ch. (E.) cinerascens* (Meigen, 1804)
77. *Ch. (E.) neglecta* (Lackschewitz, 1927)
78. *Ch. (E.) staryi* Mendl, 1973
79. *Erioconopa diuturna* (Walker, 1848)
80. *E. trivialis* (Meigen, 1818)
81. *Hoplolabis (Parilisia) areolata* (Siebke, 1872)
82. *H. (P.) subalpina* (Bangerter, 1947)
83. *H. (P.) vicina* (Tonnoir, 1920)
84. *Ilisia maculata* (Meigen, 1804)
85. *Molophilus (Molophilus) appendiculatus* (Staeger, 1840)
86. *M. (M.) ater* (Meigen, 1804)
87. *M. (M.) bifidus* Goetghebuer, 1920
88. *M. (M.) bihamatus* De Meijere, 1918
89. *M. (M.) cinereifrons* De Meijere, 1920
90. *M. (M.) corniger* De Meijere, 1920
91. *M. (M.) crassipygus* De Meijere, 1918
92. *M. (M.) griseus* (Meigen, 1804)
93. *M. (M.) maurus* Lackschewitz, 1925
94. *M. (M.) medius* De Meijere, 1918
95. *M. (M.) obscurus* (Meigen, 1818)
96. *M. (M.) ochraceus* (Meigen, 1818)
97. *M. (M.) pleuralis* De Meijere, 1920
98.*M. (M.) propinquus* (Egger, 1863)

99. *M. (M.) pullus* Lackschewitz, 1927
100. *M. (M.) serpentiger* Edwards, 1938
101. *Ormosia (Ormosia) aciculata* Edwards, 1921
102. *O. (O.) brevinervis* (Lundström, 1907)
103. *O. (O.) clavata* (Tonnoir, 1920)
104. *O. (O.) depilata* Edwards, 1938
105. *O. (O.) hederae* (Curtis, 1835)
106. *O. (O.) lineata* (Meigen, 1804)
107. *O. (O.) nodulosa* (Macquart, 1826)
108. *O. (O.) pseudosimilis* (Lundström, 1912)
109. *O. (O.) ruficauda* (Zetterstedt, 1838)
110. *O. (O.) staegeriana* Alexander, 1953
111. *Rhypholophus haemorrhoidalis* (Zetterstedt, 1838)
112. *Rh. varius* (Meigen, 1818)
113. *Tasiocera (Dasymolaphilus) murina* (Meigen, 1818)
114. *Dicranoptycha (Dicranoptycha) cinerascens* (Meigen, 1818)
115. *D. (D.) fuscescens* (Schummel, 1829)
116. *D. (D.) livescens* Loew, 1871
117. *Ellipteroides (Ellipteroides) lateralis* (Macquart, 1835)
118. *E. (Protogonomyia) alboscutellatus* (Von Roser, 1840)
119. *Gnophomyia viridipennis* (Gimmerthal, 1847)
120. *Gonomyia (Gonomyia) bifida* Tonnoir, 1920
121. *G. (G.) lucidula* De Meijere, 1920
122. *G. (G.) recta* Tonnoir, 1920
123. *G. (G.) simplex* Tonnoir, 1920
124. *G. (G.) tenella* (Meigen, 1818)
125. *Lipsothrix ecucullata* Edwards, 1938
126. *L. errans* (Walker, 1848)
127. *L. remota* (Walker, 1848)
128. *Rhabdomastix (Sacandaga) laeta* (Loew, 1873)

Subfamily LIMONIINAE

129. *Elephantomyia (Elephantomyia) edwardsi* Lackschewitz, 1932
130. *E. (E.) krivosheinae* Savchenko, 1976
131. *Helius flavus* (Walker, 1856)
132. *H. longirostris* (Meigen, 1818)
133. *H. pallirostris* Edwards, 1921
134. *Antocha (Antocha) vitripennis* (Meigen, 1830)
135. *Orimarga attenuata* (Walker, 1848)
136. *Achyrolimonia decemmaculata* (Loew, 1873)
137. *Atypophthalmus inustus* (Meigen, 1818)
138. *D. (Dicranomyia) aperta* Wahlgren, 1904
139. *D. (D.) autumnalis* (Staeger, 1840)
140. *D. (D.) chorea* (Meigen, 1818)
141. *D. (D.) didyma* (Meigen, 1804)
142. *D. (D.) distendens* Lundström, 1912
143. *D. (D.) frontalis* (Staeger, 1840)
144. *D. (D.) halterata* Osten Sacken, 1869
145. *D. (D.) handlirschi* Lackschewitz, 1928
146. *D. (D.) longipennis* (Schummel, 1829)
147. *D. (D.) mitis* (Meigen, 1830)
148. *D. (D.) modesta* (Meigen, 1818)
149. *D. (D.) omissinervis* De Meijere, 1918
150. *D. (D.) patens* Lundström, 1907
151. *D. (D.) ventralis* (Schummel, 1829)
152. *D. (D.) zernyi* Lackschewitz, 1928
153. *D. (Glochino) tristis* (Schummel, 1829)

154. *D. (Idiopyga) halterella* Edwards, 1921
155. *D. (I.) magnicauda* Lundström, 1912
156. *D. (I.) murina* (Zetterstedt, 1851)
157. *D. (I.) nigristigma* Nielsen, 1919
158. *D. (I.) stigmatica* (Meigen, 1830)
159. *D. (Melanolimonia) mario* (Fabricius, 1787)
160. *D. (M.) occidua* Edwards, 1926
161. *D. (M.) rufiventris* (Strobl, 1901)
162. *D. (Numantia) fusca* (Meigen, 1804)
163. *Discobola annulata* (Linnaeus, 1758)
164. *D. caesarea* (Osten Sacken, 1854)
165. *D. parvispinula* (Alexander, 1947)
166. *Libnotes (Afrolimonia) ladogensis* (Lackschewitz, 1940)
167. *Limania albifrons* (Meigen, 1818)
168. *L. flavipes* (Fabricius, 1787)
169. *L. macrostigma* (Schummel, 1829)
170. *L. nigropunctata* (Schummel, 1829)
171. *L. nubeculosa* Meigen, 1804
172. *L. phragmitidis* (Schrank, 1781)
173. *L. stigma* (Meigen, 1818)
174. *L. sylvicola* (Schummel, 1829)
175. *L. trivittata* (Schummel, 1829)
176. *Metalimnobia bifasciata* (Schrank, 1781)
177. *M. quadrimaculata* (Linnaeus, 1761)
178. *M. quadrinotata* (Meigen, 1818)
179. *Neolimonia dumetorum* (Meigen, 1804)
180. *Rhipidia (Rhipidia) maculata* Meigen, 1818
181. *Rh. (Rh.) uniseriata* Schiner, 1864

Family TIPULIDAE

Subfamily DOLICHOPEZINAE

182. *Dolichopeza (Dolichopeza) albipes* (Ström, 1768)

Subfamily TIPULINAE

183. *Nephrotoma aculeata* (Loew, 1871)
184. *N. analis* (Schummel, 1833)
185. *N. appendiculata* (Pierre, 1919)
186. *N. cornicina* (Linnaeus, 1758)
187. *N. crocata* (Linnaeus, 1758)
188. *N. dorsalis* (Fabricius, 1782)
189. *N. flavescens* (Linnaeus, 1758)
190. *N. lamellata* (Riedel, 1910)
191. *N. lunulicornis* (Schummel, 1833)
192. *N. pratensis* (Linnaeus, 1758)
193. *N. quadrifaria* (Meigen, 1804)
194. *N. quadristriata* (Schummel, 1833)
195. *N. scalaris* (Meigen, 1818)
196. *N. scurra* (Meigen, 1818)
197. *N. submaculosa* Edwards, 1928
198. *N. tenuipes* (Riedel, 1910)
199. *Nigrotipula nigra* (Linnaeus, 1758)
200. *Prionocera pubescens* Loew, 1844
201. *P. subserricornis* (Zetterstedt, 1851)
202. *P. turcica* (Fabricius, 1787)
203. *Tipula (Acutipula) fulvipennis* De Geer, 1776

204. *T. (A.) luna* Westhoff, 1879
205. *T. (A.) maxima* Poda, 1761
206. *T. (A.) tenuicornis* Schummel, 1833
207. *T. (Beringotipula) unca* Wiedemann, 1817
208. *T. (Dendrotipula) flavolineata* Meigen, 1804
209. *T. (Lindnerina) bistilata* Lundström, 1907
210. *T. (Lunatipula) affinis* Schummel, 1833
211. *T. (L.) fascipennis* Meigen, 1818
212. *T. (L.) humilis* Staeger, 1840
213. *T. (L.) laetabilis* Zetterstedt, 1838
214. *T. (L.) limitata* Schummel, 1833
215. *T. (L.) livida* van der Wulp, 1858
216. *T. (L.) lunata* Linnaeus, 1758
217. *T. (L.) peliostigma* Schummel, 1833
218. *T. (L.) selene* Meigen, 1830
219. *T. (L.) vernalis* Meigen, 1804
220. *T. (Odonatisca) nodicornis* Meigen, 1818
221. *T. (Platytipula) autumnalis* Loew, 1864
222. *T. (Pl.) luteipennis* Meigen, 1830
223. *T. (Pl.) melanoceros* Schummel, 1833
224. *T. (Pterelachisus) irrorata* Macquart, 1826
225. *T. (Pt.) jutlandica* Nielsen, 1947
226. *T. (Pt.) luridorostris* Schummel, 1833
227. *T. (Pt.) mutila* Wahlgren, 1905
228. *T. (Pt.) pabulina* Meigen, 1818
229. *T. (Pt.) pauli* Mannheims, 1964
230. *T. (Pt.) pseudoirrorata* Goetghebuer, 1921
231. *T. (Pt.) pseudovariipennis* Czizek, 1912
232. *T. (Pt.) submarmorata* Schummel, 1833
233. *T. (Pt.) trifascingulata* Theowald, 1980
234. *T. (Pt.) truncorum* Meigen, 1830
235. *T. (Pt.) varipennis* Meigen, 1818
236. *T. (Pt.) wahlgreni* Lackschewitz, 1925
237. *T. (Savtschenkia) grisescens* Zetterstedt, 1851
238. *T. (Sav.) invenusta* Riedel, 1919
239. *T. (Sav.) limbata* Zetterstedt, 1838
240. *T. (Sav.) obsaleta* Meigen, 1818
241. *T. (Sav.) signota* Staeger, 1840
242. *T. (Sav.) staegeri* Nielsen, 1922
243. *T. (Sav.) subnodicornis* Zetterstedt, 1838
244. *T. (Schummelia) variicornis* Schummel, 1833
245. *T. (Tipula) oleracea* Linnaeus, 1758
246. *T. (T.) paludosa* Meigen, 1830
247. *T. (T.) subcunctans* Alexander, 1921
248. *T. (Vestiplex) excisa* Schummel, 1833
249. *T. (V.) hortorum* Linnaeus, 1758
250. *T. (V.) nubeculasa* Meigen, 1804
251. *T. (V.) scripta* Meigen, 1830
252. *T. (Yamatotipula) caesia* Schummel, 1833
253. *T. (Y.) coerulescens* Lackschewitz, 1923
254. *T. (Y.) couckei* Tonnoir, 1921
255. *T. (Y.) lateralis* Meigen, 1804
256. *T. (Y.) marginella* Theowald, 1980
257. *T. (Y.) montium* Egger, 1863
258. *T. (Y.) pierrei* Tonnoir, 1921
259. *T. (Y.) pruinosa* Wiedemann, 1817
260. *T. (Y.) quadrivittata* Staeger, 1840

Subfamily CTENOPHORINAE

261. *Ctenophora (Cnemoncosis) festiva* Meigen, 1804
262. *Ct. (Ctenophora) flaveolata* (Fabricius, 1794)
263. *Ct. (Ct.) guttata* Meigen, 1818
264. *Ct. (Ct.) pectinicarnis* (Linnaeus, 1758)
265. *Dictenidia bimaculata* (Linnaeus, 1761)
266. *Tanyptera (Tanyptera) atrata* (Linnaeus, 1758)

Family CYLINDROTOMIDAE

Subfamily CYLINDROTOMINAE

267. *Cylindrotoma distinctissima* (Meigen, 1818)
268. *Diogma glabrata* (Meigen, 1818)
269. *Phalacrocera replicata* (Linnaeus, 1758)
270. *Triogma trisulcata* (Schummel, 1829)

Family TRICHOCERIDAE

Subfamily TRICHOCERINAE

271. *Trichocera (Metatrichocera) forcipula* Nielsen, 1921
272. *Tr. (M.) inexplorata* (Dahl, 1967)
273. *Tr. (Trichocera) annulata* Meigen, 1818
274. *Tr. (Tr.) hiemalis* (De Geer, 1760)
275. *Tr. (Tr.) maculipennis* Meigen, 1818
276. *Tr. (Tr.) major* Edwards, 1921
277. *Tr. (Tr.) parva* Meigen, 1804
278. *Tr. (Tr.) regelationis* (Linnaeus, 1758)
279. *Tr. (Tr.) rufescens* Edwards, 1921
280. *Tr. (Tr.) saltator* (Harris, 1776)

Family PTYCHOPTERIDAE

281. *Ptychoptera albimana* (Fabricius, 1787)
282. *P. contaminata* (Linnaeus, 1758)
283. *P. lacustris* Meigen, 1830
284. *P. minuta* (Tonnoir, 1919)
285. *P. paludosa* Meigen, 1804
286. *P. scutellaris* Meigen, 1818

4.2. ANALYSIS OF SPECIES

The total number of the species known in Lithuania is shown in Table 4.1. All the species that are still likely to be found in this country are given too. The systematic classification of the groups investigated is taken from the Catalogue of the Palaearctic Diptera, vol.1 (Oosterbroek 1992)*.

Table 4.1. Numbers of species of Tipuloidea and Ptychopteridae in Lithuania

Family, subfamily	Species recorded	Species still likely to be found**	Total number	% of species recorded in relation to their total number
Pediciinae	15	1	16	93.8
Hexatominae	39	3	42	92.9
Eriopterinae	74	8	82	90.2
Limoniinae	53	5	58	91.4
LIMONIIDAE	181	17	198	91.4
Dolichopezinae	1	-	1	100.0
Tipulinae	78	8	86	90.7
Ctenophorinae	6	2	8	75.0
TIPULIDAE	85	10	95	89.5
CYLINDROTOMIDAE	4	-	4	100.0
TRICHOCERIDAE	10	-	10	100.0
PTYCHOPTERIDAE	6	-	6	100.0
TOTAL	286	27	313	91.4

Family Limoniidae

1. *Ula bolitophila* Loew, 1869

One period of activity during the season (earliest 20.V.1988, latest 16.VIII.1993). However, it has two generations a year in the Ukrainian Carpathian Mountains.

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* All the data in the descriptions (except the cases which are mentioned directly in the text) deal only with the results gathered by author in Lithuania.

** These species were kindly listed for the author by P. Oosterbroek in his letter of October 10 1991.

Biotopes: it is restricted to deciduous forests. Larvae were found and reared in the fungi *Polyporus adustus* Fr., *P. hirsutus* Fr., *P. pinicola* Fr. and *P. fomentarius* Fr. on different deciduous trees in habitats where adult forms could be seen as well.

2. Ula mollissima Haliday, 1833

Very rare, captured only once with by entomological net in karst caves (16.VIII.1993).

3. Ula sylvatica (Meigen, 1818)

Two generations a year (specimens were observed from late spring to early summer, and from late summer to early autumn).

Biotopes: the species is most abundant among vegetation (deciduous trees and shrubs) on the banks of small rivers with fairly cold water coming from springs and rapid streams. More than 57% of all the specimens were caught in areas of this kind. Other insects were observed on lakeshores, in birch (*Betuletum oxalidosum*) and spruce groves (over 14% of them being *Piceetum oxalidosum*) and also on farmsteads. Larvae were found and reared in the fungi *Agaricus*, *Baletus*, *Paxillus* and *Cantarelus* in the Varena district.

4. Dicranota (Dicranota) bimaculata (Schummel, 1829)

Two generations a year, since, though most were caught in spring (from the end of April throughout May), some were also noticed in autumn (late September).

The most usual habitats are riverbanks. The specimens were caught in herbaceous vegetation, shrubs and deciduous groves growing near water. Over 91% of all the specimens were found in such habitats. Some insects (about 3.5%) were caught in larger alder groves on moss-covered banks of small rivers. Nearly as many were caught in land-improvement canals. It should be noted that a very small number of larvae (about 1.5%) were found in pine forests (*Pinetum myrtillo-oxalidosum*), where adult forms of this species were not observed.

5. Dicranota (Dicranota) guerini Zetterstedt, 1838

The flight period is restricted to the spring, but even then it is relatively short, lasting through early May.

Biotopes: the species was most frequently found on the banks of bigger and smaller rivers, (over 71%). About 28% were captured in fairly large alder groves on the moss-covered banks of small rivers.

6. Dicranota (Paradicranota) gracilipes Wahlgren, 1905

Emerges in spring. Flight period from late April to mid-May. No second generation was observed, although the species appears to have two generations a year in other regions of the European part of the former USSR (Savchenko 1969).

Biotopes: the species is most frequently found on the banks of medium-sized rivers - over 70% of all the specimens were caught there. More than 27% of the specimens were detected in land-improvement canals, and very few of them (about 2%) were seen both in parks and by rivers.

7. Dicranota (Paradicranota) pavida (Haliday, 1833)

Observed at the end of July in deciduous groves and shrubs on the banks of swiftly flowing rivers.

8. Dicranota (Paradicranota) robusta Lundström, 1912

Very rare, flying at the beginning of June on banks of small springs.

9. Dicranota (Paradicranota) subtilis Loew, 1871

Two generations a year - the first from early May to late June, the second in August.

Biotopes: the species was mostly observed in moss-covered alder groves on the banks of small and rapidly flowing rivers, where 79% of all specimens were caught. The species was also seen in similar habitats such as the banks of small springs surrounded by abundant deciduous trees (about 16%). Some insects (about 4.5%) were found on the boggy banks of small rapidly flowing rivers surrounded by numerous deciduous trees and shrubs.

10. Dicranota (Rhaphidolabis) exclusa (Walker, 1848)

One generation (throughout May to early June).

Biotopes: the species is usually found on the shores of different water bodies, mostly on the banks of small cold springs and small rapidly flowing rivers. About 36% of all the specimens were observed near springs. A great number of them (nearly 22%) were caught on swampy lakeshores and about 26% on banks of smaller and bigger rivers. Some of them (about 8.5%) were also observed in flood-plain meadows situated in the lower reaches of the Nemunas river. Very few (only 7%) were detected in alder groves. Larvae were caught in the water of small cold and swiftly flowing streams and springs.

11. Pedicia (Crunobia) straminea (Meigen, 1838)

Flight period from August to September. A similar situation is found in Sweden (Cuthbertson 1929). In more southern regions (the Ukraine), however, it has two generations a year (Savchenko 1986).

Biotopes: the species is generally restricted to wetlands adjacent to small rapid streams and springs surrounded by different species of trees, but most frequently they may be found in alder-groves.

12. Pedicia (Pedicia) rivosa (Linnaeus, 1758)

Flight period from mid-May to late September.

The species mostly occurs in alder groves on swampy banks of small rivers or on riverbanks with numerous springs. Its larvae are found among moss on the ground. The species was also observed in spruce forests (*Piceetum oxalidosum*) where only about 4% of all the specimens were spotted. The insects were not attracted to light traps even in the areas where they were common.

13. Tricyphona (Tricyphona) immaculata (Meigen, 1804)

Two generations a year: The insects are active throughout May to mid-June and in September.

Biotopes: wetlands with deciduous and occasionally coniferous trees. Most of the specimens were found on the banks of small rivers (over 74%) and springs (8.6%) The species was recorded not only on open banks of water bodies covered with sparse herbaceous vegetation (nearly 7%) and in alder groves dotted with springs (1.7%), but also in spruce forests (*Piceetum oxalidosum*) with low-lying marshy lands (5.2%). Both larvae and adults were found in places such as silt, mud and moss on riverbanks and springs.

14. Tricyphona (Tricyphona) livida Madarassy, 1881

Very rare flying in the middle of June in pine forests with small swamps (*Pinetum myrtillo-oxalidosum*).

15. Tricyphona (Tricyphona) unicolor (Schummel, 1829)

Two generations a year (the first from April to late May, the second in mid-September).

The biotopes are very similar to those of *T. immaculata*, but it is interesting to note that in early spring and late autumn specimens are found in large mixed forests (pine and birch) or in groves of only birch. During their period of greatest activity (in May), they mostly occur in the grass near small springs and rapidly flowing rivulets or in alder groves near water. As many as 47.7% were collected on banks of small rivers, more than 41% in wet alder groves, 4.5% by small springs, nearly as many in mixed forests, and only about 1.5% in birch forests. Larvae may frequently be found on moss-covered banks of the small water bodies mentioned above or even in small swamps.

16. Paradelphomyia (Oxyrhiza) fuscula (Loew, 1873)

Solitary specimens were observed all the time, but only once was a group of eight insects caught. Active throughout summer - from mid-June (earliest 17.VI.1985) to late September (latest 20.X.1989).

Biotopes: the species is found on shores of different water bodies surrounded by mixed forests and shrubs, or in wet alder groves interspersed by springs, small bogs and ponds. Larvae are frequently found among moss in damp areas.

17. Austrolimnophila (Archilimnophila) unica (Osten Sacken, 1869)

Rare species flying from the middle of May (17.V.1989). It is most likely to be active throughout the summer on banks of small swiftly flowing rivers covered by alder groves and shrubs.

18. Austrolimnophila (Austrolimnophila) ochracea (Meigen, 1804)

The species flights in marshy places, especially in upland moors, in July.

19. Epiphragma ocellare (Linnaeus, 1761)

Observed from late spring (earliest 9.V.1989) to late summer (latest 29.VII.1988).

Biotopes: it is found in very diverse habitats. The specimens were more abundant near rivers where they were found among vegetation (over 42%), than on lakeshores where they were rather rare (only about 1% of all the specimens). They were also captured in deciduous forests - about 8%, wet spruce forests (mostly *Piceetum oxalidosum*) - about 10%, and pine forests, where they were most common in *Pinetum myrtilla-oxalidosum* (11.2%) and *P. hepatico-oxalidosum* (5.5%). In very dry pine forests only 0.6% of all the specimens were found, and in mixed woods only 4.9%. The species also occurred in habitats such as spruce forests with bilberry-bushes (*myrtillosum*), spruce forests with occasional birch and ash trees, birch groves with an undergrowth of wood sorrel (*oxolidosum*), damp alder groves, alder groves with meadowsweet undergrowth (*filipendulosum*), alder groves in flooded areas (*fluviale*), boggy forests, shrubs, meadows near forests, swampy river beds, where altogether about 14% of total specimens were captured. The species was also found in rare habitats like ash forests (*Fraxinetum urticosum*) and karst caves. Since these habitats are rare, the number of the specimens caught was not large - 0.8 and 0.9% respectively. Larvae were often captured in rotten deciduous trees, a preference being shown for alder trees.

20. Adelphomyia punctum (Meigen, 1818)

Flight period in early June (latest 17.VI.1989).

Biotopes: the species is most common (over 89%) on riverbanks among shrubs, deciduous trees and luxuriant meadows, and some specimens (about 10%) were also observed in spruce forests with an undergrowth of wood sorrel (*oxalidosum*). A few larvae were collected from the silt on the banks of small rivers. Afterwards they developed into full grown insects.

21. Eloeophila apicata (Loew, 1871)

Period of activity from early June (earliest 9.VI.1989) to early August (3.VIII.1988). In most cases only solitary specimens were caught, and only seldom were they found swarming in groups.

Biotopes: the species is most abundant on the banks of small rivers. It was also observed in pine forests (*vaccinio-myrtillosum*) where only about 12.5% of the specimens were caught.

22. Eloeophila maculata (Meigen, 1804)

Period of activity from mid-May (earliest 17.V.1989) to mid-August (latest 16.VIII.1986).

Biotopes: the species is most numerous on riverbanks, among shrubs and deciduous trees, in meadows and occasionally in the swamps of river beds. In all, over 73% of the specimens were collected in these habitats. The species inhabits different types of alder groves, preferring damp ones with springs (11.8%). 8.7% of the insects were found in other types of alder groves (*Alnetum fluviale*

urticosum, A. filipendulosum, Incanetum oxalidosum and *I. oxalido-nemorosum*). In all the other biotopes, such as pine, spruce and mixed forests, only about 3.5% of the specimens were caught.

23. Eloeophila submarmorata (Verrall, 1887)

Observed in late July on the banks of clean and rapidly flowing river covered by pine and alder trees.

24. Eloeophila trimaculata (Zetterstedt, 1838)

Observed in mid-May on the banks of clean and rapidly flowing rivers shaded by alder trees.

25. Eloeophila verralli (Bergroth, 1912)

Rare species observed in mid-May on the banks of small rivers shaded by alder trees.

26. Euphylidorea dispar (Meigen, 1818)

Flight period from late May to early July.

Biotopes: the species inhabits meadows near damp spruce forests where about 80% of all the specimens were found, and fairly dry wood cutting areas as well. The majority of specimens (over 70%) were obtained by attracting them to a light source, but only males were found to fly to it.

27. Euphylidorea meigeni (Verrall, 1887)

Rare species (never captured on the former USSR territory before), flying in early June in boggy spruce forests.

28. Euphylidorea phaeostigma (Schummel, 1829)

Active from late June (earliest 27.VI.1993) to mid-July (latest 17.VI.1993).

All the specimens were caught in vast upland moors covered with *Sphagnum* moss, near canals extending through swamps, on swampy lakeshores and in humid spruce forests.

29. Eutonia barbipes (Meigen, 1804)

Active from late May to late July.

Biotopes: the species is most abundant (40%) on swampy moss-covered (*Sphagnum*) shores of small old lakes. It is also plentiful (nearly 27%) in humid deciduous and mixed forests. Only a few specimens (around 6%) were collected in boggy spruce forests. Some insects (about 13%) were caught among shrubs on lakeshores, but they were fairly rare in vast swamps and dry mixed forests.

30. Idioptera linnei Oosterbroek, 1992

Flight period from late May (earliest 20.V.1989) to late July (the latest on July 26 1993).

Nearly all the specimens were collected on swampy shores of small lakes covered with abundant *Sphagnum* moss, and just a few (1.6%) in spruce forests and in the vicinity of large swamps.

31. Idioptera macropteryx (Tjeder, 1955)

Very rare: captured on boggy shores of small lakes with a dense *Sphagnum* cover and swampy birch groves, in late June and the first week of August.

32. Idioptera pulchella (Meigen, 1830)

Active from late April (earliest 30.IV.1993) to early August (latest 9.VIII.1993).

Biotopes: Most of the specimens (88%) were recorded in upland moors. They were also collected in humid and boggy deciduous forests, where their larvae could be found amidst the dense mass of the moss *Sphagnum*. Since females have reduced wings, males prevail among the specimens caught.

33. Limnophila (Limnophila) pictipennis (Meigen, 1818)

Only solitary specimens were seen, flying together with *L. schranki*. The species does not form large groups. The flight period is probably very long, or perhaps the species has two generations a season, because the insects were caught both throughout May and from late July to mid-August.

Biotopes: it is commonest (about 62%) in flood-plain meadows situated in the lower reaches of the Nemunas river. It also is fairly abundant in alder forests with springs, in black-alder groves with an undergrowth of nettles (*Alnetum urticosum*), and on the lakeshores covered by alder trees and deciduous shrubs. Larvae can sometimes be found on silty banks of slowly flowing rivers with almost stagnant water, in the mud and on the wet ground, in early spring.

34. Limnophila (Limnophila) schranki Oosterbroek, 1992

Flight period from late April (earliest 29.IV.1989) to mid-June (latest 8.VI.1990).

Biotopes: the species is most common (over 56%) on riverbanks covered with shrubs and deciduous trees. It is fairly common (37%) in old land-improvement canals and near springs surrounded by the same type of vegetation. Solitary specimens also occur in other places, such as land-improvement canals, small artificial lakes, different types of alder groves, pine forests (*P. oxalidosum*), flood-plain meadows in the lower reaches of the Nemunas river, and meadows near rivers, but only about 6% of all the specimens were collected there.

35. Neolimnomyia (Brachylimnophila) nemoralis (Meigen, 1818)

Very common. The flight period starts in late May (earliest 22.V.1990) and is over in late August, but some solitary specimens were captured as late as 28.X.1984, when a single male was recorded.

The habitats in which this species is found are very varied, but only in a few of them is it quite abundant. Its favourite habitat is boggy riverbanks (51.8%), while as few as 12.7% occur on different types of banks. Only about 0.9% of the specimen were caught in flood-plain meadows of the Nemunas. As far as other biotopes are concerned, this species is most plentiful in various alder groves: *Alnetum filipendulosum* (3.6%), *A. fluviale-urticosum* (3.1%), and others (6.2%). 0.4% of the

specimen were captured in black-alder groves and 0.9% in white alder forests (*Incanetum*). The species was also spotted in coniferous forests, most frequently in spruce forests with an undergrowth of wood sorrel (5.1%), and in shrub-covered meadows (3.6%). Other habitats where the species has occasionally been seen (less than 1%) are: mixed woods, marshy forests (others than the types mentioned), various pine forests (*Pinetum vaccinio-myrtillosum, P. hepatico-oxalidosum, P. myrtillo-oxalidosum*), oak groves, other types of deciduous forests, shrubs, meadows, different kinds of swamps, sandy dunes on the sea coast, gardens, etc. Larvae were found in the wet soil on riverbanks.

36. Neolimnomyia (Neolimnomyia) batava (Edwards, 1938)

Active from the first week of June to late August.

Biotopes: the species is most abundant on riverbanks covered with shrubs and various deciduous trees, in spruce forests (*Piceetum hepatica-oxalidosum*) and in humid black-alder groves (*Alnetum filipendulosum*). It was occasionally captured on lakeshores with deciduous trees and shrubs.

37. Neolimnomyia (Neolimnomyia) filata (Walker, 1856)

Recorded only in the Ringove entomological preserve, in small meadows close to ponds and the banks of small rivers, in early June.

38. Phylidorea (Macrolabina) nigronotata (Siebke, 1870)

Biotopes: the species was caught among the vegetation on the banks of small clean and rapidly flowing rivers from mid-May to mid-June.

39. Phylidorea (Paraphylidorea) fulvonervosa (Schummel, 1829)

Flying insects were observed from late May (the earliest on May 20 1989) to late September (September 25 1988).

Biotopes: it is most common (41%) on various riverbanks, whether boggy or covered with deciduous trees and shrubs. Also, it may frequently be found in alder groves: *Incanetum* (8.9%) and *Alnetum* (7.8%). It is fairly common (6.7%) in upland moors, but much rarer (only 2.2%) in low-lying marshes. The species is totally absent from pine forests, but it is rather plentiful in spruce forests. The number of the insects collected is nearly the same in different spruce forests. The key-factor is humidity: they were most frequently found in swampy spruce forests (6.7%), while 5.5% were captured in spruce forests with a mixture of birch and ash. The species also occurs in various birch groves, wood-cutting areas, meadows, shrubs and gardens. Larvae were found in the mud and wet soil at the edge of different water bodies.

40. Phylidorea (Phylidorea) abdominalis (Staeger, 1840)

Its flight period lasts from mid-June (June 16 1991) to the second decade of August (August 21 1989) in oak groves and spruce forests (*Piceetum axalidosum*).

41. Phylidorea (Phylidorea) bicolor (Meigen, 1804)

Flight period from late May (May 20 1988) to the second decade of June (June 23 1989) in black-alder groves (*Alnetum filipendulosum*).

42. Phylidorea (Phylidorea) ferruginea (Meigen, 1818)

Period of acdvity from late May to mid-October. Since the species appeared to be active all the time over this period, it is most likely to have only one generation per year in Lithuania.

The species is found in a variety of habitats. Most of the specimens (52.9%) were observed on riversides covered with deciduous shrubs and trees, as well as on swampy lakeshores (13.7%). The species was also plentiful (15.7%) in various alder groves (5.9% of the specimens in *Alnetum fluviale-urticosum* and 2.0% in *Incanetum oxalido-nemorosum*), and spruce forests, being most abundant (7.8%) in *Piceetum oxalidosum*. It was also found in pine forests, shrubs, low lying marshes and shrub-covered meadows. Larvae were captured in dead organic material on the bottom of small stagnant water bodies.

43. Phylidorea (Phylidorea) longicornis (Schummel, 1829)

Flight period from late May (earliest 20.V.1989) to late July (latest 29.VI.1988).

Biotopes: the species was most active (43.5%) on riversides covered with luxuriant grass, shrubs and deciduous trees., 21.7% were found in alder groves (*Incanetum oxalido-nemorosum*), and 8.7% in boggy spruce forests. The insects were also seen in flood-plain meadows of the Nemunas and in other types of spruce forests, in *Alnetum fluviale-urticosum* and, birch groves, near springs and on boggy banks of small rivers. Larvae were observed only once, among the decaying matter under the moss, near a small spring.

44. Phylidorea (Phylidorea) nervosa (Schummel, 1829)

Observed from mid-May (earliest 13.V.1988) to early June near small clean and rapidly flowing rivers where their larvae were captured too.

45. Phylidorea (Phylidorea) squalens (Zetterstedt, 1838)

Biotopes: nearly half of all the insects were captured in shrubs, alder groves and the herbaceous vegetation covering the banks of small rivers, and nearly as many were observed in humid spruce forests (*Piceetum oxalidosum*), in early July.

46. Pilaria discicollis (Meigen, 1818)

Its flight period lasts from late June (19.VI.1992) to late August (30.VIII.1986).

Biotopes: the species frequents riversides. About 35.7% of the specimens were found on comparatively dry riverbanks and 28.6% on boggy ones. More than 21% of the insects were caught in alder groves with numerous springs. The species was also recorded in mixed forests, in different types of alder and ash groves.

47. Pilaria fuscipennis (Meigen, 1818)

One-month flight period: from late June to late July.

Biotopes: about 50% of the specimens were collected in *Alnetum filipendulosum*, 16.7% in alder groves of other types, 8.3% among the deciduous trees and shrubs on riverbanks, 16.7% in shrubs at the edge of springs, among deciduous trees and luxuriant grass on lakeshores.

48. Pilaria meridiana (Staeger, 1840)

Its flight period lasts from mid-May (21.V.1988) to late June among *Sphagnum* on boggy shores of small lakes.

49. Pilaria nigropunctata (Agrell, 1945)

Its flight period lasts from late June to late July. The species can be seen flying on swampy banks of small rivers covered by young alder trees and near lakes.

50. Pilaria scutellata (Staeger, 1840)

The species was only once seen flying on swampy banks of artificial lake covered by old deciduous trees in late August.

51. Pseudolimnophila lucorum (Meigen, 1818)

Flight season starts in late May (20.V.1989) and lasts into late August (latest 20.VIfl.1989).

Biotopes: most of the insects (over 46%) were collected on the banks of small clean and rapid rivers. A considerable number of them (7.5%) were recorded on boggy riverbanks. These insects were also fairly abundant (nearly 12%) on lakeshores where they occurred among shrubs and other coastal vegetation. 13.4% were caught in swampy alder groves (*Alnetum fluviale-urticosum*). The species was also collected in the following habitats: swampy shrubs, deciduous forests (it was more common in birch and alder groves of other types), mixed woods and low-lying marshes, but the total number of all the specimens caught in these habitats did not exceed 3%. Larvae were collected in the Vilnius Botanical Gardens.

52. Pseudolimnophila sepium (Verrall, 1886)

Its flight period lasts from mid-May (earliest 18.V.1989) to mid-August (latest 15.VIII.1988).

Biotopes: this species is most frequently found among shrubs, deciduous forests and grassy vegetation on riverbanks (46.3%). Only a small number of the specimens prefer boggy banks (6.1%). They are also abundant in black-alder groves (*Alnetum filipendulosum*) (25.6%) and in *A. fluviale-urticosum* (11.0%). About 6% of them was collected in low-lying moors. In other habitats, such as pine, birch and mixed forests, only solitary specimens were caught. Larvae were found by the rivers, in the mud and wet soil.

53. Hexatoma (Eriocera) cimicoides (Scopoli, 1763)

Observed flying from late April to mid-May, in meadows and grassy vegetation among trees near large rivers.

54. Hexatoma (Hexatoma) vittata (Meigen, 1830)

A lone male was caught with an entomological net on a swampy lakeshore in mid-May.

55. Crypteria limnophiloides Bergroth, 1913

All the specimens were found among shrubs growing close to bigger rivers in late June and at the very beginning of October.

56. Neolimnophila carteri (Tonnoir, 1921)

Its flight period lasts throughout May to late June.

Biotopes: the vast majority of these insects (nearly 86%) was caught in humid alder groves on the banks of small rivers, the others on open riversides and in pine forests.

57. Arctoconopa melampodia (Loew, 1873)

Observed flying on a riverside late in June.

58. Arctoconopa zonata (Zetterstedt, 1851)

Caught by entomological net in areas close to small rivers, in early June.

59. Erioptera (Erioptera) divisa (Walker, 1848)

Active nearly throughout summer: its flight season lasts from mid-May (earliest 9.V.1989) to late August (latest 20.VIII.1986); it has only one generation a year in Lithuania.

Biotopes: the majority of specimens was collected in marshy areas, nearly 60% of them on boggy shores of lakes, 31.3% in low-lying marshes, and about 7% on riversides with a thick vegetation cover. Some insects were also found in forests of pines, spruces and alders, but only a few.

60. Erioptera (Erioptera) flavata (Westhoff, 1882)

Generally found in large swarms, nearly throughout the summer (from early June to late July).

Biotopes: the species is restricted to certain habitats. Most of the specimens (over 70%) prefer muddy riverbanks, quite a few (19.4%) marshy shores of lakes, and some (7.8%) dry riversides. Only few are found in grasslands and shrub-covered meadows. The larvae live on the ground on the banks of pools, or on the bottom, among the decayed organic material close to the shore.

More active at dusk.

61. Erioptera (Erioptera) fuscipennis Meigen, 1818

Flight period in early July when it was recorded in flooded alder-groves (*Alnetum fluviale-urticosum*).

62. Erioptera (Erioptera) griseipennis Meigen, 1838

The period of activity is restricted to early June.

Biotopes: nearly all the specimens were found on riverbanks and only a few in meadows surrounded by forests. Only females were attracted by light traps placed in meadows, and it is possible that they assemble there from the nearby banks of swiftly flowing rivers.

63. Erioptera (Erioptera) limbata Loew, 1873

Flight season in early June on the banks of small rivers with a dense tree and shrub cover.

64. Erioptera (Erioptera) lutea Meigen, 1804

Flight period from late April to mid-October.

Biotopes: the species shows preference for riverbanks, where 33.8% of these insects were found. 30.5% were observed in flooded alder-groves (*Alnetum fluviale-urticosum*) and only 2.8% in other types of alder groves. They were found in a certain number in forests of pine (*Pinetum oxalidosum*, 12.7%) and spruce (*Piceetum oxalidosum*, 8.0%). Some specimens, although few in number, were recorded in other habitats, such as parks, gardens, urban areas, pine and spruce forests of other types, ash groves, low-lying moors and meadows. Larvae were collected from the decaying organic material along water bodies.

6S. Erioptera (Erioptera) sordida Zetterstedt, 1838

It seems to have two periods of activity per season: one from mid-May to early July, and the second late in September.

Biotopes: the species is most frequently found on the banks of small rivers (about 70%) (larvae were found there as well). About one fifth of the specimens were also caught in deciduous forests, and a few of them in spruce woods.

66. Erioptera (Erioptera) squalida Loew, 1871

Flight period from mid-May (earliest 11.V.1988) to late September (latest 25.IX.1988). Since no breaks were observed in the flight period, this species probably has only one generation a year. Should it have two, the only plausible explanation would be that both generations fly together for some time.

Biotopes: the majority (over 72%) was collected on the banks of various rivers. A number of solitary specimens were recorded in other areas, such as the flood-plain meadows of the Nemunas river, gardens, pine forests, alder groves and parks.

67. Erioptera (Mesocyphona) fossarum (Loew, 1873)

Found only in ash grove *Fraxinetum urticosum* in 10.VIII.1993.

68. Gonempeda flava (Schummel, 1829)

Flight period from mid-June (earliest 11.VI.1988) to late July (latest 29.VII.1988).

Biotopes: it is most frequently found on the banks of small rivers (nearly 53%), and in black-alder groves situated in flooded areas (*Alnetum fluviale-urticosum*) (35.3%). Some were also observed in alder groves of other types and pine forests (most frequently in *P. myrtillo-oxalidosum*). Larvae were found only in the southern districts, in light sandy soils near rivers.

69. Scleroprocta pentagonalis (Loew, 1873)

Discovered near a river among shrubs and luxuriant herbaceous vegetation, late in June.

70. Scleroprocta sororcula (Zetterstedt, 1851)

Only females were found, so the presence of this species in Lithuania is questionable so far. It flies near small rivers with steep banks covered by abundant shrubs and trees of various kinds in early June. They did not assemble to a light source.

71. Symplecta (Psiloconopa) stictica (Meigen, 1818)

Flight period from the very beginning of May to the very end of August.

Biotopes: the species was captured only in meadows close to the rivers. About one fourth of the specimens were found in the flood-plain meadows of the Nemunas river.

72. Symplecta (Symplecta) hybrida (Meigen, 1804)

Usually solitary insects or small groups were observed. Period of activity from mid-April (earliest 19.IV.1986), to late September (latest 23.IX.1988). According to Savchenko (1986), this species seems to have two generations a year. It is quite possible that the situation is similar in Lithuania, but since no breaks in activity were observed throughout the summer, both generations must fly together for some time.

Biotopes: the species is found in rather similar habitats. It is most abundant in shrub-covered meadows (over 55%), whereas 21.3% of the specimens were recorded on the banks of bigger and smaller rivers. They are fairly common in gardens (8.5%). Solitary specimens were recorded near springs, in meadows close to rivers, in forests and cities. Females can often be seen laying eggs in sandy soil on riverbanks where the larvae are also found.

73. Symplecta (Trimicra) pilipes (Fabricius, 1787)

Solitary specimens are usually seen. Flight season from mid-May to late August (earliest 18.V.1985, latest 26.VIII.1989).

Biotopes: both the adult forms and the larvae are found on the shores of various water bodies, the latter in the mud.

74. Cheilotrichia (Cheilotrichia) imbuta (Meigen, 1818)

Only solitary specimens were usually recorded. Flight period throughout June and July.

Biotopes: it was most frequently captured in low-lying moors (46.1%), and was totally absent from upland ones. As a result, only solitary specimens were observed on swampy riverbanks and lakes. This species is fairly common on drained riverbanks (25.3%) and in alder groves (about 14%). Solitary specimens were also seen in various meadows, including flood-plain meadows and in shrubs.

75. Cheilotrichia (Empeda) affinis (Lackschewitz, 1927)

Two periods of activity per season, in May and September, only on riverbanks.

76. Cheilotrichia (Empeda) cinerascens (Meigen, 1804)

Period of activity from late April to early October. If there are two generations a year, they must fly together for some time.

Biotopes: it is found in diverse habitats. Meadows surrounded by forests (57.1%), riverbanks (10.2%) and woods close to the rivers (8.2%) are the characteristic haunts of this species. Solitary specimens, however, can also be seen in other habitats, such as various pine forests, spruce forests with an undergrowth of wood sorrel, oak groves, wood-cutting areas, and gardens. Larvae were found living in dead organic material on the bottom of very small ponds and rivers.

77. Cheilotrichia (Empeda) neglecta (Lackschewitz, 1927)

Flight period only in October.

Biotopes: most of the specimens were caught in pine forests on the shores of small marshy lakes, whereas solitary insects were recorded among shrubs and deciduous trees bordering the rivers. Some 18% of all the specimens were captured in alder groves and in the shrubs *Rubus caesius* covering the shores of small swampy lakes.

78. Cheilotrichia (Empeda) staryi Mendl, 1973

It is a late-autumn species found from late September to late October.

Biotopes: solitary specimens were recorded in meadows, alder groves and peat bogs.

79. Erioconopa diuturna (Walker, 1848)

Flight period from mid-September to early October.

Biotopes: One third of these insects was caught in large apple-tree orchards, the rest close to peat-bogs.

80. Erioconopa trivialis (Meigen, 1818)

Two generations a year: the first throughout May and June (7.V.1988 and 4.VI.1984), the second from mid-September to mid-October (10.IX.1986 and 9.X.1988). So these insects were not observed flying in mid- and late July and August, while in more southerly regions (the Ukraine) a break in their activity was noticed only in July (Savchenko 1982).

Biotopes: nearly half of all the specimens (over 45%) were caught in flooded meadows in the lower reaches of the Nemunas, approximately 27% on small riverbanks and 18% near springs. Solitary specimens were recorded in parks with ponds. Larvae were found in mud rich with organic materials, on the banks of water bodies covered by luxuriant herbaceous vegetation, as well as among deciduous shrubs and trees.

81. Hoplolabis (Parilisia) areolata (Siebke, 1872)

Flight period from mid-May to late June (14.V.1989 and 26.VI.1988).

Biotopes: the species was most frequently found on riverbanks (61.5%) and its larvae were also found there, generally in mud (mostly sandy), among the roots of grasses, especially those of *Valeriana officinalis L., Epilobium hirsutum L., E. palustre L.*ete. It is interesting to note that over 20% of the specimens were caught in small gardens, most likely having ventured there from the boggy meadows nearby. Nearly as many (about 7%) were observed in mixed forests and parks situated near rivers.

82. Hoplolabis (Parilisia) subalpina (Bangerter, 1947)

Only a single male was caught with a light trap in a shrub-covered meadow near a river, on June 30 1990.

83. Hoplolabis (Parilisia) vicina (Tonnoir, 1920)

Its flight period lasts over the entire months of May and June to mid-July.

Biotopes: nearly all the specimens were found on small riverbanks (over 90%), 6.0% among shrubs near the rivers and solitary specimens by springs, in parks and flooded alder groves.

84. Ilisia maculata (Meigen, 1804)

It is active and seen in flight nearly throughout the summer (earliest 1.VI.1989, latest 16.VIII.1990 and 1993).

Biotopes: they are most abundant in flooded alder groves (over 43%) and on riverbanks, generally overgrown with alder trees (about 35%). Some 5.5% of the specimens were found in humid spruce forests (*P. oxalidosum*), and solitary insects were recorded in alder groves with an undergrowth of meadowsweet (*Alnetum filipendulosum*) (2.7%), among shrubs (*Solix*) near rivers and in deciduous forests. Larvae were collected in wet soil (near springs and bogs) among alder trees.

85. Molophilus (Molophilus) appendiculatus (Staeger, 1840)

Insects in flight could be observed nearly the entire summer - from mid-May to late August (earliest 17.V.1989, latest 21.VIII.1989).

Biotopes: it was found in diverse habitats, its favourite ones being alder groves in flooded lands (24.5%), riverbanks with various kinds of vegetation, including alders (16.4%), and humid mixed forests (10.6%). The species is fairly common in damp woods carpeted with wood sorrel, 8.5%, in birch groves, 6.7%, in spruce forests, 6.1%, in oak woods, 6.4%, in swampy spruce groves, and, in alder groves with springs, 5.4%. Solitary specimens were also found in various pine and spruce woods, and also in other kinds of forests, among shrubs and near springs.

86. Molophilus (Molophilus) ater (Meigen, 1804)

Insects were found during late spring to early summer (earliest 4.V.1989, latest 3.VII.1992).

Biotopes: the species frequents swampy alder groves (*Alnetum filipendulosum*) overgrown with meadowsweet (about 40%), and nearly as many specimens were captured in humid and boggy spruce groves (*Piceetum oxalidosum*). Nearly 20% of them were found in parks with a lot of old water pools and in low-lying marshes. Larvae were collected in small swamps and peat bogs.

87. Molophilus (Molophilus) bifidus Goetghebuer, 1920

It is difficult to define its period of activity because solitary specimens were collected as early as the beginning of April (7.IV.1990). This is rather unusual, since such an early flight period was not indicated in West and Central Europe (Mendl 1975), neither was it in the Ukraine (Savchenko 1982). The other specimens were caught in mid-August.

Biotopes: shrubs with springs, near rivers.

88. Molophilus (Molophilus) bihamatus De Meijere, 1918

Insects were caught only at the beginning of June (earliest 4.VI.1988, latest 17.VI.1989).

Biotopes: two-thirds of these insects were collected among herbaceous vegetation and bird cherry (*Padus avium Mill.*) shrubs near a small river and one third in a damp spruce forest with an undergrowth of wood sorrel.

89. Molophilus (Molophilus) cinereifrons De Meijere, 1920

It is a summer species, active from early June to late August (earliest 9.VI.1990, latest 21.VIII.1989).

Biotopes: most specimens were collected in oak (about 46%) and spruce (about 30%) forests, both of them with an undergrowth of wood sorrel. The rest were found on riverbanks (around 23%).

90. Molophilus (Molophilus) corniger De Meijere, 1920

Active in late summer: from late June to mid-August.

Biotopes: Most of these insects (over 60%) were observed in swampy *Alnetum filipendulosum* with abundant *Carex* vegetation, the others were found on marshy banks of small rivers and in spruce forests.

91. Molophilus (Molophilus) crassipygus De Meijere, 1918

Active nearly the entire summer: from mid-June to mid-August (earliest 9.VI.1989).

Biotopes: the majority were found in alder groves with springs (about 57%), others were caught in pine forests (*Pinetum vaccinio myrtillosum*).

92. Molophilus (Molophilus) griseus (Meigen, 1804)

Period of activity from June to early July (earliest 10.VI.1989, latest 6.VII.1988) on riverbanks.

93. Molophilus (Molophilus) maurus Lackschewitz, 1925

A single male was caught with by entomological net on the swampy bank of a small river at the end of June (26.VI.1990).

94. Molophilus (Molophilus) medius De Meijere, 1918

Active in early summer: throughout June and July (latest 3.VIII.1988).

Biotopes: the majority (around 82%) were caught on banks of various rivers, about 16% of them on swampy banks of small rivers. A fairly large number of them were also found in humid alder groves - *Alnetum fluviale-urticosum* (14.6%), alder groves with springs (0.7%) and swampy *Alnetum filipendulosum* (0.7%). Solitary specimens were caught in meadows with shrubs (1.4%) and in humid spruce groves (0.4%).

95. Molophilus (Molophilus) obscurus (Meigen, 1818)

It is difficult to say something about the flight period of this species because it was caught only three times: in June (9.VI.1990 and 29.VI.1993), and then in late October (28.X.1984).

Biotopes: it was recorded in damp spruce forests with an undergrowth of wood sorrel and on the bank of a river.

96. Molophilus (Molophilus) ochraceus (Meigen, 1818)

Active nearly throughout the summer, from June to mid-August.

Biotopes: most of the insects were found in humid environments. In *Alnetum fluviole-urticosum* (over 34%), on riverbanks (nearly 30%), and in humid spruce forests (*Piceetum oxalidosum*) (about 27%). The others were recorded in such areas as pine woods (*Pinetum vocclnio myrtillosum*) (4.5%), cleared spaces in pine forests (about 2%), nearly the same number being found in other types of alder groves (*Incanetum oxalido-nemorosum*).

97. Molophilus (Molophilus) pleuralis De Meijere, 1920

The period of activity lasts for about two months - from mid-June to mid-August.

Biotopes: nearly 60% of the insects were collected among low shrubs near artificial lakes and in meadows, the others (about 40%) in pine woods, on swampy banks (covered with *Sphagnum*) of small lakes.

In Lithuania, the insects of this species were exclusively collected with entomological nets, but in Tajikistan more specimens were captured by the author with light traps. The sex ratio in Lithuania (19.00) is far from normal, with males prevailing. However, in Tajikistan a more southern regions of the former Soviet Union, the author recorded a more normal sex ratio (2.50).

98. Molophilus (Molophilus) propinquus (Egger, 1863)

Flight period from mid-May to early July.

Biotopes: the species was found mostly near rivers (nearly 95%), showing preference for swampy banks of small rivers (80%). Solitary specimens were also recorded in parks and alder groves with springs.

99. Molophilus (Molophilus) pullus Lackschewitz, 1927

Insects were caught in early July (4.VII.1984) in shrub-covered meadows not far from rivers, although according to Savchenko (1982), this species is active in the Ukraine in spring.

100. Molophilus (Molophilus) serpentiger Edwards, 1938

Recorded only in late spring - early summer (earliest 17.V.1989 latest 23.VI.1988).

Biotopes: about 64% of these insects were found on riverbanks, while the remaining 36% were captured in areas such as old cleared spaces in pine woods, where small young trees of different types grew in abundance.

101. Ormosia (Ormosia) aciculata Edwards, 1921

It was seen flying throughout spring and early summer (earliest 20.IV.1990 latest 26.VI.1988) in boggy alder groves and among deciduous trees, within easy reach of small rivers.

102. Ormosia (Ormosia) brevinervis (Lundström, 1907)

It was observed flying in mixed woods not far from rivers in early May.

103. Ormosia (Ormosia) clavata (Tonnoir, 1920)

It is interesting to note that the species has two generations a year: the first flying from late April (earliest 21.IV.1989) to mid-June, and the second throughout August. Savchenko (1982) writes that in the Ukraine this species is active from early July to early August.

Biotopes: if, according to Savchenko (1982), this species is found mostly in coniferous and mixed woods in the Ukraine, the situation in Lithuania is different: over 34% of the insects were found

in alder groves (*Incanetum oxalido-nemorosum*) and nearly 19% in alder groves with springs. Nearly 22% occurred on boggy shores of small lakes covered with *Sphagnum* and 12.5% on riverbanks. Only solitary specimens were found in swampy spruce forests and pine woods.

104. Ormosia (Ormosia) depilata Edwards, 1938

It is a spring species, with a flight period from late April to late May. The earliest date recorded is 26.IV.1986 and the latest is 28.V.1989.

Biotopes: the majority of these insects was collected close to small rivers in mixed woods in sheltered places (under the branches of large trees and under bridges), and also in damp birch and alder (*Alnetum filipendulosum*) forests.

105. Ormosia (Ormosia) hederae (Curtis, 1835)

The period of activity in Lithuania is the same as in Western Europe (Cuthbertson 1929). It is an autumn species with a flight season from early September to mid-October, while in the Ukraine (Savchenko 1982) and on the territory of the former Czechoslovakia (Stary 1974b) it appears to have two periods of activity a year.

Biotopes: the species was found in pine woods on steep banks of small rivers. One larva was found there under rotten fallen leaves on the sand at the edge of a river.

106. Ormosia (Ormosia) lineata (Meigen, 1804)

Flight period throughout spring to late summer (earliest 20.IV.1989, latest 29.VII.1988).

Biotopes: the majority was collected in alder groves with springs (nearly 46%), where larvae were found developing in mud (larvae also occured in mud on the banks of lakes). Strange as it may seem, many of them were observed in fairly dry spruce forests (about 23%). Solitary specimens were recorded in mixed woods (8%), alder groves growing on the banks of rapidly flowing rivers (5.4%).

107. Ormosia (Ormosia) nodulosa (Macquart, 1826)

All the specimens were collected in pine woods in early May.

108. Ormosia (Ormosia) pseudosimilis (Lundström, 1912)

Its existence is questionable because only one female was caught in a pine grove (*Pinetum hepatico oxalidosum*).

109. Ormosia (Ormosia) ruficauda (Zetterstedt, 1838)

It was observed flying from early June (earliest 10.VI.1991) to mid-August.

Biotopes: the insects were found in humid spruce (*oxalidosum*) and mixed woods, on riverbanks, and lakeshores.

110. Ormosia (Ormosia) staegeriana Alexander, 1953

Its flight period lasts from mid-May (earliest 13.III.1988) to late July.

Biotopes: the species was observed on riverbanks, in shrub-covered swamp lands, and in birch groves with an undergrowth of wood sorrel.

111. Rhypholophus haemorrhoidalis (Zetterstedt, 1838)

Active in late summer and early autumn (earliest 15.VIII.1988 latest 9.X.1992).

Biotopes: more than half of these insects (53.8%) was collected in shrubs on riverbanks, a great number of them (38.5%) in oak groves (*Quercetum oxalido-nemorosum*), and only solitary specimens in pine forests on riverbanks.

It is interesting to note that on September 10 1992, during a collecting trip in the Varena district, copulation of a male of this species with a female of *Tricyphona immaculata* was observed in an drain, where normal copulating pairs of this species were observed as well.

112. Rhypholophus varius (Meigen, 1818)

It is likely to have two generations a year since a few females were noticed at the beginning of May 1989. Generally, these insects were seen on the wing from mid-August to late September (latest 19.IX.1989).

Biotopes: nearly all the specimens (92.3%) were collected on riverbanks, and only solitary specimens in shrubs and birch groves. Larvae were found in decayed fallen leaves on the riverside.

113. Tasiocera (Dasymolophilus) murina (Meigen, 1818)

The insects were observed flying only in June, on steep banks of small streams covered by mixed old trees, and in meadows close to ponds.

114. Dicranoptycha (Dicranoptycha) cinerascens (Meigen, 1818)

Flight period from mid-May to late July (latest 22.VII.1987).

Biotopes: the majority of these insects (over 77%) was collected on riverbanks, and the rest in pine groves (*Pinetum hepatico oxalidosum*).

115. Dicranoptycha (Dicranoptycha) fuscescens (Schummel, 1829)

Most frequently no groups but only solitary specimens were recorded. It is a summer species with a flight period lasting from late May to mid-August.

Biotopes: it is impossible to indicate a habitat in which the species is most plentiful since the material collected comes in nearly equal quantities from riverbanks, mixed woods, pine (*Pinetum hepatico-oxalidosum*) and alder groves (*Incanetum oxalido-nemorosum*). Larvae were collected in parks under moss on old rotten tree stumps.

116. Dicranoptycha (Dicranoptycha) livescens Loew, 1871

All the insects were collected in August, among shrubs and luxuriant herbaceous vegetation bordering small rivers and in ash groves.

117. Ellipteroides (Ellipteroides) lateralis (Macquart, 1835)

The insects were collected during the first week of July 1984, in shrub-covered meadows within easy reach of a river.

118. Ellipteroides (Protogonomyia) alboscutellatus (Von Roser, 1840)

Only once was it captured in a very small area (a few m^2), and no insects of this species have been recorded for a long time in the habitat mentioned below or nearby. Specimens were collected on July 3 1992.

Biotope: an alder grove (*Alnetum filipendulosum*) close to a small stream with swampy and muddy banks.

119. Gnophomyia viridipennis (Gimmerthal, 1847)

Only once was it observed around Vilnius, among very old and sick deciduous trees (mainly poplars) at the very beginning of August.

120. Gonomyia (Gonomyia) bifida Tonnoir, 1920

The insects were collected in mixed groves in early October.

121. Gonomyia (Gonomyia) lucidula De Meijere, 1920

Active from early summer (earliest 20.V.1989) to early August (latest 10.VIII.1990).

Biotopes: it was found in fairly different habitats, but nearly one third of the insects (32.6%) was on riverbanks. The same number (nearly 14%) were caught in *Alnetum fluviole-urticosum* and among luxuriant herbaceous vegetation under deciduous trees bordering springs. 9.3% were found in boggy groves or in alder groves dotted with abundant springs. Only solitary specimens were caught in habitats such as different types of pine woods, mixed woods, shrubs and swampy riverbanks.

122. Gonomyia (Gonomyia) recta Tonnoir, 1920

Flight period from late June to early July in humid alder groves (*Alnetum filipendulosum* and *Alnetum* near a river with abundant springs), in spruce forests and near lakes.

123. Gonomyia (Gonomyia) simplex Tonnoir, 1920

Only a single male was caught in central Lithuania, in a meadow surrounded by old larches, oaks and lime trees in early June 1990.

124. Gonomyia (Gonomyia) tenella (Meigen, 1818)

Flight period from late May to mid-August in wet meadows, and among pine groves bordering rivers.

125. Lipsothrix ecucullata Edwards, 1938

Flight period throughout nearly all June to mid-July.

Biotopes: it was mainly observed in swampy alder groves (*Alnetum filipendulosum*) (37.5%), and alder groves interspersed with abundant springs, near a river (25%). It was also be found in habitats such as *Alnetum fluviale-urticosum*, mixed groves on steep riverbanks and herbaceous vegetation near small springs.

126. Lipsothrix errans (Walker, 1848)

The insects were seen flying from late June to mid-July in alder groves bordering rivers (*Alnetum fluviale-urticosum*) and in shrubs on riverbanks.

127. Lipsothrix remota (Walker, 1848)

All the insects were collected on the wing in early June.

Biotopes: the insects were mostly observed on steep banks of very small rivers covered by old mixed groves (over 90%) and others were found in meadows near ponds. Larvae were collected from old rotten trunks of deciduous trees.

128. Rhabdomastix (Sacandaga) laeta (Loew, 1873)

Observed flying from mid-June to mid-July.

Biotopes: roughly half of these insects were collected in alder groves near rivers (*Alnetum fluviale-urticosum*), the rest in alder groves with springs (about 22%), and in similar places, such as deciduous forests covering riverbanks, and deciduous shrubs close to a river.

129. Elephantomyia (Elephantomyia) edwardsi Lackschewitz, 1932

Flight season in early June (latest 17.VI.1989).

Biotopes: it was most abundant in young mixed groves, where approximately half the specimens were caught. One-fourth were found in pine forests (*Pinetum myrtillo-oxalidosum*), the others in spruce and birch forests with an undergrowth of wood sorrel (*oxalidosum*) (16.7% and 8.3% respectively). Larvae were collected from dead rotten trunks of different types of trees (spruce, birch and ash).

130. Elephantomyia (Elephantomyia) krivosheinae Savchenko, 1976

Only a single male was caught in central Lithuania in a small mixed forest in late May, 1994.

131. Helius flavus (Walker, 1856)

It is a summer species: flight period from early June (earliest 8.VI.1990) to early September.

Biotopes: it is most abundant on swampy riverbanks covered with *Carex* (about 55%) while dry riverbanks were favourite habitats of fewer specimens (about 24%). More than 10% were collected in a humid spruce forest (*Piceetum oxalidosum*), the rest in areas such as ash groves (*Fraxinetum urticosum*), alder groves (boggy *Alnetum filipendulosum* and *Alnetum fluviale-urticosum*) and shrub-covered meadows situated close to water bodies, lakeshores in particular.

132. Helius longirostris (Meigen, 1818)

It is a summer species, with a flight period from early May to late August (latest 21.VIII.1989).

Biotopes: it is most plentiful in deciduous groves on lakeshores. Nearly 31% of these crane flies in such areas were captured, while about 38% were found on riverbanks. Some insects (7.2%) were spotted in spruce woods with an undergrowth of wood sorrel. Only solitary specimens, however, were found in habitats such as shrubs bordering water bodies, deciduous and coniferous woods, oak forests, various types of alder groves, wood sorrel-covered birch groves and gardens.

133. Helius pallirostris Edwards, 1921

Observed flying late in June in meadows and shrubs near a river.

134. Antocha (Antocha) vitripennis (Meigen, 1830)

Flight period throughout summer and early autumn: from late May to mid-September.

Biotopes: the insects were usually collected near rivers (66.7% in shrub-covered meadows, and 21.2% on riverbanks). Other habitats (mixed woods, different types of alder groves, pine forests */Pinetum vaccinio-myrtillosum/*, meadows near damp spruce woods) are characterized by a very small number of these crane flies. Larvae were found under fallen leaves on the banks of rapid streams.

135. Orimarga attenuata (Walker, 1848)

It was collected in shrub-covered meadows near a river late in July.

136. Achyrolimonia decemmaculata (Loew, 1873)

Two generations a year in Lithuania: the first lasting throughout May to very early June, whereas the second was observed in late August.

Biotopes: the insects were found in oak groves (*Quercetum oxalido-nemorosum*), ash forests, on riverbanks and even in gardens. Only once were larvae collected from the lower pan of the fungus *Daedalea quercina Fr.* (fam. *Polyporacea*) growing on a dead deciduous tree trunk.

137. Atypophthalmus inustus (Meigen, 1818)

The insects were seen flying from late July to mid-August in deciduous groves on small lake islands and the swampy banks of small streams.

138. Dicranomyia (Dicranomyia) aperta Wahlgren, 1904

It is a very rare species found only once in late July. Only males were caught near rivers.

139. Dicranomyia (Dicranomyia) autumnalis (Staeger, 1840)

Two generations a year in Lithuania: the first generation from mid-May throughout June, and those of the second generation from early August to mid-October.

Biotopes: the species frequents riverbanks (43%), although quite a few of these insects were observed on swampy shores of small lakes (about 14%), and nearly as many in gardens. Some were collected in pine and spruce forests (*oxalidasum*), parks and peat bogs. Larvae were found amidst dead organic material, in the mud and rotten leaves near small streams.

140. Dicranomyia (Dicranomyia) chorea (Meigen, 1818)

Period of activity from early May (earliest 9.V.1990) to late September (latest 23.IX.1989).

Biotopes: the majority (as many as 57%) were found in parks, 30% in sheltered places (in water pipes, under low bridges) near flowing water. A fairly large number (over 6%) were also captured in swampy spruce groves, and quite a few in alder groves (*Incanetum aegopodiosum*) and not far away from ponds. Larvae were collected in the Vilnius Botanical Gardens under the moss near a small artificial stream.

141. Dicranomyia (Dicranomyia) didyma (Meigen, 1804)

It is a summer species, with a flight period from late May (earliest 22.V.1990) to mid-August.

Biotopes: nearly all the crane flies were found near small rapidly flowing rivers. They like to congregate in sheltered places throughout the day (under old wooden bridges and water-mill dams). More than 51% of them were caught in habitats of this kind, and only about 2% were collected near water or among deciduous trees and shrubs growing much farther away. Larvae were captured on old planks under a bridge, where they were hidden in the moss at the water-level.

142. Dicranomyia (Dicranomyia) distendens Lundström, 1912

Two generations a year in Lithuania: the first generation lasting throughout June while the second is found only in early October.

Biotopes: the flying insects were observed close to swamps (about 40%), nearly as many in shrub-covered meadows bordering rivers, and the rest on other types of riversides. Larvae were separated from *Sphagnum* obtained in an upland moor when the latter was examined in water.

Females were seen flying to a light source more often than males. The sex ratio of the flying insects is 0.33, and that of the larvae is 0.50 (the ratio was estimated after the adults emerged).

143. Dicranomyia (Dicranomyia) frontalis (Staeger, 1840)

Flight period from mid-June to mid-October.

Biotopes: the majority were recorded in shrub-covered meadows near rivers (70%), and on riverbanks (20%). Only 10% were found in the forests of lichen-covered pine (*Pinetum cladoniosum*) and spruce with an undergrowth of wood sorrel (*Piceetum oxalidosum*).

144. Dicranomyia (Dicranomyia) halterata Osten Sacken, 1869

The insects were observed on the wing only during mid-summer, from late June to very early August, on riverbanks.

145. Dicranomyia (Dicranomyia) handlirschi Lackschewitz, 1928

Flight period from mid-May to early October (the latest 12.X.1991).

Biotopes: the insects were observed mainly near the banks of bigger and smaller rivers (over 58%), and only 8% were captured in alder groves close to water (*Alnetum fluviale urticosum*), where about one fourth of them was collected in pine forests with an undergrowth of lichen (*Pinetum cladoniosum*). Solitary specimens were recorded in birch groves.

146. Dicranomyia (Dicranomyia) longipennis (Schummel, 1829)

Flying insects were recorded from late May to mid-October.

Biotopes: it was found in different habitats, no one in particular harbouring larger aggregations. Most of the insects were recorded in gardens (over 38%), birch groves (19%), and near rivers (nearly 15%). Solitary specimens were also captured on the swampy banks of small rivers, in boggy spruce groves, pine forests and alder groves.

147. Dicranomyia (Dicranomyia) mitis (Meigen, 1830)

It is most likely to have two generations a year. The first late in May while the second from late July throughout August (latest 5.IX.1989).

Biotopes: About 70% of the insects were collected in pine groves (*Pinetum hepatico-oxalidosum*), the rest in alder groves and shrubs surrounding ponds. Larvae were found under the moss growing on stones in a small artificial pond.

148. Dicranomyia (Dicranomyia) modesta (Meigen, 1818)

Flight period from very late May to late October.

Biotopes: it is found in diverse habitats, most insects (34.4%) giving preference to riverbanks. A certain number also haunts deciduous woods (10%), deciduous forests close to water bodies (7.7%) and birch groves (7.4%) Other biotopes frequented by over 1% of these crane flies include shrubs, meadows, pine forests with an undergrowth of lichen (*cladoniosum*) and spruce (*oxalidosum*), mixed woods, alder groves and gardens. Larvae occur in damp soil in alder groves.

149. Dicranomyia (Dicranomyia) omissinervis De Meijere, 1918

Flight period from mid-June (earliest 12.VI.1988) to mid-October (latest 12.X.1991).

Biotopes: it most frequently was found in pinewoods (*Pinetum cladoniosum*) (60%), with females prevailing. 20% of the insects were collected in deciduous forests, and 13% on riverbanks. Solitary specimens were recorded in meadows.

150. Dicranomyia (Dicranomyia) patens Lundström, 1907

It was collected in a mixed forest with small plant-filled ponds in late July.

151. Dicranomyia (Dicranomyia) ventralis (Schummel, 1829)

It was observed flying from mid-May to late August (latest on 25.VIII.1988).

Biotopes: Riverbanks are the favourite habitat of the species: over 62% of the specimens were caught there. It is also fairly abundant among shrubs (20.7%), whereas only solitary specimens frequent habitats such as birch groves (5.7%), deciduous forests (3.8%), pine and spruce woods, swampy alder groves, and the vicinity of springs.

152. Dicranomyia (Dicranomyia) zernyi Lackschewitz, 1928

It was observed flying late in September in a pine forest (*Pinetum myrtillosum*) surrounded by small lakes.

153. Dicranomyia (Glochina) tristis (Schummel, 1829)

Flight period from early June (earliest 8.VI.1990) to very late July in meadows near ponds, and in pine forests dotted with small patches of wetlands.

154. Dicranomyia (Idiopyga) halterella Edwards, 1921

It was recorded near a small swampy lake (with a cover of *Sphagnum*) in a pine forest in early October.

155. Dicranomyia (Idiopyga) magnicauda Lundström, 1912

Flight period from early June to late October (latest 20.X.1988).

Biotopes: Most (over 36%) were collected in spruce forests (*Piceetum oxalidosum*), about 18% in pine woods with an admixture of spruce and birch, and only solitary specimens were found in other habitats (*Pinetum myrtillo-oxalidosum*, *Piceetum myrtillosum*, riverbanks, low-lying marshes, gardens).

156. Dicranomyia (Idiopyga) murina (Zetterstedt, 1851)

Flying insects were observed only in mid-June in alder groves near a large artificial pond.

157. Dicranomyia (Idiopyga) nigristigma Nielsen, 1919

Flight period from mid-September to mid-October mostly on river banks and in meadows.

158. Dicranomyia (Idiopyga) stigmatica (Meigen, 1830)

The species appears in early October in peat bogs.

159. Dicranomyia (Melanolimonia) morio (Fabricius, 1787)

The insects were observed flying during mid-June and late July, in low-lying marshes near small lakes, in pine forests and on riverbanks.

160. Dicranomyia (Melanolimonia) occidua Edwards, 1926

Solitary specimens were observed as early as mid-May, and the latest on 17.VI.1985 mostly in old mixed groves on steep banks of small rivers and near springs.

161. Dicranomyia (Melanolimonia) rufiventris (Strobl, 1901)

It is a rare species caught on the swampy bank of a small river bordered by young alder trees in late July 1991.

162. Dicranomyia (Numantia) fusca (Meigen, 1804)

It was caught only in a fir grove (*Piceetum hepotico-oxalidosum*) near a small river on 22.VII.1993.

163. Discobola annulata (Linnaeus, 1758)

It has a summer flight season starting in mid-July (earliest 16.VII.1993) and lasting into late August (latest 21.VIII.1989).

Biotopes: it frequents forests of the *oxalidosum* type: spruce (about 60%), oak (about 20%) and very damp groves with abundant shrubs of *Frongula alnus* Mill. (also about 20%).

164. Discobola caesarea (Osten Sacken, 1854)

It was observed flying from late June to very early October.

Biotopes: these crane flies are most plentiful in mixed forests (37.5%), and in different types of alder groves (nearly the same percentage), but they are twice as abundant in *Incanetum* as in *Alnetum*. A few insects were also collected in pioe forests where the ground is dominated by *Calluna vulgaris* (L.) and in deciduous forests.

165. Discobola parvispinula (Alexander, 1947)

Flight season from early August (earliest 8.VIII.1991) to mid-September (latest 11.IX.1992).

Biotopes: the majority was collected in pine groves with shrubs and near small plant-filled ponds, the rest close to small rivers.

166. Libnotes (Afrolimonia) ladogensis (Lackschewitz, 1940)

It was recorded only in early June on the steep banks of a small river covered by old mixed trees.

167. Limonia albifrons (Meigen, 1818)

It probably has two generations a year. The first from late May to mid-June, while a few specimens were also collected on 11.IX.1992.

Biotopes: most specimens were found near rapidly flowing rivers, among shrubs and luxuriant herbaceous vegetation. Some of them were recorded in a humid spruce forest (*oxalidosum*).

168. Limonia flavipes (Fabricius, 1787)

It was recorded flying from mid-May to the very end of July.

Biotopes: it is most abundant near rivers. Over 37% of the specimens were collected on their banks. 23.6% were caught in spruce forests (*oxalidosum*), 13.7% in birch groves (*axalidosum*). Only about 3% of the specimens were found in habitats such as deciduous forests bordering lakeshores, pine woods (*Pinetum hepatico-oxalidosum*) and swampy alder groves (*Alnetum filipendulosum*). Solitary specimens were recorded in meadows with shrubs and other types of coniferous and deciduous forests. Larvae were collected in very humid soil, near slowly flowing streams.

169. Limonia macrostigma (Schummel, 1829)

Its flight period is very long, and this species probably has at least two or even more generations a year. Their flight periods seem to overlap since no pauses were observed between them. The earliest date was 6.V.1989, the latest 9.X.1992.

Biotopes: most specimens were collected on riverbanks (nearly 56%). Others were distributed in various habitats without showing preference for a particular one. Thus, 9% of the insects were found in alder groves with springs, 7.8% in spruce forests *oxalidosum*, 6.5% in boggy alder groves (*Alnetum filipendulosum*) and 5.1% in *Alnetum fluviale-urticosum*. The species was also recorded in different types of pine forests, birch groves, shrubs, swampy riverbanks and upland bogs. Larvae were collected amidst a dense and humid mass of rotten leaves.

170. Limonia nigropunctata (Schummel, 1829)

It was observed flying in alder groves on a riverbank in mid-May.

171. Limonia nubeculosa Meigen, 1804

Flight period during nearly the whole vegetative period: from late April (earliest 19.IV.1989) to early October. The species is likely to have two or more generations a year. Their flight periods, however, overlap and no breaks were noticed between them.

Biotopes: the species was found in different habitats without apparent preference for a particular one. 20% of the specimens were collected in shrubs and alder groves on the banks of ponds

and in meadows near humid spruce forests (*oxalidosum*). More than 13% were captured on riverbanks and steep banks of small streams overgrown by old mixed groves. Solitary specimens were observed in pine and spruce forests, alder groves and meadows. Larvae were collected in the wet mud and amidst a dense and humid mass of rotten leaves.

172. Limonia phragmitidis (Schrank, 1781)

Flight period from late May (earliest 18.V.1989) to early August (latest 10.VIII.1993); one generation a year.

Biotopes: it is fairly abundant in a rather dry environment. The largest aggregations were observed on riverbanks (over 40%) and in the spruce forests (*P. oxalidosum*) (nearly 10%). Other specimens were found in the following habitats: meadows near damp spruce forests (*P. oxalidosum*) (6.7%), alder groves (*Incanetum oxalido nemorosum*) (6.3%), deciduous groves on lakeshores and deciduous woods (5.6% and 5.4% respectively), other types of alder groves (up to 3.5%) and pine forests. 2.8% were caught in pine forests (*Pinetum vaccinio-myrtillosum*). Single specimens were collected in other types of spruce forests, mixed woods, birch and ash groves, shrubs, peat bogs, meadows and gardens. Larvae were captured amidst a very humid mass of rotten leaves and mud, in soil rich with organic material, and under fallen leaves.

Among the predators preying on this species was a female of *Dioctria atricapilla Mg.* (*Asilidae*) captured catching a female of *L. phragmitidis* in a meadow near shrubs.

173. Limonia stigma (Meigen, 1818)

Flight period from the last days of June to mid-August.

Biotopes: it was found in a variety of habitats, and no preference for a particular one was observed. It was most abundant in deciduous groves on lakeshores (28%), on riverbanks (17.8%), among shrubs near flowing water (10.7%) and in different types of alder groves (up to 12.6%). It was also recorded in various pine forests, but only in *Pinetum hepatico-oxalidosum* were as many as 6.5% of the insects found. Single specimens were also recorded in deciduous forests, parks, meadows and on swampy riverbanks.

174. Limonia sylvicola (Schummel, 1829)

Only one male was caught in a humid spruce forest near a river, in mid-August.

175. Limonia trivittata (Schummel, 1829)

Flight period from late June (earliest 23.VI.1989) to late August.

Biotopes: it lives in many different habitats without showing a preference for any in particular. The largest numbers of insects were collected in different types of alder groves, with the following distribution: 22.1% in *Alnetum filipendulosum*, 14.3% in *A. urticosum*, 1.3% in *A. fluviale-urticosum* and 11.7% in swampy *A. filipendulosum*. The species is fairly abundant on riverbanks (over 14%), in deciduous woods (nearly 12%) and deciduous groves on lakeshores (9%). The species was also

recorded on swampy riverbanks, near springs, in pine forests, parks, and even on sandy dunes on the sea coast.

176. Metalimnobia bifasciata (Schrank, 1781)

Flight period from mid-May to early September (earliest 13.V.1989, latest 10.IX.1986).

Biotopes: it occurs in a variety of habitats. The largest number of specimens (17.2%) was recorded in deciduous forests on lakeshores. The species is fairly abundant in mixed forests (nearly 14%) and shrub-covered swampland (nearly 7%). Solitary specimens were caught in shrubs, different types of pine and spruce forests, oak, birch, alder and ash groves, as well as in gardens. Larvae were collected from various mushrooms in pine forests (southern Lithuania).

177. Metalimnobia quadrimaculata (Linnaeus, 1761)

Flight period from mid-May to very early October.

Biotopes: it was found in different habitats, but most frequently only solitary specimens were captured. Strange as it may seem, a large number of them was collected in cities (about 23%). A lot of insects were observed in pine forests (*Pinetum vaccinio-myrtillosum*) (about 15.5%) and nearly as many in alder groves with springs. Solitary specimens were also recorded in parks, ash groves, mixed and spruce forests, on riverbanks and in meadows. A large number of larvae were collected under the bark of dead old *Salix* trees standing by the river.

The sex ratio of the adult insects is 1.33 and that of the larvae collected is 3.00 (about 15% of them did not survive).

178. Metalimnobia quadrinotata (Meigen, 1818)

Flight period from late April (earliest 20.IV.1989) to early September (latest 10.IX.1985).

Biotopes: it was found in diverse habitats. The largest number of them (roughly 25%) was recorded on riverbanks, 11.3% in pine forests with an undergrowth of bilberries, and nearly 9% in spruce forests with an admixture of birch and ash trees. A fairly large number (6.5%) were caught in other pine forests (*P. hepatico-oxalidosum*). Isolated individuals were also captured in parks, cities, meadows, shrubs, upland moors, swampy forests, other types of pine and spruce forests, alder and birch groves. A few larvae were collected from mushrooms growing in pine forests of southern Lithuania.

179. Neolimonia dumetorum (Meigen, 1804)

Flight period from early June to mid-August.

Biotopes: it is most abundant (about 40%) in spruce forests (*Piceetum oxalidosum*); about 20% of specimens were recorded in pine forests (*Pinetum vaccinio-myrtillosum*), and nearly as many in old wood-cutting areas in pine forests. Solitary specimens were also observed on river and lakeshores and in other types of pine forests. A few larvae were collected under the bark of old rotten birch stumps.

180. Rhipidia (Rhipidia) maculata Meigen, 1818

Flight period from early May to late October.

Biotopes: dense aggregations of individuals were found in wood-cutting areas overgrown by numerous young trees, and in pine forests (as many as 81.6%). They also frequent riverbanks (4.3%) and meadows near humid spruce forests (3.3%). Isolated individuals were also recorded in parks, cities, gardens, shrubs, near springs, in various forests of pine, oak and alder, in upland moors and dry meadows. Larvae were collected in rotten old birch stumps.

181. Rhipidia (Rhipidia) uniseriata Schiner, 1864

Flight period from early June to early July (earliest 8.VI.1990, latest 3.VII.1992).

Biotopes: the insects were captured on shrub-covered riverbanks, in old wood-cutting areas in pine forests, in alder groves with springs, and swampy alder groves (*Alnetum filipendulosum*) with an undergrowth of *Carex*. Males were captured with entomological nets and females with light traps.

Family Tipulidae

182. Dolichopeza (Dolichopeza) albipes (Strŏm, 1768)

All the specimens were captured nearly at the same time, i. e. in early June.

Biotopes: the largest number of specimens (nearly 67%) was collected under an old wooden bridge built across a small river in a pine forest (*Pinetum vaccinio-myrtillosum*). Solitary specimens were also captured near a small stream in an old mixed forest, and in a humid spruce forest (*P. oxalidosum*) where they were caught on the wing above a small pond.

183. Nephrotoma aculeata (Loew, 1871)

It has a late June to late September flight period (latest 23.IX.1991).

Biotopes: it was most frequently recorded in pine forests, the largest number of specimens (25%) occuring in *Pinetum vacciniosum* with a dense undergrowth of *Calluno vulgaris* (L.). Many were observed in *P. vaccinio-myrtillosum*, also in parks and shrub-covered meadows. Solitary individuals were collected in *P. hepatico-oxalidosum*, deciduous woods bordering lakeshores, and among shrubs on riverbanks.

184. Nephrotoma analis (Schummel, 1833)

Its flight period lasts from June to July (latest 6.VIII.1984).

Biotopes: the species was found in diverse biotopes without showing preference for any particular ones. Thus, over 27% of the specimens were collected on riverbanks, about 15% in pine forests with mixed spruce and birch trees. The insects like to shelter under bridges throughout the day (as many as 12% of them were collected there). Solitary individuals were also caught in cities, other

kinds of pine woods, spruce forests, alder groves, shrubs, on lakeshores, and even in karst caves. Larvae were collected under moss on wet ground.

185. Nephrotoma appendiculata (Pierre, 1919)

The flight period is not very long (earliest 22.V.1985, latest 8.VIII.1991).

Biotopes: Most of these crane flies (28.5%) were observed on riverbanks (especially in meadows on riverbanks). 13.6% were found in mixed woods, 13.0% in spruce forests (*P. oxalidosum*), and 12.0% in meadows (usually dry ones). Others were collected in cities, gardens, in barley fields, near roads, in meadows, spruce forests *myrtillosum*, alder groves, and upland moors. Isolated specimens were captured in shrubs and deciduous woods growing on lakeshores, and in pine forests. Larvae were found in humid soil in gardens and meadows.

186. Nephrotoma cornicina (Linnaeus, 1758)

It has a mid-June to early August flight period.

Biotopes: the largest number of these crane flies (as many as 25%) was collected on sandy hills on the seashore, and nearly 19% in deciduous forests on lakeshores and on riverbanks. The species is fairly common (about 6%) in cities and in *Pinetum vacciniosum* with a dense undergrowth of *Calluna vulgaris* (L.). Isolated specimens were recorded in meadows and gardens. Larvae were found hidden in the soil of lowlands and in humid places.

187. Nephrotoma crocata (Linnaeus, 1758)

Flight period from late June (earliest 20.VI.1992) to early August in alder groves (*Alnetum filipendulosum*), on riverbanks and in cities. Larvae were captured in the soil of lowlands and in humid places.

188. Nephrotoma dorsalis (Fabricius, 1782)

Its flight period lasts from mid-June (earliest 11.VI.1988) to early August.

Biotopes: the insects were most frequently recorded on riverbanks (nearly 32%), on the riverside with springs (over 18%), in deciduous groves on lakeshores (nearly 16%), and in shrubs near rivers (13.6%). Solitary individuals were also collected in pine and mixed forests, different alder groves and cities.

Gerris (Aquarius) najas (De Geer, 1773) is one of the predators of this species. A copulating pair was observed to catch a female of *N. dorsalis* and skate for a long time with it over the water of a small stream flowing across fields.

189. Nephrotoma flavescens (Linnaeus, 1758)

It has a late May to early August flight period.

Biotopes: it is most common in cities (43.5%), gardens (17.4%) and shrub-covered meadows (13%). Solitary individuals were also observed in birch and alder groves, shrubs, meadows and on lakeshores. Larvae were found in the soil of moist depressions.

190. Nephrotoma lamellata (Riedel, 1910)

It has a flight period from late May to late June.

Biotopes: the insects were collected in pine forests (*Pinetum myrtillo-oxalidosum*), alder groves (*Inconetum oxalido-nemorosum*), on lakeshores, and in cities.

191. Nephrotoma lunulicornis (Schummel, 1833)

Flight period from late May (earliest 19.V.1989) to late August (latest 24.VIII.1987).

Biotopes: it was found in diverse habitats, but it obviously forms aggregations only on riverbanks (nearly 32%). Other individuals were collected in cities (9.4%), spruce forests (*P. oxalidosum*) (7.7%), upland moors and gardens (about 7% in each of them). Solitary specimens were also caught in parks, deciduous forests and groves, different pine forests, swampy spruce forests, mixed woods, alder, ash and birch groves, shrubs and corn fields. Larvae were collected in the soil of deciduous forests.

192. Nephrotoma pratensis (Linnaeus, 1758)

It has an early May to early July flight period (earliest 9.V.1991, latest 6.VII.1987).

Biotopes: it mostly occurs in drier and more open habitats. The largest number (over 36%) was recorded in gardens and nearly 29% by rivers. It is the commonest crane fly in big cities in early summer, when it is most abundant in streets (nearly 23% of the specimens were collected there). Solitary individuals were also found in parks, pine forests, alder groves, meadows gravel pits and near roads. Larvae were collected in the soil of natural meadows in autumn.

193. Nephrotoma quadrifaria (Meigen, 1804)

Flight period from mid-June (earliest 9.VI.1990) to late July (latest 23.VII.1988).

Biotopes: it gives preference to open habitats. More than 23% of them were found on riverbanks, and nearly as many in gardens. About 15% were recorded in *Alnetum fluviale-urticosum* whereas solitary specimens were caught in mixed woods, other types of alder groves, shrubs and meadows. Larvae were collected among shrubs by rivers, in the soil under the carpet of dead leaves.

194. Nephrotoma quadristriata (Schummel, 1833)

Flight period from early June (earliest 8.VI.1988) to early September (latest 4.IX.1991).

Biotopes: it was usually found in meadows (nearly 31%), and in fairly dry pine forests (over 21%). Some were also collected in meadows interspersed by springs (nearly 12%), shrubs within easy reach of water (about 7%), on open and swampy riverbanks (altogether about 14%). Solitary specimens were observed in alder groves, gardens and cities.

195. Nephrotoma scalaris (Meigen, 1818)

Flight period from late June (earliest 25.VI.1989) to mid-August (latest 18.VIII.1988), on riverbanks and in pine forests (*Pinetum hepatico-oxalidosum*). Larvae were collected in the soil near peat bogs.

196. Nephrotoma scurra (Meigen, 1818)

Its flight period lasts during the entire summer to mid-September (earliest 3.VI.1988).

Biotopes: it swarms plentifully near small rivers (about 27%) and in meadows (over 26%). A fairly large number of specimens (6.5%) were found in big cities, and nearly as many in pine forests. Solitary individuals were captured in parks, gardens, spruce forests (*P. oxalidosum*), oak and alder groves, and on swampy lakeshores. Larvae were found in soil with a dense cover of lupines (*Lupinus polyphyllus* Lindl.), near pine forests.

197. Nephrotoma submaculosa Edwards, 1928

Its flight period lasts about three months: from late May (earliest 20.V.1990) to late August (latest 21.VIII.1989).

Biotopes: the insects occurred mostly on the banks of small rivers and in oak groves. They may quite frequently be found dead among the material cast ashore by the sea waves. The larval habitat is sandy soil near small rivers.

198. Nephrotoma tenuipes (Riedel, 1910)

It was observed only in pine forests (*Pinetum vacciniosum*) with a dense cover of *Calluna vulgaris* (L.), in July.

199. Nigrotipula nigra (Linnaeus, 1758)

The insects were seen flying from mid-May (earliest 13.V.1988) to late-July.

Biotopes: these crane flies most frequently occurred in meadows over 36% in shrub-covered ones, and over 27% in meadows devoid of shrubs. Solitary individuals were collected near springs and rivers as well as in deciduous forests and alder groves.

200. Prionocera pubescens Loew, 1844

Its flight period lasts throughout May.

Biotopes: nearly 60% of the specimens were found on swampy lakeshores in old humid mixed forests, upland moors, and most frequently on boggy riverbanks.

201. Prionocera subserricornis (Zetterstedt, 1851)

Its flight period lasts from mid-May to late August (latest 20.VIII.1989).

Biotopes: these crane flies were collected in spruce forests (*P. oxalidosum*), on riverbanks covered by shrubs and alder groves, and on shores of ponds. Larvae were found in boggy ground under a moss cover in alder groves.

202. Prionocera turcica (Fabricius, 1787)

All the insects were collected on riverbanks from mid-May to early June.

203. Tipula (Acutipula) fulvipennis De Geer, 1776

Its flight period lasts from early June to mid-September (latest 19.IX.1989). Since only isolated individuals are usually recorded, the species is unlikely to swarm plentifully.

Biotopes: the largest number of them was collected on riverbanks (nearly 29%), in oak groves (nearly 17%), and among shrubs and alder trees on the shores of ponds (nearly 12%). The others were collected in alder groves and deciduous forests. Solitary individuals were caught on boggy riverbanks, near springs, in pine and spruce forests, mixed woods, parks, shrubs, shrub-covered meadows, and even on sandy dunes on the sea coast. Larvae were found in the humid soil under the leaf litter near small streams.

204. Tipula (Acutipula) luna Westhoff, 1879

Flight season from mid-May (earliest 10.V.1990) to early July (latest 5.VII.1985).

Biotopes: it was found mostly in humid environments. Nearly 38% of the specimens occurred on riverbanks, 26% in spruce forests (*P. oxalidosum*), and 13% in alder groves with springs. They were also fairly frequently recorded in meadows (over 6%). Solitary specimens were recorded in other types of spruce forests, as well as in alder groves and gardens. Larvae were collected in alder groves, in the humid soil at the edge of a spring.

One male and one female were observed feeding on the sweet exudate of aphids *Macrosiphum cholodkovskyi* (Mordvilko 1909) on meadowsweet (*Filipendula ulmaria*) in the *oxalidosum* spruce forest.

205. Tipula (Acutipula) maxima Poda, 1761

Flight period from late May (earliest 20.V.1989) to early July (latest 12.VII.1991).

Biotopes: the majority of the specimens were found on riverbanks (over 51%), and on steep banks of small rivers covered by old mixed groves (over 14%). The species is also fairly common in spruce forests (*P. oxalidosum*) and alder groves. Solitary specimens were captured on lakeshores. Larvae were very frequently found in the moss in the swiftly running water of small streams and springs. Under laboratory conditions they complete their development in still water as well.

The sex ratio of the adult insects is 2.18, and that of the larvae 0.70.

206. Tipula (Acutipula) tenuicornis Schummel, 1833

Flight period from early May (earliest 9.V.1989 and 1990) to early June (latest 4.VI.1988).

Biotopes: nearly all the insects (84.6%) were collected on the banks of small rivers (even of polluted ones). Over 15% were recorded in alder groves (*Alnetum filipendulosum*). Solitary specimens were caught in other types of alder groves, but only those with springs. Larvae were collected in the wet soil at the edge of a small river.

207. Tipula (Beringotipula) unca Wiedemann, 1817

Flight period from late May to late July (latest 25.VII.1991).

Biotopes: it shows preference for riverbanks (over 47%), lakeshores with alder groves (11%) and damp alder groves of different types (up to 9.4%). Solitary specimens were collected in the following areas: shrubs, swampy riverbanks, flooded meadows, coniferous and deciduous forests.The larval habitat is moist soil.

208. Tipula (Dendrotipula) flavolineata Meigen, 1804

Its flight period lasts from late May (earliest 18.V.1989) to early June (latest 8.VI.1990), in pine forests (*Pinetum hepatico-oxalidosum*) and on the banks of small streams covered by old mixed groves.

209. Tipula (Lindnerina) bistilata Lundström, 1907

Flight period from late May (earliest 19.V.1989) to mid-June. One female was also caught in mid-July.

Biotopes: pine forests (*Pinetum hepatico-oxalidosum*) and mixed groves on riverbanks.

210. Tipula (Lunatipula) affinis Schummel, 1833

The insects were recorded from late June to early July, in swampy forests and shrub-covered meadows on lake coasts.

211. Tipula (Lunatipula) fascipennis Meigen, 1818

Flight period from mid-June (earliest 10.VI.1988) to early August (latest 8.VIII.1991).

Biotopes: the largest numbers of insects was collected on riverbanks (nearly 40%), and in swampy alder groves (*Alnetum filipendulosum*) (over 14%). They were also abundant in shrubs (nearly 7%), on lakeshores (5.4%) and in meadows (4.7%). Solitary individuals were captured on swampy riverbanks and lakes, in upland moors, as well as in coniferous, deciduous and mixed forests, birch groves and cities. Larvae were found under the leaf litter.

212. Tipula (Lunatipula) humilis Staeger, 1840

Its flight period lasts from mid-June to mid-July.

Biotopes: the species shows preference for riverbanks (over 58%) and humid alder groves (32.8%). Solitary specimens were collected in meadows and shrubs.

213. Tipula (Lunatipula) laetabilis Zetterstedt, 1838

Its flight period starts late in June and lasts to mid-August (latest 11.VIII.1988).

Biotopes: Over 33% of the specimens were collected on riverbanks, about 23% in mixed woods bordering rivers, and nearly the same percentage was recorded on lakeshores. Solitary specimens were captured in birch groves and humid spruce forests. Larvae were collected under the leaf liner in humid mixed woods.

214. Tipula (Lunatipula) limitata Schummel, 1833

Its flight period starts in late June and lasts to mid-July.

Biotopes: Over 60% of the specimens were collected on lake costs, more than 30% on river banks, and others in a meadow on a riverbank among pine forests.

215. Tipula (Lunatipula) livida van der Wulp, 1858

Flight period from late June (earliest 25.VI.1989) to mid-July (latest 22.VII.1993).

Biotopes: the largest numbers of these crane flies were found in fairly humid pine forests (*Pinetum hepatico-oxalidosum*) (about 67%) and in swampy alder groves (*Alnetum filipendulosum*) (about 22%). The others were caught on riverbanks.

216. Tipula (Lunatipula) lunata Linnaeus, 1758

It was seen flying from late May to early August (earliest 19.V.1989, latest 5.VIII.1985).

Biotopes: it shows preference for a humid environment. Nearly 32% of the specimens were collected on riverbanks. Other insects were caught in different pine forests, *Pinetum myrtillo-oxalidosum* being their favourite habitat (nearly 8%). 6.6% were found on lakeshores in deciduous groves. The same percentage was recorded on open lakeshores. Solitary individuals were captured in cities, meadows, deciduous groves, spruce forests, alder woods and gardens. Larvae were collected in the soil among shrubs.

217. Tipula (Lunatipula) peliostigma Schummel, 1833

The insects were seen flying in meadows and shrubs on the banks of rapidly flowing rivers from late June to mid-July.

218. Tipula (Lunatipula) selene Meigen, 1830

Its flight period lasts from late May to mid-June.

Biotopes: nearly all the insects were caught on riverbanks, but larvae were collected farther away from water, under the moss on trees (some of them as high as 3 m; even under snow in early spring). Larvae are usually found on old oak trees, sometimes under the bark of dead and rotting alder trees. It is interesting to note that larvae are more common than adults. Since larvae are restricted to old oak trees and since pine forests prevail in southern Lithuania, they were not captured in southern districts.

The sex ratio of adults is 1.50, and that of the larvae is 2.50.

219. Tipula (Lunatipula) vernalis Meigen, 1804

It has a flight period lasting from early May (earliest 9.V.1989) to early July.

Biotopes: this species favours rather dry habitats. Thus, it is usually found in meadows far away from water (as many as 46.7% of the specimens captured). 23% occurred on open riverbanks (mostly in meadows) and 15.6% in flood-plain meadows of the Nemunas river. The species is fairly common at the edge of pine forests (8.2%). Solitary specimens were collected in cities, alder groves and gravel pits. Larvae were dug out of the soil in meadows.

T. vernalis was also found among organic remnants cast ashore by the sea waves.

220. Tipula (Odonatisca) nodicornis Meigen, 1818

It is not a common species, its range being restricted to areas with sandy soils. Since hard clayey soils prevail in the central and northern parts of Lithuania, the species was not found here. Its flight period lasts from late May (the earliest specimens were collected on May 20 1989) to mid-August.

Biotopes: the species occurs in fairly dry pine and spruce (*Piceetum myrtillosum*) forests, in the vicinity of graveled and sandy roads in forests, and sometimes in meadows. It was rather frequently recorded near rivers (38.5%), although farther away from water, and in areas with sandy soil. Females were observed laying eggs only in early morning and late evening, when the air is most humid. Larvae were collected in sandy soils in meadows and among shrubs near small rivers.

221. Tipula (Platytipula) autumnalis Loew, 1864

Flight period lasts throughout September to early October.

Biotopes: It is mostly found in swampy birch groves, some specimens were caught in damp spruce groves and only two males in *Alnetum fluviale-urticosum*.

222. Tipula (Platytipula) luteipennis Meigen, 1830

Flight period from late August to early October (earliest 20.VIII.1989, latest 10.X.1991).

Biotopes: the species forms aggregations only on swampy riverbanks (as many as 97.5% of the total were caught there). Solitary specimens were recorded on swampy lakeshores, among shrubs near ponds, and in cities. Larvae were captured only once, in wet soil close to the swampy riverside.

Collections by entomological nets were dominated by males, whereas females prevailed in light-trap collections. Since most specimens were netted, the sex ratio of the whole material is 22.08.

223. Tipula (Platytipula) melanoceros Schummel, 1833

Flight period from late September to mid-October (earliest 20.IX.1989, latest 12.X.1991).

Biotopes: swampy shores of small lakes (covered by *Sphagnum*) and boggy riverbanks.

224. Tipula (Pterelachisus) irrorata Macquart, 1826

It was observed flying from late May to mid-August.

Biotopes: the largest number of this kind of crane flies was found in fairly dry areas. Thus, 38.5% of them were recorded in pine woods (*Pinetum myrtillo-oxalidosum*), while only 15.4% were collected in humid spruce forests (*P. oxalidosum*). Solitary specimens were collected on riverbanks, in upland moors near canals, in birch and alder groves, deciduous forests, meadows, and on graveled roads passing through pine forests. Larvae may frequently be found under moss on trees and stones, more rarely in rotting deciduous and coniferous trees, and occasionally under a litter of spruce needles.

The sex ratio of the adult insects is 0.43, nearly the same as that of the larvae (0.50).

225. Tipula (Pterelachisus) jutlandica Nielsen, 1947

Only once recorded in *Pinetum myrtillo-oxalidosum*, in early June 1989.

226. Tipula (Pterelachisus) luridorostris Schummel, 1833

Its flight period lasts from mid-June to mid-August, in meadows, swampy spruce forests and cities.

227. Tipula (Pterelachisus) mutila Wahlgren, 1905

It was seen flying only on riverbanks in mid-June 1988.

228. Tipula (Pterelachisus) pabulina Meigen 1818

Flight period from mid-May (earliest 9.V.1990) to early July.

Biotopes: the largest number (about 21%) was caught on the banks of large and small rivers, quite a few (as many as 17.2%) in big cities (Vilnius), the same percentage in parks, and nearly 14% in pine forests (*Pinetum hepatico-oxalidosum*). Solitary specimens were collected in gardens, alder groves and mixed woods. Larvae were collected only once, under moss on a rotten tree trunk.

229. Tipula (Pterelachisus) pauli Mannheims, 1964

The insects were seen flying in meadows and shrubs on riverbanks, in June.

230. Tipula (Pterelachisus) pseudoirrorata Goetghebuer, 1921

It has a flight season from late May to early July. One female was also caught on 1.X.1986.

Biotopes: the largest number of insects was collected in spruce forests. Some specimens were recorded in a pine forest (*Pinetum myrtillo-oxalidosum*).

231. Tipula (Pterelachisus) pseudovariipennis Czizek, 1912

Its flight period lasts from mid-May (earliest 9.V.1989) to late June (latest 26.VI.1986).

Biotopes: the biggest aggregations of them were observed in pine forests, *Pinetum hepatico-oxalidosum* being their favourite haunt (35%). Quite a few were collected on the banks of small rivers

(about 20%), and about 10% in gardens. Solitary individuals were caught in deciduous woods, parks and cities, and on sandy dunes on the sea coast.

232. Tipula (Pterelachisus) submarmorata Schummel, 1833

Its flight period lasts from early May (earliest 9.V.1989) to late June (latest 26.VI.1986) (single female was caught even in late August).

Biotopes: The biggest aggregations of them were observed in alder groves, *Incanetum aegopodiosum* being their favourite one (18.2%); quite a few were collected on the banks of small rivers covered with alders (about 16%), and about 14% in gardens. Solitary individuals were caught in meadows, parks, spruce forests, on lake shores, in cities and gardens.

233. Tipula (Pterelachisus) trifascingulata Theowald, 1980

The insects were observed only in early June, flying in flood-plain meadows of the Nemunas river, in shrubs near rivers, and in pine forests (*Pinetum myrtillo-oxalidosum*).

234. Tipula (Pterelachisus) truncorum Meigen, 1830

Flight period from late June (earliest 23.VI.1990) to early August (latest 6.VIII.1991).

Biotopes: the insects mostly occur on lakeshores, and sometimes on riverbanks. Only once were larvae collected under moss on the ground, in a deciduous grove bordering a lake.

235. Tipula (Pterelachisus) varipennis Meigen, 1818

Its flight period lasts from early May to mid-June (latest 12.VI.1988).

Biotopes: mostly collected on the banks of small rivers (nearly 67%) and fairly common in alder groves with springs (over 23%). Solitary individuals were captured on swampy lakeshores, in pine forests and parks. Larvae were found under the leaf litter in alder groves.

236. Tipula (Pterelachisus) wahlgreni Lackschewitz, 1925

It was recorded in a pine forest in late May 1985.

237. Tipula (Savtshenkia) grisescens Zetterstedt, 1851

Its flight period lasts from mid-April (earliest 12.IV.1990) to early May (latest 11.V.1990), in swampy riverbanks and boggy alder groves (*Alnetum filipendulosum*).

238. Tipula (Savtshenkia) invenusta Riedel, 1919

All the specimens were caught in upland moors (with dense *Sphagnum* cover) and on the moss-covered (*Sphagnum*) shore of a small lake in early October.

239. Tipula (Savtshenkia) limbata Zetterstedt, 1838

The species is most active from early September until late October (latest 18.X.1985 and 1989).

Biotopes: the largest number of these crane flies was collected on the banks of swampy ponds (over 33%), riverbanks (nearly 27%), and in meadows (20%). Solitary specimens were captured on swampy lakeshores and in upland moors.

240. Tipula (Savtshenkia) obsoleta Meigen, 1818

The insects were observed flying in peat bogs, meadows, and pine forests on the banks of small rivers only at the beginning of October.

241. Tipula (Savtshenkia) signata Staeger, 1840

Its flight period lasts from late August (earliest 25.VIII.1988) to late October.

Biotopes: the largest number of these insects was collected in meadows (nearly 47%) and in upland moors (33.3%). Solitary specimens were captured in birch groves, parks and on riverbanks. Larvae were found under humid moss on dead tree trunks.

242. Tipula (Savtshenkia) staegeri Nielsen, 1922

It was observed flying in upland moors in early October.

243. Tipula (Savtshenkia) subnodicornis Zetterstedt, 1838

The insects were seen flying in early May.

Biotopes: Most of these crane flies were collected in upland moors, others in plant-filled ponds, meadows, alder groves, and on riverbanks. Larvae were only once found under *Sphagnum* on wet ground, in late autumn.

244. Tipula (Schummelia) variicornis Schummel, 1833

It has a mid-May to late July flight period (earliest 10.V.1990, latest 22.VII.1989).

Biotopes: mostly collected on the banks of small rivers (22.6%), in humid spruce forests (*P. oxalidosum*) (over 20%), pine woods (*Pinetum myrtillosum*) (nearly 16%) and *oxalidosum* birch groves (9%). Occasionally found in other types of pine woods, alder groves, and mixed forests with small rivers, as well as on lakeshores. Solitary specimens were recorded in upland moors with small and scattered pine trees, spruce forests (especially swampy ones) and parks. Larvae were collected in moist soil on riverbanks, near springs.

245. Tipula (Tipula) oleracea Linnaeus, 1758

Only isolated individuals are usually recorded flying with *T. paludosa*. It has an August flight period (the same period of activity has also been recorded by the author in the neighboring territories of north-eastern Poland).

Biotopes: most insects were found in meadows, and some of them in cities.

All the specimens were captured with entomological nets. In Poland, however, the author collected them exclusively with light traps.

246. Tipula (Tipula) paludosa Meigen, 1830

Flight period from early July (earliest 2.VII.1991) to mid-October. Collecting dates show that the peak emergence is in August.

Biotopes: the vast majority of these crane flies (as many as 67.6%) was collected in meadows, whereas only 8.8% were found in gardens. Solitary specimens were caught in shrubs (near meadows), on riverbanks and lakes, in spruce forests, in alder and birch groves, in swamps and in cities. Larvae were found hidden in the meadow soil.

247. Tipula (Tipula) subcunctans Alexander, 1921

Flying insects were collected in peat bogs and meadows only in October.

248. Tipula (Vestiplex) excisa Schummel, 1833

It was observed flying in a humid spruce forest (*P. oxalidosum*) in early July.

249. Tipula (Vestiplex) hortorum Linnaeus, 1758

Flight period from mid-May (earliest 9.V.1990) to early June.

Biotopes: the largest number of individuals was collected on riverbanks (over 33%), and nearly as many in the city of Vilnius. The species is fairly common in gardens (nearly 15%). Solitary specimens were captured in parks and alder groves. Larvae were collected in the moss-covered ground of a park.

250. Tipula (Vestiplex) nubeculosa Meigen, 1804

Its flight period starts in late May (earliest 20.V.1989) and lasts into early July (latest 7.VII.1986).

Biotopes: the majority of these crane flies was collected in spruce forests (*Piceetum oxalidosum*) (over 63%), others in pine woods (*Pinetum myrtillo-oxalidosum*) (over 13%) and on riverbanks (nearly 12%). Solitary specimens were caught in other types of spruce forests. Larvae were collected in the moist ground in a spruce forest (*P. oxalidosum*).

251. Tipula (Vestiplex) scripta Meigen, 1830

It has a very long flight period lasting from mid-May to mid-October.

Biotopes: although the species is concentrated mostly in coniferous forests, it may also be found in very diverse habitats. It is most abundant in pine woods, especially in the vicinity of lakes. It is in *Pinetum vaccinio-myrtillosum* that the largest number of the specimens was found (over 27%). They were fairly plentiful on riverbanks (12.5%), in spruce forests, particularly in *P. oxalidosum*

(8.3%), and in mixed woods (5.7%). Solitary individuals were captured in oak, birch, ash and alder groves, in shrubs, meadows, gardens and cities. Larvae were collected under moss on birch stumps.

252. Tipula (Yamatotipula) caesia Schummel, 1833

Its flight period lasts from late June to mid-October, in swampy alder groves (*Alnetum filipendulosum*) and on riverbanks. Larvae were found in a very moist soil on riverbanks.

253. Tipula (Yamatotipula) coerulescens Lackschewitz, 1923

Flight period from mid-May (earliest 8.V.1988) to early August (latest 10.VIII.1989).

Biotopes: the largest number was collected in meadows, on riverbanks, and some in land-improvement canals. Larvae were found in mud and sandy soils on riverbanks, often under water.

254. Tipula (Yamatotipula) couckei Tonnoir, 1921

Flight period from late April to late August.

Biotopes: this species shows a marked preference for riverbanks (65.6%) and alder groves peppered with springs (nearly 22%). Solitary individuals were also recorded in shrubs, pine forests, meadows and on lakeshores. Larvae were often collected in mud on the banks of small rivers.

255. Tipula (Yamatotipula) lateralis Meigen, 1804

It has a very long flight period, lasting from late April to mid-September.

Biotopes: most collected on riverbanks (50.6%) and in meadows (11.4%). Some of them were also recorded in shrubs, pine forests, alder groves and on lakeshores. Larvae were usually found in mud or in sandy soils on riverbanks, either at the water edge or, more frequently, under water.

256. Tipula (Yamatotipula) marginella Theowald, 1980

Its flight period lasts from late April to mid-August.

Biotopes: the largest number of them was caught on riverbanks (nearly 46%), and in flood-land meadows of the Nemunas river (21.6%). Some specimens were also collected on swampy riverbanks, in shrub-covered meadows, deciduous groves on lakeshores and alder groves. Larvae were found in mud on riverbanks.

257. Tipula (Yamatotipula) montium Egger, 1863

Its flight period lasts from late May (earliest 20.V.1988) to mid-August.

Biotopes: it was most frequently observed on riverbanks and hill slopes close to ponds. Solitary individuals were collected in alder groves peppered with springs. Larvae were usually found in mud and dead organic material at the bottom of rivers, close to the bank.

258. Tipula (Yamatotipula) pierrei Tonnoir, 1921

Flight period from early May to mid-September.

Biotopes: these insects were usually found among deciduous trees and shrubs on lakeshores (nearly 60%), and in alder groves (over 9%). Others were collected in different kinds of meadows, as well as on riverbanks. Solitary individuals were captured in cities and gardens. Larvae were generally found hidden in very humid soil on the banks of different water bodies. Some were collected under the moss *Bryum caespiticium* Hedw., on dead trees surrounded by water.

259. Tipula (Yamatotipula) pruinosa Wiedemann, 1817

Its flight period starts in late May and lasts into mid-August.

Biotopes: the largest number was collected on riverbanks (over 43%), in shrubs near rivers (9.1%) and among deciduous trees and shrubs on lakeshores (nearly 7%). Others occurred near springs, in pine forests, mixed and deciduous woods, and in different kinds of meadows. Solitary individuals were captured in various alder groves. Larvae were found in very humid soil near water.

260. Tipula (Yamatotipula) quadrivittata Staeger, 1840

Its flight period starts in early June and lasts into mid-July (latest 17.VII.1993).

Biotopes: riverbanks covered by alder groves with abundant springs, and upland marshes.

261. Ctenophora (Cnemoncosis) festiva Meigen, 1804

A lone female was caught in a meadow near a river, early in July.

262. Ctenophora (Ctenophora) flaveolata (Fabricius, 1794)

Its flight season lasts from late April (earliest 23.IV.1990) to mid-May (latest 17.V.1988).

Biotopes: most insects were found in old parks and city streets. According to A. Stubbs (1992), this species is a good indicator of ancient woodlands in England (pg. 23), but since in Lithuania it is fairly frequently recorded in streets, this cannot be the case here.

263. Ctenophora (Ctenophora) guttata Meigen, 1818

Flight period from early April to mid-June (latest 19.VI.1990), in old parks and city streets.

264. Ctenophora (Ctenophora) pectinicornis (Linnaeus, 1758)

A single female was caught by prof. T. Ivanauskas in Kaunas (central Lithuania), on 3.V.1927. The label says that the specimen was caught at the railway station.

265. Dictenidia bimaculata (Linnaeus, 1761)

The species was observed flying from late June (earliest 27.VI.1990) to the very end of July, in alder groves on lakeshores, and near swamps and ponds. The larval habitat is rotten stumps of birch and alder trees.

266. Tanyptera (Tanyptera) atrata (Linnaeus, 1758)

Its flight period lasts from mid-May to late June (earliest 9.V.1990, latest 26.VI.1988). It should be noted that only solitary specimens could be found.

Biotopes: it occurs among deciduous trees, especially in such humid areas as riversides and swamplands. Some individuals were recorded in parks and gardens. Larvae were found in the rotten wood of old oaks.

Family Cylindrotomidae

267. Cylindrotoma distinctissima (Meigen, 1818)

It probably has two generations a year, since two periods of activity were recorded. The first from mid-May (earliest 10.V.1990) to early July, the second from late July to early September.

Biotopes: the largest number of these insects was collected on riverbanks (nearly 36%), in different types of alder groves, where it is most abundant in *Incanetum oxalido-nemorosum* (over 16%), in mixed groves on steep banks of small streams (13%), and in spruce forests (*P. oxalidosum*) (6.5%). The species was also observed in cities, parks, pine forests, other kinds of spruce woods, as well as in oak groves and near springs. Solitary individuals were captured in meadows. Larvae were collected from leaves of *Polemonium coeruleum* L.

One female of *C. distinctissima* was found on the seashore, among the material cast ashore by the waves.

268. Diogma glabrata (Meigen, 1818)

Its flight period starts in mid-June and lasts into early August (latest 6.VIII.1985).

Biotopes: it is most abundant on riverbanks (over 27%), but it is not evenly distributed in different habitats. As far as alder groves are concerned, it was found only in *Alnetum fluviale-urticosum* (11.4%), whereas the same number (about 10%) were recorded in mixed forests and on riverbanks with numerous springs. The species is fairly common in different types of pine forests, showing a preference for *Pinetum vacciniosum* with a dense undergrowth of *Calluna vulgaris* (L.) (8.6%). It was also recorded in parks (7.1%). Solitary individuals were collected in spruce forests (*P. oxalidosum*), birch groves, shrubs and cities.

269. Phalacrocera replicata (Linnaeus, 1758)

All these insects were caught on swampy lakeshores and small rivers in early May.

270. Triogma trisulcata (Schummel, 1829)

It has an early May flight period, on swampy lakeshores and the banks of springs.

271. Trichocera (Metatrichocera) forcipula Nielsen, 1921

It was observed flying from 22.VIII.(1993) to 12.X.(1991 and 1992).

Biotopes: the largest number of specimens was collected in pine forests on riverbanks (50%), and among shrubs and alder trees on swampy lakeshores (43.5%). The species is also fairly common in *Pinetum cladoniosum* (5.1%). Solitary individuals were spotted in peat bogs, meadows, deciduous forests and on open riverbanks.

272. Trichocera (Metatrichocera) inexplorata (Dahl, 1967)

Syn. *Tr. skrobli* Podenas 1991

This species was described by the author as *Tr. skrobli* from southern Lithuania, but, after examination of additional material with the help of E. Krzeminska and J. Stary, it appeared to be identical to *T. inexplorata* described by Ch. Dahl (1967) from Sweden.

It was observed flying in a pine forest (*Pinetum cladoniosum*), near a small swiftly flowing river, in mid-October.

273. Trichocera (Trichocera) annulata Meigen, 1818

It was observed flying in upland moors, *Alnetum fluviale-urticosum* and *Pinetum cladoniosum* from late September to mid-October (earliest 19.IX.1989, latest 10.X.1992).

274. Trichocera (Trichocera) hiemalis (De Geer, 1760)

The insects appear to have two flight periods a year: in spring from late February to mid-May (earliest 20.II.1990, latest 11.V.1988) depending on the weather, and in autumn from mid-September (earliest 10.IX.1986) to late October, also depending on the weather.

Biotopes: the largest number of insects was collected in shrubs on riverbanks (nearly 25%), in small meadows among shrubs (23.6%), in gardens (14.4%) and small peat bogs (8.1%). They were also captured in pine and spruce forests, mixed woods, birch and alder groves, land-improvement canals, parks, cities and some others areas.

275. Trichocera (Trichocera) maculipennis Meigen, 1818

Its flight period lasts throughout winter and spring (earliest 11.I.1989, latest 23.V.1989). A single male was caught in October, and this species, like other more abundant species of winter gnats, may well have an autumn flight season as well, although it is less active than in spring.

Biotopes: the largest number (over 51%) was found in mixed forests, hidden in places such as hollows in old trees and caves. A fairly large number was caught in gardens (32.6%). Solitary specimens were collected in cities.

276. Trichocera (Trichocera) major Edwards, 1921

It was observed flying in the autumn: from late September (earliest 19.IX.1989) to late October.

Biotopes: the largest number(48%) was collected in mixed forests near small water bodies (pools, land-improvement canals, etc.) and in pine forests, especially in *Pinetum cladoniosum* (36%). Solitary specimens were caught in peat bogs, alder groves, meadows and on riverbanks.

277. Trichocera (Trichocera) parva Meigen, 1804

The insects were observed flying only in autumn: from late September to late October.

Biotopes: the vast majority was caught on swampy shores of small lakes (as many as 76.5%) and on riverbanks (nearly 13%). Solitary specimens were collected in mixed woods near small water bodies (pools, land-improvement canals, etc.), in peat bogs and meadows.

278. Trichocera (Trichocera) regelationis (Linnaeus, 1758)

The insects were seen flying twice in the year: in spring and in autumn. The earliest individuals were observed from late March to mid-May (latest 20.V.1991). The second flight period lasts throughout October (earliest 8.X.1991).

Biotopes: the largest number was caught among shrubs (as many as 76.5%) and in pine forests (*Pinetum cladoniosum*) (over 17%). Solitary specimens were collected in spruce forests, mixed woods near small water bodies (pools, land-improvement canals, etc.), in peat bogs, meadows, gardens, and on riverbanks.

279. Trichocera (Trichocera) rufescens Edwards, 1921

Flight period from late September (earliest 24.IX.1989) to mid-November (latest 10.XI.1989).

Biotopes: the largest number of them is concentrated in shrubs (over 70%), meadows (9.6%) and pine forests (*Pinetum cladoniosum*) (9.2%). Solitary specimens were also collected in mixed woods near small water bodies, deciduous groves and shrubs bordering lakes, other types of pine forests and gardens.

280. Trichocera (Trichocera) saltator (Harris, 1776)

It was observed flying twice a year: in spring from early April to mid-May (latest 18.V.1986) depending on the weather, and in autumn, from mid-August to mid-November, also depending on the weather.

Biotopes: the largest number of them is concentrated in shrubs (51.3%), different pine forests among which they are most abundant in *Pinetum clodoniosum* (14.6%), in gardens (13.5%), and mixed groves near various small water bodies (nearly 7%). Solitary insects were caught in spruce forests, meadows, peat bogs, cities, as well as on open riverbanks and swampy lakeshores.

281. Ptychoptera albimana (Fabricius, 1787)

It likely has two generations a year: the first in May and the second from the very beginning of July to early October. No specimens were observed flying in June.

Biotopes: the vast majority of the insects was collected near springs (over 83%), and the others close to rivers. Larvae were found in the mud in springs.

282. Ptychoptera contaminata (Linnaeus, 1758)

Flight period from mid-May to mid-August (earliest 13.V.1988, latest 17.VIII.1983 and 1986).

Biotopes: it is mostly associated with stagnant water. Thus 34.5% of the specimens were collected in deciduous forests and shrubs bordering lakes, 29.1% in alder groves on the banks of slowly flowing rivers, and 14.5% on open riverbanks. Solitary specimens were caught near springs, on open lakeshores, in cities and even in pine forests. A large number of larvae were collected in the mud on the banks of very slowly flowing rivers and on lakeshores.

283. Ptychoptera lacustris Meigen, 1830

Its flight period lasts from early May (earliest 9.V.1989) to mid-July (latest 22.VII.1993).

Biotopes: Most of them were observed on the banks of big and small rivers (42.1%), on the banks of springs (29.3%) and in alder groves with springs (nearly 8%). Others were caught among different kind of vegetation within easy reach of water. Larvae were found in the mud of various small water bodies.

284. Ptychoptera minuta (Tonnoir, 1919)

Flight period from mid-June to mid-July (latest 21.VII.1988) in deciduous groves and shrubs fringing lakes, and humid spruce forests (*P. oxalidosum*) with abundant ponds.

285. Ptychoptera paludosa Meigen, 1804

Flight period from late May to mid-August (earliest 22.V.1988 and 1990, latest 20.VIII.1989).

Biotopes: the largest number was collected on riverbanks and among shrubs fringing ponds. The others were caught in humid spruce forests (*P. oxalidosum*). Larvae were only once found in the mud at the edge of a slowly flowing river.

286. Ptychoptera scutellaris Meigen, 1818

Flight period from mid-May to mid-July (earliest 9.V.1990, latest 11.VII.1988).

Biotopes: the majority of them were found on banks of bigger and smaller rivers (over 64%), at the edge of springs (28.4%) and in alder groves (*Inconetum aegopodiosum*) near ponds (6%). Larvae were found only in the mud on the banks of slowly flowing river, and in the mud close to ponds.

5. A SURVEY OF TIPULOIDEA AND PTYCHOPTERIDAE IN LITHUANIA

5.1. MAIN FEATURES OF LITHUANIAN FAUNA

Family Tipulidae. In the course of this study, 85 species of crane flies belonging to the family Tipulidae were found in Lithuania. They belong to all three subfamilies, Dolichopezinae, Tipulinae and Ctenophorinae, and to 8 genera, amounting to 14.8% of the 54 known genera of Tipulidae. The subfamily Tipulinae and genus *Tipula* prevail quantitatively in our Republic, just as they do in the world and in the Palaearctic. They form respectively 91.9% and 68.6% of the local fauna.

The world-wide genera of this family (*Dolichopeza*, *Tipula*, *Nephrotoma*) are represented in our fauna, and so are the genera which are typical only of some territories in the Old and the New World (*Prionocera*, *Nigropula*, *Dictenidia*, *Ctenophora*).

In Lithuania, 13 subgenera of the genus *Tipula* have been recorded. This amounts to 54.2% of the 24 subgenera known in the Palaearctic (22 of them are known in the former USSR).

Almost 400 species of Tipulidae have been found in the territory of the former USSR (Savchenko 1983) and about 300 in the whole of Europe (Oosterbroek 1992).

The Tipulidae have been studied unequally in the different territories of the former Soviet Union and the Palaearctic in general. The following areas in the European part of the USSR have been studied in most detail: the Ukrainian territory (without the steppe zone) - 119 species, Lithuania - 85 species (Podenas S. 1992), the region of Sankt Petersburg - 79 species. Only 47 species have up till been found now in the territory of neighbouring Bielorussia (Zapolskayia 1992). In the European countries the situation is similar: for example in former Czechoslovakia 137 species are known (Rozkosny R., Jezek J. 1987), in Switzerland 149 (Dufour Ch. 1986) and in Great Britain and Ireland 87 (Stubbs A. 1992).

Table 5.1. Comparison of the abundance of genera between Lithuania and the former USSR.

Subfamily	Abundance of genera		
	USSR	Lithuania	
		in abs. nurobers	(%)
Pediciinae	8	4	50.0
Hexatominae	19	14	73.7
Eriopterinae	30	21	70.0
Limoniinae	14	13	92.9
Total	71	52	73.2

Family Limoniidae. 181 species of Limoniidae were found in Lithuania. They belong to four subfamilies (Pediciinae, Hexatominae, Eriopterinae, Limoniinae), only the tropical Lechrinae are missing. The distribution between subfamilies is as follows: Pediciinae - 15 species (8.3% of all Lithuanian Limoniidae), Hexatominae - 39 (21.5%), Eriopterinae - 74 (40.9%) and Limoniinae - 53 (29.3%). The abundance of genera in the subfamilies as compared to the USSR fauna is shown in Table 5.1.

In the territory of the USSR the Limoniidae are even less well known than the Tipulidae. Today, the territories most studied are the Ukraine, where 267 species have been found (Savchenko 1986), and the region of Sankt Petersburg in Russia, with 149 species (Stackelberg 1951). In all, 786 species have been found in the USSR (Savchenko 1989) and 200-220 species in the European part of the USSR (Savchenko 1969). So in Lithuania, about 80% of all the Limoniidae species observed in the European part of the former USSR territory have been found. The whole of Europe contains about 650 species (Oosterbroek 1992) and 125 are known in Finland, for example (Mannheims 1965a, b 1972), in Sweden 211 (Tjeder 1955a 1968 1969 1973; Mendl 1974a), in Denmark 144 (Tjeder 1955b), in former Czechoslovakia 344 (Stary 1987a), in the southern part of Germany 186 (Mendl 1977), in Switzerland 183 (Bangerter 1948), in Northern Italy 126 (Mendl 1974b), in Great Britain 214 (Edwards 1938; Hutson and Stubbs 1974 - according to Mendl 1977). Accordingly, there must be nearly 200 species of Limoniidae in Lithuania.

Family Cylindrotomidae. There are 4 species of Cylindrotomidae insects in Lithuania. They belong to four genera and correspond to about 6.7% of the total number of existing species known today for this family throughout the world. These amount to about 60, while 8 species belonging to the extinct genus *Cyttaromyia* are also known (according to Soos and Oosterbroek 1992). 6 species are found in Europe.

Family Trichoceridae. There are 10 species of winter gnats (Trichoceridae) in Lithuania, all belonging to the genus *Trichocera* Mg. Since winter gnats have been very little studied, only 2 genera have been observed in the European part of the former USSR (*Diazosma* Bergr. with only 1 species and 12 species of the genus *Trichocero* Mg.) (Lantzov 1990). 123 species of winter gnats are known in the whole world (Dahl 1992; Rohdendorf 1964), 25 in Europe, and 14 in neighbouring Poland (Krzeminska 1991).

Family Ptychopteridae. In Lithuania there are 6 species, belonging to one genus, *Ptychoptera* Mg. The fauna of this family is very little known too and only about 6-7 species have been found in the European part of the USSR. There are 9 species of Ptychopteridae in Poland (Krzeminski 1991). There are 13 species in Europe and in the whole world 64 species are known, distributed in the Holarctic, the Ethiopian and the Oriental regions (Rozkosny 1992).

5.2. THE QUANTITATIVE COMPARISON OF LITHUANIAN CRANE FLIES

The insects of different systematical groups were counted every year and today the average results of each of them are known. The quantitative relationship between different groups mainly shows their importance in the habitats. It is quite interesting to observe that some families, as Pediciinae, with numerous but rare species play a small ecological role in their habitats. On the other hand insects of the subfamilies Limoniinae, Eriopterinae and Hexatominae which are most abundant (fig. 5.1.) are of great importance.

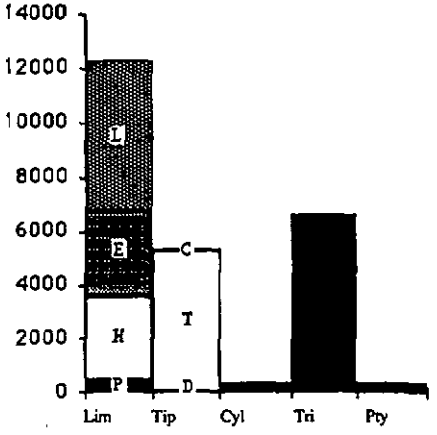


Fig. 5.1. Comparative abundance of the various groups of crane flies collected (L - Limoniinae, E - Eriopterinae, H - Hexatominae, P - Pediciinae, D - Dolichopezinae, T - Tipulinae, C - Ctenophorinae).

The number of Tipulidae species is more than half that of the Limoniidae. However, the abundance of flying Tipulidae is less than half that of the Limoniidae, because the latter comprise some very numerous species (though usually very small ones) which fly in great "swarms". The insects of the Trichoceridae are more important among small families. They form "swarms" in autumn and in spring, and are distributed in very different biotopes. Since there are only four species of which two are quite numerous, Cylindrotomidae is rather important among flying insects. Ptychopteridae, the larvae of which are sometimes very abundant in the silt (up to a few hundred per 10 litres of coastal silt), make up only a small part of all flying insects, and they form "swarms" rather rarely.

6. ZOOGEOGRAPHICAL EVALUATION OF LITHUANIAN CRANE FLIES (FAMILIES TIPULIDAE, LIMONIIDAE, CYLINDROTOMIDAE, TRICHOCERIDAE AND PTYCHOPTERIDAE)

The fauna of Lithuanian crane flies is comparatively young, because the whole fauna of Lithuania was formed during the last post-glacial period. Therefore most species have broad distributions. The analysis of the distribution of all the crane flies allowed us to classify them following the system defined by K. B. Gorodkov (1984) and E. N. Savchenko (1961, 1964, 1973, 1983, 1989).

The regional fauna is rather heterogeneous. The number of species in the separate zoogeographical complexes cannot be determined very precisely, because the distribution of many Palaearctic species, especially in the eastern part of Lithuania and beyond its boundaries, is not well known. Thus, the zoogeographical classification as well as the size of the separate zoogeographical complexes may change in the future. Despite this, our investigation into the Lithuanian fauna suggests interesting data about the distribution of separate species (Table 6.1).

Table 6.1. Composition of the Lithuanian crane flies fauna according to the distribution areas

Distribution	Families - abs. number of species (%)				
	Limon.	Tipulid.	Cylindr.	Trichoc.	Ptychopt.
Circumglobal	1 (0.6)				
Multiregional		1 (1.2)			
Holarctic	8 (4.4)	1 (1.2)		5 (50)	
Transpalearctic:					
a) Palaearctic	9 (5.0)	4 (4.7)			
b) Transboreal	23 (12.7)	12 (14.1)			
c) Euro-Siberian	7 (3.9)	11 (12.9)			
d) Euboreomountainous	10 (5.5)	3 (3.5)			
e) Boreomountainous	21 (11.6)	8 (9.4)			
Amphipalearctic	10 (5.5)	3 (3.5)			
West-Central Palaearctic:					
a) European - Near East	19 (10.5)	1 (1.2)			
b) European - Middle-East	8 (4.4)	4 (4.7)			1 (16.7)
West-Palaearctic:					
a) Whole West-Palaearctic	3 (1.7)	7 (8.2)			
b) European	56 (30.8)	25 (29.6)	4 (100)	4 (40)	5 (83.3)
c) Central-European	5 (2.8)			1 (10)	
d) East-European		1 (1.2)			
e) Circum-Baltic		2 (2.3)			
f) West-European	1 (0.6)	2 (2.3)			

The species from Lithuania to be added to the list of species known in the territory of the former USSR are: *Euphylidorea meigeni* (Verr.), *Cheilotrichia (Empeda) staryi* Mendl, *Dicranoptycha (Dicranoptycha) cinerascens* (Mg.) and *Ellipteroides (Ellipteroides) lateralis* (Macq.).

7. BIOLOGY OF LITHUANIAN TIPULOIDEA AND PTYCHOPTERIDAE

7.1. EVALUATION OF THE DIFFERENT BIOTOPES

Abundance of species

The species are most abundant in damp, humid and wet biotopes, because insects from the groups investigated are hydrophilous, hydromesophilous and only rather rarely mesophilous. The fact that moisture is one of the most important factors determining the distribution of these species was confirmed during our investigations. These insects depend less on special species of plants, since they mainly feed on dead and disintegrating vegetation, while for example most Lepidoptera and some Coleoptera and other groups feed on living plants.

1. Pine forests are generally dry. In such places the entomofauna of the examined groups is very poor, but since such forests are most abundant in Lithuania (38.1%) (Verbyla 1991), they were investigated throughout this study.

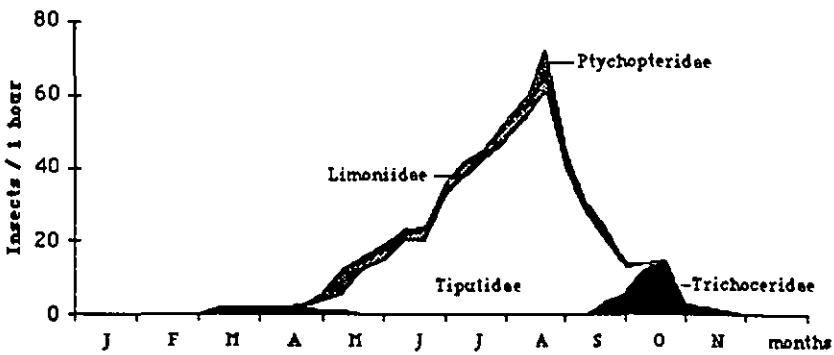


Fig. 7.1. Abundance of crane flies in *Pinetum vaccinio-myrtillosum* (Varena district 1989, capture by entomological net).

a) *Pinetum vaccinio-myrtillosum*. The flying period of the insects under investigation starts rather early, at the beginning of March (fig. 7.1). The earliest flying insects belong to the family Trichoceridae. Then the flying period of the Limoniinae starts, but their abundance is limited and it is possible to catch only solitary specimens. The quantity of insects belonging to this group, as well as the activity of crane flies from the family Tipulidae begins to increase at the beginning of May (or mid-May, depending on the weather). During the whole season only single specimens from other families are found. The biggest activity of Tipulidae is registered in August, when it usually starts to rain and the temperature falls. The total abundance rarely reaches more than 70 specimens per hour.

b) *Pinetum myrtillo-oxalidosum* (Fig. 7.2). Unlike the *P. vaccinio-myrtillosum*, the main part of the entomocomplexes (from the families of the groups investigated) is formed by Hexatominae and not by Tipulidae. Here the crane flies (Tipulidae) are most abundant in May, but their maximal activity during the season never reaches more than 20 insects per hour. Crane flies from the subfamily Limoniinae come third as to their activity, and their maximum is registered in the middle of June, when the total maximal activity in this type of forests is also reached (60 insects per 1 hour). The other groups are not abundant.

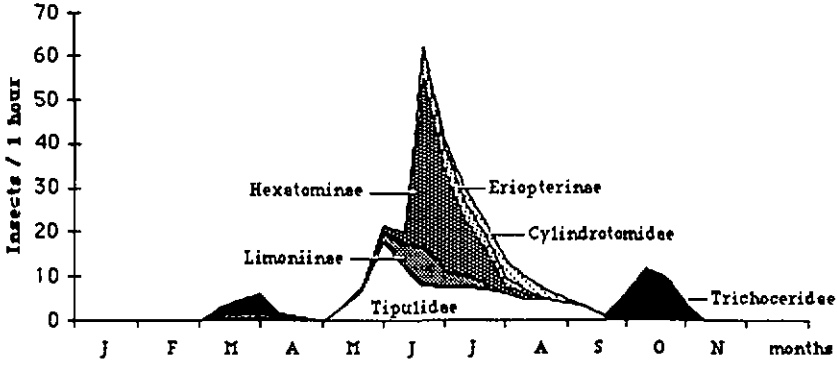


Fig. 7.2. Abundance of crane flies in *Pinetum myrtillo-oxalidosum* (Varena district 1989, by entomological net).

c) *Pinetum hepatico-oxalidosum* (fig. 7.3). Insects from the subfamily Limoniinae and Hexatominae are most numerous. The Tipulidae constitute a rather prominent group. Trichoceridae are rather common in spring and in autumn, but only 2-3 of them are active. Eriopterinae are encountered over a very long period, but always only as single specimens.

2. Spruce forests. More detailed research on these forests was undertaken in the northern part of Lithuania (in the Mazeikiai and Birzai districts), where spruce forests are most abundant. The regime of humidity in these forests suits crane flies better and their total abundance is nearly double that in pine forests. The pattern of the activity of the Tipulidae and Hexatominae is very similar (fig. 7.4): they begin their flying in the second half of May, the highest activity is reached in the first part of June (about 20-25 insects per hour) and the flying period is nearly finished at the end of August or the beginning of September. The Eriopterinae have two distinct bursts of activity at the beginning and at the end of summer, when the abundance of flying insects is 9-10 times greater than usual, but these bursts are rather short. The second burst of activity coincides with the total maximum of flying insects in these forests, in the middle of August (it reaches 120 insects per hour of collecting). The most abundant group is that of Limoniinae insects, but in spruce forests their burst of activity is about 20-

30 days earlier than the total, except for the Trichoceridae. During this period their abundance reaches 75 insects per hour (from the middle to the end of June). Limoniinae remain active till the cold weather starts late in autumn. The conditions in spruce forests are also very good for the Trichoceridae, because there is enough moisture early in spring and late in autumn. When the weather is good, the activity of these insects reaches 150 insects per hour.

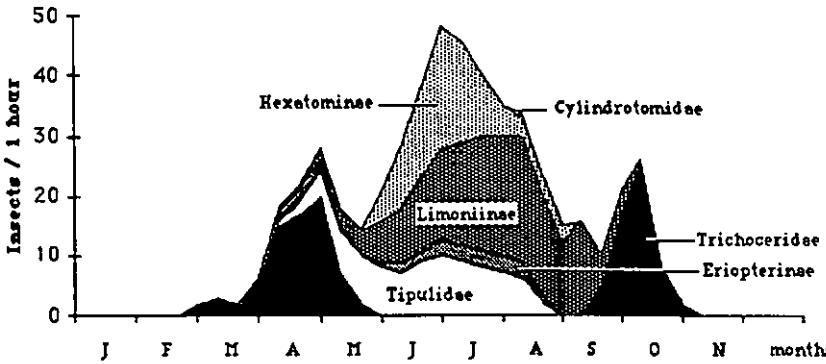


Fig. 7.3. Abundance of crane flies in *Pinetum hepatico-oxalidosum* (Vilnius district 1989-1992, by entomological net).

These results were compared with those obtained with a light trap in the Vilnius district (fig. 7.5). As these spruce forests grow on sandy soil and are always full of tourists from Vilnius who trample the ground, a quite different pattern of activity was observed here. Also, pine trees are rather common here, while they are not found in the territories investigated in northern Lithuania,. The results of a light trap were compared with the data obtained with by entomological net during the burst of activity of these insects (Table 7.1). It is evident that the entomological net is more suitable for such research, because greater amounts of flying insects are caught with it.

In spruce forests it is rather difficult to get a global view of the activity of these insects. 4 to 5 bursts of activity follow each other during the season, because different systematical groups reach their maxima at different times. It is generally accepted that the greatest abundance of flying insects (not species) is reached in the second half of summer, when the temperature falls and the rains begin.

3. Alder groves (*Incanetum*). Limoniidae are most abundant and only single specimens of Tipulidae are met here. Eriopterinae insects, whose flying period starts in the second half of May, are abundant, and so are Limoniinae. The activity of the latter stays almost the same during the whole season and reaches about 40 insects per hour. In such biotopes, Cylindrotomidae insects are most active and their highest activity is registered at the end of May. The common maximum of activity in alder groves is reached at the end of summer, but mainly because of the small Eriopterinae species. These results were obtained in the south-eastern part of Lithuania. They were compared with those

obtained in similar biotopes in the northern part of Lithuania (in the Akmene and Mazeikiai districts) (fig. 7.6), where big oil and cement plants are situated and the environment is very polluted. The abundance of the Tipulidae is nearly the same - it is comparatively small. The other groups are in the same quantitative relationship with each other, as in the south-eastern Lithuania, but the total activity of all groups without the Tipulidae is about 3.5 times lower. The flying period of the Eriopterinae began one and a half month later than in the south-eastern part.

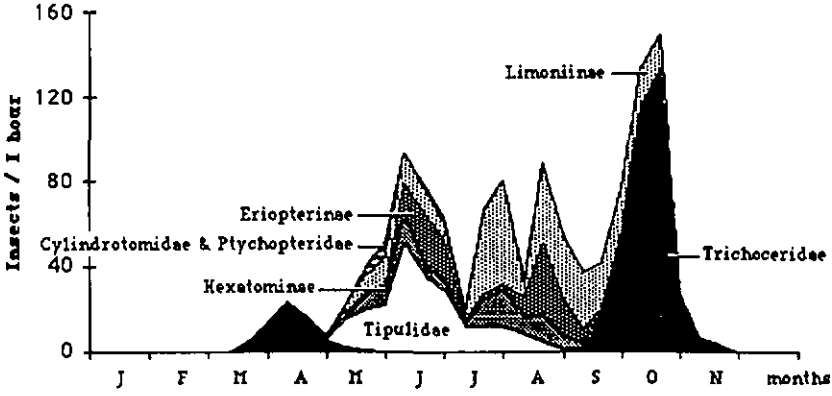


Fig. 7.4. Abundance of crane flies in *Piceetum-oxalidosum* (Birzai & Mazeikiai districts 1988-1992, by entomological net).

Table 7.1. A comparison between the efficiency of capture by light trap (LT) and by entomological net (EN) in a spruce forest (Vilnius district, near Nemencine 1991-1992)

Families, subfamilies	Insects / 1 hour			
	June		July	
	LT	EN	LT	EN
Tipulidae	2	17.6	5.3	13.5
Limoniinae	2	12.8	2	2
Eriopterinae	0	12.7	2.5	1
Hexatominae	0	3.6	1.3	1.5
Pediciinae	1	1.6	0	0
Cylindrotomidae	0	3.2	0	0
Ptychopteridae	0	0.4	0	0
Total	5	51.9	11.1	18

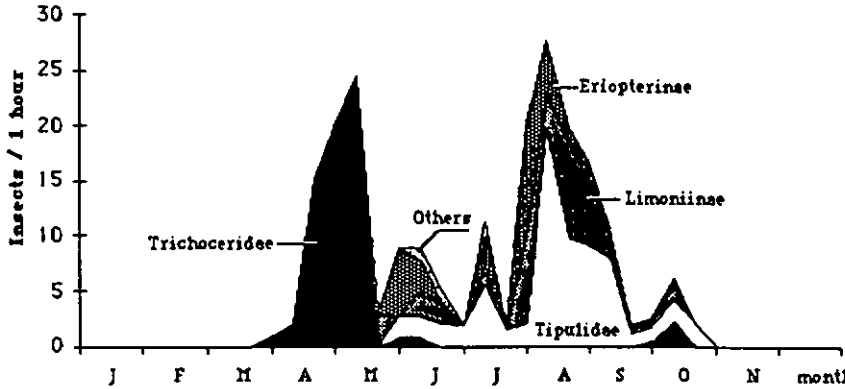


Fig. 7.5. Abundance of crane flies in *Piceetum-oxalidosum* (Vilnius district, around Nemencine 1988-1992, by light trap).

4. Riverbanks.

Black-alder groves on flooded and swamped land (*Alnetum fluviale*) and shrubs on riverbanks are the best places to find breeding crane flies. On the other hand, the influence of these biotopes on the abundance of insects is less important than the individual factors of the river, i.e. the rapidity of the current, the sources of food (springs, rainwater and other), the degree of water pollution, the amount of silt on the banks etc. We present here the data gathered near different rivers, because it is very difficult to generalize these factors in different places.

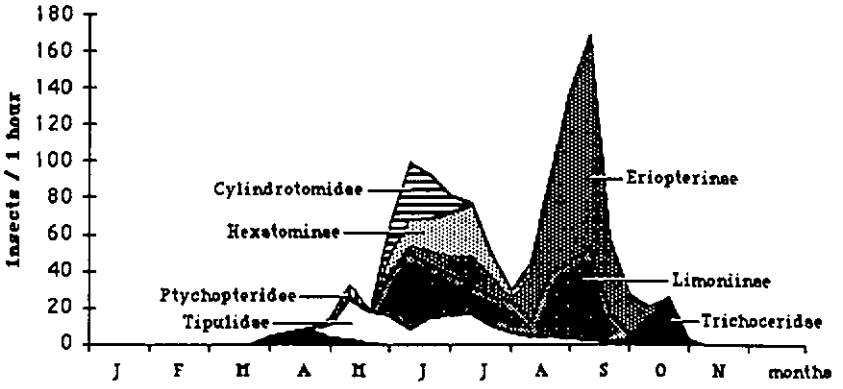


Fig. 7.6. Abundance of crane flies in alder groves (*Incanetum*) (Akmene & Mazeikiai districts 1988-1992, by entomological net).

a) The river Sudervele around Vilnius. This river is mainly fed by rainwater. The river is polluted by organic materials, upstream the greater part of it is driven into water-pipes. The banks are very trampled by people. The research was done from 1985 to 1989.

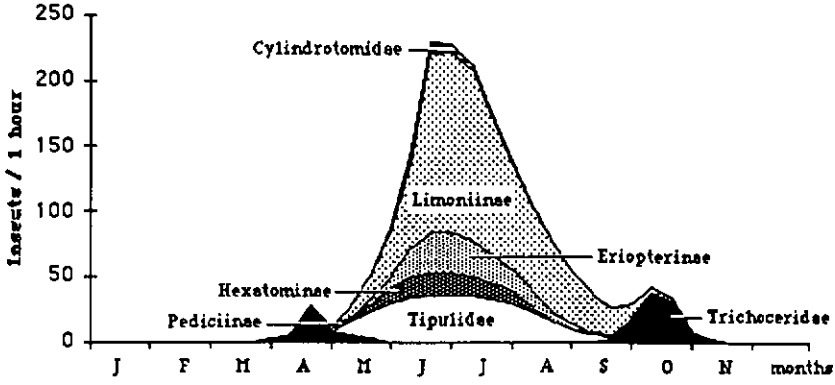


Fig. 7.7. Abundance of crane flies on the banks of the river Sudervele (Vilnius district 1988, with corrections in 1989, by entomological net).

Insects begin to fly in April (fig. 7.7). At this time the winter gnats (Trichoceridae) are most abundant, whereas the Pediciinae are very few. The other groups begin to fly at the beginning of May and the total number of insects caught grows very fast. The maximum is reached in the middle of June and since nearly all systematical groups reach it together, the global aspect of the evolution of the activity of all crane flies is rather simple: a bell-shaped curve with its maximum at about 230 insects per hour. Limoniinae insects as well as Eriopterinae, Hexatominae and Tipulidae are rather numerous. The maximum of the Cylindrotomidae is reached one week earlier than the total, but it has little influence on the whole picture as they are not numerous. Then, from the beginning of July, the number of active specimens in all the groups falls slightly but constantly and the flights are completely over by the end of September (except for the Limoniinae, which may fly on until November, depending on weather).

b) The banks of the rivers Gruda and Merkys in the Varena district (South Lithuania). Regular studies were carried out near the village of Puvocial from 1984 on. These rivers are fed by rain and spring waters and are among the cleanest rivers in Lithuania. Every spring the rivers flood because of the melting snow. The water temperature is always low (14-18°C) and only very seldom does the water of the river Merkys reach 21°C during hot summers. The banks of the rivers are not silted up, the current in both is rapid (the abatement in the lower reaches of the river Gruda is 11 m/km). Man has a comparatively small influence on the banks. The territory under investigation is in the Lithuanian National Park of Dzukija.

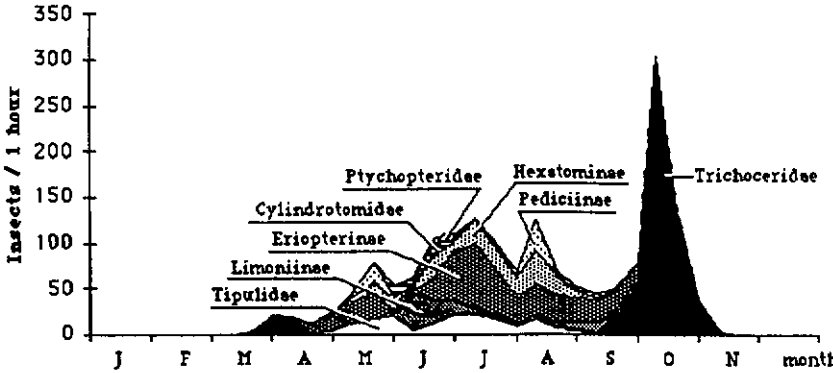


Fig. 7.8. Abundance of crane flies on the banks of the rivers Merkys and Gruda (Varena district 1988-1992, by entomological net).

In our opinion, it is the comparison of the results obtained in two succeeding years (1988 and 1989) which is most interesting, because each was characterized by quite different weather conditions.

In 1988, the summer was exceptionally cold and the number of flying insects was comparatively low (the water temperature was 14-16°C). At the beginning of spring there was a burst of activity of Limoniidae insects, but when the weather became colder, it decreased; whereas the level of activity of the Tipulidae remained the same and did not increase as had in the past years. A very strong drop of the total activity was observed in the first half of June. During the second half of the summer, the increase of the total activity was insignificant. This was mainly due to the pattern of activity of the Hexatominae and Eriopterinae, but it is accentuated by the falling activity of the Tipulidae. The total maximum reached only 90 insects per hour.

The summer of 1989 was very hot, the water temperature of the Merkys reached 21°C and the growth of activity was rapid from the middle of June on. The maximum level was 180 insects/hour, i.e. twice the amount of 1988, but this abundance was mainly due to the small Eriopterinae. The other groups, however, remained almost on the same level, while the number of Tipulidae decreased in comparison with 1988, because they reached their maximum earlier. *Cylindrotomidae* are the insects with most stable pattern of activity and their break-off occurred at the same time, at the beginning of July, in 1988 and in 1989.

Fig. 7.8 gives the average view of the abundance of crane flies, drawn from our long investigations (from 1988 on). However, like in every biotope, there are fluctuations depending on the weather.

c) The river Skroblus and the territories around it are declared an hydrological preserve. It flows in the Varena district (South Lithuania) and falls into the river Merkys only 4 km below the river Gruda. Skroblus river is 17.3 km long, its average depth is 0.5-1 m. It runs at the bottom of a

rather deep (max. 30 m) and broad (300-600 m) valley. There are wet meadows on the banks of the river. The low-lying marshy lands are situated in two places: between 16.6 and 14.9 km and between 13.6 and 11.7 km from the river's mouth. Dry meadows lie among the pine forests on the slopes. Cultivated lands are found only near the villages (Margionys, Kapiniskes, Rudnele and Dubinykas). The forest covers 96.3 percent and swamps 2.5 percent of the territory. The biggest part of forests is *Pinetum vacciniosum* and alder groves prevail in the valley.

About 65% of the water in this river comes from springs, so the flow of water is the same all year round and there are no floods in spring. The water is very cold all year round and the insect activity is comparatively low even in summer. This activity reaches its maximum of almost 150 insects per hour (or sometimes less, depending on the weather) rather early (in May), because the valley slopes are quickly warmed by the sun in spring. The subfamily Hexatominae (fig. 7.9) and especially the species *Limnophila schranki* Oost. constitute the greatest part of the insects and they are massively dominant in spring. A fall in the total activity of insects is registered already at the end of May. Only in 1989, when the summer was very hot, was an increase in the number of insects (about 1.5 times more than during the other years) observed, but it was mainly due to the Eriopterinae and Limoniinae. The activity of the Tipulidae was even lower than usual. Comparatively large amounts of Ptychopteridae are found on the banks of Skroblus, and the Pediciinae fly later than usual, till the end of September. In autumn, when the weather is good, the total activity may increase rather a lot, mainly because of the *Platytipula* species (especially *T. luteipennis* Mg.).

5. Shrubs.

a) Comparatively dry shrubs covering big territories are rather rarely found in the territories investigated. Nearly all the groups of insects show a very strongly fluctuating activity in these biotopes. The Limoniinae and Eriopterinae subfamilies constitute the greatest part of all the insects.

b) The situation in shrubs growing on the banks of water reservoirs partly depends on the type of these water reservoirs. It has also been described when analyzing certain rivers. The total abundance of flying insects during the whole season is rather high, because crane flies find good conditions for breeding in such biotopes. It may be pointed out that the flying period of crane flies starts early in spring (when the snow thaws) and finishes late in autumn (when snow covers the ground). The total activity of all the groups of insects (except the Trichoceridae) has one maximum per season (in June) and its character depends on the weather conditions. In 1988, when the summer was cold, the shape of this bell curve was very narrow and high (reaching up to 270 insects per hour), because the specimens waited for the good weather, came out from the pupa and started flying all at once. Usually, under normal weather conditions, the rise in activity in these biotopes is slower and the whole aspect of the curve is flatter and lower.

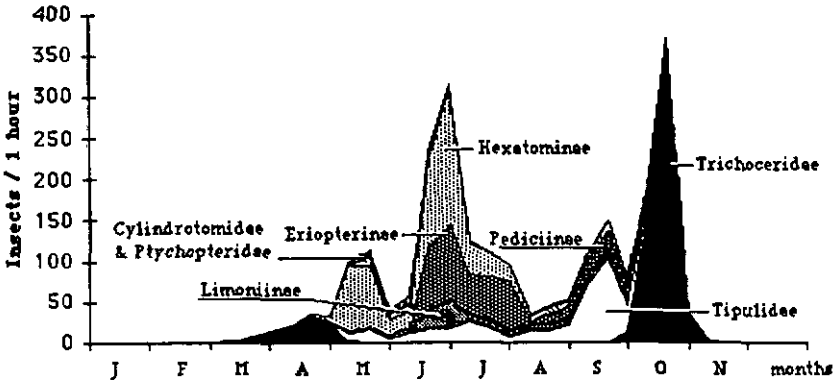


Fig. 7.9. Abundance of crane flies on the banks of the river Skroblus (Varena district 1988-1992, by entomological net).

6. Swamped lakeshores (Ezeraitis and Trikampis in the Varena district). Only single specimens of Tipulidae and Limoniinae were met in such biotopes. Cylindrotomidae and Ptychopteridae are also rare and they are not seen in fig. 7.10. Insects from the Pediciinae subfamily are more common, from the end of spring till the beginning of June. Here, Hexatominae and especially Eriopterinae are the most abundant insects. They reach their maximum of activity at the end of June and the beginning of July. The rise in activity is very clear and the shape of the curve is rather narrow and high. It reaches a maximum of 300-400 insects per hour of collecting (the activity even reached 1040 insects per hour in some cases).

7. The meadows are mostly dry, they are open to the winds and only a few species of crane flies breed regularly in these biotopes. Most abundant are some Tipulidae species (fig. 7.11), and their numbers can sometimes be overwhelming. A few species dominate: *Tipula (Lunatipula) vernalis* Mg. in spring, *Nephrotoma appendiculata* (Pierre) in the first half and middle of summer and *T. (Tipula) paludosa* Mg. at the end of summer and in autumn. In the meadows these three species play the most important role among the crane flies, and in some cases may reach a maximum of more than 40-50 insects per hour of collecting. Cylindrotomidae were not found in the course of our investigations, and Pediciinae are so rare that they are not seen in fig. 7.11.

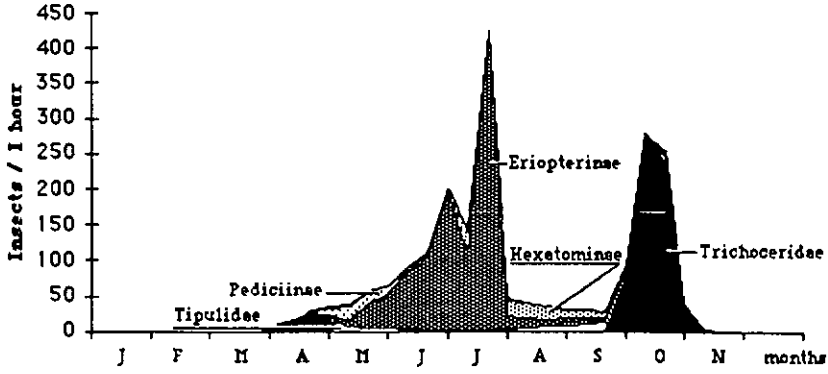
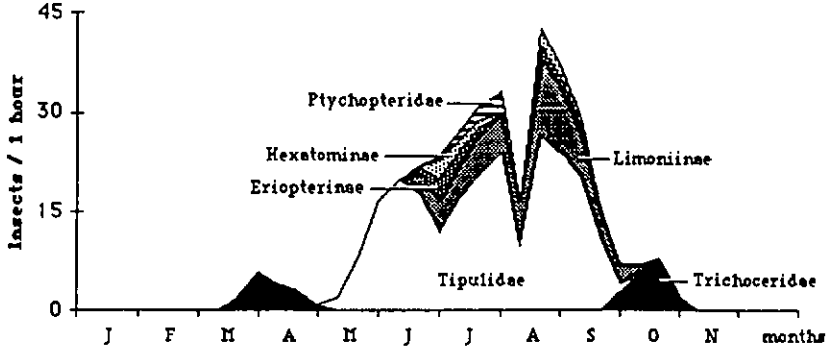


Fig. 7.10. Abundance of crane flies on the swamped shores of lake Ezeraitis and lake Trikampis (Varena district 1988-1992, by entomological net).



Diversity of species

Biotopes were compared for the diversity of species from different families, because their ecological ties and biology are different. Since these dendrograms were constructed according to the correlation coefficients between biotopes, it is possible to distinguish reliable groups.

Limoniidae (fig. 7.12). The critical coefficient of correlation r'_{45}=0.2779 (when the level of significance is 0.05 - α=0.05) allows to select 6 groups and 8 reliable separate biotopes. They are: swampy riverbanks, land improvement canals, crop fields, gravel pits, karst caves, swampy shrubs, meadows with shrubs and low lying marshes.

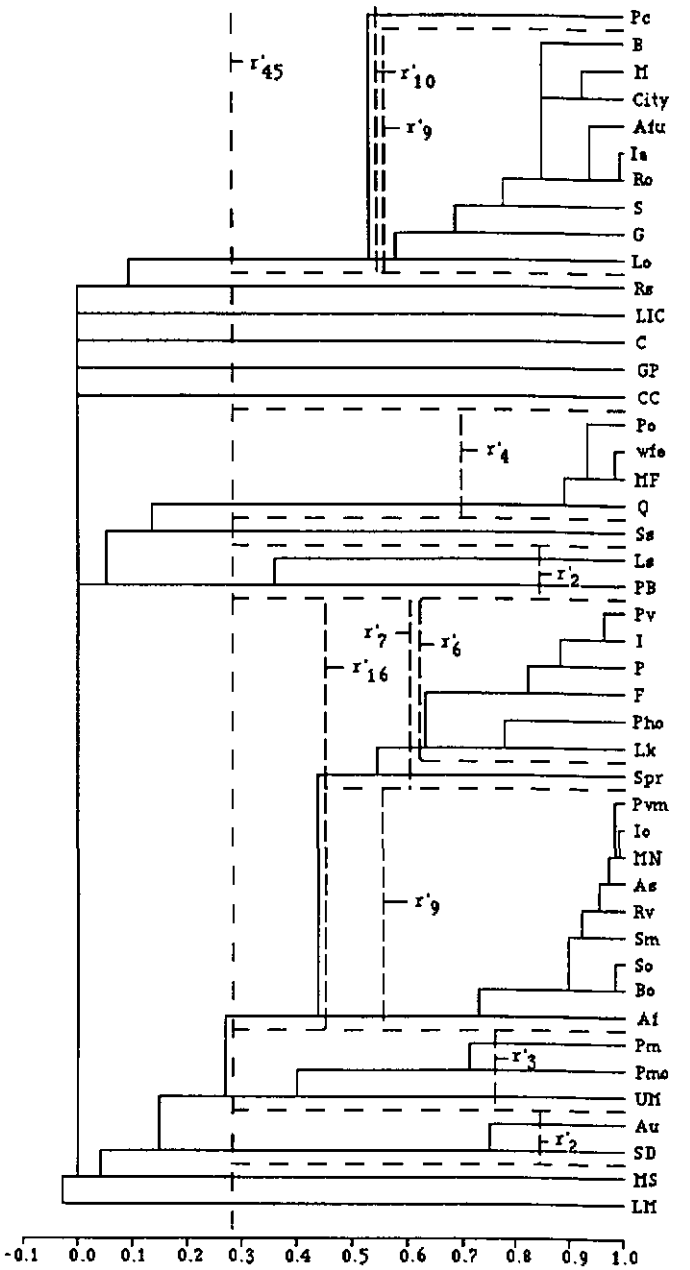


Fig. 7.12. Grouping of biotopes for the family Limoniidae.

The first group is big, composed of 10 biotopes, and r'_{10}=0.5168 allows to separate them into only two subgroups: the first contains a single type of pine forest (*Pinetum cladoniosum*) and the second is composed of 9 habitats: birch forests (except *B. oxalidosum*), meadows, cities, alder groves (*Alnetum fluviale urticosum* and *Incanetum aegopodiosum*), open riverbanks and lakeshores, shrubs and orchards. Separate smaller groups are seen among them, but the coefficient r'_9=0.5567 does not allow to consider them reliable. Thus, these biotopes cannot be described by a complex of all the Limoniidae species, but by smaller groups of species particular to them.

The second group is formed by 4 biotopes: *Pinetum oxalidosum*, wood-felled areas in coniferous forests, small meadows near forests (usually coniferous too) and more separate oak groves, but the value of r'_4=0.7030 does not allow to divide them further.

The third group is formed by two slightly similar biotopes: swampy lakeshores and peat bogs. The value of r'_2=0.8490 allows to separate them with great reliability.

The fourth group is the biggest, and consists of 16 mostly humid habitats. They can be separated into two subgroups at r'_{16}=0.4314. The first of these could be divided further at r'_7=0.5871, separating the banks of springs as a distinct biotope. However, other habitats, with rather big differences but not reliable ones, are left in one group at r'_6=0.6181. These biotopes are: *Pinetum vacciniosum* and *hepatico-oxalidosum*, white alder groves other than *oxalido-nemorosum* and *aegopodiosum*, parks, ash groves and deciduous groves on lakesbores. The second subgroup, which can not be separated into smaller parts, is composed of humid biotopes: pine forests *Pinetum vaccinio-myrtillosum*, spruce forests *Piceetum myrtillosum* and *axalidosum*, alder and birch groves *Inconetum oxalido-nemorosum*, *Alnetum filipendulosum*, *Betuletum oxalidosum*, alder groves with springs, flooded meadows and riverbanks.

The fifth group is formed by three rather similar biotopes, but which are totally isolated by an r'_3=0.7641. These biotopes are: *Pinetum myrtillosum*, *P. myrtillo-oxalidosum* and upland moors. That pine forests and swamps occurred in one group could be explained by the fact that nutritional conditions are rather similar for plants in pine forests and in upland moors (lacking N, P and K) (Kultiasov 1982). Botanists have found a lot of similar plants here (*Pinus sylvestris* L., *Calluna vulgoris* /L./, *Empetrum nigrum* L., *Vaccinium myrtillus* L., *V. vitis-idaea* L., *V. uliginosum* L., some species of mosses and others) (Karazija 1988), and this will have an influence on the insects too.

The last group is formed by two habitats, which are further separated by r'_2=0.8490. They are: *Alnetum urticosum* and sandy dunes on the sea coast.

Tipulidae (fig. 7.13). All the habitats divide into 10 groups and 7 of these can be considered totally specific by the critical coefficient of correlation r'_{45}=0.2779. These separate biotopes are: pine forests *Pinetum cladoniosum*, peat bogs, low lying marshes, banks of springs, alder groves *Inconetum aegopodiosum*, oak groves and sandy dunes on the sea coast.

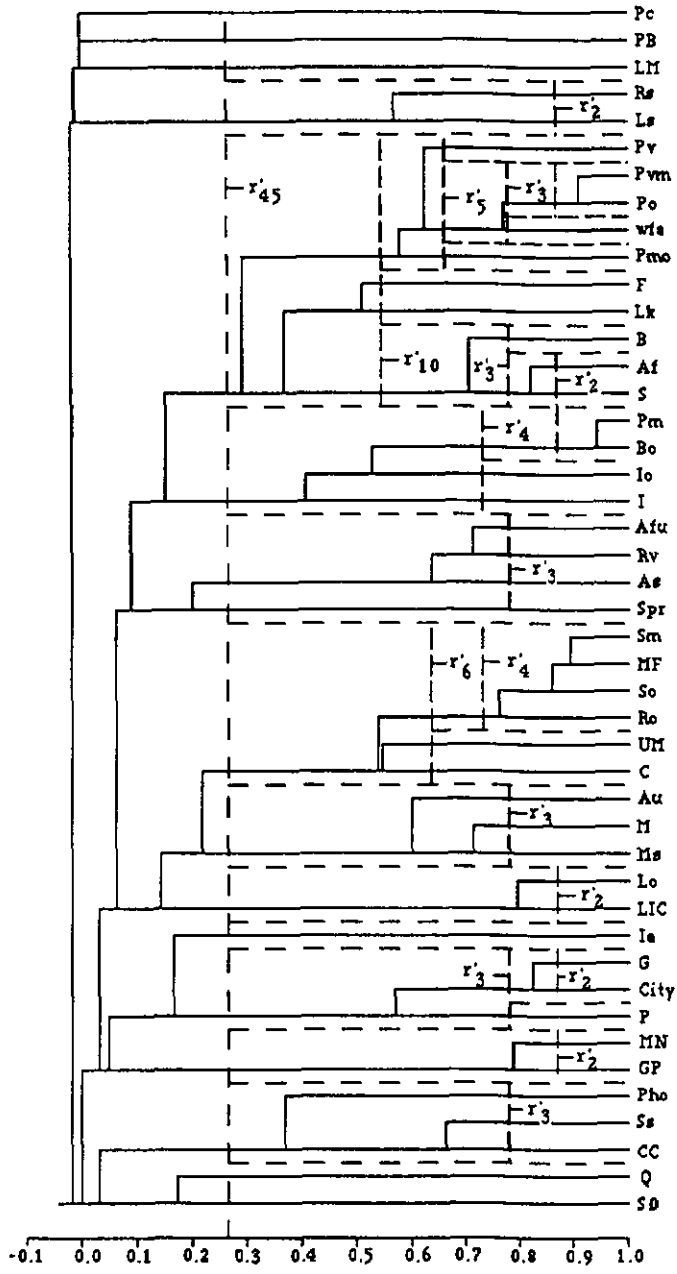


Fig. 7.13. Grouping of biotopes for the family Tipulidae.

The first group is composed of two habitats, further separated by r'_2=0.8490: swampy riverbanks and boggy lakeshores.

The second group is fairly big and further split into two subgroups and two separate biotopes by r'_{10}=0.5168. These are: ash groves and groves of deciduous trees and shrubs on lakeshores. The first subgroup is further separated at r'_5=0.6555 into one bigger group and two separate biotopes: *Pinetum vacciniosum* and *P. myrtillo-oxalidosum*. The group could be further divided at r'_3=0.7641 into two habitats which are nearly identical (*Pinetum vaccinio-myrtillosum* and *P. oxalidosum*) and a separate biotope: wood-felled areas in coniferous forests. The second subgroup is divided by r'_3=0.7641 into separate birch groves and another group, which splits further at r'_2=0.8490 into *Alnetum filipendulosum* and shrubs.

The third group is smaller and formed of two separate types of white alder groves (r'_4=0.7030), *I. oxalido-nemorosum* and other types of *Incanetum*, and of a subgroup of two biotopes, *Pinetum myrtillosum* and *Betuletum oxalidosum*.

The fourth group is composed of three separate biotopes (r'_3=0.7641): *Alnetum fluviale urticosum*, riverbanks with groves of shrubs and deciduous trees and alder groves with springs.

The fifth group is of a medium size, but interesting. It is composed of two separate biotopes (r'_6=0.6181): upland moors and crop fields and one subgroup, which is further united at r'_4=0.7030 and can not be reliably split: *Piceetum myrtillosum*, *P. oxalidosum*, meadows near forests (usually coniferous) and open, trampled riverbanks.

The sixth group consists of three separate biotopes (r'_3=0.7641): *Alnetum urticosum*, meadows and meadows with shrubs.

The seventh group is also small and composed of separate habitats (r'_2=0.8490): opened and trampled banks of the lakes and land improvement canals.

The eighth group is composed of three biotopes (r'_3=0.7641): parks and a subgroup of two members (gardens and city territories), which are reliably split at r'_2=0.8490.

The ninth group is composed of two separate habitats (r'_2=0.8490): flooded meadows of the Nemunas river and gravel pits.

The last group is composed of three separate (r'_3=0.7641) biotopes: *Piceetum hepatico-oxalidosum*, swampy shrubs and karst caves.

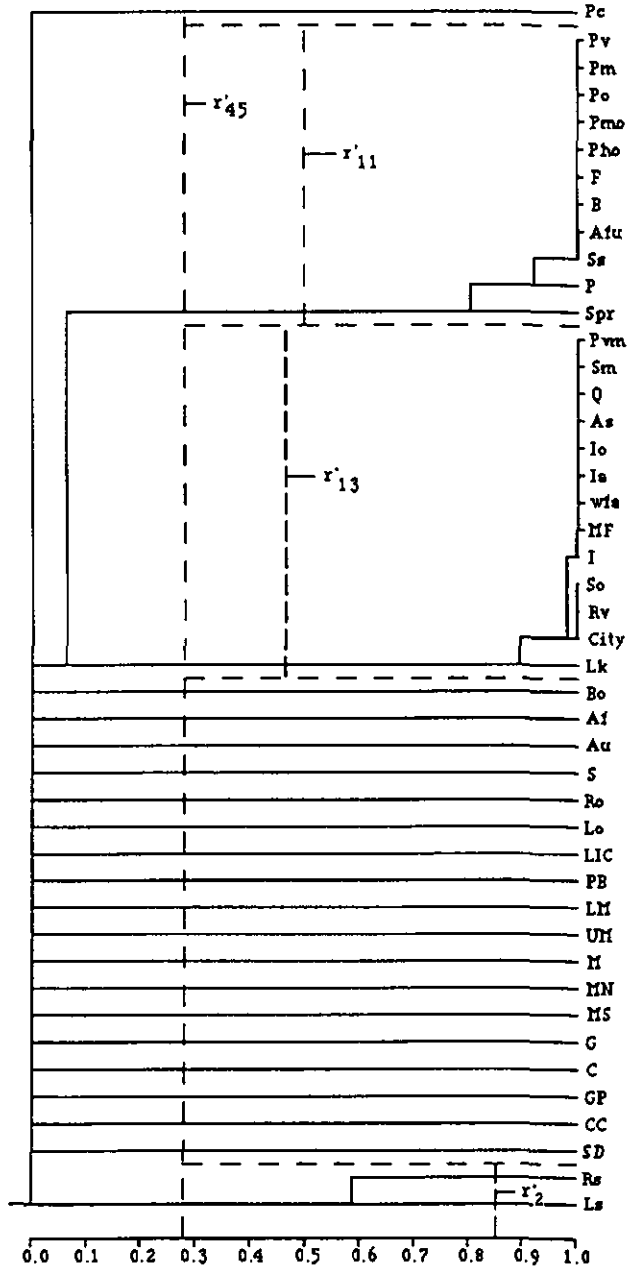


Fig. 7.14. Grouping of biotopes for the family Cylindrotomidae.

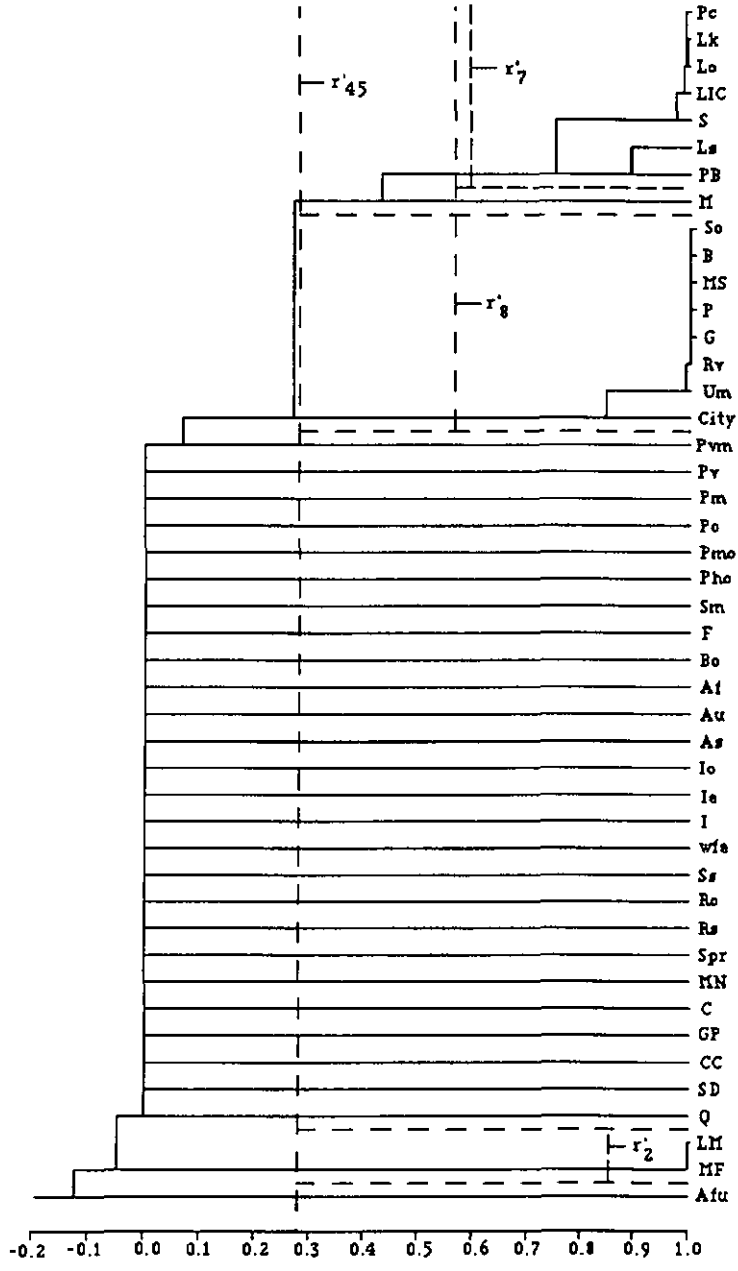


Fig. 7.15. Grouping of biotopes for the family Trichoceridae.

Cylindrotomidae (fig. 7.14). The larvae of these insects are phytophagous, developing on mosses or herbaceous plants. *Diogma* feeds on terrestrial mosses, *Triogma* are semi-aquatic, feeding on mosses, *Phalacrocera* are fully aquatic feeding on mosses in fens, acid pools, moors or marshy glades and only *Cylindrotoma* live freely, like caterpillars, on the leaves of phanerogams in marshy woodland habitats. Therefore, adult insects are found in marshy places too, near swamps, lakes, rivers and pools, no matter what kind of biotopes they belong to. Some of these biotopes, sometimes very different, are united by r'_{45}=0.2779 into two big groups with very high coefficients of correlation (1.0 or nearly so). The first is composed of different pine forests (*P. vacciniosum, P. myrtillosum, P. oxalidosum, P. myrtillo-oxalidosum* and *P. hepatico-oxalidosum*), ash and birch groves, black-alder groves in flooded lands, swampy shrubs, parks and banks of springs. The second group consists of: *Pinetum vaccinio-myrtillosum, Piceetum myrtillosum, P. oxalidosum*, ash groves, alder groves with springs, *Incanetum oxalido-nemorosum, I. aegopodiosum* and other white alder groves, wood cutting areas, meadows near forests, riverbanks, lakeshores and cities. It is impossible to separate these two groups into smaller reliable subgroups. The third and smallest group is formed of two similar biotopes: swampy riverbanks and lakeshores. These habitats could be reliably separated at r'_2=0.8490. Other biotopes are come out as separate, because Cylindrotomidae insects are not found in them or are very rare.

Trichoceridae (fig. 7.15) are also connected with special microclimatic conditions (Podenas 1993), and because of this the dendrogram has a rather simple aspect: one small and two bigger groups are separated at r'_{45}=0.2779.

The first group, composed of 8 elements, can be separated at r'_8=0.5603 into one big subgroup and meadows as a separate habitat. The big subgroup is not split further by r'_7=0.5871 and is composed of: *Pinetum cladoniosum*, various lakeshores, land improvement canals, shrubs, peat bogs.

The second group is formed by biotopes which have a very high coefficients of correlation and cannot be separated further: *Piceetum oxalidosum*, birch groves, meadows with shrubs, parks, gardens, riverbanks, upland moors and even cities.

The third and smallest group is compiled from two seemingly separate habitats, but which have a high level of correlation: low lying marshes and meadows near and among forests.

The other biotopes are considered separate, mostly because winter gnats are not found there or are scarce.

Ptychopteridae (fig. 7.16) develop in damp places, feeding on very tiny particles of silt. Therefore, adult insects are met in exceptional habitats. The dendrogram is simple, r'_{45}=0.2779 also only separates three groups of biotopes. The first is composed of pine forests *Pinetum vaccinio-myrtillosum*, black-alder groves *Alnetum urticasum*, lakeshores (not swampy) and city territories. Their coefficients of correlation are high, and it is impossible to separate them further. The second group is composed of distinct black and white alder groves, shrubs and riverbanks, because alders as well as shrubs usually grow near water. The last group is formed by meadows and banks of springs, which are divided further by the meaning of r'_2=0.8490. The other biotopes appear as separate because Ptychopteridae insects are not found in them.

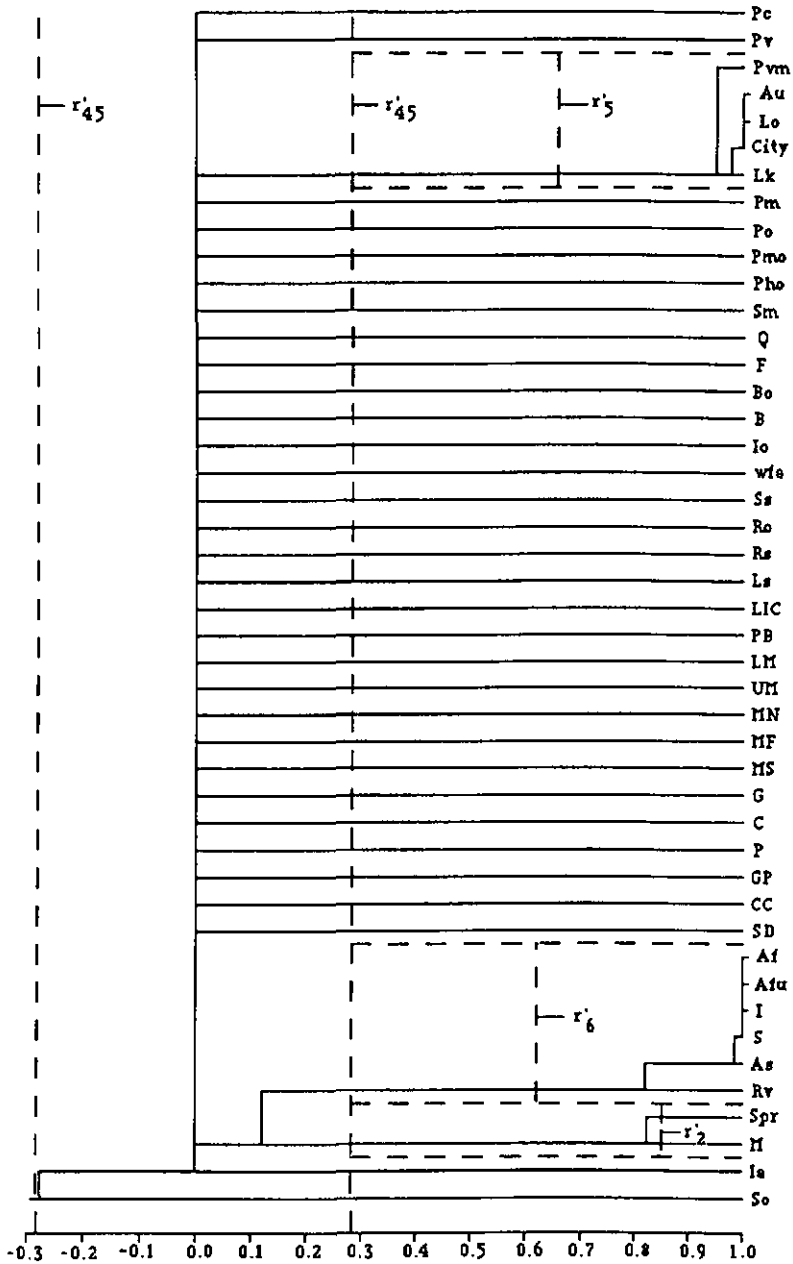


Fig. 7.16. Grouping of biotopes for the family Ptychopteridae.

7.2. SEASONAL CHANGES OF ACTIVITY

The flying activity of the groups investigated was observed during almost an entire year, since even from late autumn to early spring, when the other groups are inactive, one still often finds winter gnats (Trichoceridae). They are even active in winter during thaws, a particularity of the Lithuanian climate (fig. 7.17).

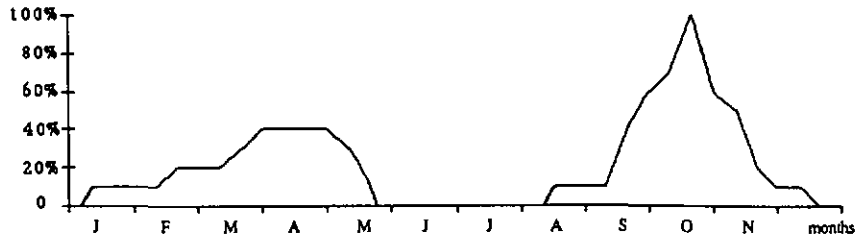


Fig. 7.17. Seasonal activity of the Trichoceridae.

The greatest number of Trichoceridae species are active during late autumn, from the second half of September till the end of October. Only 1-2 species are active during the whole winter. In spring more species appear and the activity is greatest from April to the first half of May. They end their flights completely during the second half of May and this break lasts till the second half of August.

Crane flies from the Tipulidae family start flying at the very beginning of April (fig. 7.18), and it is even sometimes possible to observe them during the last days of March. May sees a constant and quick rise in the activity of many species that reach their maximum in the first half of May. This maximum is mainly formed by the late spring - early summer species, which in most cases end their flights at the end of June. Then the activity of the summer species starts and its burst is registered during the first days of July. After this, very slowly but constantly, the number of active species starts to fall and the summer species are gradually replaced by the autumn species during the second half of August. The total flying period of all the Tipulidae lasts till the frosts and snow set in, usually in the first half of November.

The pattern of activity of Lithuanian Tipulidae is very similar to the one observed in the area of Sankt Petersburg (Savchenko 1983), but it differs in having two distinct maximums (the late spring - early summer species and the summer ones are more clearly separated in time than in Sankt Petersburg). In Lithuania, the general increase of activity begins about two weeks earlier in spring and the total activity before this rise is rather low, whereas in Sankt-Petersburg the rise begins later, but the activity grows faster.

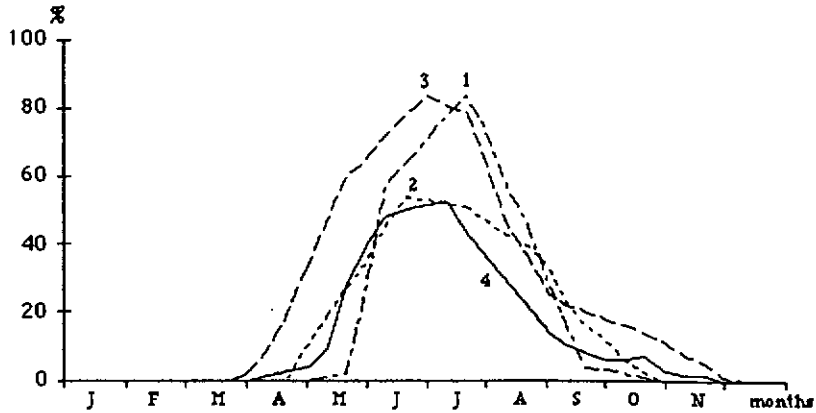


Fig. 7.18. Seasonal activity of the Tipulidae: 1 - European tundra, 2 - St. Petersburg's Region, 3 - Central Europe (Bonn), 4 - Lithuania (1 - 3 according to Savchenko 1983, 4 - original).

The Limoniidae began their flying nearly at the same time as the Tipulidae - at the very beginning of April (fig. 7.19). Then the character of their activity is very similar to that of the Tipulidae, but is slightly more intense: the maximum even reaches 60%, while it amounts to 50% for the Tipulidae at the beginning of July. Both Tipulidae and Limoniidae complete their flights at the beginning of November, when snow starts to fall and the continuously cold weather sets in.

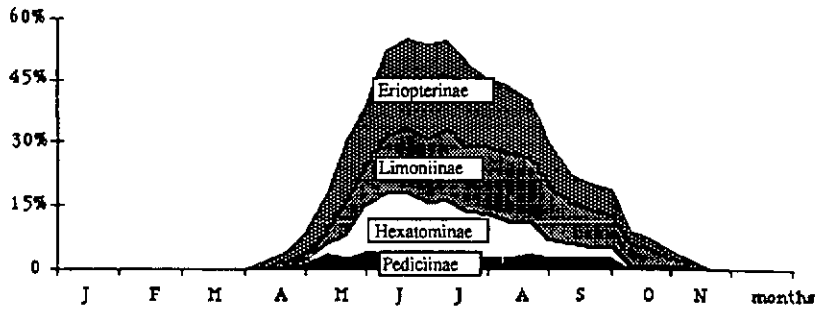


Fig. 7.19. Seasonal activity of the Limoniidae.

The Limoniidae subfamilies Eriopterinae, Limoniinae and Hexatominae all have very similar patterns of activity. The first to begin their flight are the Eriopterinae (at the beginning of April). After a few days the Pediciinae appear, then the Limoniinae and, about ten days later, Hexatominae can be caught. The total maximum of activity is reached from June on to the beginning of July. At this time the Eriopterinae are most abundant, then the Limoniinae and the Hexatominae. Pediciinae

form the smallest group among the subfamilies. They start to fly from the middle of April till the end of May when some fluctuations of their activity are registered, but then, at the beginning of June, their activity becomes stable and remains so nearly to the very end, which is the beginning of October. The other subfamilies usually complete their activity at the beginning of November, or in some cases already at the end of September, depending on the weather.

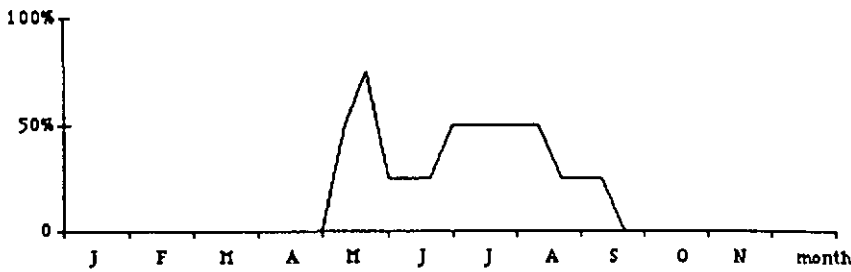


Fig. 7.20. Seasonal activity of the Cylindrotomidae.

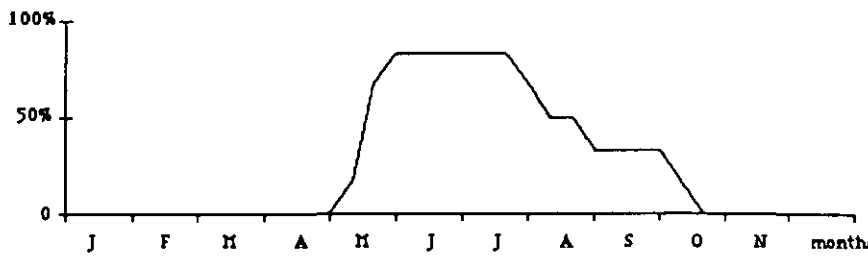


Fig. 7.21. Seasonal activity of the Ptychopteridae.

The first solitary Cylindrotomidae will be met at the end of April, but stable flights begin in the first days of May (fig. 7.20) and 1-2 species are active during the whole season. The activity ceases at the beginning of September. The species with longest active periods are *Cylindrotoma distinctissima* Wd. and *Diogma glabrata* Mg. Of this family, only these two species are commonly found in nature.

Insects from the family Ptychopteridae (fig. 7.21) begin their flight during the first decade of May and reach the maximum abundance at the end of May. They stay at this level till the second decade of June. Then the abundance of species starts to fall slightly but constantly. The latest flying specimens will be met at the end of September.

7.3. COMPARISON OF THE BEGINNING OF THE FLYING PERIOD IN LITHUANIA

We compared the dates of the beginning of the flying period in four districts of Lithuania: Varena, Vilnius, Birzai and Mazeikiai. This was done mainly for the Tipulidae and Limoniidae families and only partly for the Ptychopteridae and Cylindrotomidae families. The activity of the winter gnats (Trichoceridae) was not taken into consideration, because the character of their activity differs from that of the other families.

The results from the Varena district, the southernmost district of Lithuania, were compared with those of the three others. The climatic conditions of the districts investigated are given in Table 7.2.

In the Vilnius district, the crane flies started to fly earlier (1.4 days on the average) than in Varena (fig. 7.22). The biggest fluctuations registered were +/-10.2 days. This can be explained by the fact that climate here is slightly warmer than in Varena, there are less fluctuations in temperature (both daily and yearly) and, although the total abundance of rainfall is nearly the same, the soil is sandy in Varena district and the influence of the deficit in humidity is more distinctly felt.

The districts of Mazeikiai and Birzai are situated in the northern part of Lithuania. However, in the Mazeikiai district, the crane flies started to fly only 2.7 days later than in Varena (with fluctuations of up to 15.9 days). In Birzai they started to fly 9.0 days later (with fluctuations of up to 16.0 days). Mazeikiai district being nearer to the sea, the climate is milder there, with fewer fluctuations in temperature and more rain. The frosts come later and the snow thaws earlier. Birzai district is the northernmost district of Lithuania and it is characterized by a harsher climate: it rains less, the ground freezes earlier in winter (5 days) and thaws later in spring (3 days). This difference in the number of days when the ground is frozen is nearly equal to the delay in the start of flying, because the larvae of crane flies are active and can feed as soon as the temperature rises above 0°C.

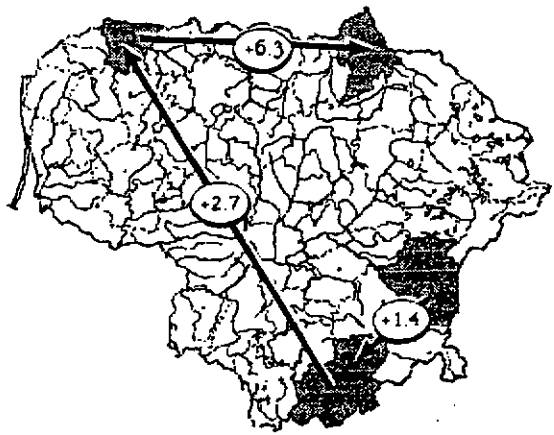


Fig. 7.22. Change in the start of the flying period of the Tipuloidea across Lithuania.

Table 7.2. The main climatic features in the districts investigated (according to the "Atlas of the Lithuanian SSR" 1981)

The main climatic features	Investigated districts			
	Birzai	Mazeikiai	Varena	Vilnius
Average monthly temperature °C				
January	-6	-4.5	-5.5	-6
February	-5.5	-4.5	-4.5	-5.5
March	-2	-1.5	-0.5	-1.5
April	5.5	5	6.5	6
May	12	11	13	12.5
June	15.5	14.5	16	15.5
July	17.5	17	17.5	17.5
August	16	15.5	16.5	16
September	11.5	12	12.5	12
October	6	6.5	7	6.5
November	0.5	1.5	1.5	0.5
December	-3.5	-3	-3.5	-4
The date, when the temperature reaches certain level				
a) during the rising, through the:				
0°C	25.03.	25.03.	20.03.	20.03.
5°C	10.04.	15.04.	10.04.	10.04.
10°C	6.05.	15.05.	30.04.	5.05.
b) during the falling, through the:				
10°C	25.09.	25.09.	30.09.	25.09.
5°C	20.10.	20.10.	20.10.	20.10.
0°C	20.11.	24.11.	22.11.	20.11.
Sum of the average day temperatures during the period, when $t° > 5°C$	2500	2400	2600	2500
Dates of the last late frosts	10.05.	20.05.	20.05.	20.05.
Dates of the first early frosts	30.09.	30.09.	25.09.	25.09.
The lowest temperature in winter	-39°C	-35°C	-42°C	-38°C
The average date when the ground becomes frozen	10.12.	15.12.	1.12.	5.12.
The average date when the ground thaws	12.04.	9.04.	6.04.	9.04.
Total annual precipitations (mm)	600	650	600	600

CONCLUSIONS

1. 85 species of Tipulidae, 181 of Limoniidae, 4 of Cylindrotomidae, 10 of Trichoceridae and 6 of Ptychopteridae were found during our investigations in Lithuania. Nearly all of them proved to be new species in the local fauna of the country, since only 11 species of Tipulidae were known before.

2. Intensive four-hour net sweeping resulted in the capture of as many as 95% of all the flying species, whereas only 55-65% of the species could be caught in one hour.

3. Out of 25,260 insects caught in Lithuania, 5,527 belonged to the Tipulidae (6 Dolichopezinae, 5,473 Tipulinae and 48 Ctenophorinae), 12,324 to the Limoniidae (496 Pediciinae, 3,039 Hexatominae, 3,048 Eriopterinae and 5,581 Limoniinae), 398 to the Cylindrotomidae, 6,608 to the Trichoceridae and 403 to the Ptychopteridae. The ratio between these groups is approximately the same as the one in nature.

4. Lithuania is dominated by species with a European distribution range: 56 Limoniidae (30.8%), 25 Tipulidae (29.6%), 4 Cylindrotomidae (100%), 4 Trichoceridae (40%) and 5 Ptychopteridae (83.3%). 8 species of Limoniidae (4.5%), 1 of Tipulidae (1.2%) and 5 of Trichoceridae (50%) are widespread in the Holarctic region. No endemic species exist, because the fauna of Lithuanian crane flies is comparatively young, since it was formed during the last post-glacial period.

5. Humidity is a key factor in the biotopical distribution of crane flies, whereas plant species are of secondary importance.

6. Winter gnats (Trichoceridae) are most active in April and October, crane flies (Tipulidae) from late June to early July, and Limoniidae in June. The largest number of Cylindrotomidae is recorded in late spring and through nearly the whole summer, and that of Ptychopteridae in the first half of summer.

7. The emergence of crane flies changes locally, depending on the climatic conditions. The farther to the north and west, the later the start of the flight period.

8. No highly harmful species exist in Lithuania. Under favourable conditions only two species (*Tipula paludosa* Mg. and *Nephrotoma appendiculata* /Pier./) can cause harm.

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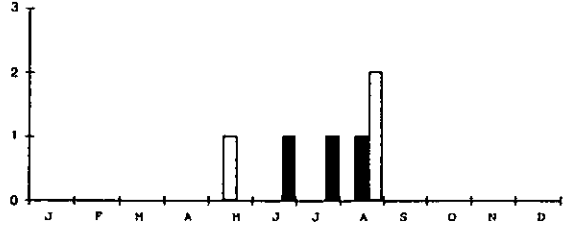
APPENDIX

Transcription of Lithuanian names

Birzai	Biržai
Druskininku	Druskininkų
Dudelis	Dūdelis
Kadziulyte	Kadžiulytė
Kairiukstis	Kairiūkštis
Kausyla	Kaušyla
Kazlu-Rudos	Kazlų-Rūdos
Krasauskiene	Krasauskienė
Kulvietiene	Kulvietienė
Lesinskas	Lešinskas
Mazeikiai	Mažeikiai
Pakalniskis	Pakalniškis
Repsiene	Repšienė
Ricardas	Ričardas
Rudninku	Rūdninkų
Salkauskiene	Šalkauskienė
Slezevicius	Šleževičius
Smalininku	Smalininkų
Stancevicius	Stancevičius
Surkus	Šurkus
Susve	Šušvė
Svitra	Švitra
Vaicys	Vaičys
Varena	Varėna
Varenos	Varėnos
Vengeliauskaite	Vengeliauskaitė
Zievyte	Žievytė
Zizys	Žižys
Zukliene	Žuklienė
Zuklys	Žuklys

Synthetical card-index

1. Ula bolitophila Loew, 1869



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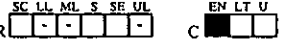
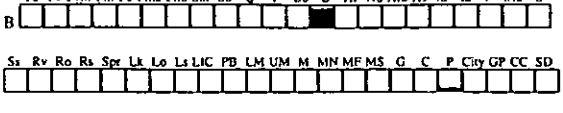
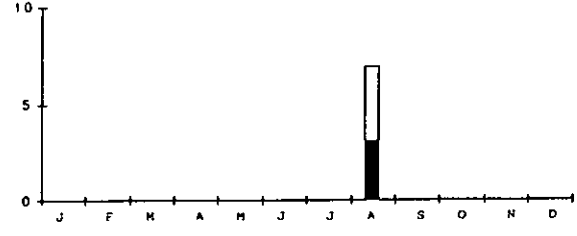




2. Ula mollissima Halliday, 1833



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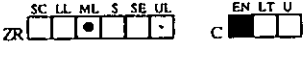
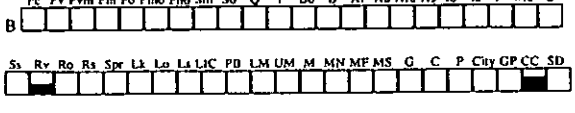
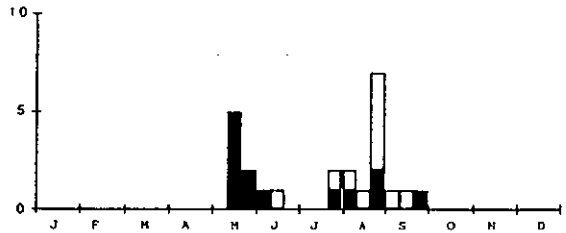




3. Ula sylvatica (Meigen, 1818)



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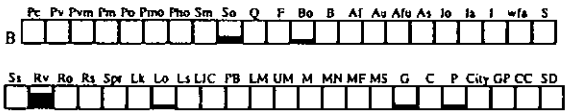

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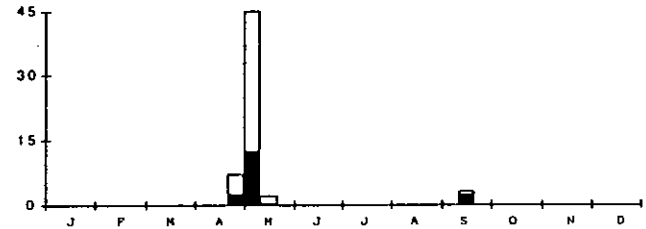

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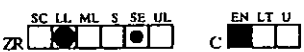

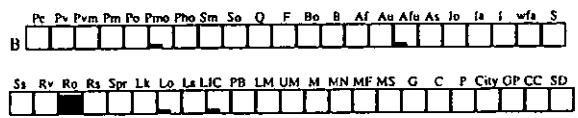

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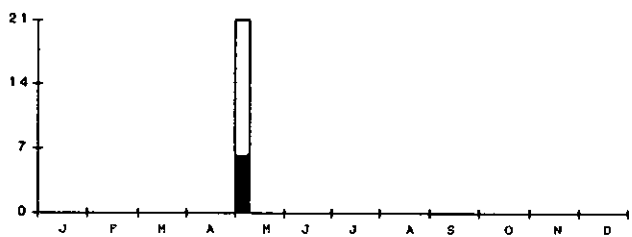

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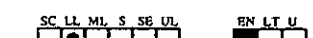
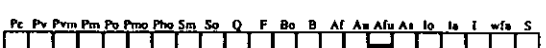
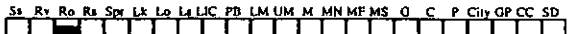
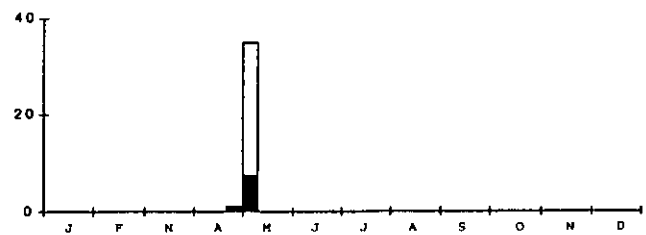






6. Dicranota (Paradicranota) gracilipes Wahlgren, 1905



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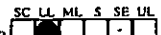
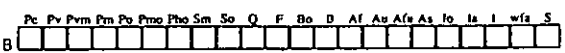
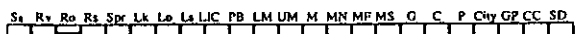
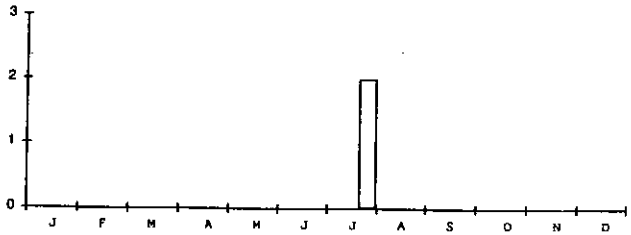






7. Dicranota (Paradicranota) pavida (Halliday, 1833)



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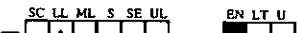
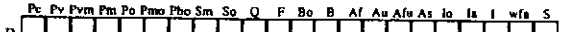
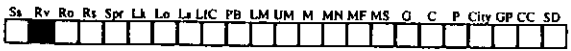
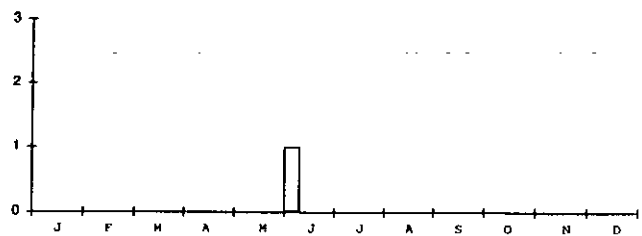


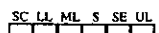


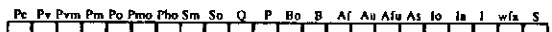


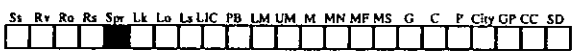
8. Dicranota (Paradicranota) robusta Lundström, 1912



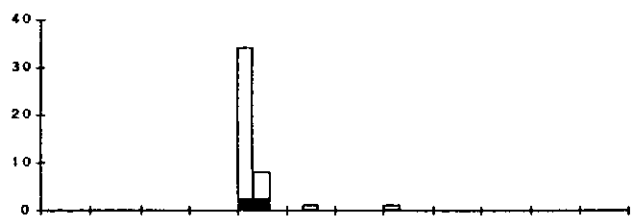
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



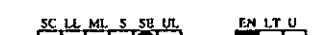


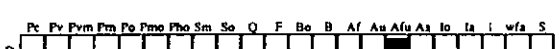


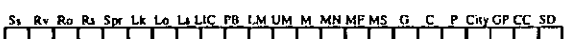
9. Dicranota (Paradicranota) subtilis Loew, 1871



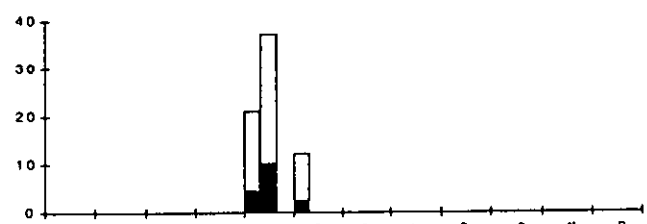
N ind 44 R ♂/♀ 10.00
N occur 6
R ind/occur 7.33



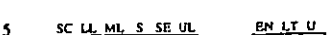


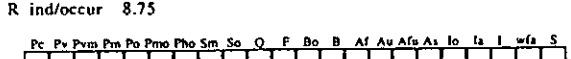


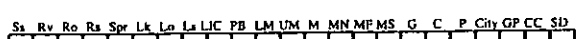
10. Dicranota (Rhaphidolabis) exclusa (Walker, 1848)



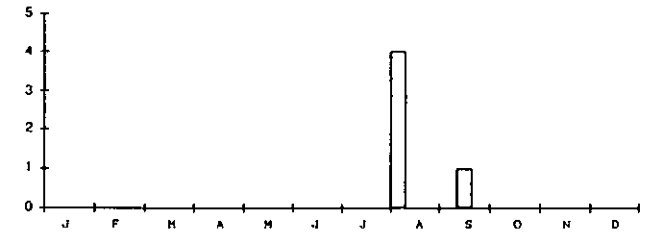
N ind 70 R ♂/♀ 4.15
N occur 8
R ind/occur 8.75



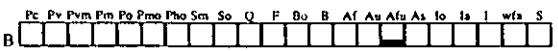


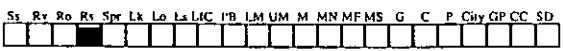


11. Pedicia (Crunobia) straminea (Meigen, 1838)

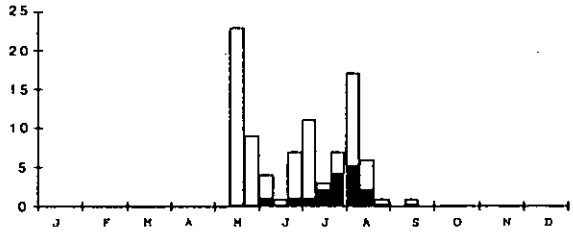


N ind 5 R ♂/♀ 5/0
N occur 2
R ind/occur 2.50

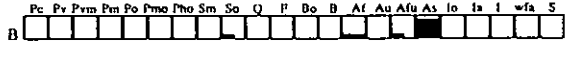


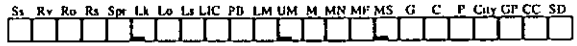


12. Pedicia (Pedicia) rivosa (Linnaeus, 1758)

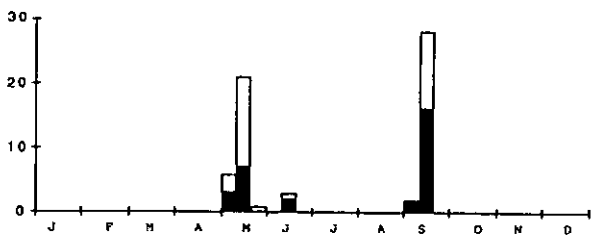


N ind 94 R ♂/♀ 4.81
N occur 44
R ind/occur 2.14

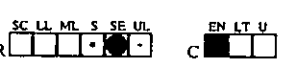


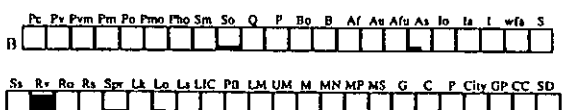


13. Tricyphona (Tricyphona) immaculata (Meigen, 1804)

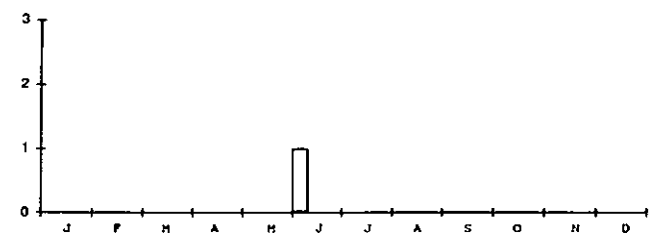


N ind 61 R ♂/♀ 1.00
N occur 11
R ind/occur 5.55

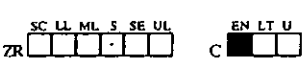


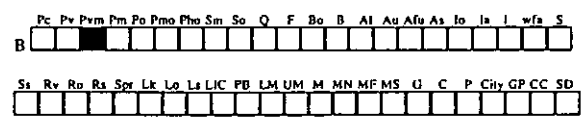


14. Tricyphona (Tricyphona) livida Madarassy, 1881

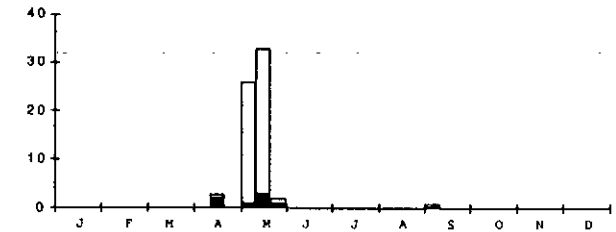


N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00

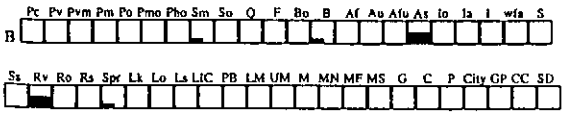




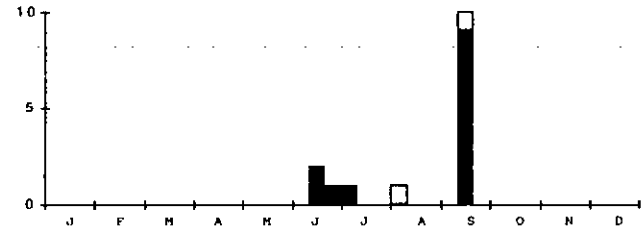
15. Tricyphona (Tricyphona) unicolor (Schummel, 1829)



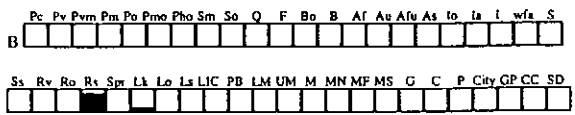
N ind 65 R ♂/♀ 8.28
N occur 9
R ind/occur 7.22



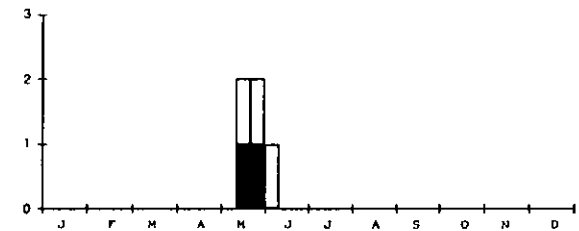
16. Paradelphomyia (Oxyrhiza) fuscula (Loew, 1873)



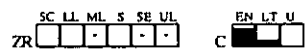
N ind 15 R ♂/♀ 0.15
N occur 7
R ind/occur 2.14

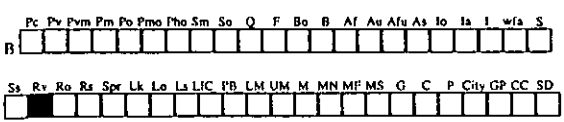


17. Austrotimnophila (Archilimnophila) unica (Osten Sacken, 1869)

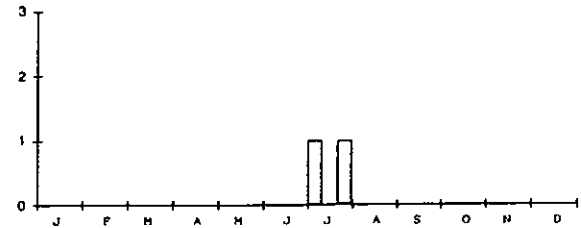


N ind 5 R ♂/♀ 1.50
N occur 3
R ind/occur 1.67

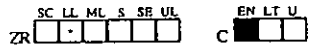


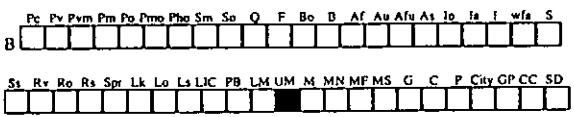


18. Austrotimnophila (Austrotimnophila) ochracea (Meigen, 1804)

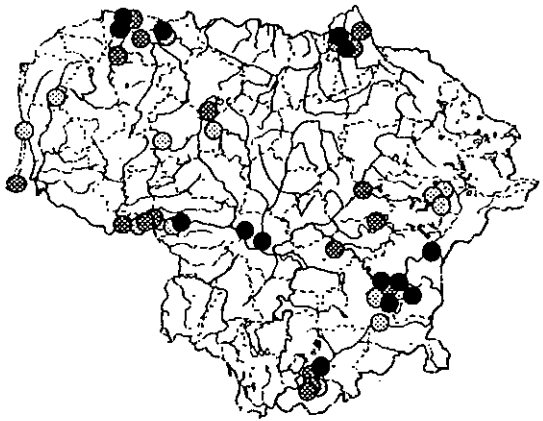


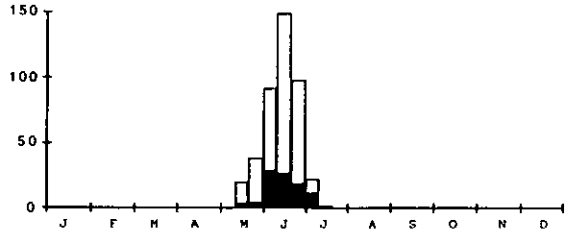
N ind 2 R ♂/♀ 2/0
N occur 2
R ind/occur 1.00



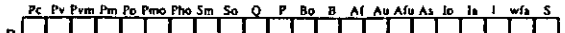


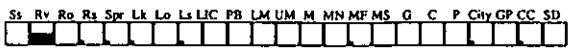
19. Epiphragma ocellare (Linnaeus, 1761)



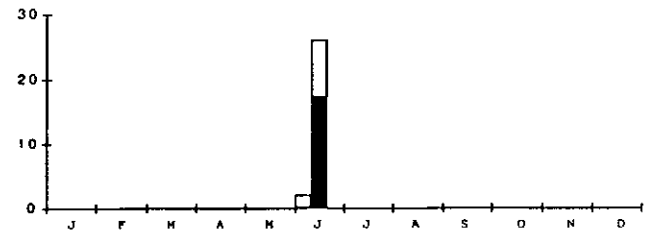


N ind 441 R ♂/♀ 3.99
N occur 72
R ind/occur 6.13

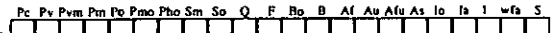


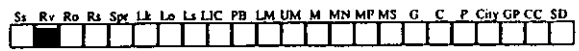


20. Adelphomyia punctum (Meigen, 1818)

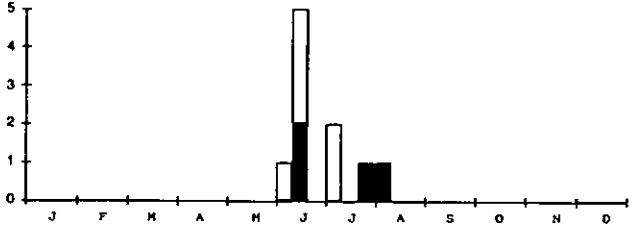


N ind 28 R ♂/♀ 0.65
N occur 4
R ind/occur 7.00

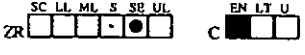


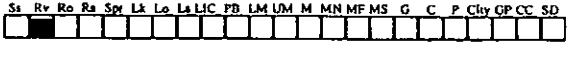


21. Eloeophila apicata (Loew, 1871)

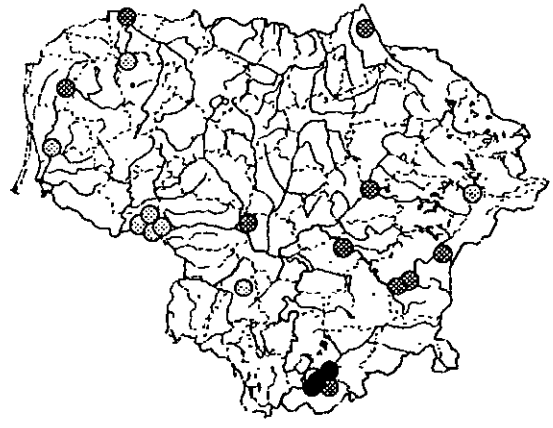


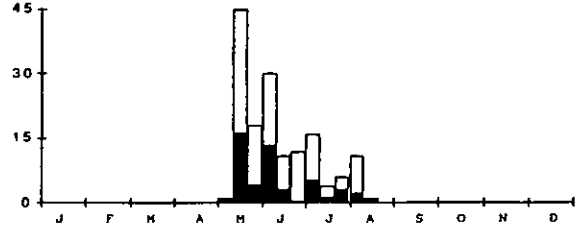
N ind 10 R ♂/♀ 1.50
N occur 6
R ind/occur 1.67



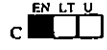


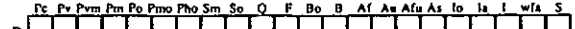
22. Eloeophila maculata (Meigen, 1804)

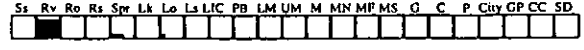




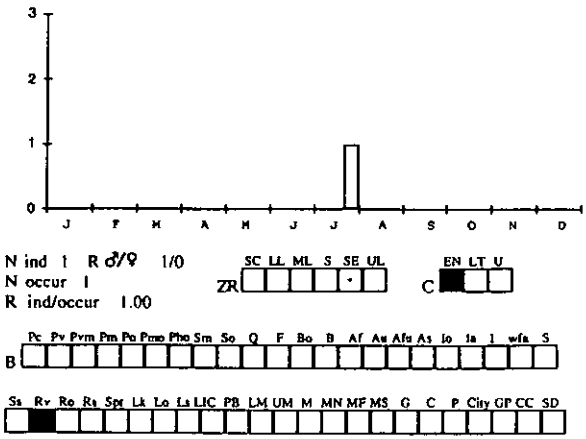
N ind 154 R ♂/♀ 2.25
N occur 45
R ind/occur 3.42



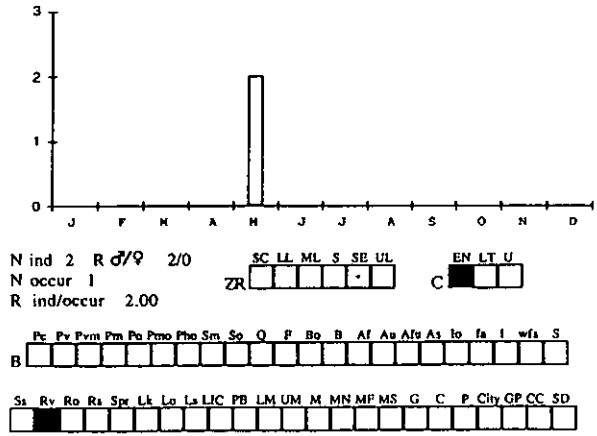




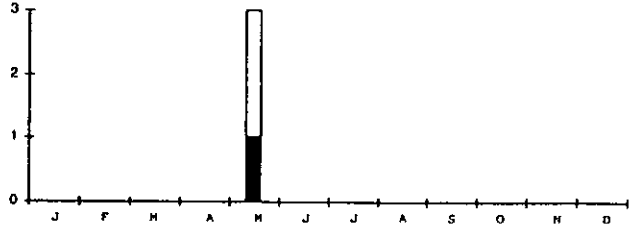
23. **Eloeophila submarmorata (Verrall, 1887)**



24. **Eloeophila trimaculata (Zetterstedt, 1838)**



25. Eloeophila verralli (Bergroth, 1912)



N ind 3 R ♂/♀ 2.00
N occur 1
R ind/occur 3.00

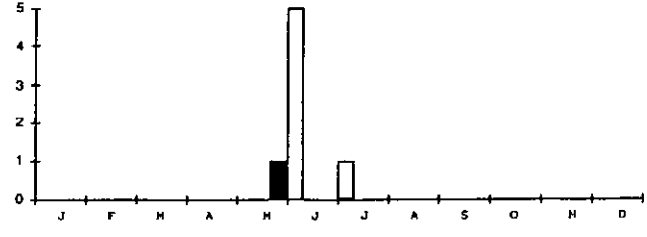
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Ra Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

26. Euphylidorea dispar (Meigen, 1818)



N ind 7 R ♂/♀ 6.00
N occur 4
R ind/occur 1.75

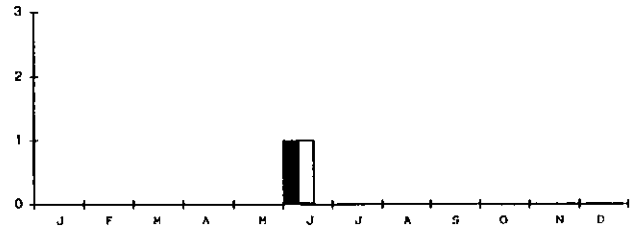
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Ra Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

27. Euphylidorea meigeni (Verrall, 1887)



N ind 2 R ♂/♀ 1.00
N occur 2
R ind/occur 1.00

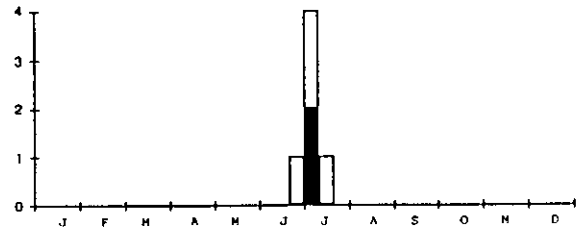
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

28. Euphylidorea phaeostigma (Schummel, 1829)



N ind 6 R ♂/♀ 2.00
N occur 6
R ind/occur 1.00

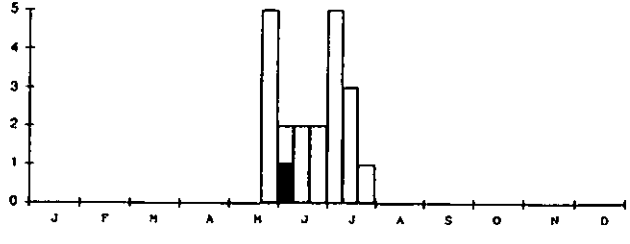
ZR SC LL ML S SE UL

C EN LT U

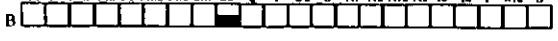
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

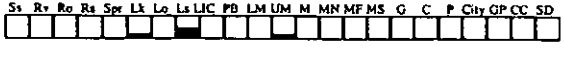
Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

29. Eutonia barbipes (Melgen, 1804)

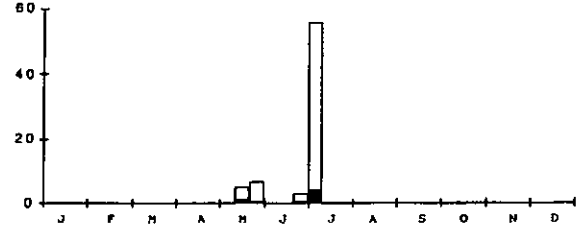


N ind 21 R ♂/♀ 19.00
N occur 13
R ind/occur 1.61

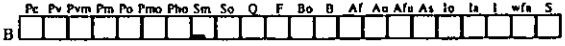


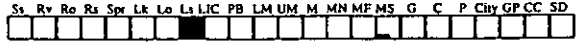


30. Idioptera linnei Oosterbroek, 1992

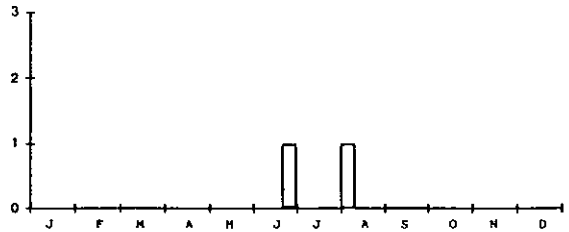


N ind 71 R ♂/♀ 13.00
N occur 9
R ind/occur 7.89

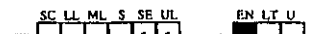


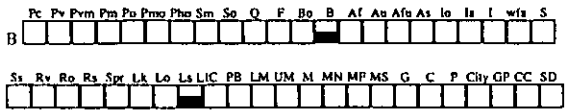


31. Idioptera macropteryx (Tjeder, 1955)

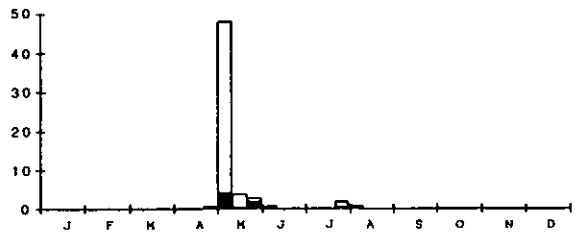


N ind 2 R ♂/♀ 2/0
N occur 2
R ind/occur 1.00

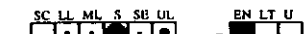


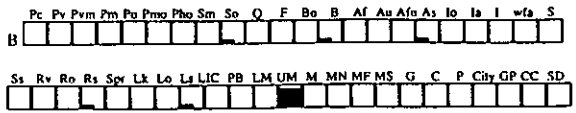


32. Idioptera pulchella (Meigen, 1830)

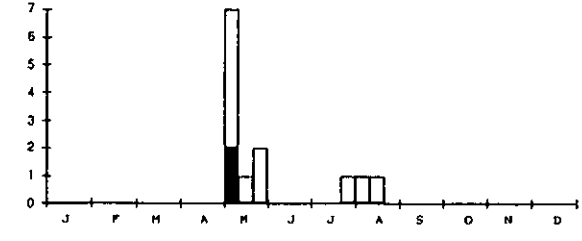


N ind 60 R ♂/♀ 9.00
N occur 13
R ind/occur 4.62

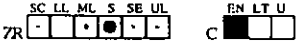


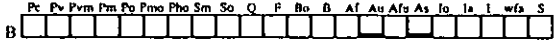


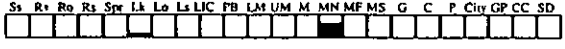
33. Limnophila (Limnophila) pictipennis (Meigen, 1818)



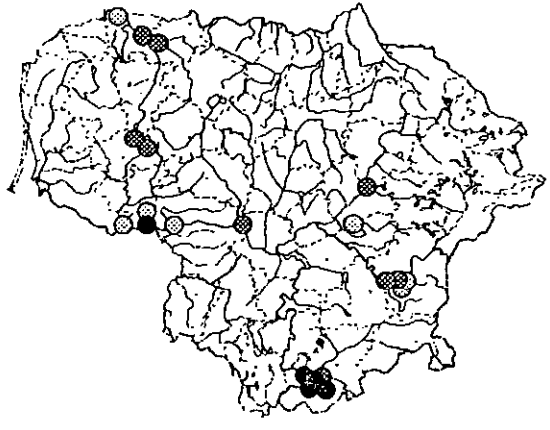
N ind 13 R ♂/♀ 5.50
N occur 6
R ind/occur 2.17

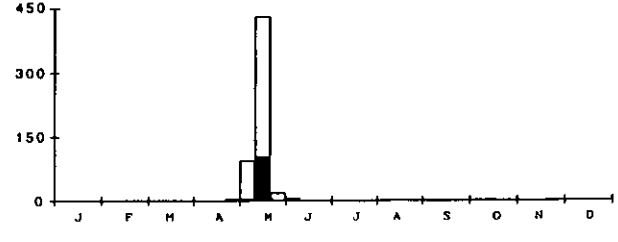




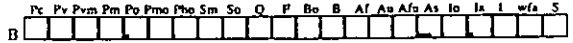


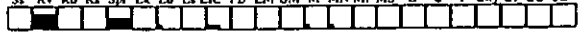
34. Limnophila (Limnophila) schranki Oosterbroek, 1992



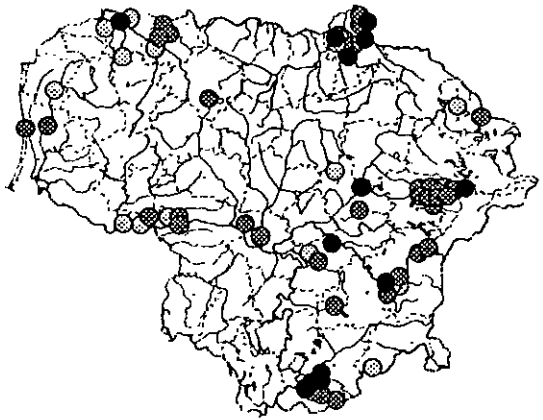


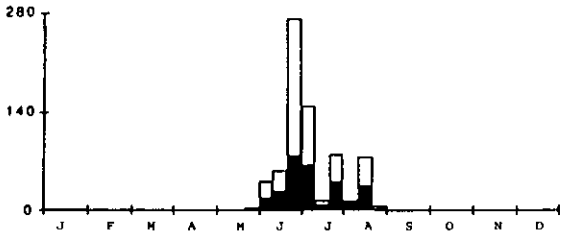
N ind 560 R ♂/♀ 3.93
N occur 29
R ind/occur 19.31





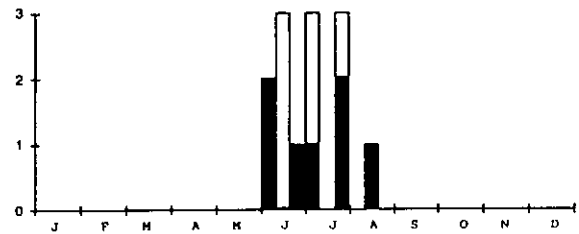
35. Neolimnomyia (Brachylimnophila) nemoralis (Meigen, 1818)



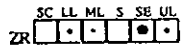


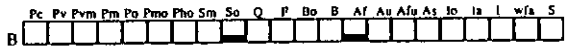
N ind 713 R ♂/♀ 1.62
N occur 124
R ind/occur 5.75

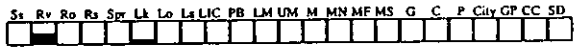
36. Neolimnomyia (Neolimnomyia) batava (Edwards, 1938)



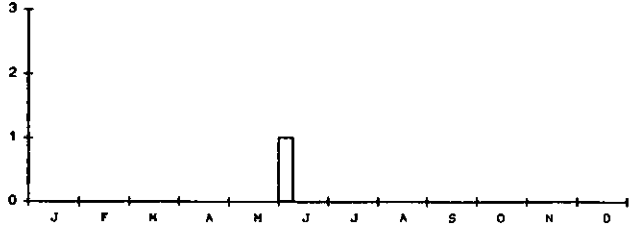
N ind 13 R ♂/♀ 0.86
N occur 8
R ind/occur 1.63



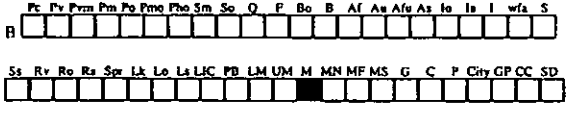




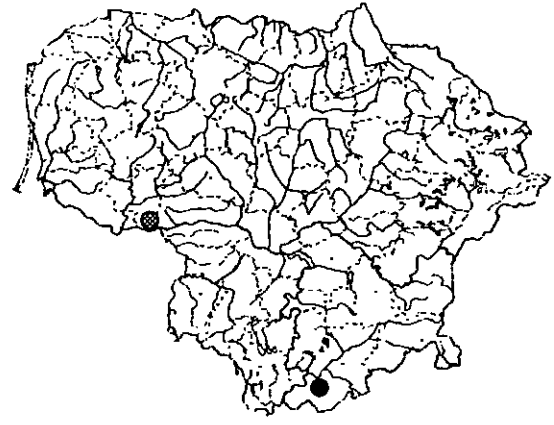
37. Neolimnomyia (Neolimnomyia) filata (Walker, 1856)

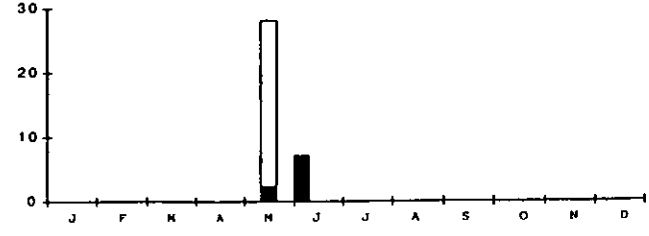


N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00

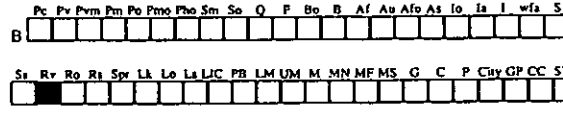


38. Phylidorea (Macrolabina) nigronotata (Siebke, 1870)

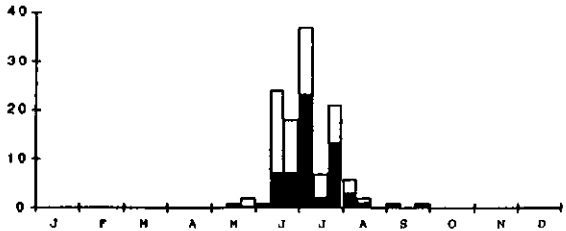




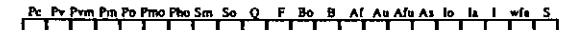
N ind 35 R ♂/♀ 2.89
N occur 5
R ind/occur 7.00



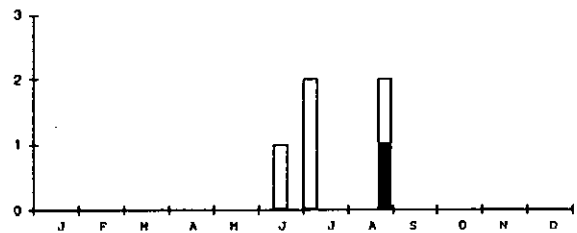
39. Phyllidorea (Paraphyllidorea) fulvonervosa (Schummel, 1829)



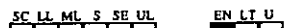
N ind 121 R ♂/♀ 1.05
N occur 54
R ind/occur 2.24

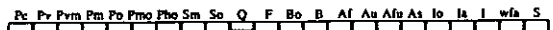


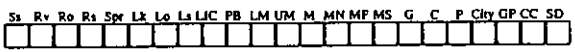
40. Phyllidorea (Phyllidorea) abdominalis (Staeger, 1840)



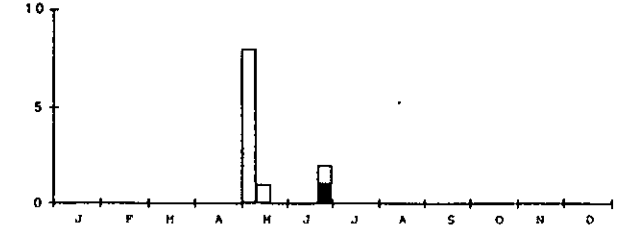
N ind 5 R ♂/♀ 4.00
N occur 3
R ind/occur 1.67



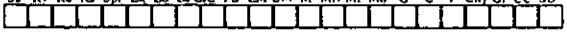




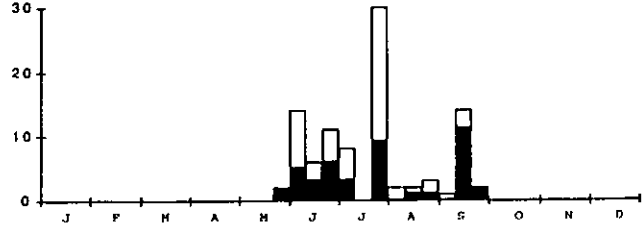
41. Phyllidorea (Phyllidorea) bicolor (Meigen, 1804)



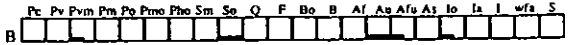
N ind 11 R ♂/♀ 10.00
N occur 3
R ind/occur 3.67

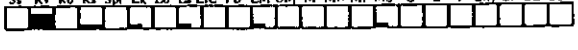


42. Phyllidorea (Phyllidorea) ferruginea (Meigen, 1818)

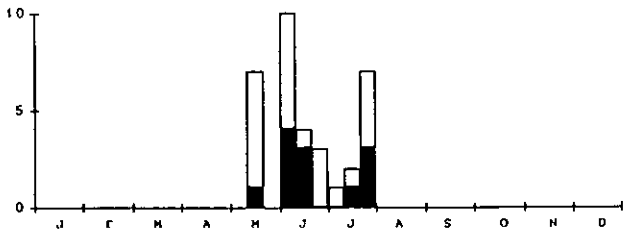


N ind 99 R ♂/♀ 1.08
N occur 32
R ind/occur 3.09





43. Phylidorea (Phylidorea) longicornis (Schummel, 1829)



N ind 34 R ♂/♀ 1.83
N occur 15
R ind/occur 2.27

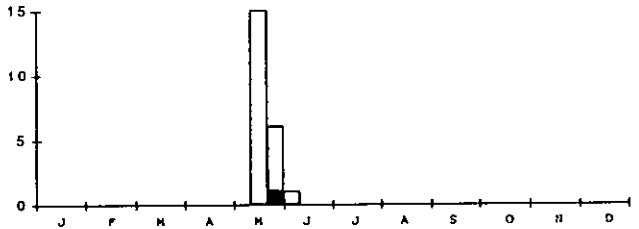
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

44. Phylidorea (Phylidorea) nervosa (Schummel, 1829)



N ind 22 R ♂/♀ 21.00
N occur 7
R ind/occur 3.14

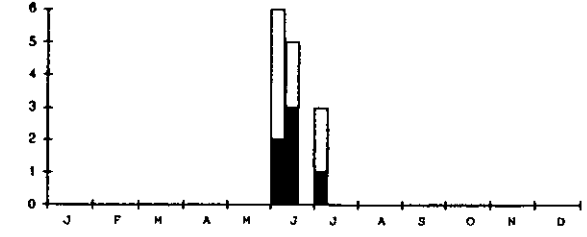
ZR SC LL ML S SE UL

C EN LT U

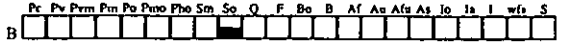
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

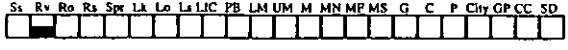
Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

45. Phylidorea (Phylidorea) squalens (Zetterstedt, 1838)

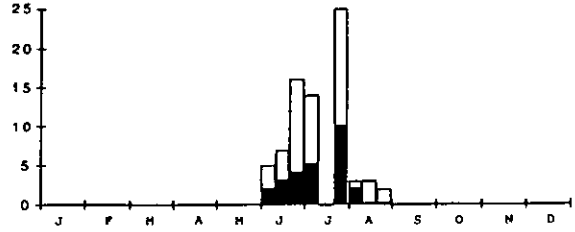


N ind 14 R ♂/♀ 1.33
N occur 3
R ind/occur 4.67

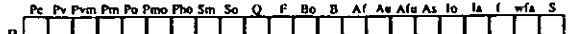


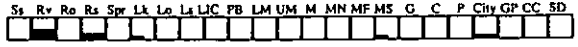


46. Pilaria discicollis (Meigen, 1818)

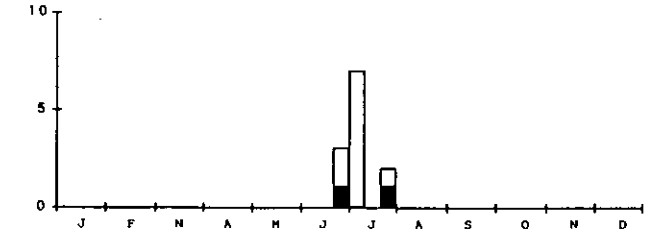


N ind 76 R ♂/♀ 2.25
N occur 34
R ind/occur 2.24

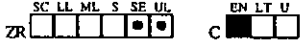


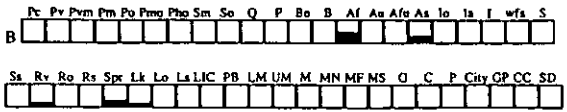


47. Pilaria fuscipennis (Meigen, 1818)

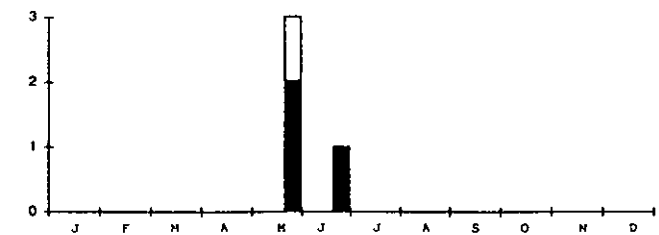


N ind 12 R ♂/♀ 5.00
N occur 4
R ind/occur 3.00

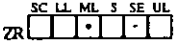


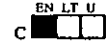


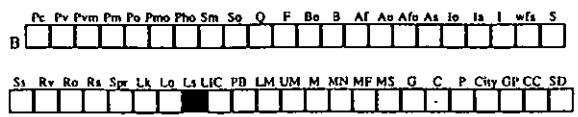
48. Pilaria meridiana (Staeger, 1840)



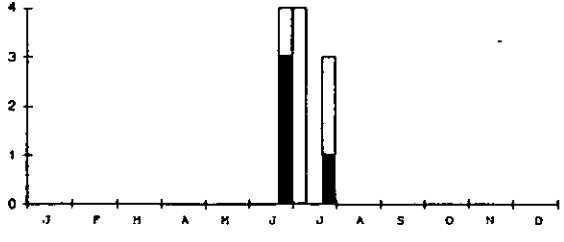
N ind 4 R ♂/♀ 0.33
N occur 2
R ind/occur 2.00



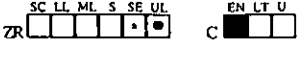


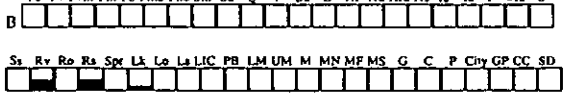


49. Pilaria nigropunctata (Agrell, 1945)

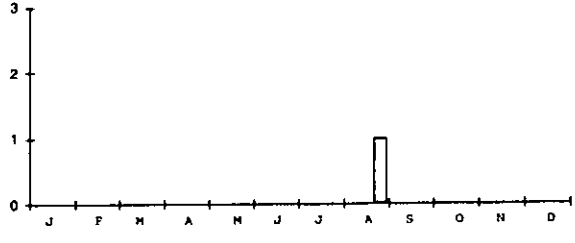


N ind 11 R ♂/♀ 1.75
N occur 4
R ind/occur 2.75

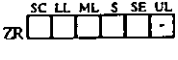


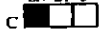


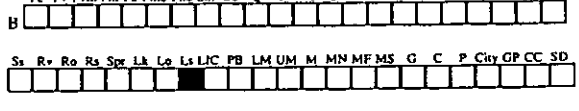
50. Pilaria scutellata (Staeger, 1840)



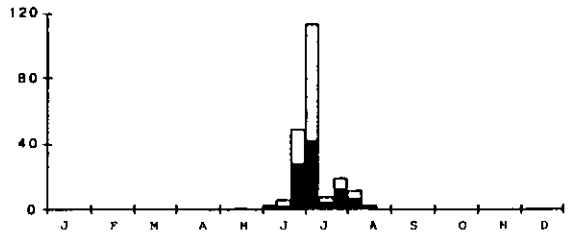
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



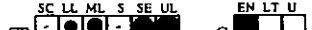


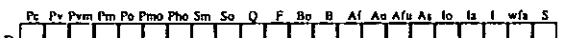


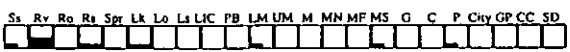
51. Pseudolimnophila lucorum (Meigen, 1818)



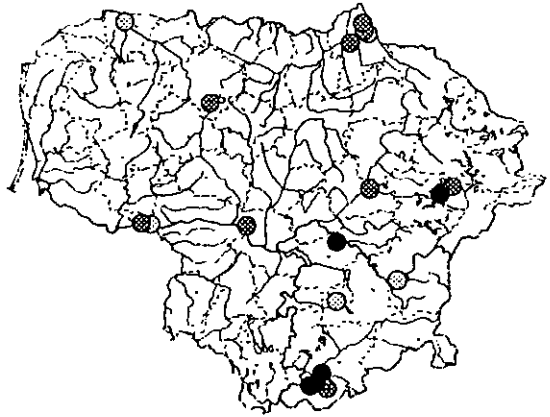
N ind 214 R ♂/♀ 1.24
N occur 46
R ind/occur 4.65

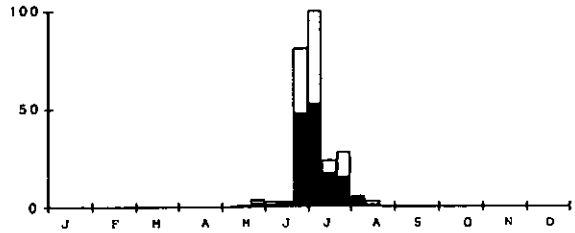




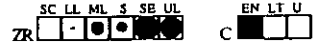


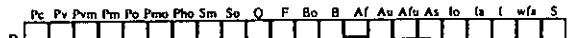
52. Pseudolimnophila sepium (Verrall, 1886)

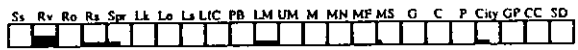




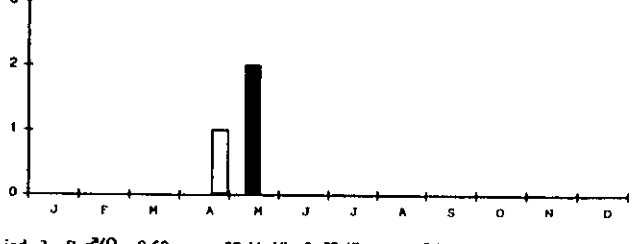
N ind 255 R ♂/♀ 0.77
N occur 47
R ind/occur 5.43



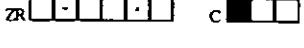


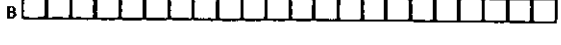


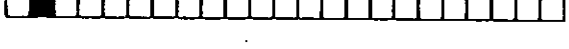
53. Hexatoma (Eriocera) cimicoides (Scopoli, 1763)



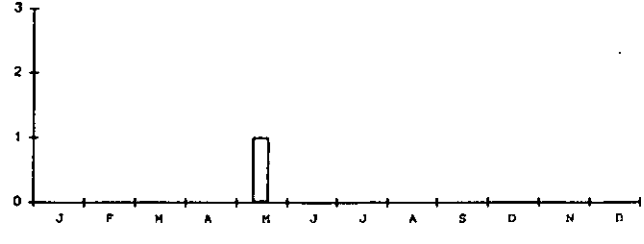
N ind 3 R ♂/♀ 0.50
N occur 2
R ind/occur 1.50



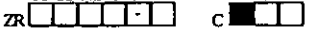


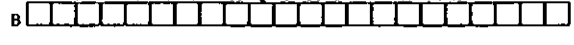


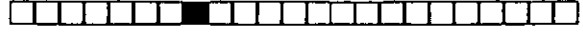
54. Hexatoma (Hexatoma) vittata (Meigen, 1830)



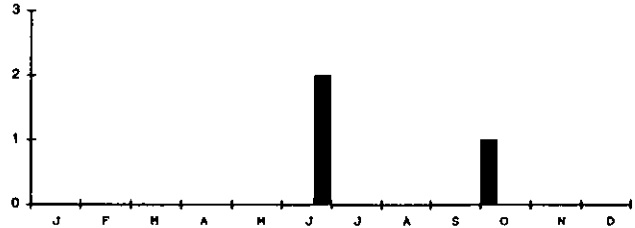
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



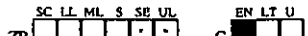


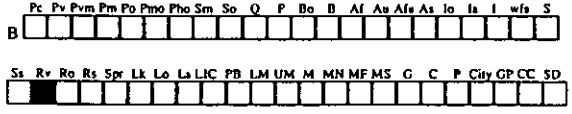


55. Crypteria limnophiloides Bergroth, 1913

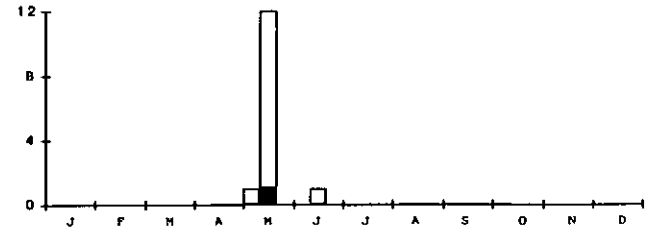


N ind 3 R ♂/♀ 0/3
N occur 2
R ind/occur 1.50

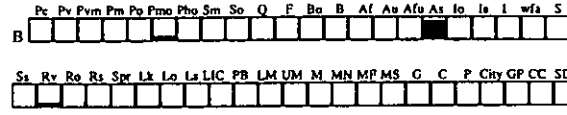




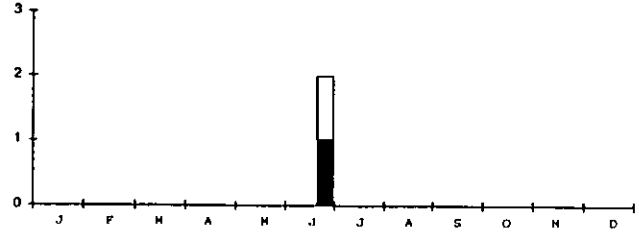
56. Neolimnophila carteri (Tonnoir, 1921)



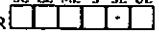
N ind 14 R ♂/♀ 12.00
N occur 3
R ind/occur 4.67

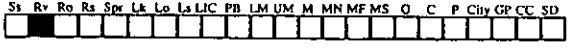


57. Arctoconopa melampodia (Loew, 1873)

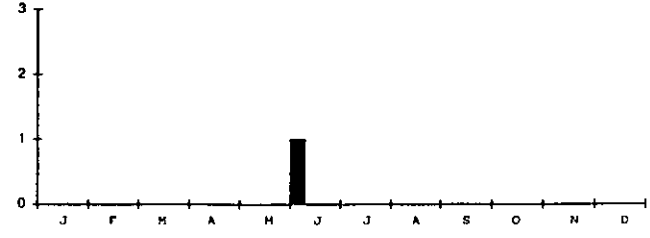


N ind 2 R ♂/♀ 1.00
N occur 1
R ind/occur 2.00

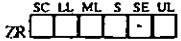


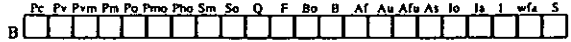


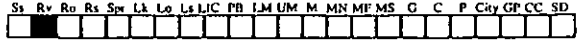
58. Arctoconopa zonata (Zetterstedt, 1851)



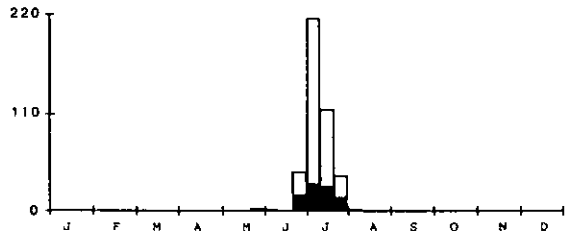
N ind 1 R ♂/♀ 0/1
N occur 1
R ind/occur 1.00



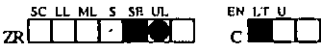


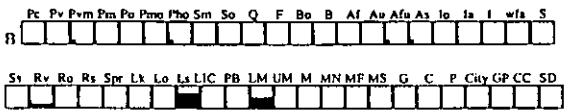


59. Erioptera (Erioptera) divisa (Walker, 1848)

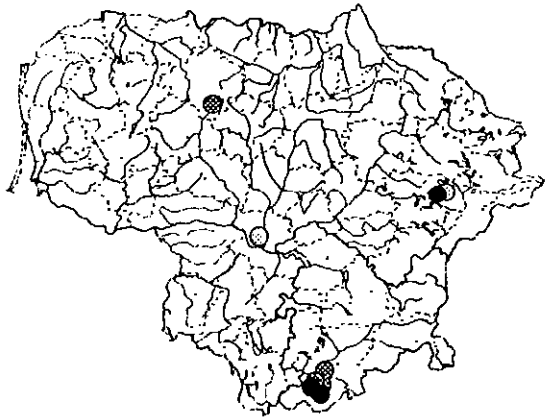


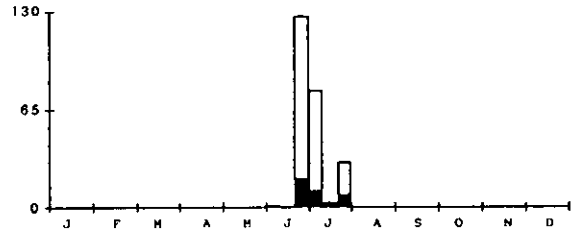
N ind 422 R ♂/♀ 3.51
N occur 22
R ind/occur 19.18



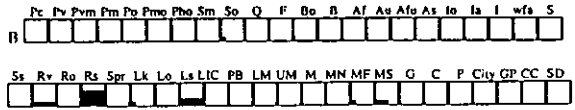


60. Erioptera (Erioptera) flavata (Westhoff, 1882)

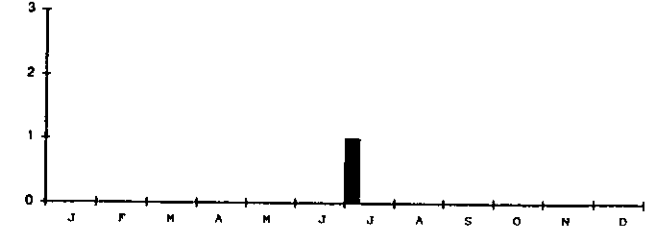




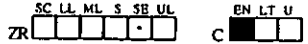
N ind 237 R ♂/♀ 6.43
N occur 16
R ind/occur 14.81

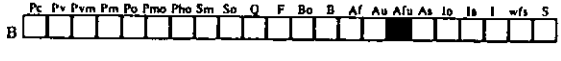


61. Erioptera (Erioptera) fuscipennis Meigen, 1818

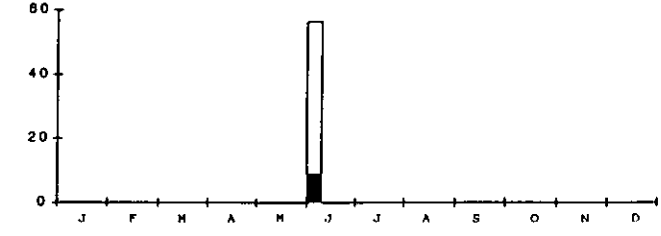


N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00

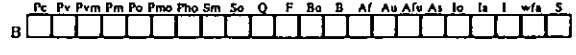




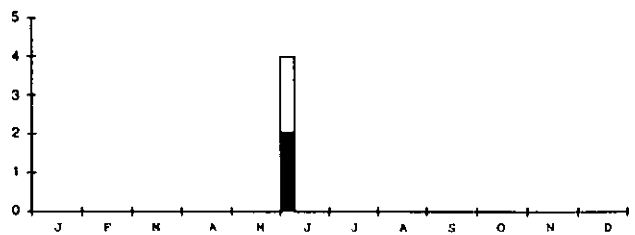
62. Erioptera (Erioptera) griseipennis Meigen, 1838



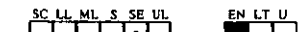
N ind 57 R ♂/♀ 6.12
N occur 4
R ind/occur 14.25

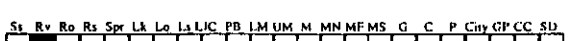


63. Erioptera (Erioptera) limbata Loew, 1873

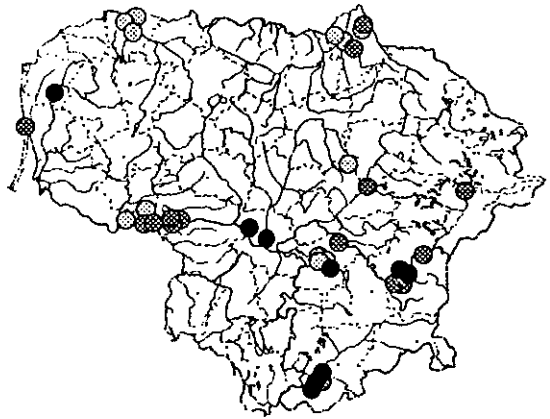


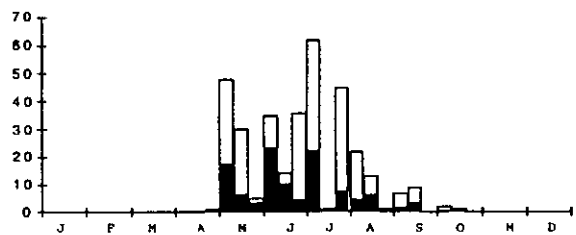
N ind 4 R ♂/♀ 1.00
N occur 1
R ind/occur 4.00



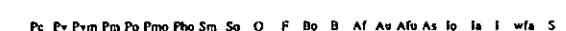


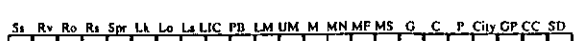
64. Erioptera (Erioptera) lutea Meigen, 1804



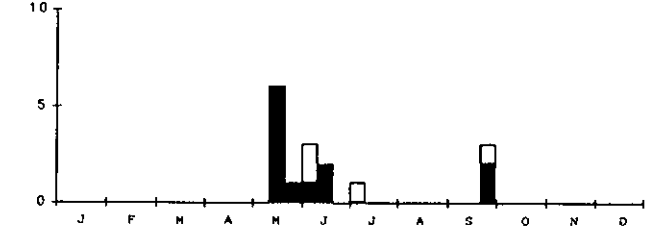


N ind 330 R ♂/♀ 2.03
N occur 76
R ind/occur 4.34

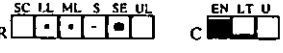


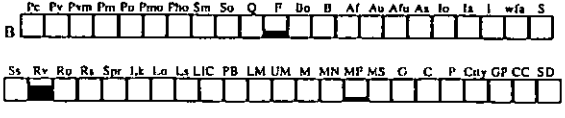


65. Erioptera (Erioptera) sordida Zetterstedt, 1838

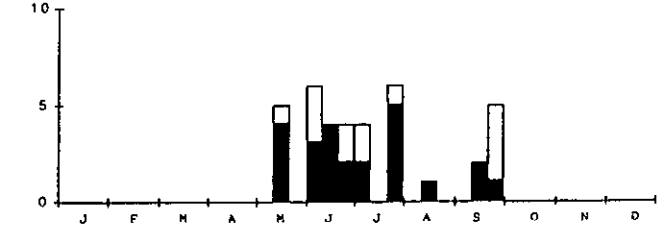


N ind 16 R ♂/♀ 0.33
N occur 10
R ind/occur 1.60

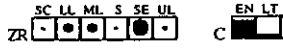


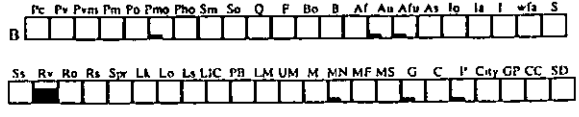


66. Erioptera (Erioptera) squalida Loew, 1871

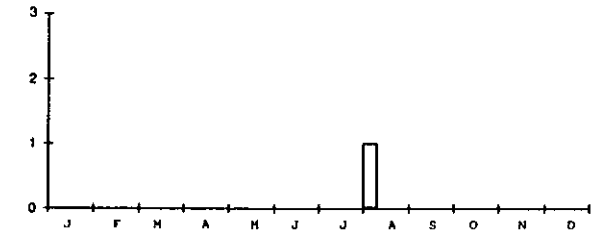


N ind 37 R ♂/♀ 0.54
N occur 24
R ind/occur 1.54





67. Erioptera (Mesocyphona) fossarum (Loew, 1873)



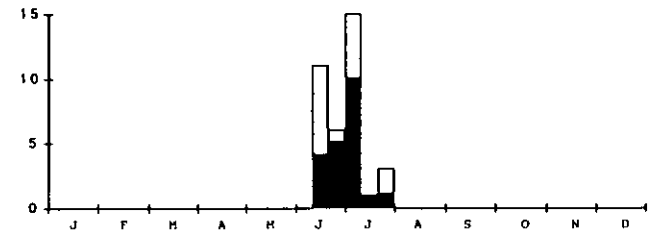
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00

ZR SC LL ML S SE UL
C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MP MS G C P City GP CC SD

68. Gonempeda flava (Schummel, 1829)



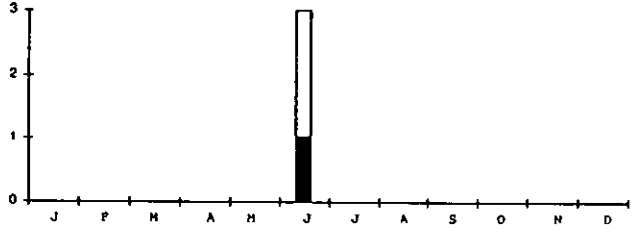
N ind 36 R ♂/♀ 0.62
N occur 11
R ind/occur 3.27

ZR SC LL ML S SE UL
C EN LT U

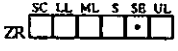
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

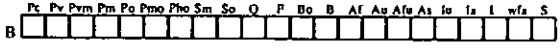
Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MP MS G C P City GP CC SD

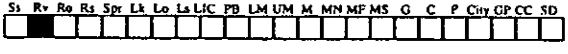
69. Scleroprocta pentagonalis (Loew, 1873)



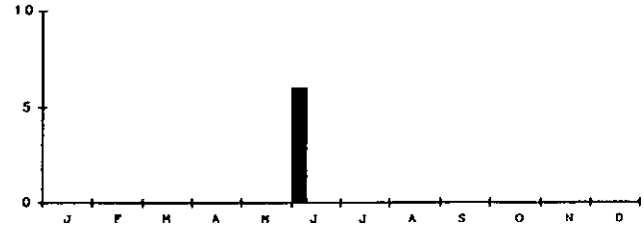
N ind 3 R ♂/♀ 2.00
N occur 1
R ind/occur 3.00



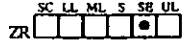


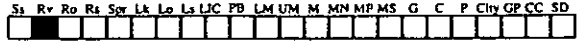


70. Scleroprocta sororcula (Zetterstedt, 1851)

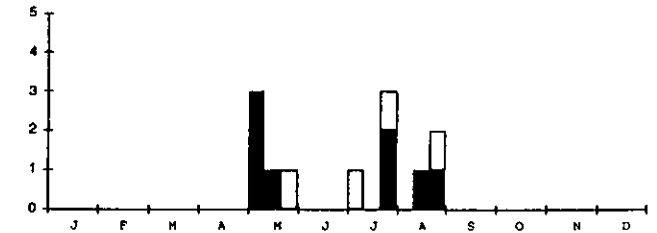


N ind 6 R ♂/♀ 0/6
N occur 1
R ind/occur 6.00

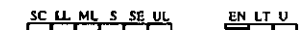


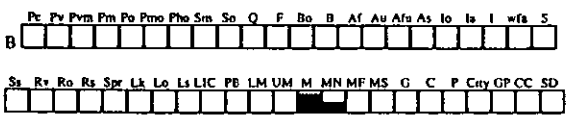


71. Symplecta (Psiloconopa) stictica (Meigen, 1818)

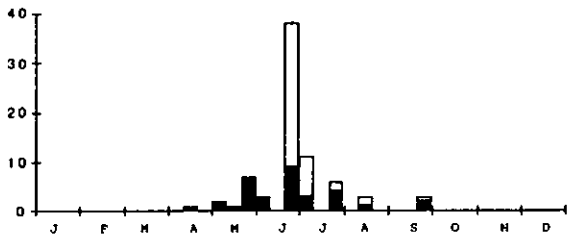


N ind 12 R ♂/♀ 0.50
N occur 10
R ind/occur 1.20

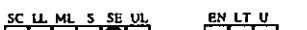


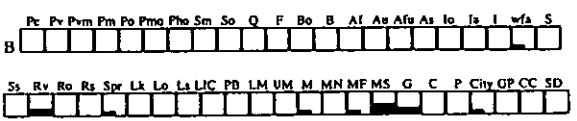


72. Symplecta (Symplecta) hybrida (Meigen, 1804)

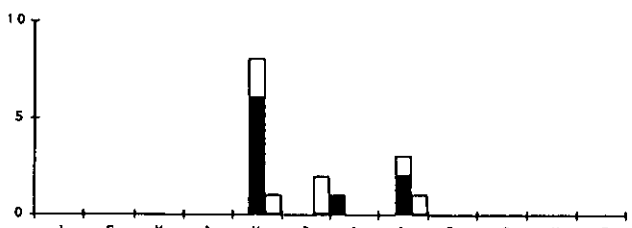


N ind 75 R ♂/♀ 1.18
N occur 29
R ind/occur 2.59

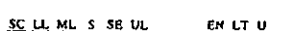


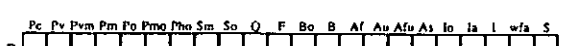


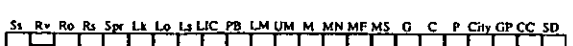
73. Symplecta (Trimicra) pilipes (Fabricius, 1787)



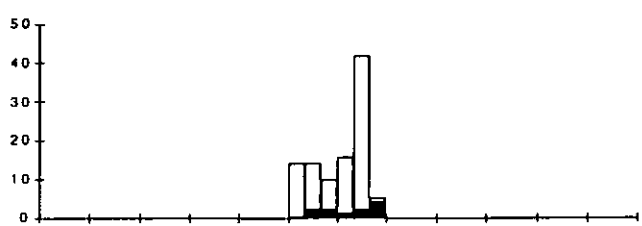
N ind 16 R ♂/♀ 0.78
N occur 8
R ind/occur 2.00



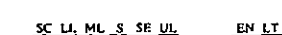


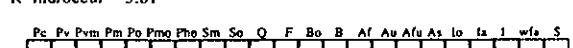


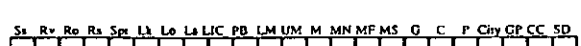
74. Cheilotrichia (Cheilotrichia) imbuta (Meigen, 1818)



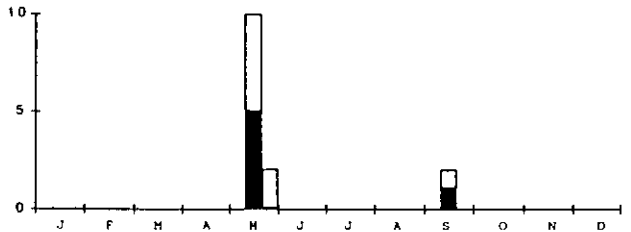
N ind 101 R ♂/♀ 9.44
N occur 18
R ind/occur 5.61







75. Cheilotrichia (Empeda) affinis (Lackschewitz, 1927)



N ind 14 R ♂/♀ 1.33
N occur 3
R ind/occur 4.67

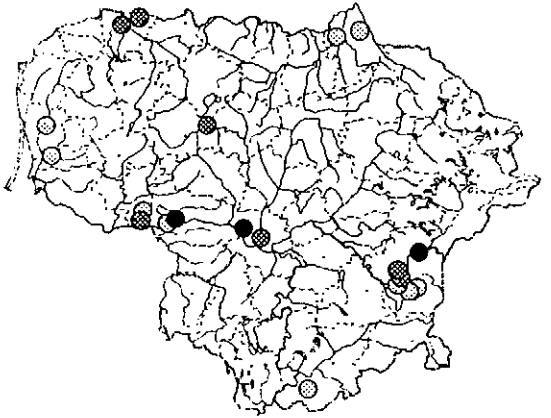
ZR SC LL ML S SE UL

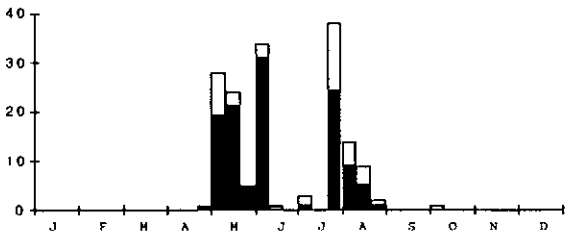
C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm Sc Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LfC PB LM UM M MN MF MS G C P City GP CC SD

76. Cheilotrichia (Empeda) cinerascens (Meigen, 1804)





N ind 162 R ♂/♀ 0.36
N occur 38
R ind/occur 4.26

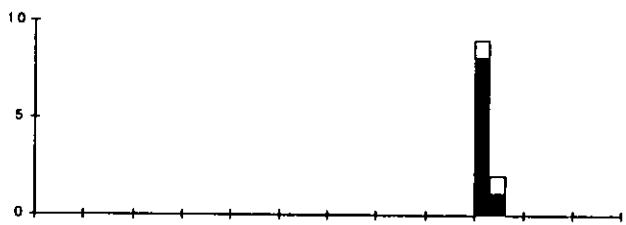
ZR SC LL ML S SE UL

C EN LT U

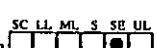
B Pc Pv Pvm Pm Po Pmo Pho Sm Sc Q F Bo B Af Au Afu As Io Ia I wfa S

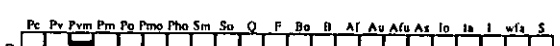
Ss Rv Ro Rs Spr Lk Lo Ls LfC PB LM UM M MN MF MS G C P City GP CC SD

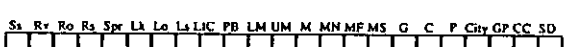
77. Cheilotrichia (Empeda) neglecta (Lackschewitz, 1927)



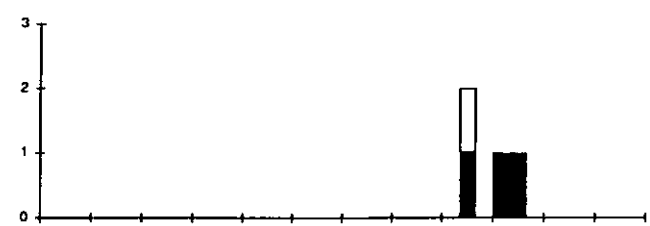
N ind 11 R ♂/♀ 0.22
N occur 4
R ind/occur 2.75



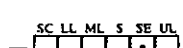


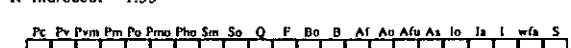


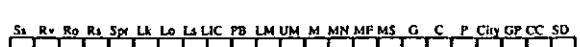
78. Cheilotrichia (Empeda) staryi Mendl, 1973



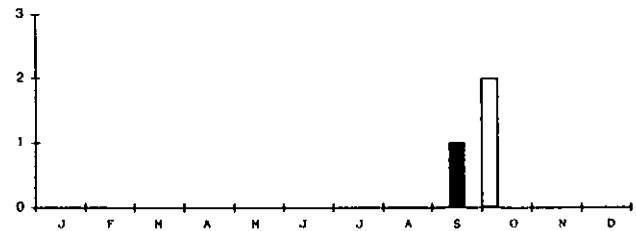
N ind 4 R ♂/♀ 0.33
N occur 3
R ind/occur 1.33



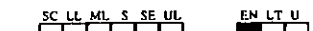


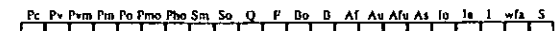


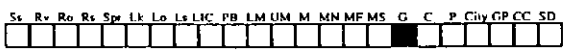
79. Erioconopa diuturna (Walker, 1848)



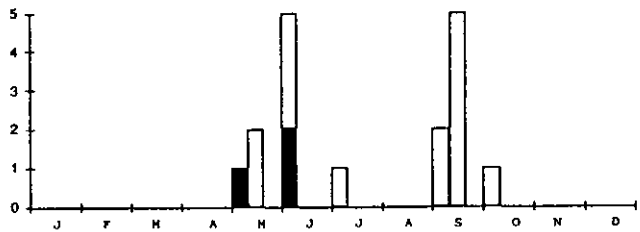
N ind 3 R ♂/♀ 2.00
N occur 2
R ind/occur 1.50



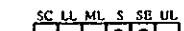


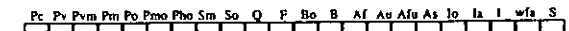


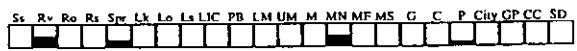
80. Erioconopa trivialis (Meigen, 1818)



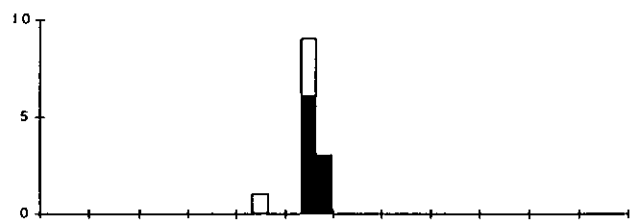
N ind 17 R ♂/♀ 4.67
N occur 8
R ind/occur 2.12



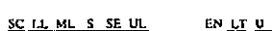


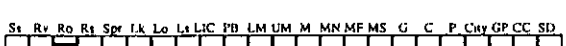


81. Hoplolabis (Parilisia) areolata (Slebke, 1872)

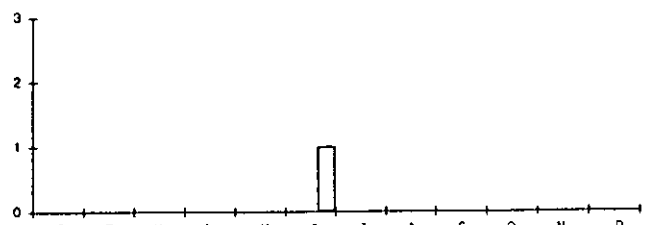


N ind 13 R ♂/♀ 0.50
N occur 5
R ind/occur 2.60

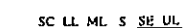


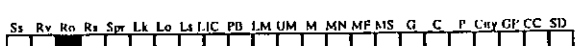


82. Hoplolabis (Parilisia) subalpina (Bangerter, 1947)

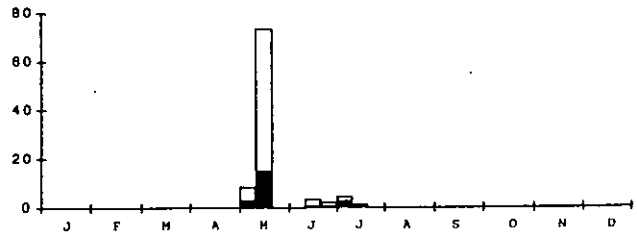


N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00

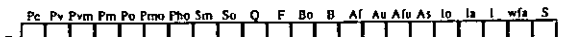


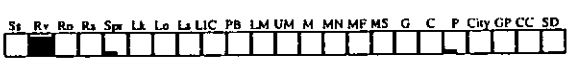


83. Hoplolabis (Parilisia) vicina (Tonnoir, 1920)

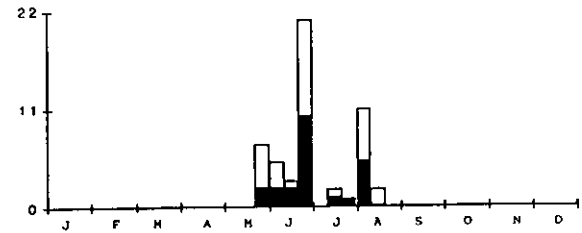


N ind 91 R ♂/♀ 4.00
N occur 14
R ind/occur 6.50

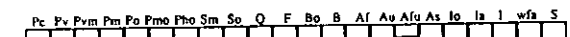


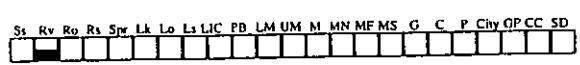


84. Ilisia maculata (Meigen, 1804)

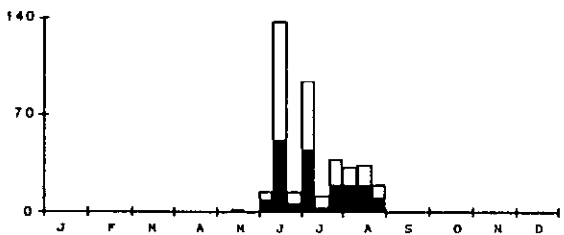


N ind 54 R ♂/♀ 1.25
N occur 23
R ind/occur 2.35

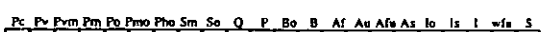


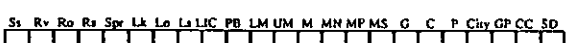


85. Molophilus (Molophilus) appendiculatus (Staeger, 1840)

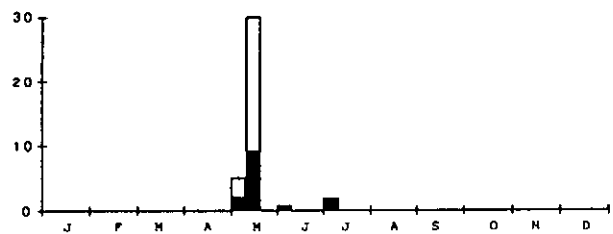


N ind 402 R ♂/♀ 1.23
N occur 51
R ind/occur 7.88

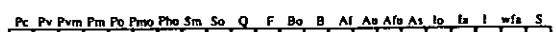


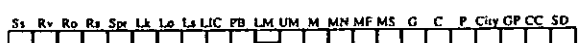


86. Molophilus (Molophilus) ater (Meigen, 1804)

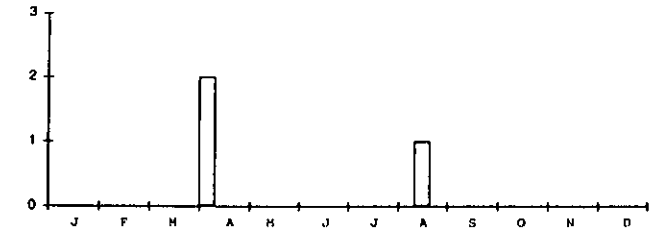


N ind 38 R ♂/♀ 1.71
N occur 9
R ind/occur 4.22





87. Molophilus (Molophilus) bifidus Goetghebuer, 1920



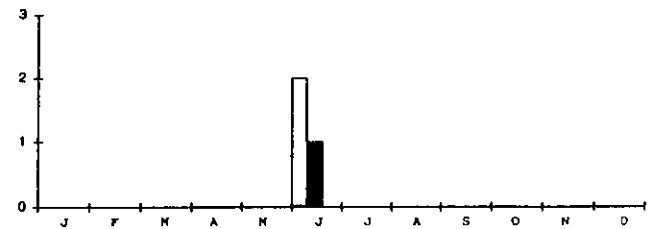
N ind 3 R ♂/♀ 3/0
N occur 2
R ind/occur 1.50

ZR SC LL ML S SE UL
C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

88. Molophilus (Molophilus) bihamatus De Meijere, 1918



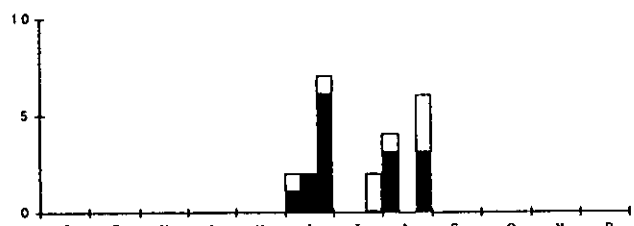
N ind 3 R ♂/♀ 2.00
N occur 2
R ind/occur 1.50

ZR SC LL ML S SE UL
C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afe As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

89. Molophilus (Molophilus) cinereifrons De Meijere, 1920



N ind 23 R ♂/♀ 0.53
N occur 7
R ind/occur 3.29

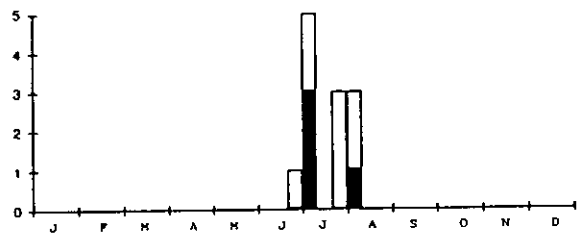
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q P Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

90. Molophilus (Molophilus) corniger De Meijere, 1920



N ind 12 R ♂/♀ 2.00
N occur 5
R ind/occur 2.40

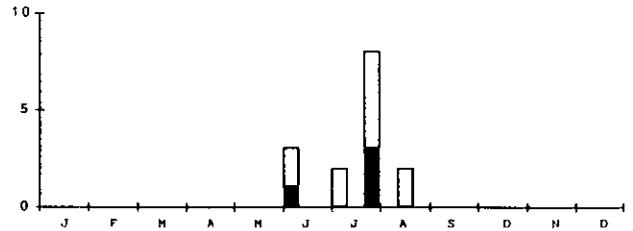
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q P Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

91. Molophilus (Molophilus) crassipygus De Meijere, 1918



N ind 16 R ♂/♀ 3.00
N occur 7
R ind/occur 2.29

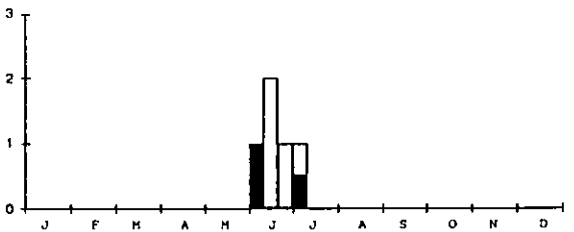
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LJC PB LM UM M MN MF MS G C P City GP CC SD

92. Molophilus (Molophilus) griseus (Meigen, 1804)



N ind 5 R ♂/♀ 3.00
N occur 4
R ind/occur 1.25

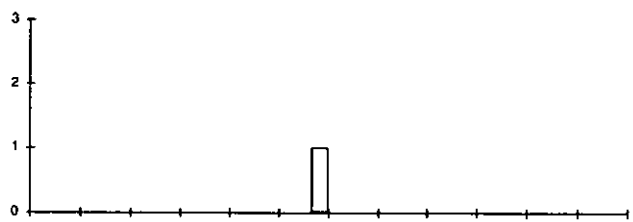
ZR SC LL ML S SE UL

C EN LT U

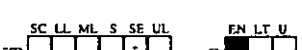
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

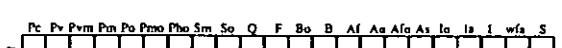
Ss Rv Ro Rs Spr Lk Lo Ls LJC PB LM UM M MN MF MS G C P City GP CC SD

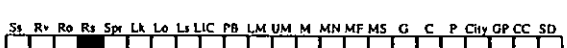
93. Molophilus (Molophilus) maurus Lackschewitz, 1925



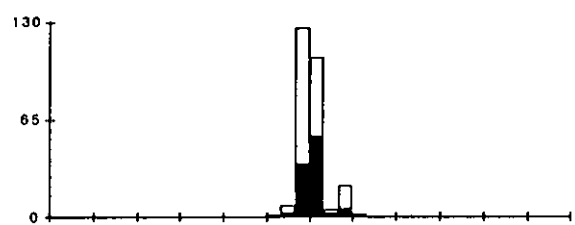
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



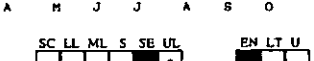


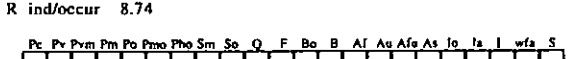


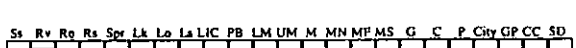
94. Molophilus (Molophilus) medius De Meijere, 1918



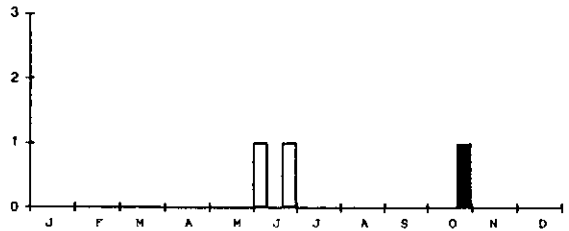
N ind 271 R ♂/♀ 1.78
N occur 31
R ind/occur 8.74



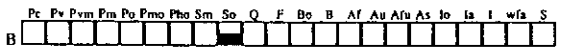


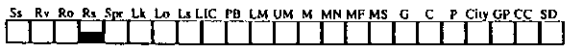


95. Molophilus (Molophilus) obscurus (Meigen, 1818)

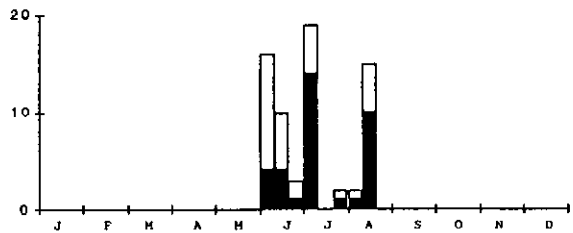


N ind 3 R ♂/♀ 2.00
N occur 3
R ind/occur 1.00

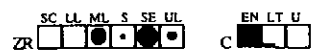


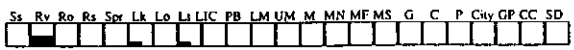


96. Molophilus (Molophilus) ochraceus (Meigen, 1818)

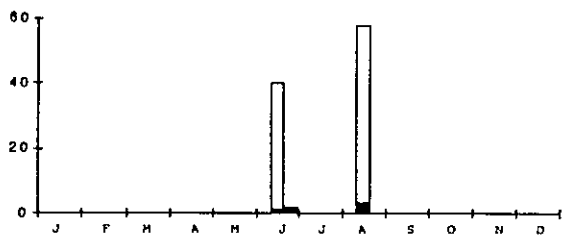


N ind 67 R ♂/♀ 0.91
N occur 22
R ind/occur 3.05

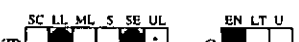


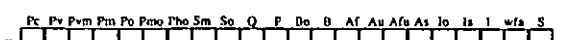


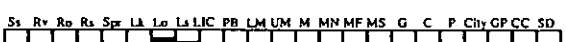
97. Molophilus (Molophilus) pleuralis De Meijere, 1920



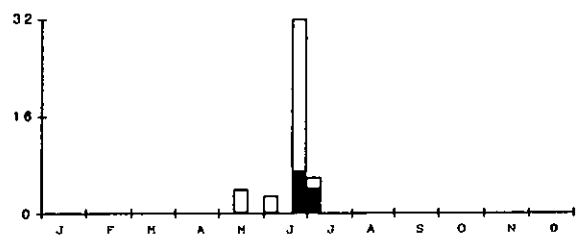
N ind 100 R ♂/♀ 19.00
N occur 3
R ind/occur 33.33



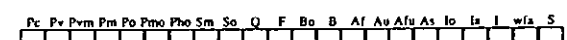


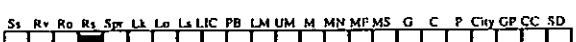


98. Molophilus (Molophilus) propinquus (Egger, 1863)

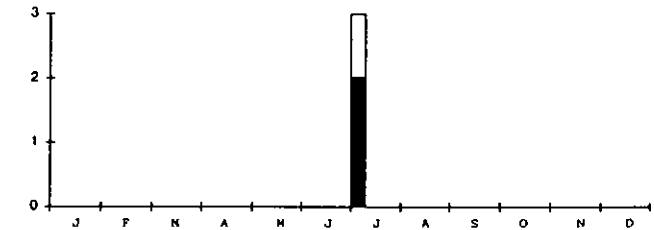


N ind 45 R ♂/♀ 3.00
N occur 9
R ind/occur 5.00





99. Molophilus (Molophilus) pullus Lackschewitz, 1937



N ind 3 R ♂/♀ 0.50
N occur 1
R ind/occur 3.00

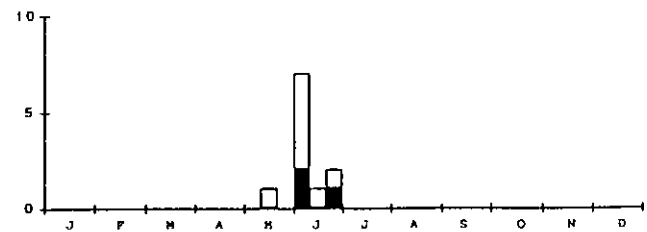
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Alu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

100. Molophilus (Molophilus) serpentiger Edwards, 1938



N ind 11 R ♂/♀ 2.67
N occur 5
R ind/occur 2.20

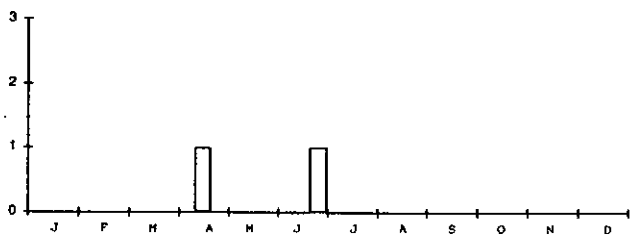
ZR SC LL ML S SE UL

C EN LT U

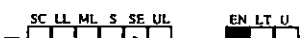
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Ao Afu As Io Ia I wfa S

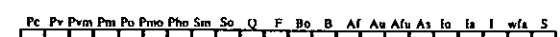
Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

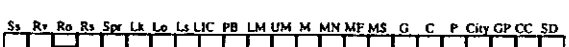
101. Ormosia (Ormosia) aciculata Edwards, 1921



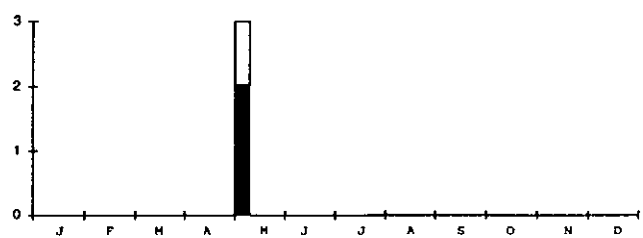
N ind 2 R ♂/♀ 2/0
N occur 2
R ind/occur 1.00



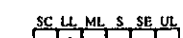


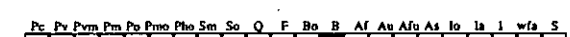


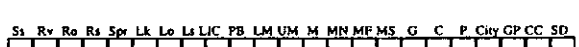
102. Ormosia (Ormosia) brevinervis (Lundström, 1907)



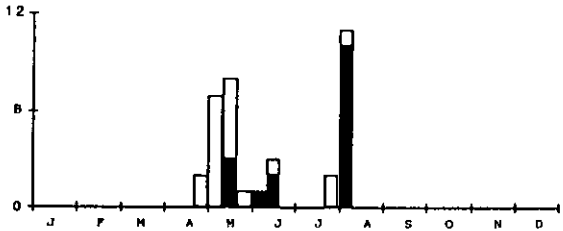
N ind 3 R ♂/♀ 0.50
N occur 2
R ind/occur 1.50



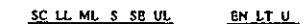


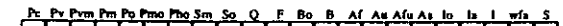


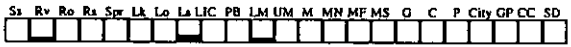
103. Ormosia (Ormosia) clavata (Tonnoir, 1920)



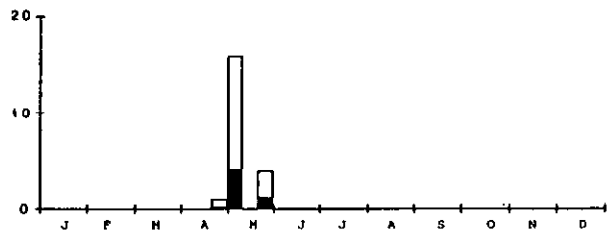
N ind 35 R ♂/♀ 1.19
N occur 10
R ind/occur 3.50



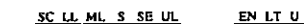


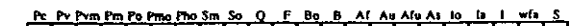


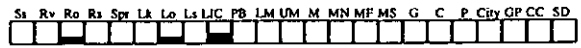
104. Ormosia (Ormosia) depilata Edwards, 1938



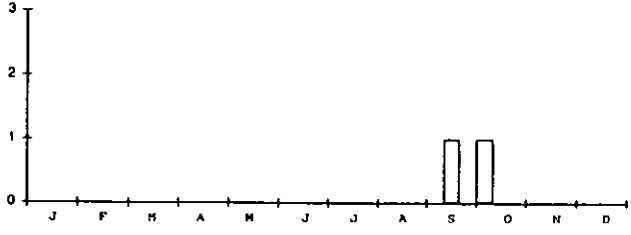
N ind 21 R ♂/♀ 3.20
N occur 6
R ind/occur 3.50



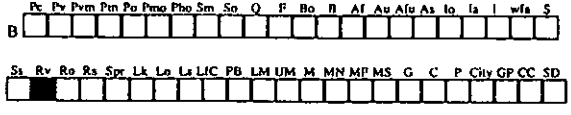




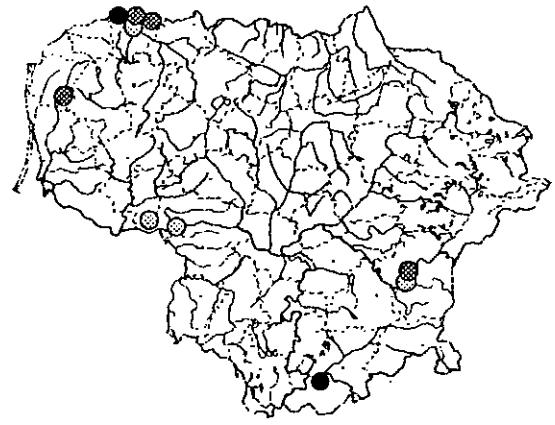
105. Ormosia (Ormosia) hederae (Curtis, 1835)

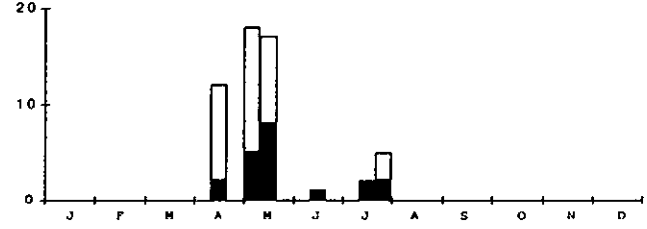


N ind 2 R ♂/♀ 2/0
N occur 2
R ind/occur 1.00

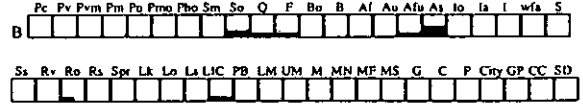


106. Ormosia (Ormosia) lineata (Meigen, 1804)

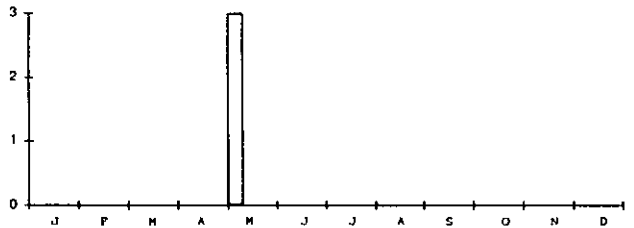




N ind 56 R ♂/♀ 1.80
N occur 10
R ind/occur 5.60



107. Ormosia (Ormosia) nodulosa (Macquart, 1826)



N ind 3 R ♂/♀ 3/0
N occur 2
R ind/occur 1.50

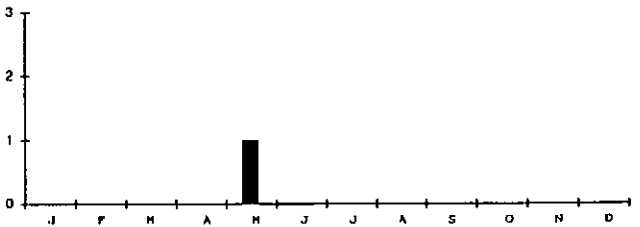
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wIa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

108. Ormosia (Ormosia) pseudosimilis (Lundström, 1912)



N ind 1 R ♂/♀ 0/1
N occur 1
R ind/occur 1.00

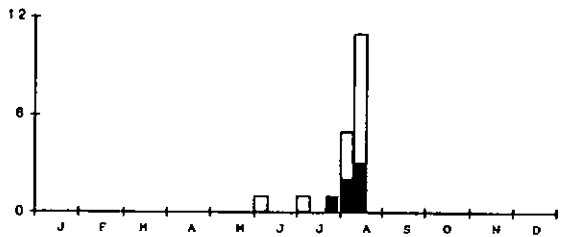
ZR SC LL ML S SE UL

C EN LT U

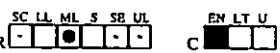
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wIa S

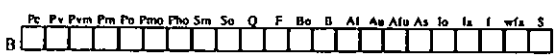
Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

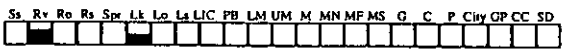
109. Ormosia (Ormosia) ruficauda (Zetterstedt, 1838)



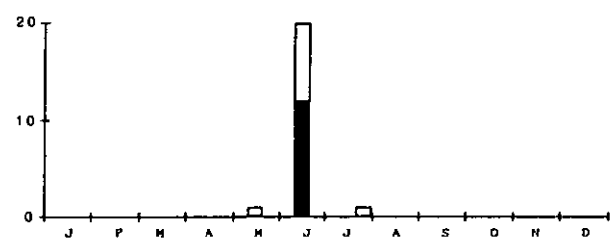
N ind 19 R ♂/♀ 2.40
N occur 7
R ind/occur 2.71



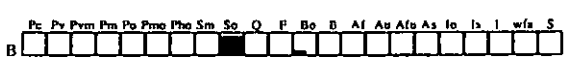


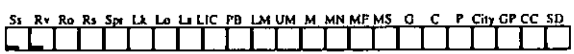


110. Ormosia (Ormosia) staegeriana Alexander, 1953

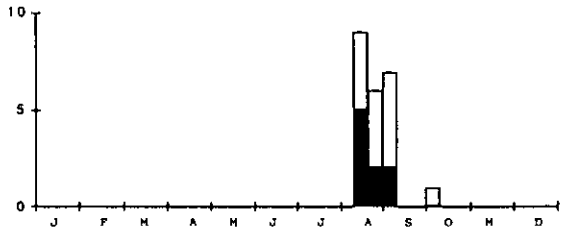


N ind 22 R ♂/♀ 0.83
N occur 4
R ind/occur 5.50





111. Rhypholophus haemorrhoidalis (Zetterstedt, 1838)



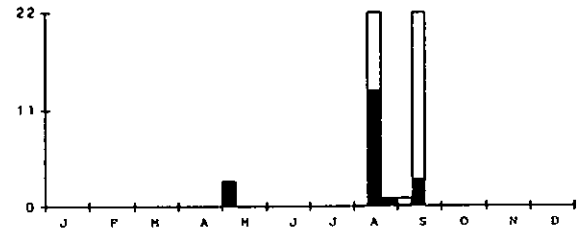
N ind 23 R ♂/♀ 1.56
N occur 7
R ind/occur 3.29

ZR SC LL ML S SE UL
C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

112. Rhypholophus varius (Melgen, 1818)



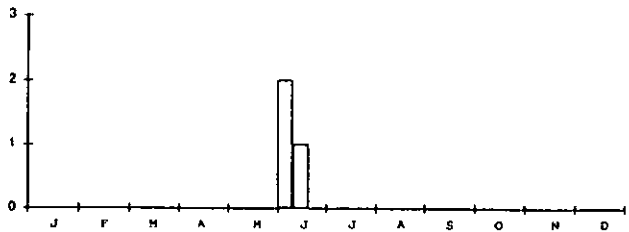
N ind 49 R ♂/♀ 1.45
N occur 9
R ind/occur 5.44

ZR SC LL ML S SE UL
C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

113. Taslocera (Dasymolophilus) murina (Meigen, 1818)



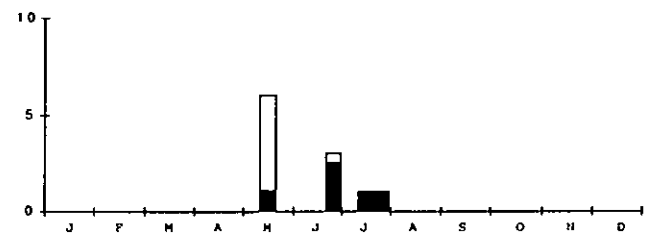
N ind 3 R ♂/♀ 3/0
N occur 2
R ind/occur 1.50

ZR SC LL ML S SE UL
C BN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q P Bo B Af Au Afo As fo fa l wfa S

St Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

114. Dicranoptycha (Dicranoptycha) cinerascens (Meigen, 1818)



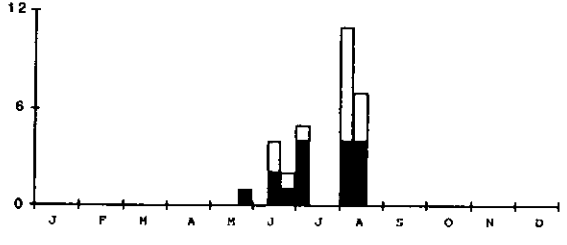
N ind 11 R ♂/♀ 1.00
N occur 6
R ind/occur 1.83

ZR SC LL ML S SE UL
C BN LT U

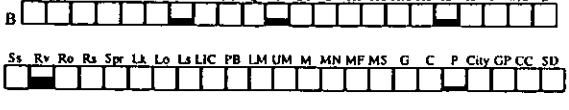
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q P Bo B Af Au Afo As fo fa l wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MP MS G C P City GP CC SD

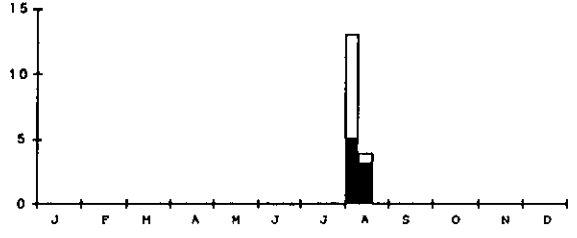
115. Dicranoptycha (Dicranoptycha) fuscescens (Schummel, 1829)



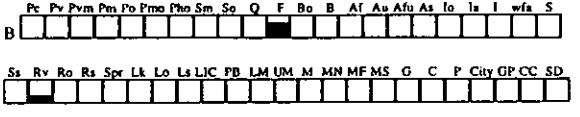
N ind 29 R ♂/♀ 0.81
N occur 15
R ind/occur 1.93



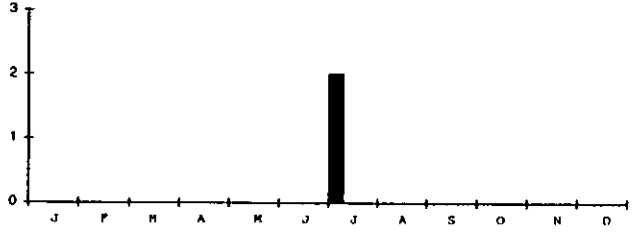
116. Dicranoptycha (Dicranoptycha) livescens Loew, 1871



N ind 16 R ♂/♀ 1.00
N occur 6
R ind/occur 2.67



117. Ellipteroides (Ellipteroides) lateralis (Macquart, 1835)



N ind 2 R ♂/♀ 0/2
N occur 1
R ind/occur 2.00

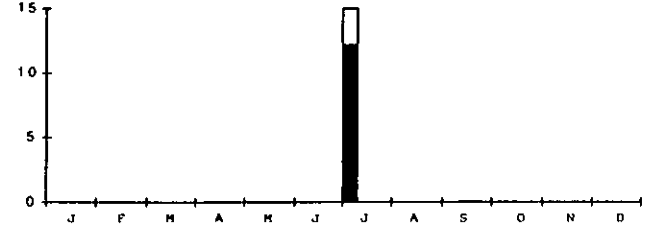
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Is I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

118. Ellipteroides (Protogonomyia) alboscutellatus (Von Roser, 1840)



N ind 15 R ♂/♀ 0.25
N occur 1
R ind/occur 15.00

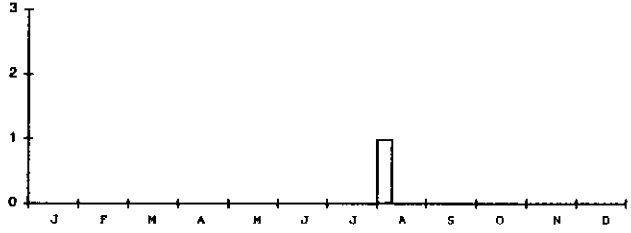
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Is I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

119. Gnophomyia viridipennis (Gimmerthal, 1847)



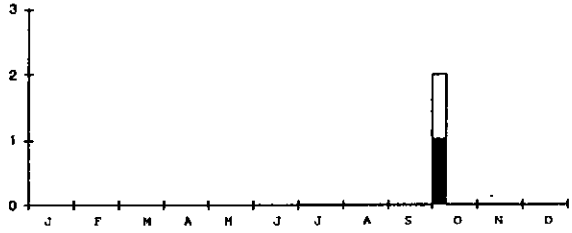
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00

ZR SC LL ML S SE UL
C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

120. Gonomyia (Gonomyia) bifida Tonnoir, 1920



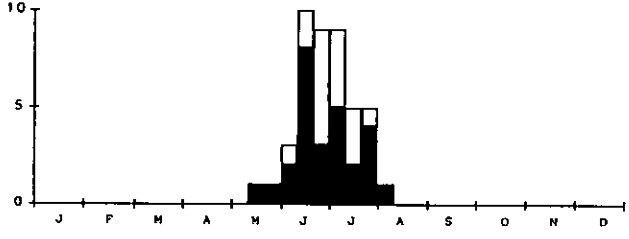
N ind 2 R ♂/♀ 1.00
N occur 2
R ind/occur 1.00

ZR SC LL ML S SB UL
C EN LT U

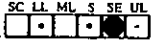
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

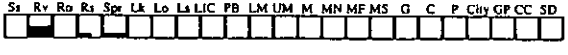
Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

121. Gonomyia (Gonomyia) lucidula De Meijere, 1920

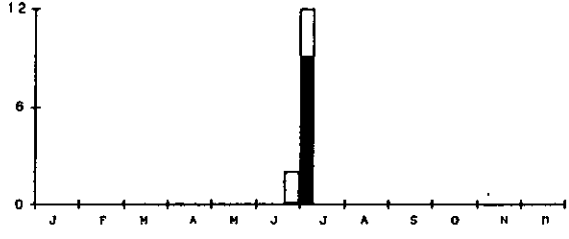


N ind 44 R ♂/♀ 0.65
N occur 23
R ind/occur 1.91

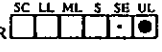


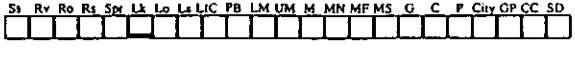


122. Gonomyia (Gonomyia) recta Tonnoir, 1920

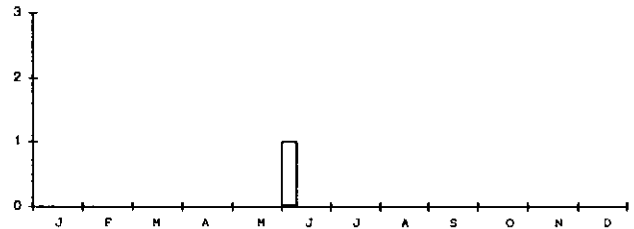


N ind 14 R ♂/♀ 0.56
N occur 4
R ind/occur 3.50

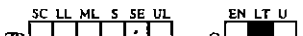


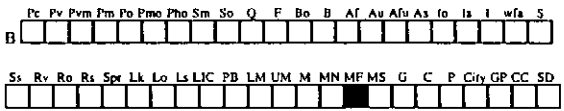


123. Gonomyia (Gonomyia) simplex Tonnoir, 1920

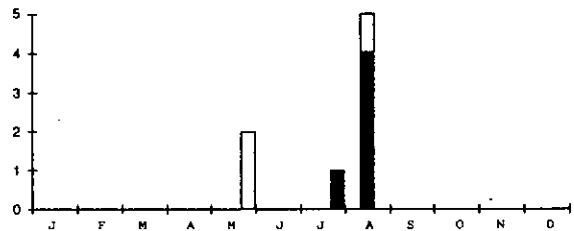


N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00

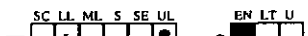


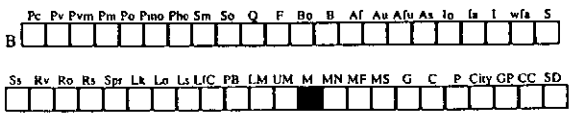


124. Gonomyia (Gonomyia) tenella (Meigen, 1818)

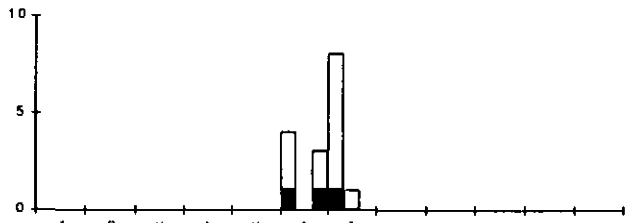


N ind 8 R ♂/♀ 0.60
N occur 3
R ind/occur 2.67





125. Lipsothrix ecuculiata Edwards, 1938



N ind 16 R ♂/♀ 4.33
N occur 8
R ind/occur 2.00

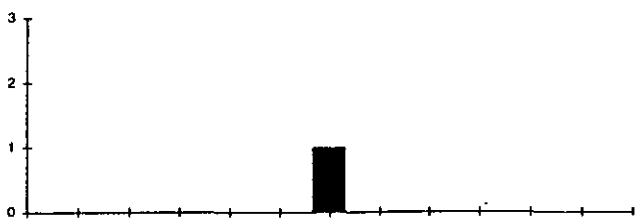
ZR SC LL ML S SE UL

C EN LT U

B Pc Py Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

126. Lipsothrix errans (Walker, 1848)



N ind 2 R ♂/♀ 0/2
N occur 2
R ind/occur 1.00

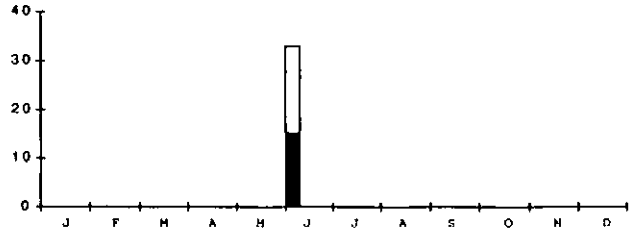
ZR SC LL ML S SE UL

C EN LT U

B Pc Py Pvm Pm Po Pmo Pho Sm So Q P Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

127. Lipsothrix remota (Walker, 1848)



N ind 33 R ♂/♀ 1.20
N occur 1
R ind/occur 33.00

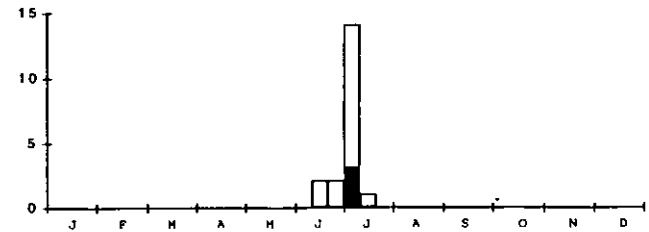
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Alu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

128. Rhabdomastix (Secandaga) laeta (Loew, 1873)



N ind 19 R ♂/♀ 5.33
N occur 8
R ind/occur 2.37

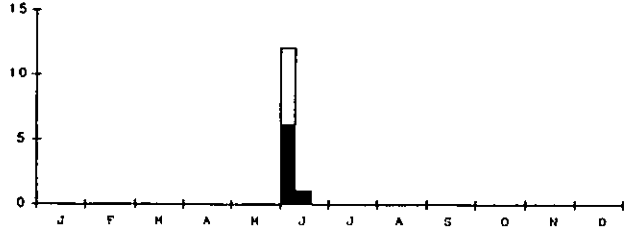
ZR SC LL ML S SE UL

C EN LT U

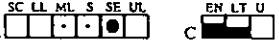
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Alu As Io Ia I wfa S

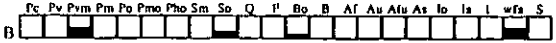
Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

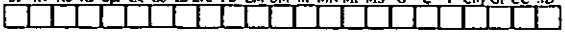
129. Elephantomyia (Elephantomyia) edwardsi Lackschewitz, 1932



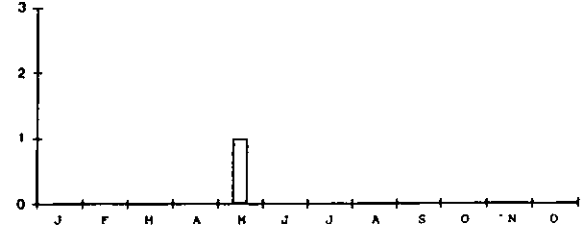
N ind 13 R ♂/♀ 0.86
N occur 5
R ind/occur 2.60



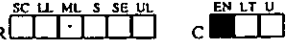


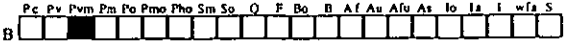


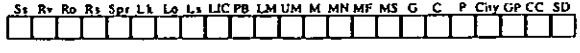
130. Elephantomyia (Elephantomyia) krivosheinae Savchenko, 1976



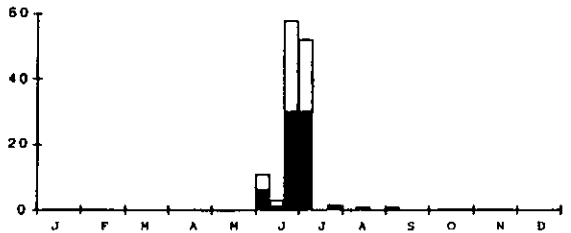
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



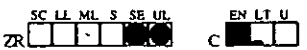


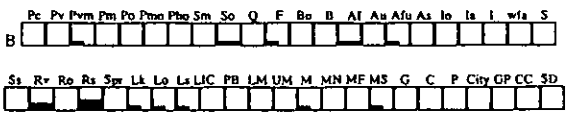


131. Helius flavus (Walker, 1856)

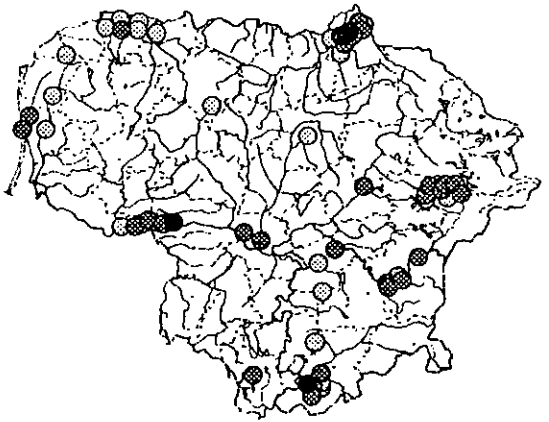


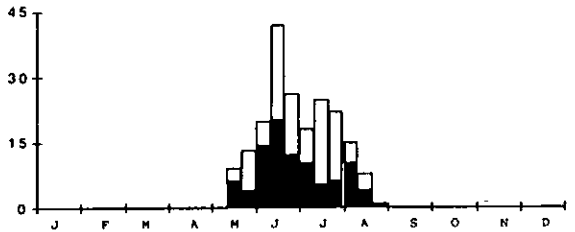
N ind 128 R ♂/♀ 0.88
N occur 25
R ind/occur 5.12



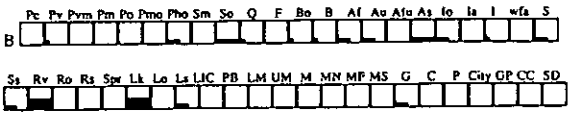


132. Helius longirostris (Meigen, 1818)

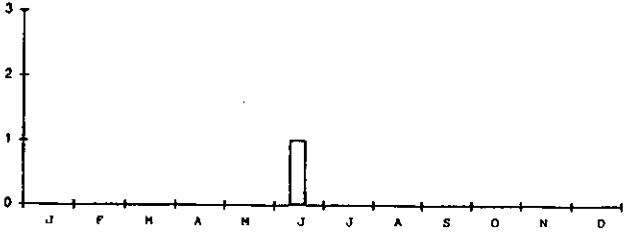




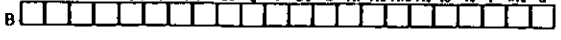
N ind 206 R ♂/♀ 1.08
N occur 70
R ind/occur 2.94

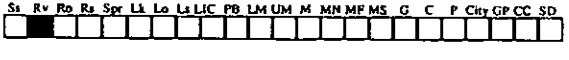


133. Hellus pallirostris Edwards, 1921

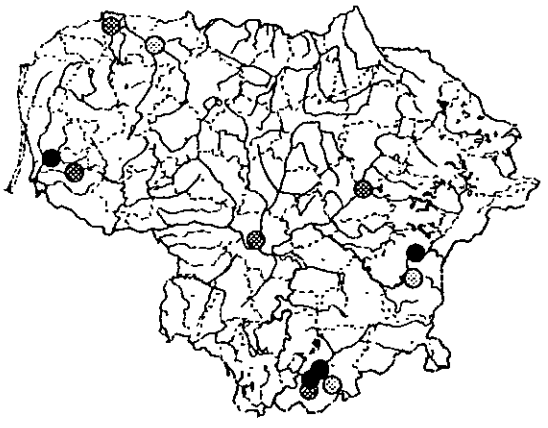


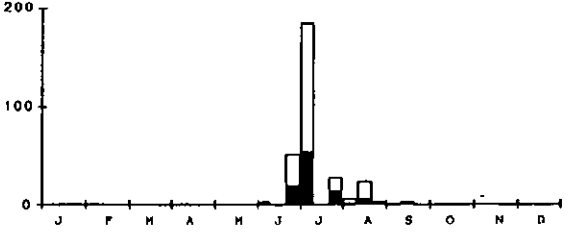
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



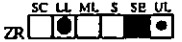


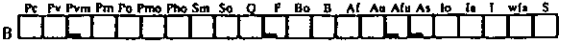
134. Antocha (Antocha) vitripennis (Meigen, 1830)

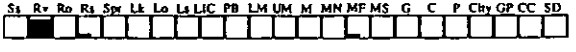




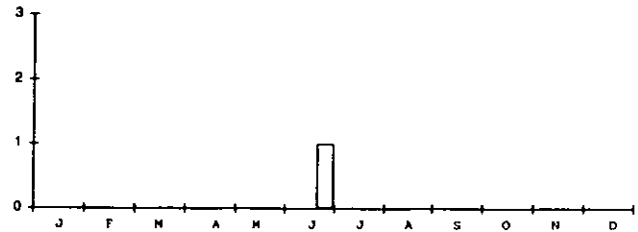
N ind 305 R ♂/♀ 2.20
N occur 36
R ind/occur 8.47



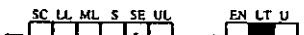


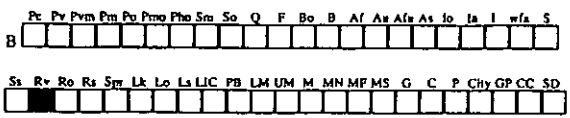


135. Orimarga (Orimarga) attenuata (Walker, 1848)

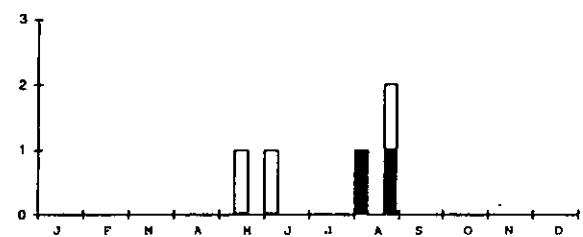


N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00

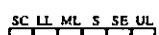


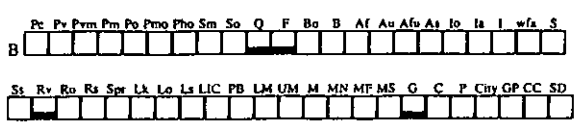


136. Achyrolimonia decemmaculata (Loew, 1873)

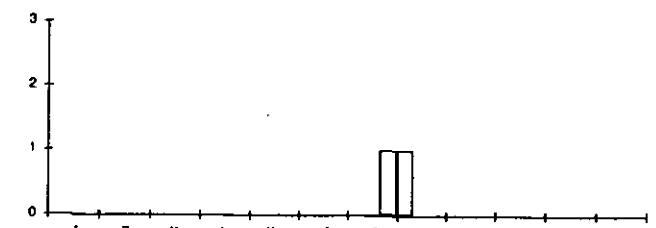


N ind 5 R ♂/♀ 1.50
N occur 5
R ind/occur 1.00

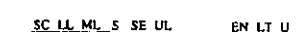


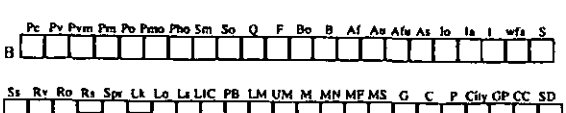


137. Atypophthalmus inustus (Meigen, 1818)

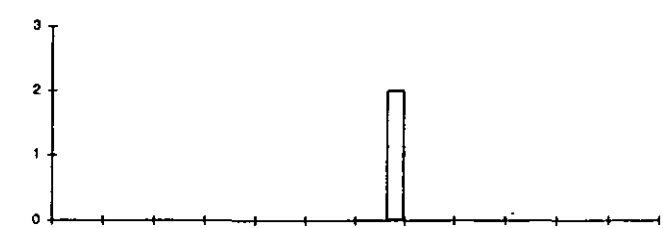


N ind 2 R ♂/♀ 2/0
N occur 2
R ind/occur 1.00

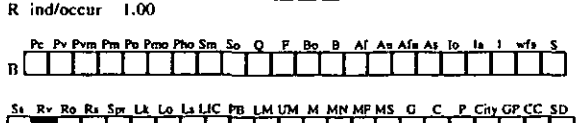




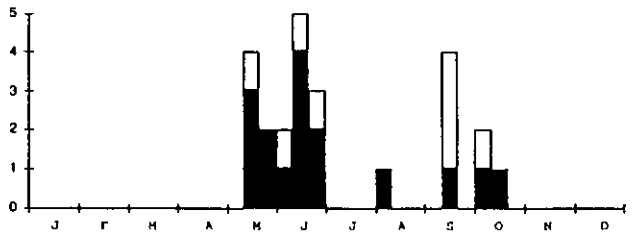
138. Dicranomyia (Dicranomyia) aperta Wahlgren, 1904



N ind 2 R ♂/♀ 2/0
N occur 2
R ind/occur 1.00



139. Dicranomyia (Dicranomyia) autumnalis (Staeger, 1840)



N ind 24 R ♂/♀ 0.50
N occur 12
R ind/occur 2.00

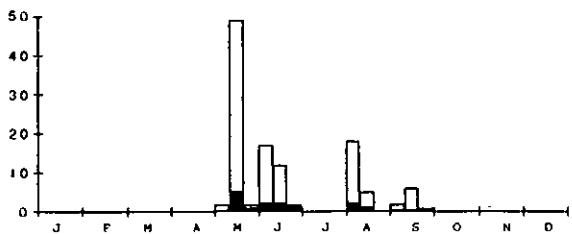
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q P Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

140. Dicranomyia (Dicranomyia) chorea (Meigen, 1818)



N ind 117 R ♂/♀ 6.07
N occur 28
R ind/occur 4.18

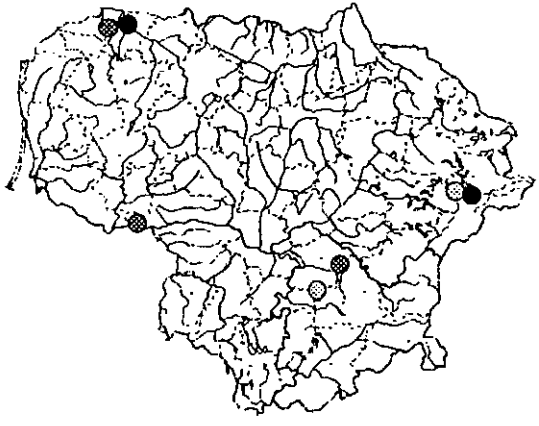
ZR SC LL ML S SE UL

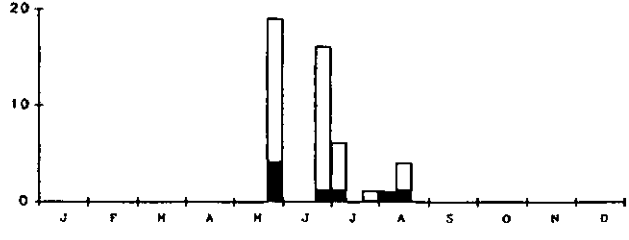
C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q P Bo B Af Au Afu As Io Ia I wfa S

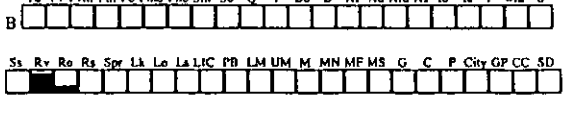
Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

141. Dicranomyia (Dicranomyia) didyma (Meigen, 1804)

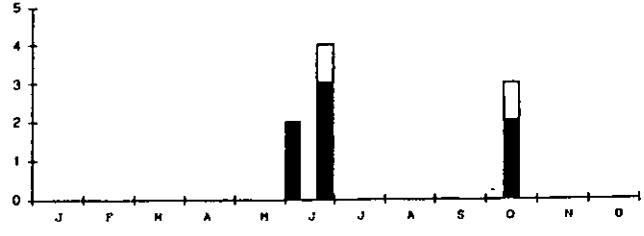




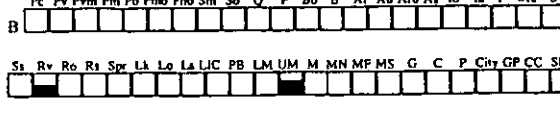
N ind 47 R ♂/♀ 4.87
N occur 7
R ind/occur 6.71



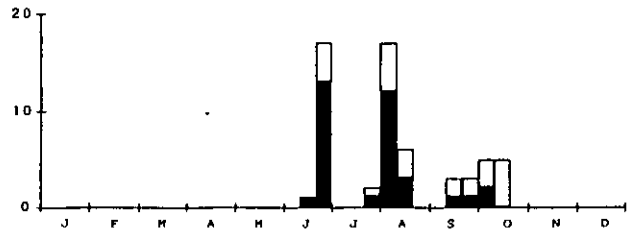
142. Dicranomyia (Dicranomyia) distendens Lundström, 1912



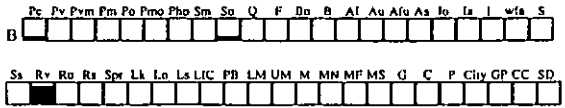
N ind 12 R ♂/♀ 0.33
N occur 7
R ind/occur 1.71



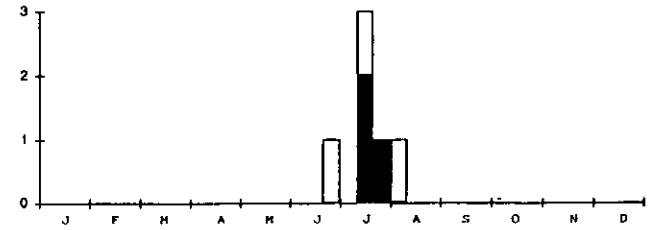
143. Dicranomyia (Dicranomyia) frontalis (Staeger, 1840)



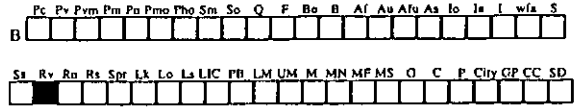
N ind 59 R ♂/♀ 0.73
N occur 24
R ind/occur 2.46



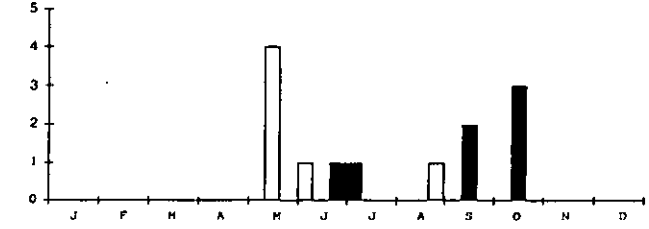
144. Dicranomyia (Dicranomyia) halterata Osten Sacken, 1869



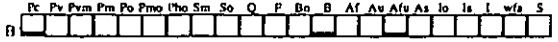
N ind 6 R ♂/♀ 1.00
N occur 5
R ind/occur 1.20

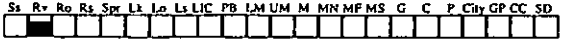


145. Dicranomyia (Dicranomyia) handlirschi Lackschewitz, 1928

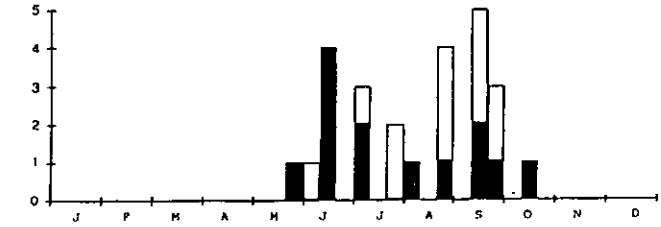


N ind 13 R ♂/♀ 0.86
N occur 8
R ind/occur 1.62

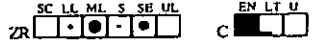


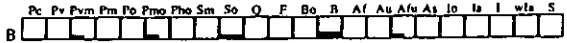


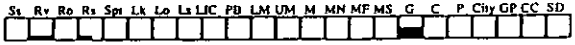
146. Dicranomyia (Dicranomyia) longipennis (Schummel, 1829)



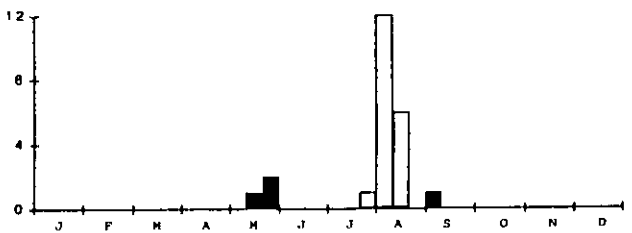
N ind 25 R ♂/♀ 0.92
N occur 16
R ind/occur 1.56



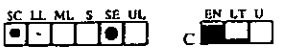


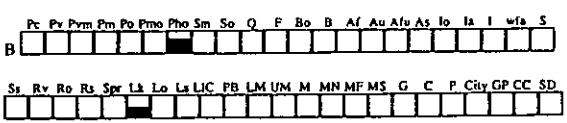


147. Dicranomyia (Dicranomyia) mitis (Meigen, 1830)

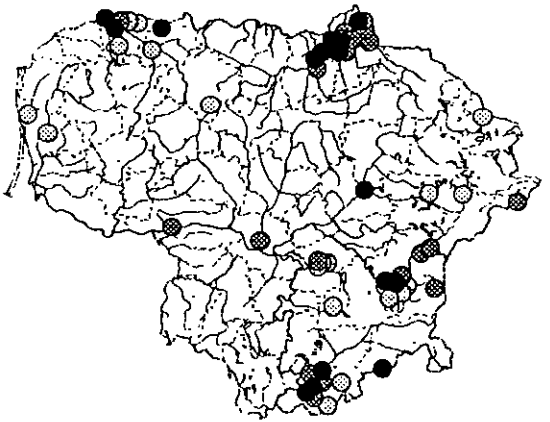


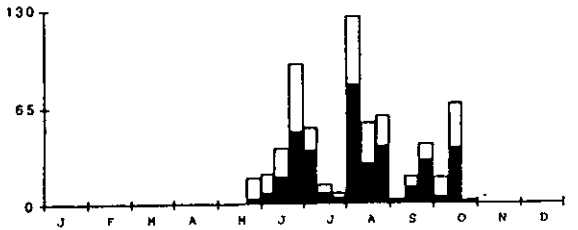
N ind 23 R ♂/♀ 4.75
N occur 7
R ind/occur 3.29



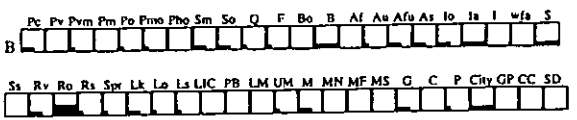


148. Dicranomyia (Dicranomyia) modesta (Meigen, 1818)

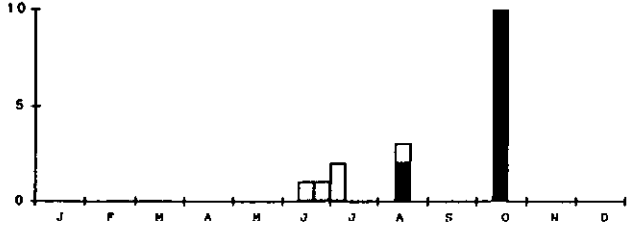




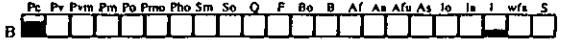
N ind 529 R ♂/♀ 0.86
N occur 118
R ind/occur 4.48

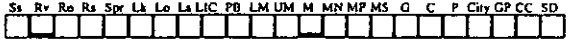


149. Dicranomyia (Dicranomyia) omissinervis De Meijere, 1918

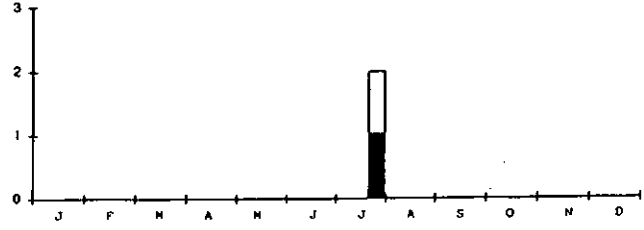


N ind 17 R ♂/♀ 0.42
N occur 6
R ind/occur 2.83

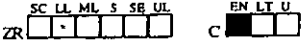


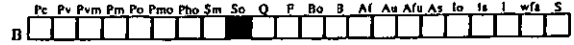


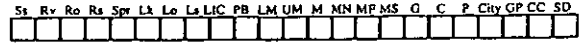
150. Dicranomyia (Dicranomyia) patens Lundström, 1907



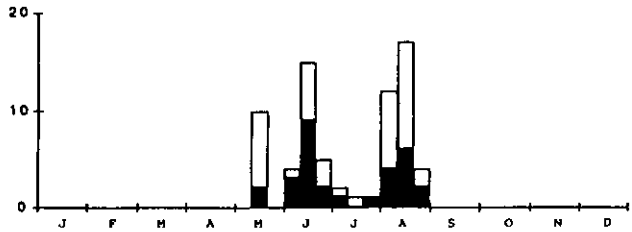
N ind 2 R ♂/♀ 1.00
N occur 1
R ind/occur 2.00



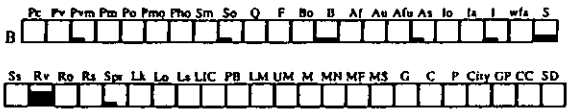




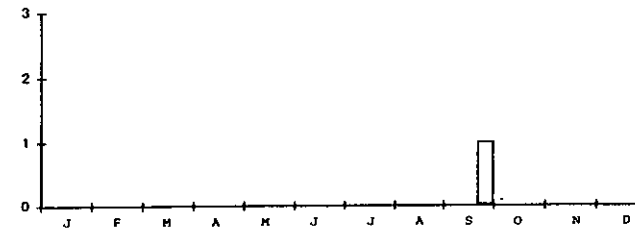
151. Dicranomyia (Dicranomyia) ventralis (Schummel, 1829)



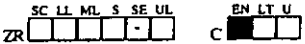
N ind 61 R ♂/♀ 1.39
N occur 22
R ind/occur 2.77

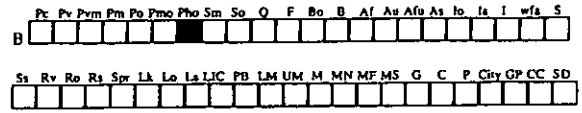


152. Dicranomyia (Dicranomyia) zernyi Lackschewitz, 1928

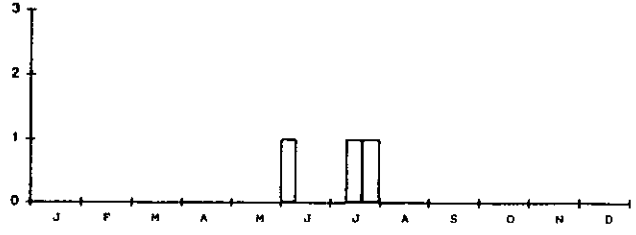


N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00

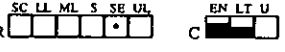


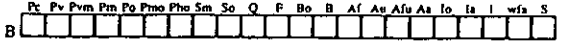


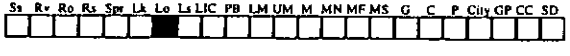
153. Dicranomyia (Glochina) tristis (Schummel, 1829)



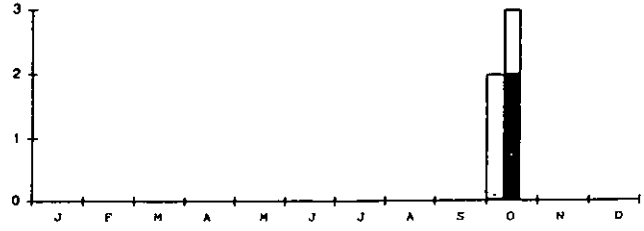
N ind 3 R ♂/♀ 3/0
N occur 3
R ind/occur 1.00



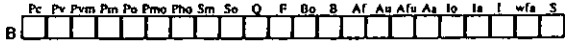


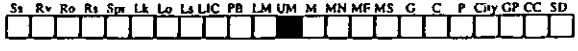


154. Dicranomyia (Idiopyga) halterella Edwards, 1921

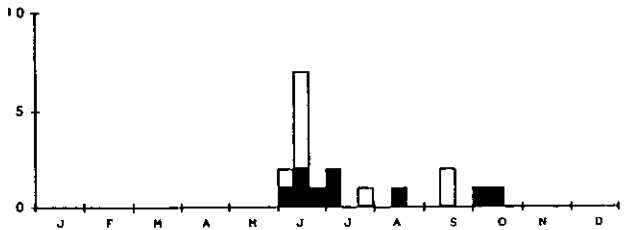


N ind 5 R ♂/♀ 1.50
N occur 2
R ind/occur 2.50

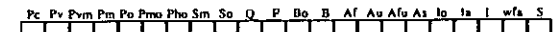


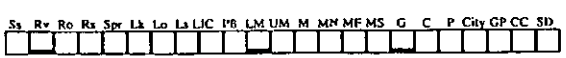


155. Dicranomyia (Idiopyga) magnicauda Lundström, 1912

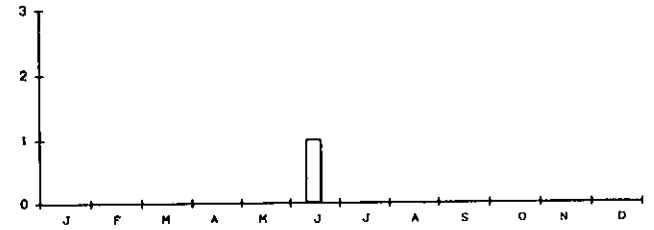


N ind 18 R ♂/♀ 1.00
N occur 13
R ind/occur 1.38

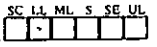


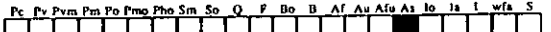


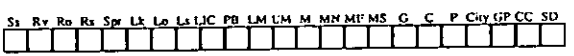
156. Dicranomyia (Idiopyga) murina (Zetterstedt, 1851)



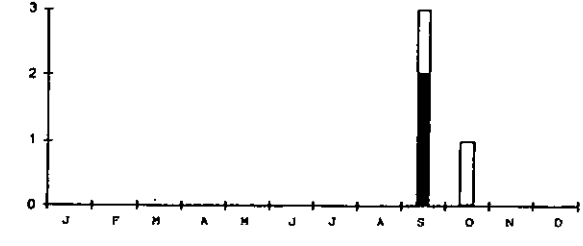
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



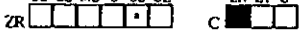


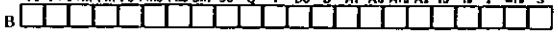


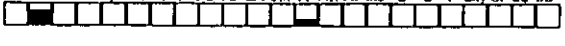
157. Dicranomyia (Idiopyga) nigristigma Nielsen, 1919



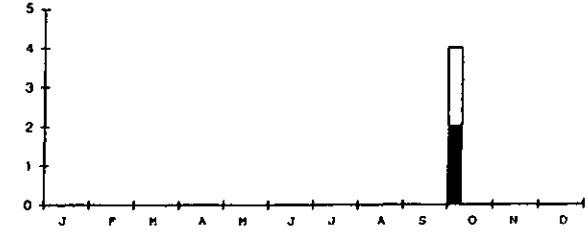
N ind 4 R ♂/♀ 1.00
N occur 2
R ind/occur 2.00



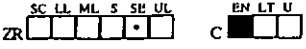


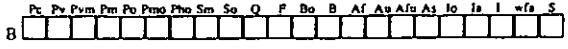


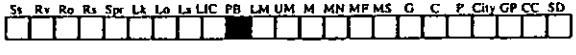
158. Dicranomyia (Idiopyga) stigmatica (Meigen, 1830)



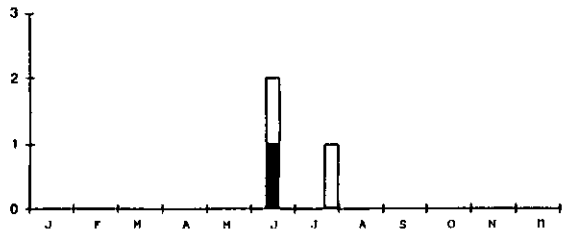
N ind 4 R ♂/♀ 1.00
N occur 1
R ind/occur 4.00



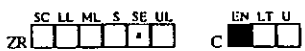


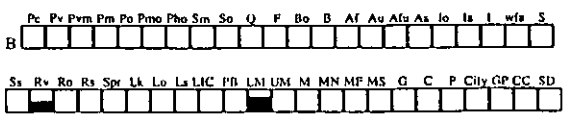


159. Dicranomyia (Melanolimonia) morio (Fabricius, 1787)

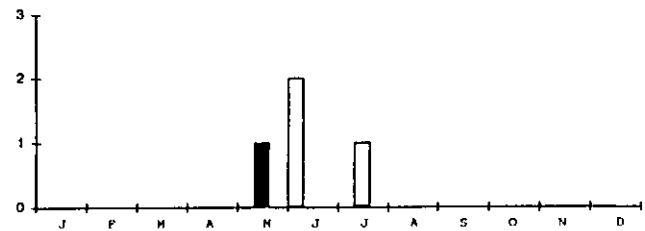


N ind 3 R ♂/♀ 2.00
N occur 2
R ind/occur 1.50

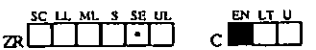


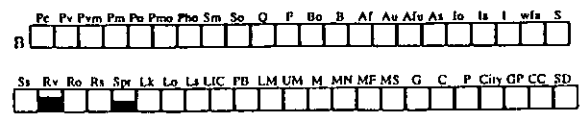


160. Dicranomyia (Melanolimonia) occidua Edwards, 1926

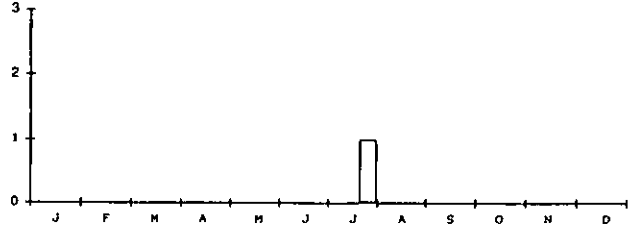


N ind 4 R ♂/♀ 3.00
N occur 3
R ind/occur 1.33





161. Dicranomyia (Melanolimonia) rufiventris (Strobl, 1901)



N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00

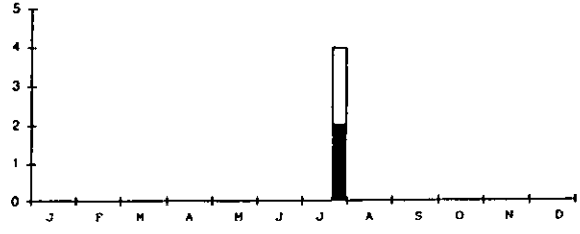
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

162. Dicranomyia (Numantia) fusca (Meigen, 1804)



N ind 4 R ♂/♀ 1.00
N occur 1
R ind/occur 4.00

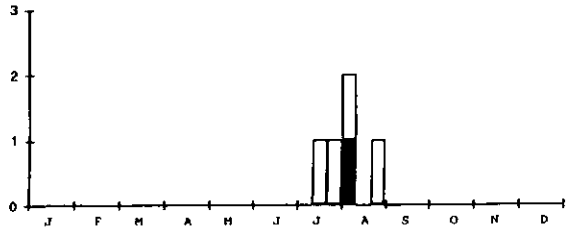
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MP MS G C P City GP CC SD

163. Discobola annulata (Linnaeus, 1758)



N ind 5 R ♂/♀ 4.00
N occur 4
R ind/occur 1.25

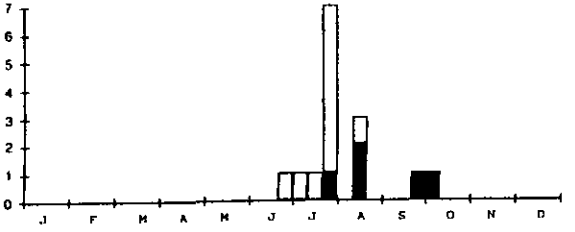
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

164. Discobola caesarea (Osten Sacken, 1854)



N ind 15 R ♂/♀ 1.80
N occur 11
R ind/occur 1.36

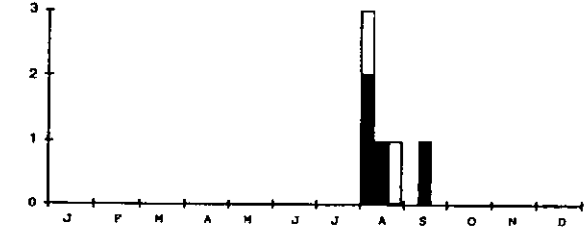
ZR SC LL ML S SE UL

C EN LT U

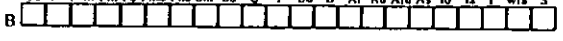
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

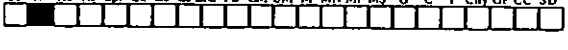
Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

165. Discobola parvispinula (Alexander, 1947)

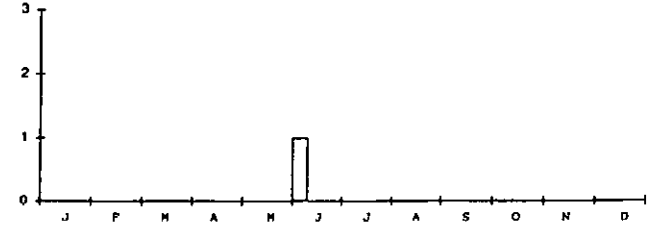


N ind 6 R ♂/♀ 0.50
N occur 4
R ind/occur 1.50

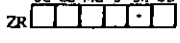


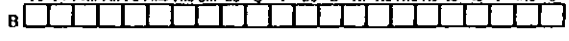


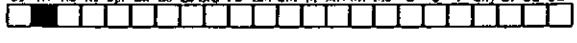
166. Libnotes (Afrolimonia) ladogensis (Lackschewitz, 1940)



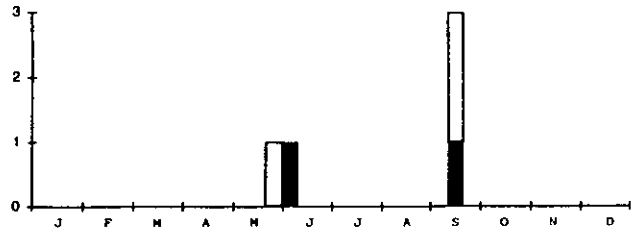
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



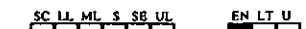


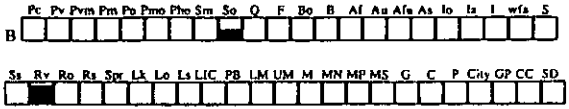


167. Limonia nibifrons (Meigen, 1818)

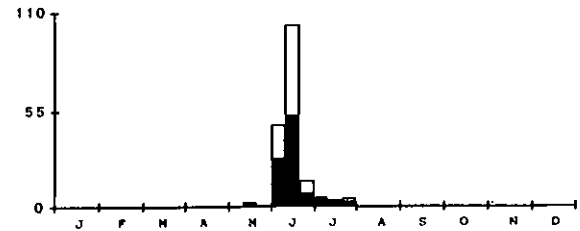


N ind 5 R ♂/♀ 1.50
N occur 3
R ind/occur 1.67

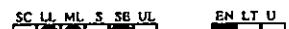


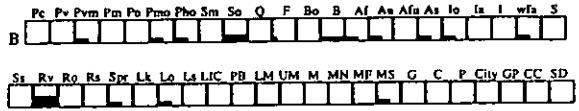


168. Limonia flavipes (Fabricius, 1787)

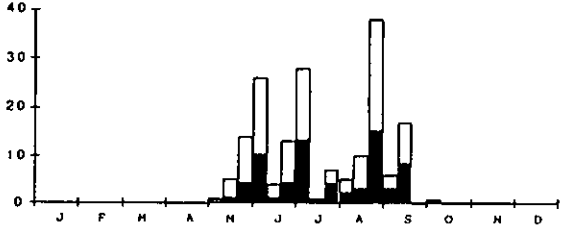


N ind 186 R ♂/♀ 0.89
N occur 39
R ind/occur 4.77

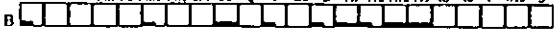




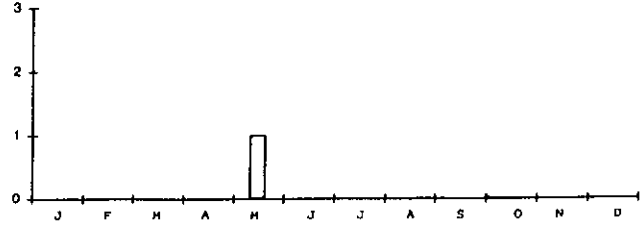
169. Limonia macrostigma (Schummel, 1829)



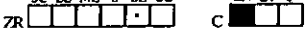
N ind 176 R ♂/♀ 1.51
N occur 53
R ind/occur 3.32

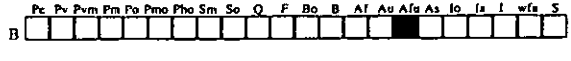


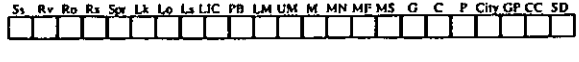
170. Limonia nigropunctata (Schummel, 1829)



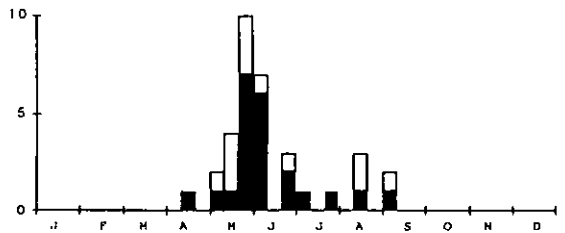
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



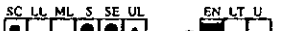


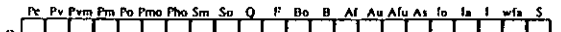


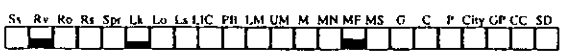
171. Limonia nubeculosa Meigen, 1804



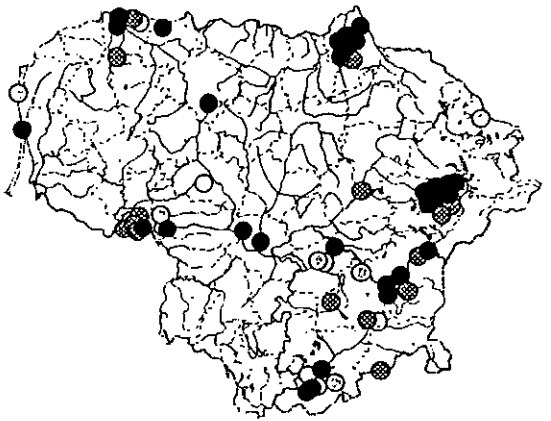
N ind 34 R ♂/♀ 0.55
N occur 20
R ind/occur 1.70

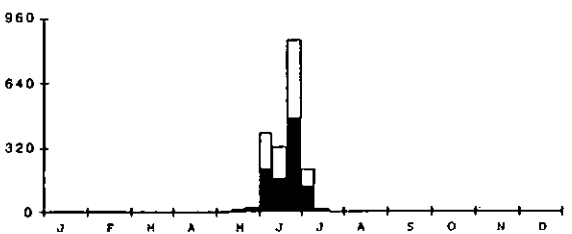




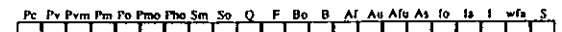


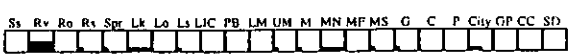
172. Limonia phragmitidis (Schrank, 1781)



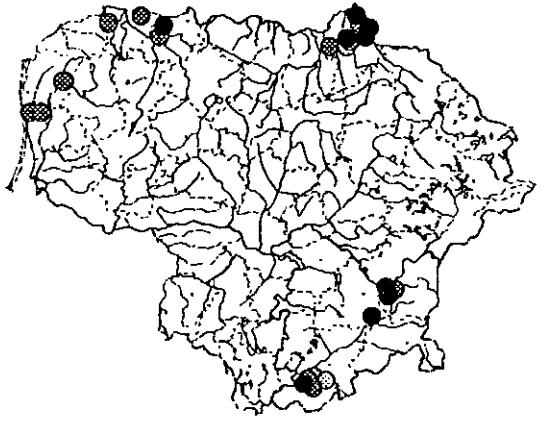


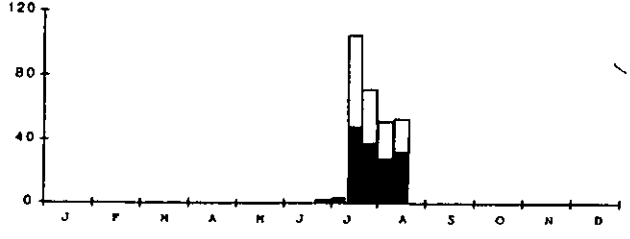
N ind 1865 R ♂/♀ 0.89
N occur 104
R ind/occur 17.93



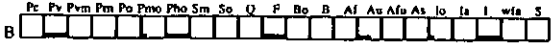


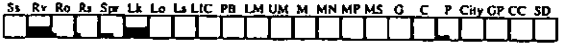
173. Limonia stigma (Meigen, 1818)



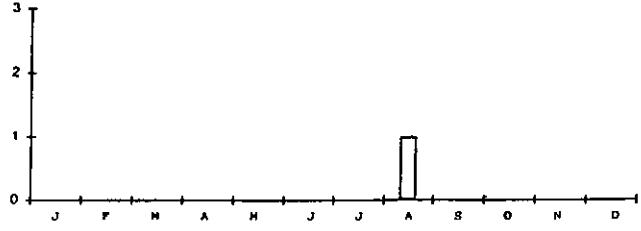


N ind 286 R ♂/♀ 0.98
N occur 27
R ind/occur 10.59

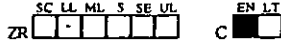


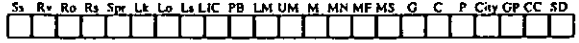


174. Limonia sylvicola (Schummel, 1829)

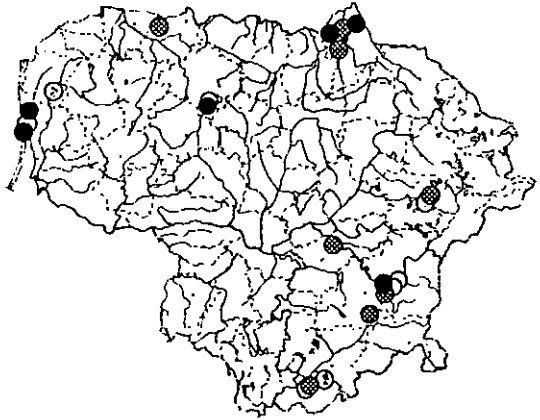


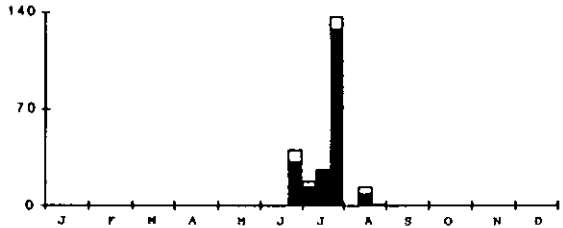
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



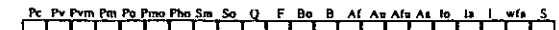


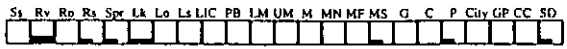
175. Limonia trivittata (Schummel, 1829)



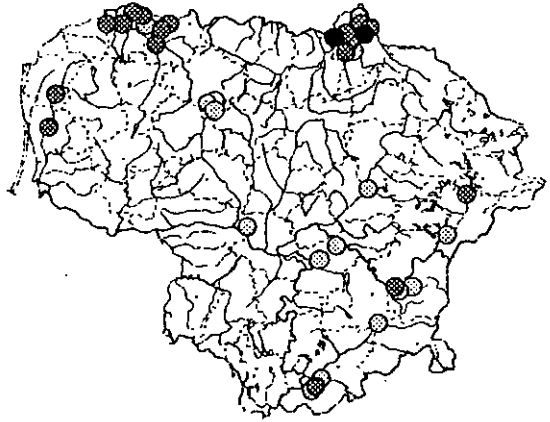


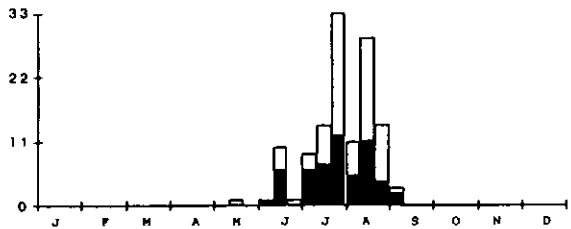
N ind 237 R ♂/♀ 0.15
N occur 37
R ind/occur 6.41



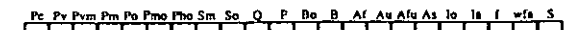


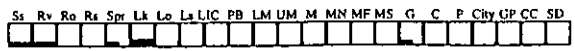
176. Metalimnobia bifasciata (Schrank, 1781)



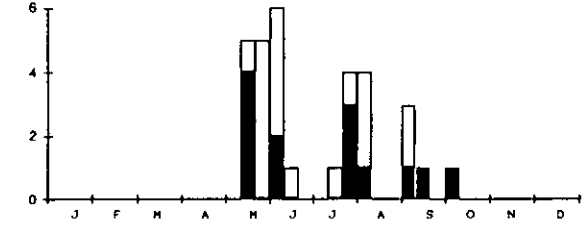


N ind 126 R ♂/♀ 1.38
N occur 45
R ind/occur 2.80

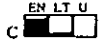


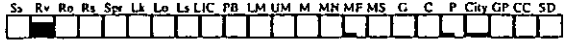


177. Metalimnobia quadrimaculata (Linnaeus, 1761)

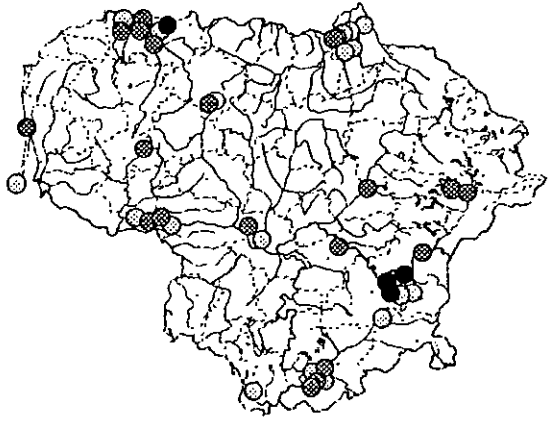


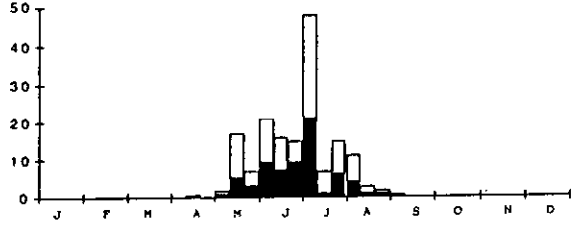
N ind 29 R ♂/♀ 1.23
N occur 26
R ind/occur 1.11



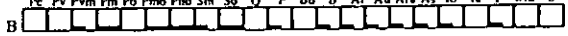


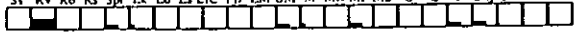
178. Metalimnobia quadrinotata (Meigen, 1818)



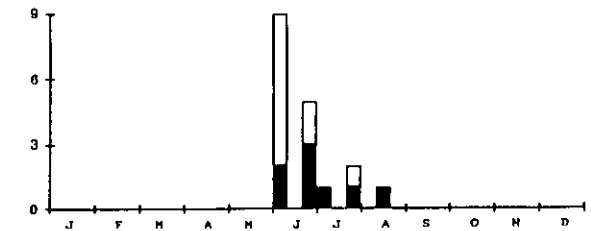


N ind 166 R ♂/♀ 1.36
N occur 78
R ind/occur 2.13

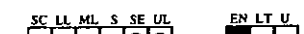


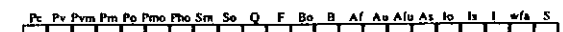


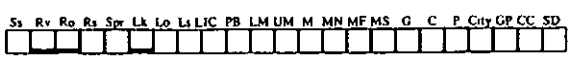
179. Neolimonia dumetorum (Meigen, 1804)



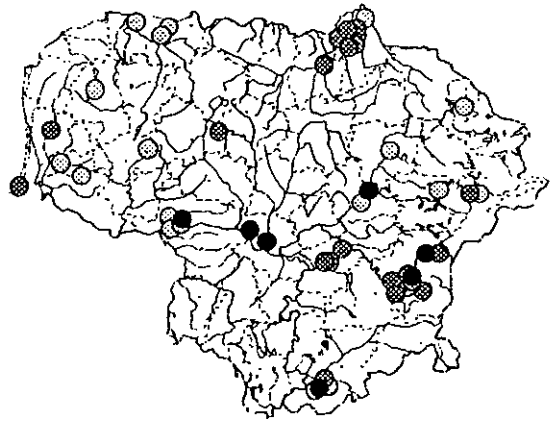
N ind 18 R ♂/♀ 1.00
N occur 11
R ind/occur 1.64

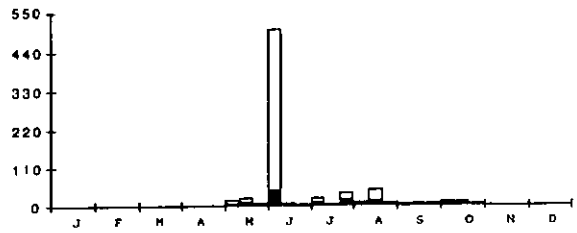




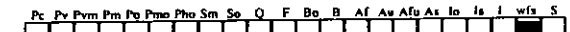


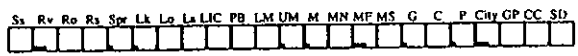
180. Rhipidia (Rhipidia) maculata Meigen, 1818



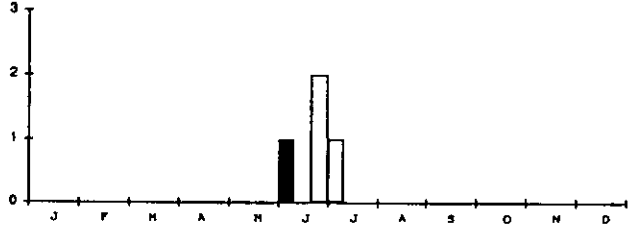


N ind 773 R ♂/♀ 3.91
N occur 107
R ind/occur 7.22

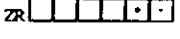


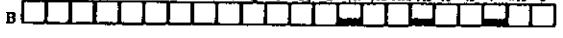


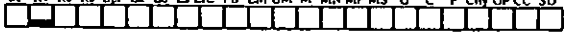
181. Rhipidia (Rhipidia) uniseriata Schiner, 1864



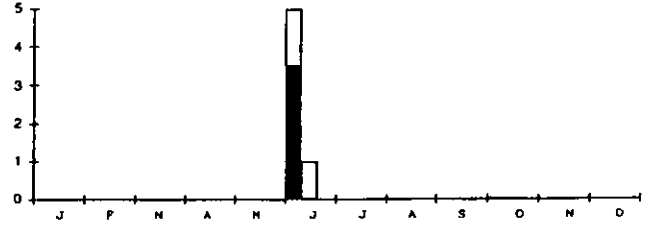
N ind 4 R ♂/♀ 3.00
N occur 4
R ind/occur 1.00



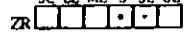


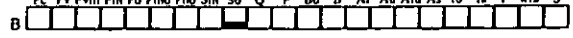


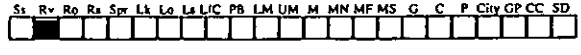
182. Dolichopeza albipes (Ström, 1768)



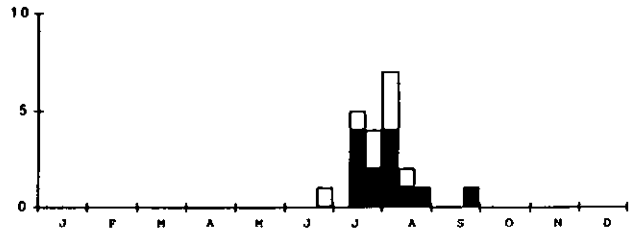
N ind 6 R ♂/♀ 0.67
N occur 3
R ind/occur 2.00



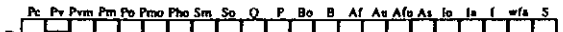


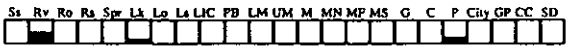


183. Nephrotoma aculeata (Loew, 1871)

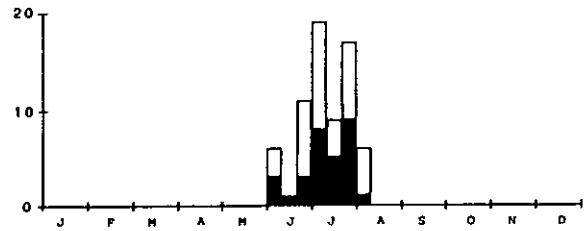


N ind 21 R ♂/♀ 0.62
N occur 15
R ind/occur 1.40

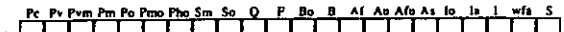


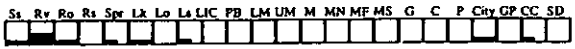


184. Nephrotoma analis (Schummel, 1833)

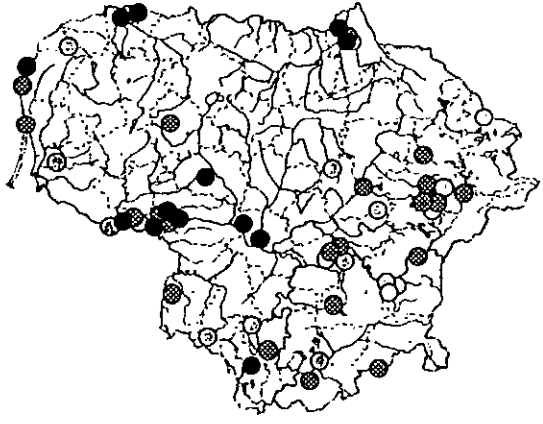


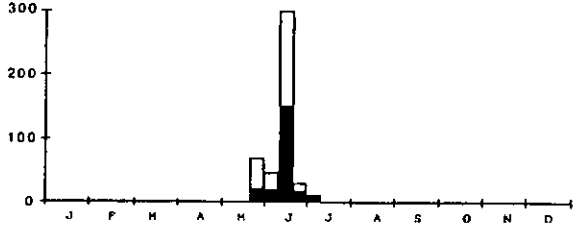
N ind 70 R ♂/♀ 1.26
N occur 44
R ind/occur 1.59



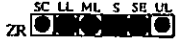


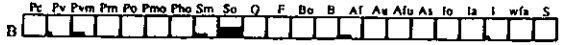
185. Nephrotoma appendiculata (Pierre, 1919)



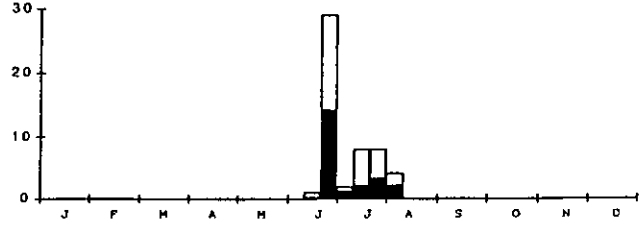


N ind 453 R ♂/♀ 1.02
N occur 64
R ind/occur 7.08

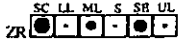


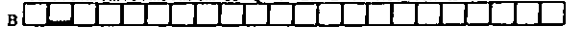


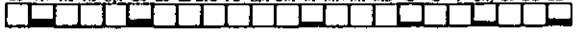
186. Nephrotoma cornicina (Linnaeus, 1758)



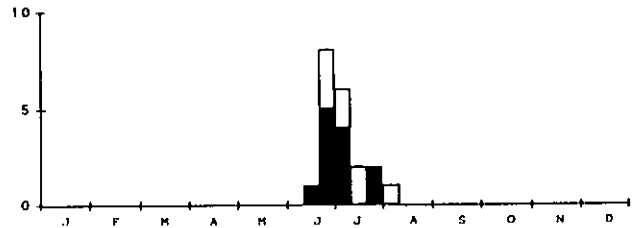
N ind 53 R ♂/♀ 1.50
N occur 25
R ind/occur 2.12



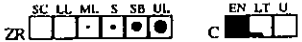


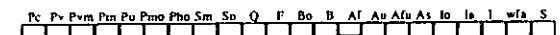


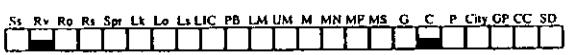
187. Nephrotoma crocata (Linnaeus, 1758)



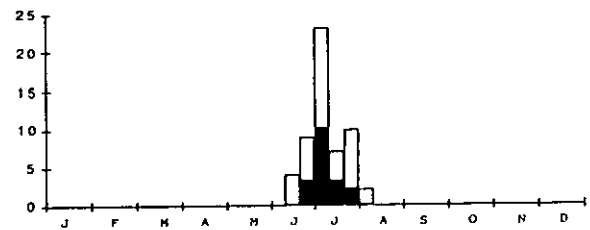
N ind 20 R ♂/♀ 0.67
N occur 16
R ind/occur 1.25



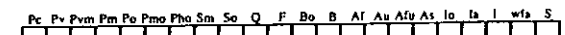


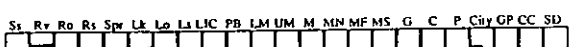


188. Nephrotoma dorsalis (Fabricius, 1782)

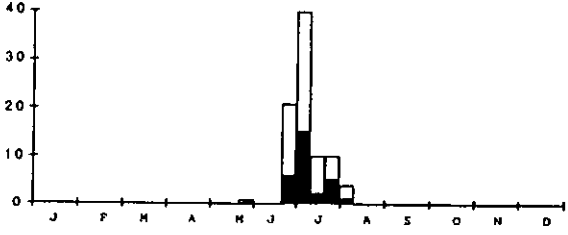


N ind 56 R ♂/♀ 1.95
N occur 36
R ind/occur 1.56

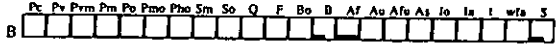


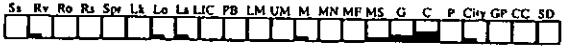


189. Nephrotoma flavescens (Linnaeus, 1758)

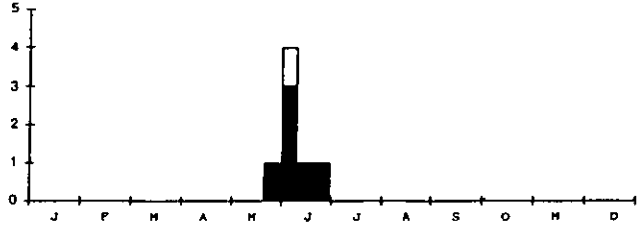


N ind 84 R ♂/♀ 2.12
N occur 42
R ind/occur 2.00

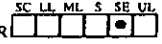


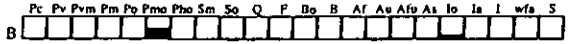


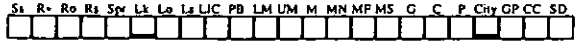
190. Nephrotoma lamellata (Riedel, 1910)



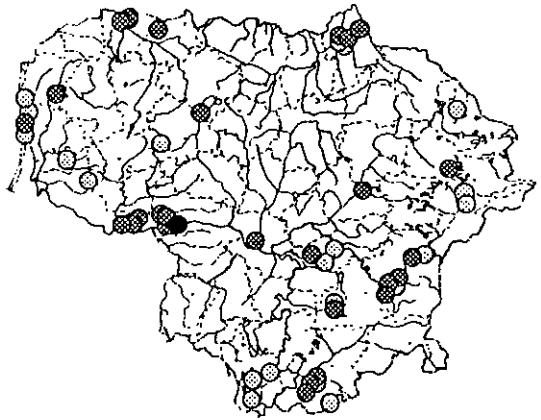
N ind 7 R ♂/♀ 0.17
N occur 4
R ind/occur 1.75

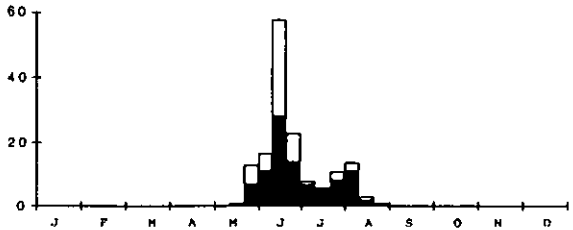




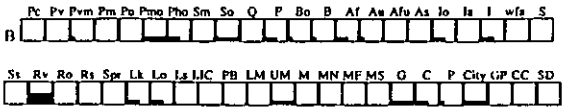


191. Nephrotoma lunulicornis (Schummel, 1833)

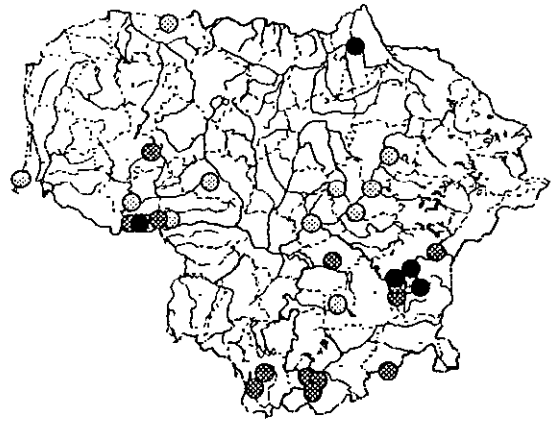


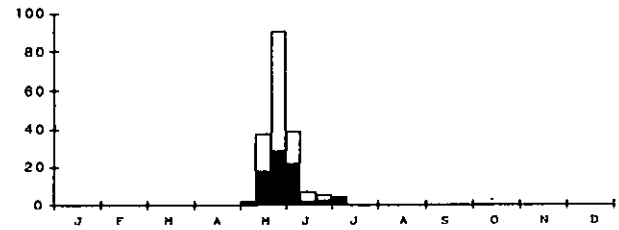


N ind 156 R ♂/♀ 0.63
N occur 69
R ind/occur 2.26

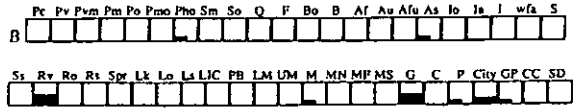


192. Nephrotoma pratensis (Linnaeus, 1758)

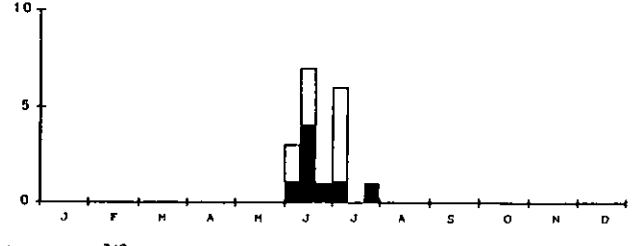




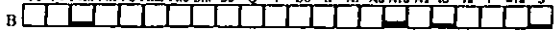
N ind 194 R ♂/♀ 1.46
N occur 63
R ind/occur 3.08

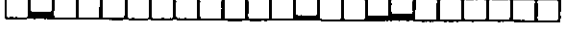


193. Nephrotoma quadrifaria (Meigen, 1804)

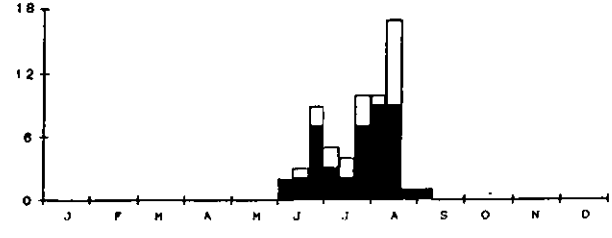


N ind 19 R ♂/♀ 1.37
N occur 13
R ind/occur 1.46

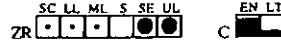


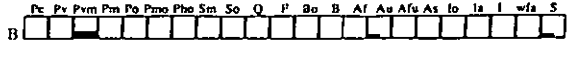


194. Nephrotoma quadristriata (Schummel, 1833)

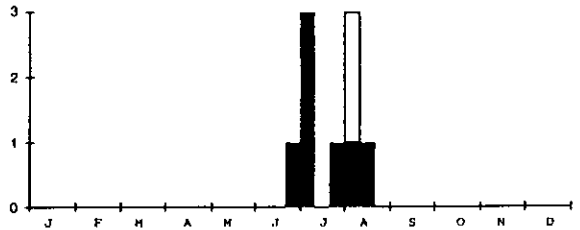


N ind 62 R ♂/♀ 0.44
N occur 35
R ind/occur 1.77

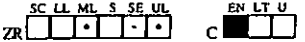


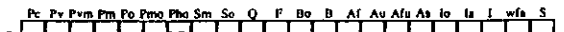


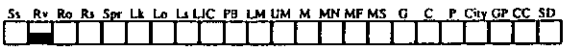
195. Nephrotoma scalaris (Meigen, 1818)



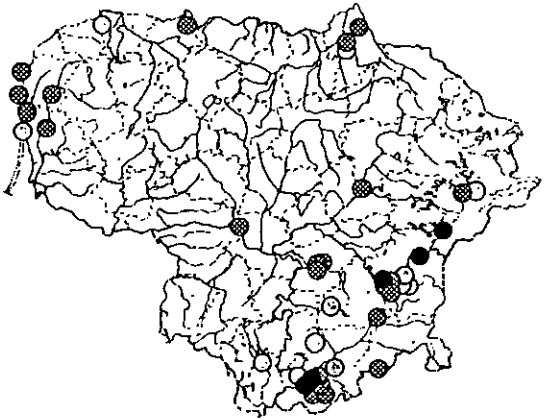
N ind 9 R ♂/♀ 0.29
N occur 6
R ind/occur 1.50

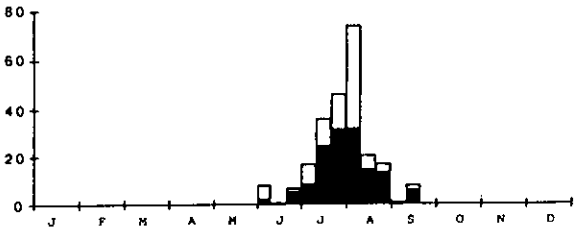




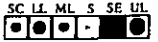


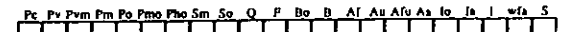
196. Nephrotoma scurra (Meigen, 1818)

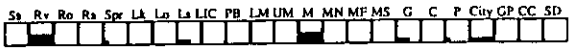




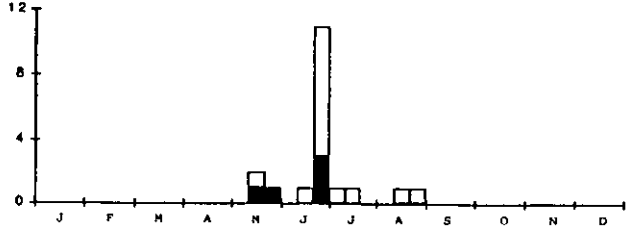
N ind 249 R ♂/♀ 0.64
N occur 98
R ind/occur 2.54



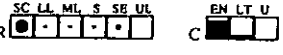


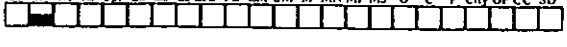


197. Nephrotoma submaculosa Edwards, 1928

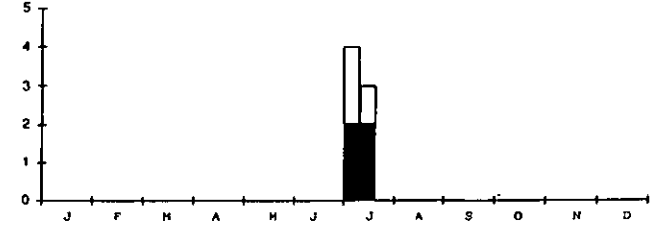


N ind 19 R ♂/♀ 2.80
N occur 11
R ind/occur 1.73

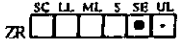


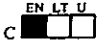


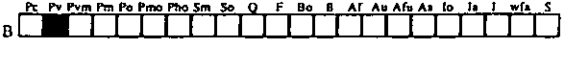
198. Nephrotoma tenuipes (Riedel, 1910)

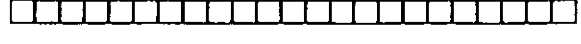


N ind 7 R ♂/♀ 0.75
N occur 5
R ind/occur 1.40

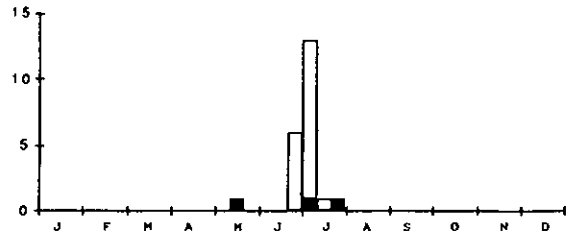




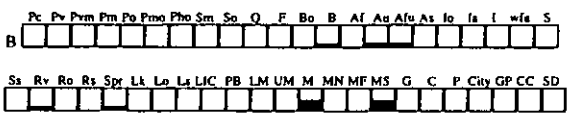




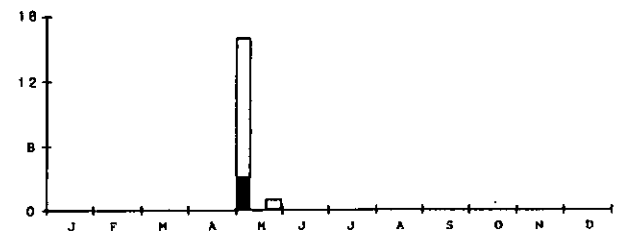
199. Nigrotipula nigra (Linnaeus, 1758)



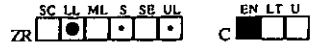
N ind 22 R ♂/♀ 6.33
N occur 13
R ind/occur 1.69

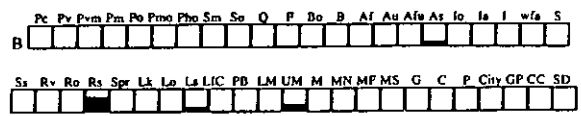


200. Prionocera pubescens Loew, 1844

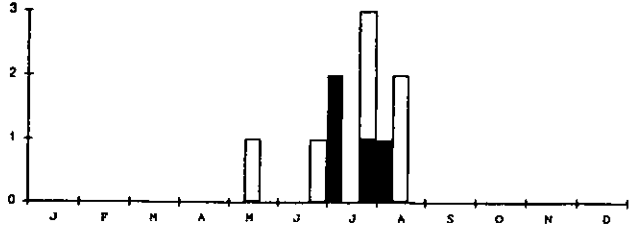


N ind 17 R ♂/♀ 4.67
N occur 4
R ind/occur 4.25





201. Prionocera subserricornis (Zetterstedt, 1851)



N ind 10 R ♂/♀ 1.50
N occur 9
R ind/occur 1.11

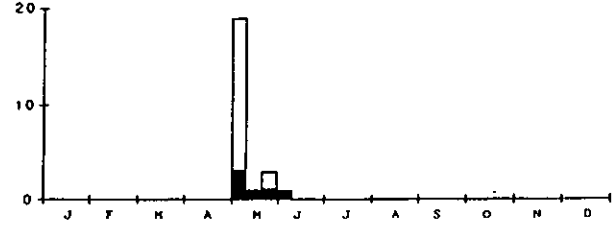
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

202. Prionocera turcica (Fabricius, 1787)



N ind 24 R ♂/♀ 3.00
N occur 6
R ind/occur 4.00

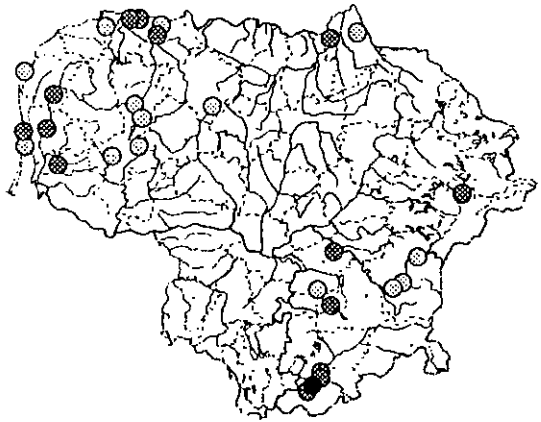
ZR SC LL ML S SE UL

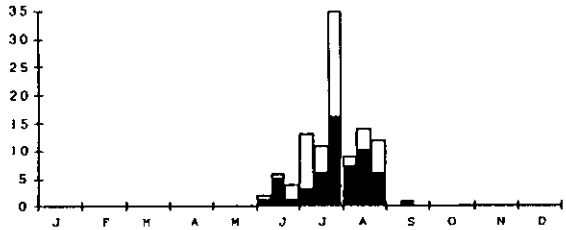
C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

203. Tipula (Acutipula) fulvipennis De Geer, 1776





N ind 107 R ♂/♀ 0.91
N occur 54
R ind/occur 1.98

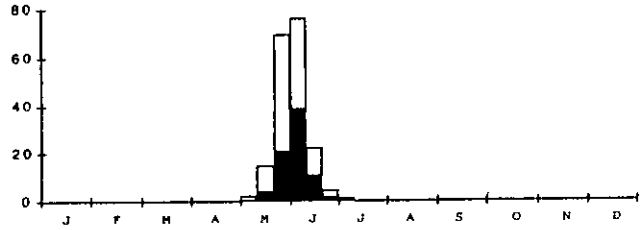
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

204. Tipula (Acutipula) luna Westhoff, 1879



N ind 188 R ♂/♀ 1.80
N occur 39
R ind/occur 4.82

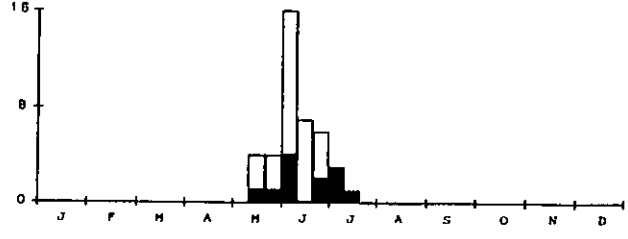
ZR SC LL ML S SE UL

C EN LT U

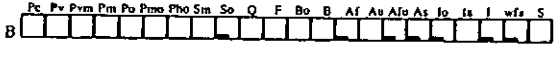
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

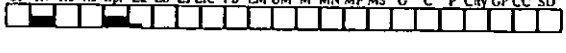
Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

205. Tipula (Acutipula) maxima Poda, 1761

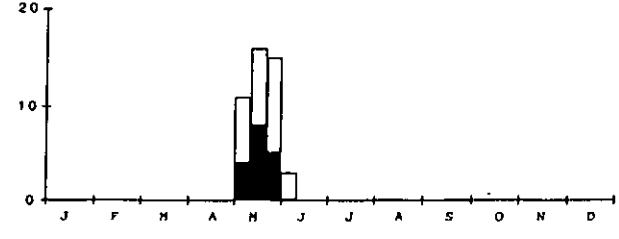


N ind 43 R ♂/♀ 2.18
N occur 27
R ind/occur 1.59

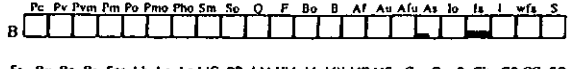


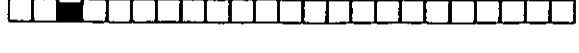


206. Tipula (Acutipula) tenuicornis Schummel, 1833

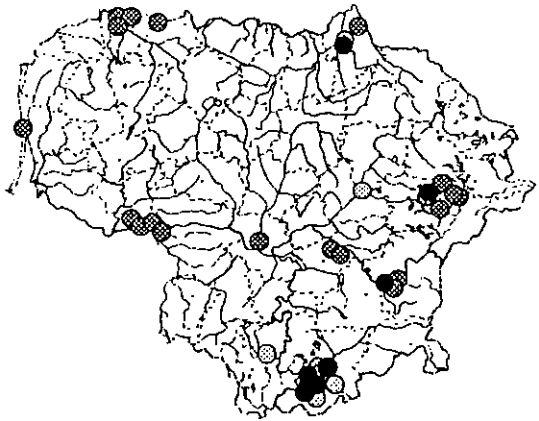


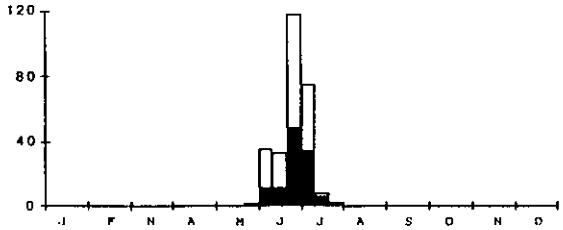
N ind 45 R ♂/♀ 1.65
N occur 14
R ind/occur 3.21



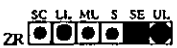


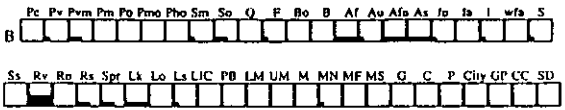
207. Tipula (Beringotipula) unca Wiedemann, 1817



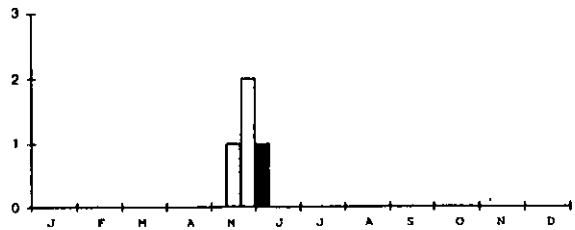


N ind 177 R ♂/♀ 1.44
N occur 76
R ind/occur 2.33

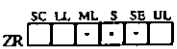


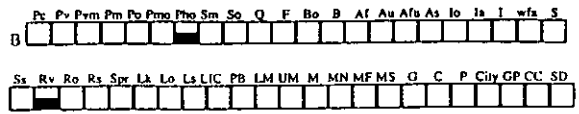


208. Tipula (Dendrotipula) flavolineata Meigen, 1804

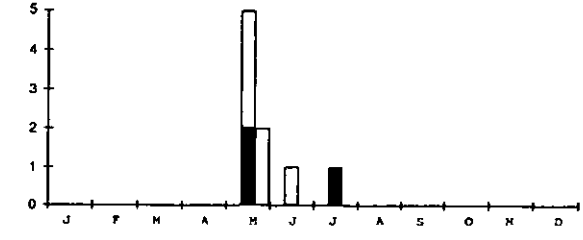


N ind 4 R ♂/♀ 3.00
N occur 4
R ind/occur 1.00

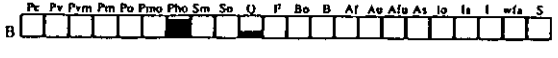


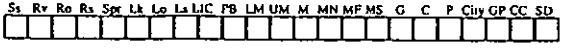


209. Tipula (Lindnerina) bistilata Lundström, 1907

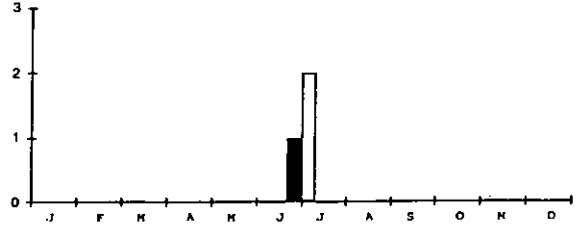


N ind 9 R ♂/♀ 2.00
N occur 4
R ind/occur 2.25

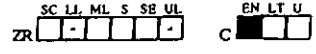


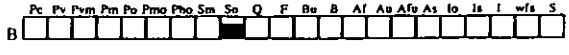


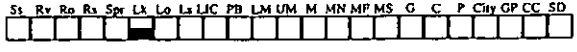
210. Tipula (Lunatipula) affinis Schummel, 1833



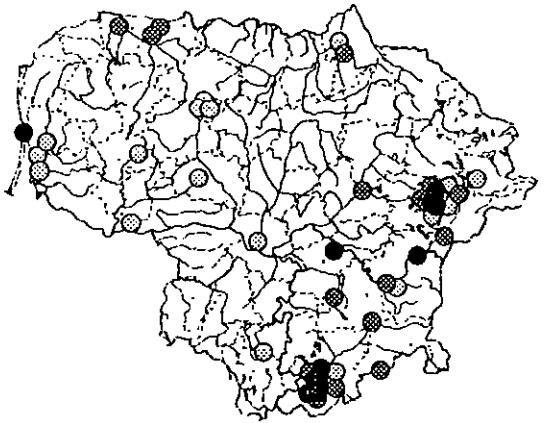
N ind 3 R ♂/♀ 2.00
N occur 2
R ind/occur 1.50

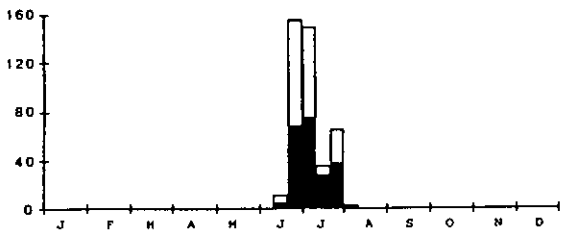




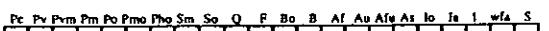


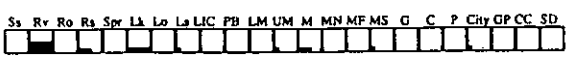
211. Tipula (Lunatipula) fascipennis Meigen, 1818



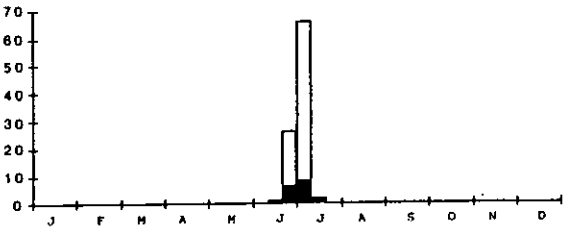


N ind 428 R ♂/♀ 0.92
N occur 123
R ind/occur 3.48

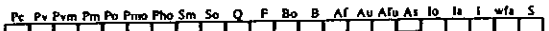


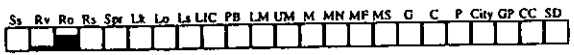


212. Tipula (Lunatipula) humilis Staeger, 1840

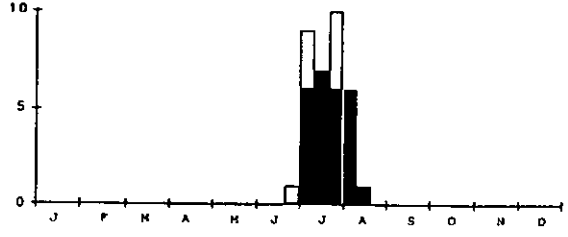


N ind 95 R ♂/♀ 4.94
N occur 16
R ind/occur 5.93

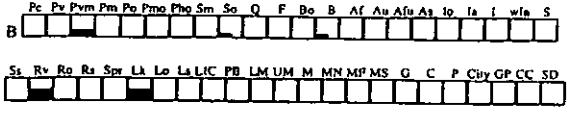




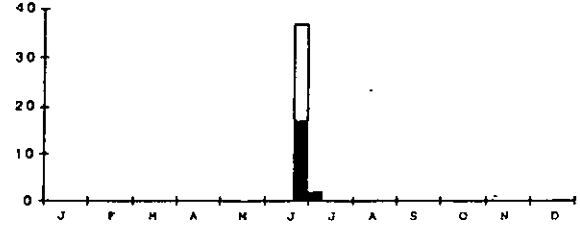
213. Tipula (Lunatipula) lactabilis Zetterstedt, 1838



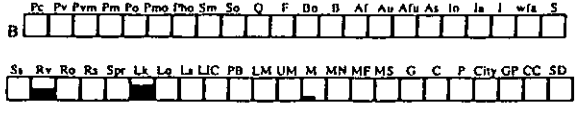
N ind 34 R ♂/♀ 0.31
N occur 19
R ind/occur 1.79



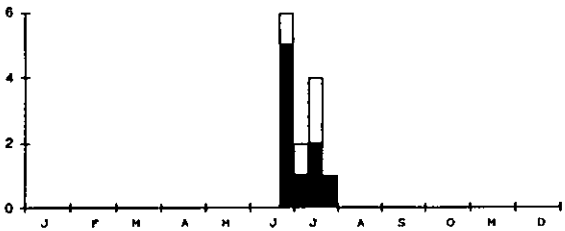
214. Tipula (Lunatipula) limitata Schummel, 1833



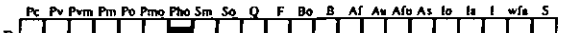
N ind 40 R ♂/♀ 1.05
N occur 5
R ind/occur 8.00

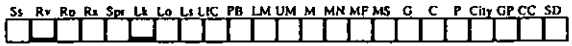


215. Tipula (Lunatipula) livida Van Der Vulp, 1858

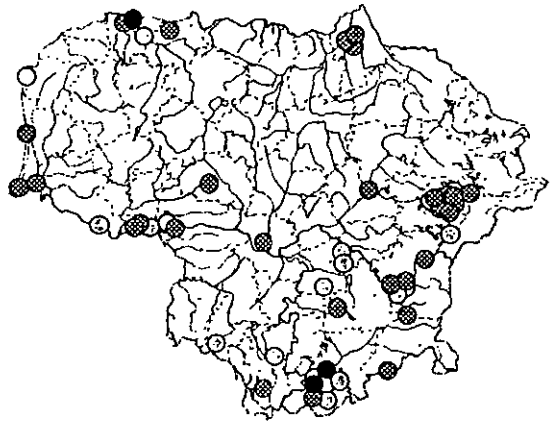


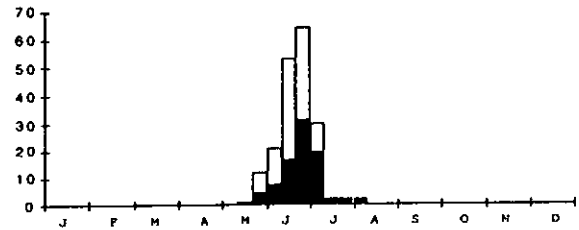
N ind 13 R ♂/♀ 0.57
N occur 5
R ind/occur 2.60



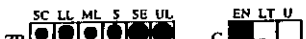


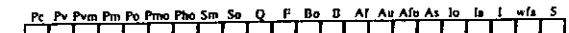
216. Tipula (Lunatipula) lunata Linnaeus, 1758

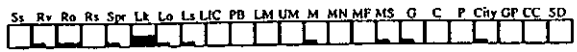




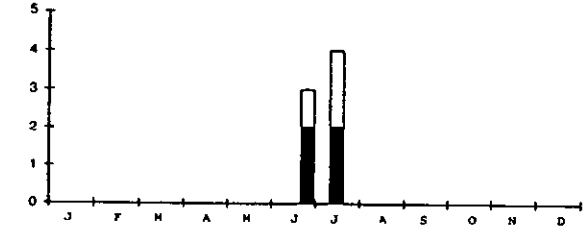
N ind 187 R ♂/♀ 1.32
N occur 74
R ind/occur 2.53



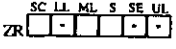


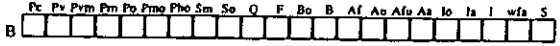


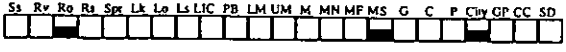
217. Tipula (Lunatipula) pellostigma Schummel, 1833



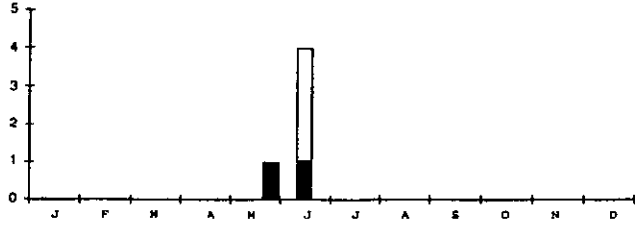
N ind 7 R ♂/♀ 1.00
N occur 4
R ind/occur 1.75



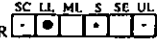


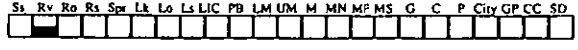


218. Tipula (Lunatipula) selene Meigen, 1830

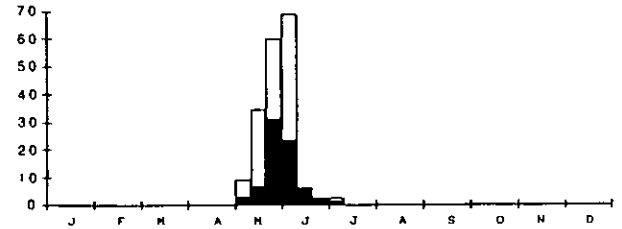


N ind 5 R ♂/♀ 1.50
N occur 4
R ind/occur 1.25

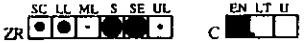


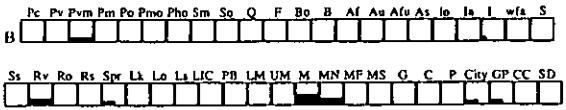


219. Tipula (Lunatipula) vernalis Meigen, 1804

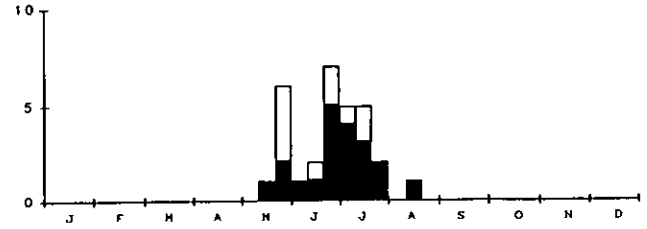


N ind 187 R ♂/♀ 1.66
N occur 34
R ind/occur 5.50

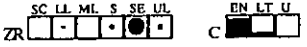


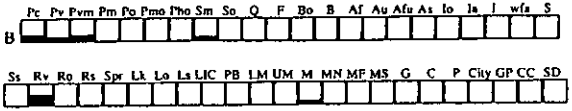


220. Tipula (Odonatisca) nodicornis Meigen, 1818

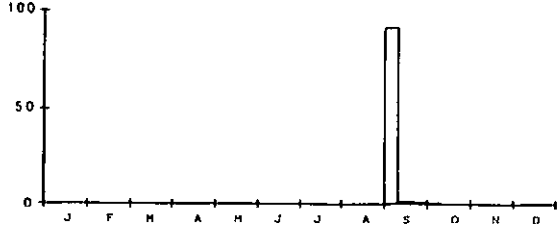


N ind 30 R ♂/♀ 0.50
N occur 26
R ind/occur 1.15

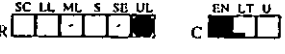


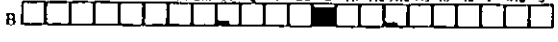


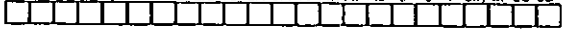
221. Tipula (Platytipula) autumnalis Loew, 1864



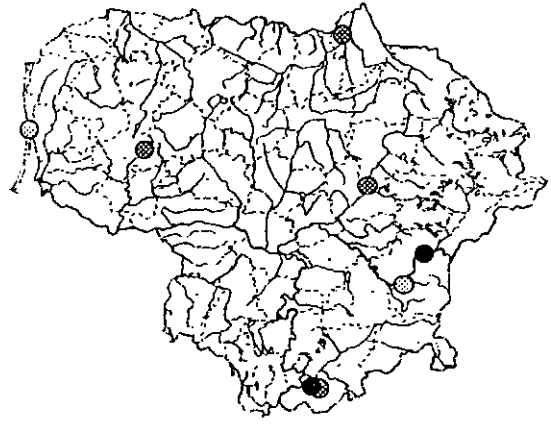
N ind 97 R ♂/♀ 96.00
N occur 7
R ind/occur 13.86

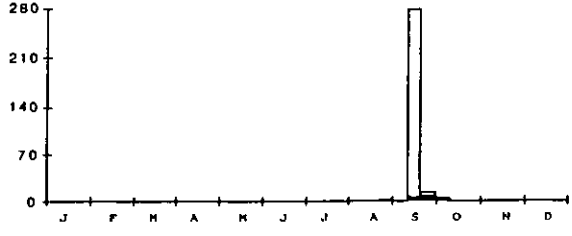




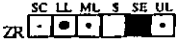


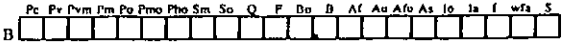
222. Tipula (Platytipula) lutelpennis Meigen, 1830

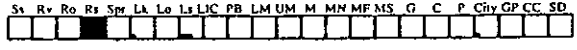




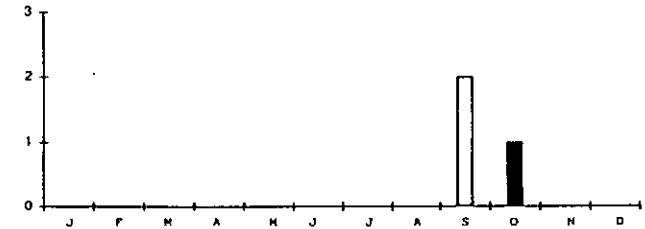
N ind 303 R ♂/♀ 22.08
N occur 13
R ind/occur 23.31



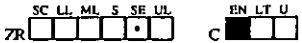


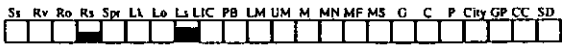


223. Tipula (Platytipula) melanoceros Schummel, 1833

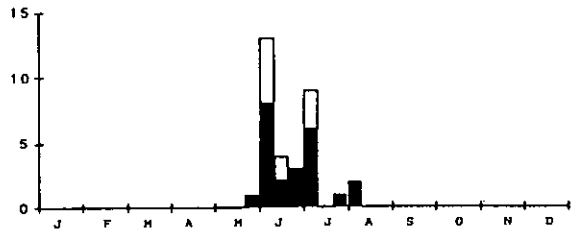


N ind 3 R ♂/♀ 2.00
N occur 2
R ind/occur 1.50

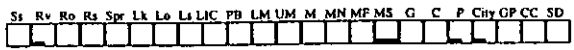




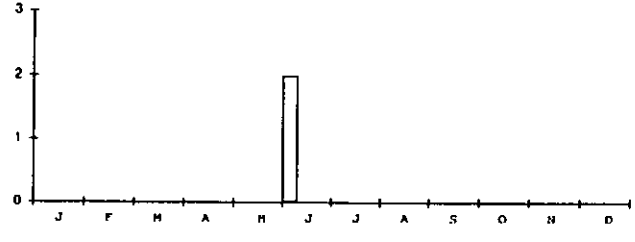
224. Tipula (Pterelachisus) irrorata Macquart, 1826



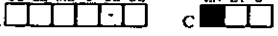
N ind 33 R ♂/♀ 0.43
N occur 20
R ind/occur 1.65

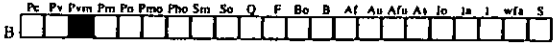


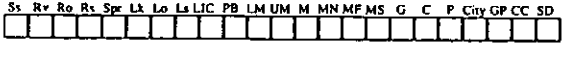
225. Tipula (Pterelachisus) jutlandica Nielsen, 1947



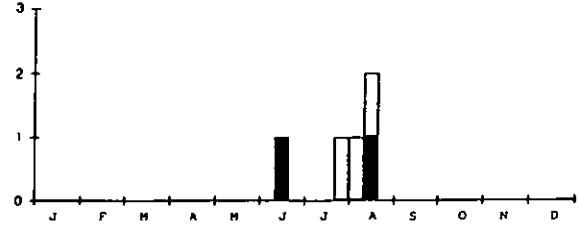
N ind 2 R ♂/♀ 2/0
N occur 1
R ind/occur 2.00



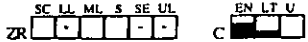


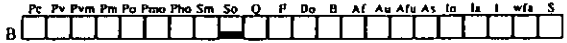


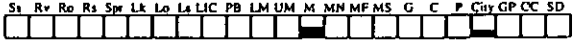
226. Tipula (Pterelachisus) luridorostris Schummel, 1833



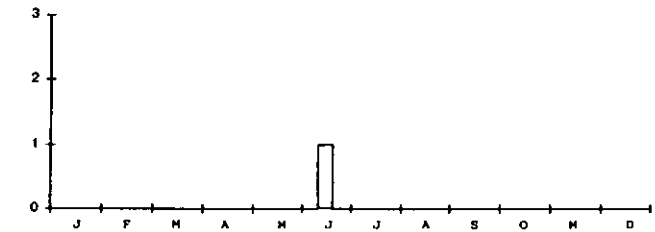
N ind 5 R ♂/♀ 1.50
N occur 5
R ind/occur 1.00



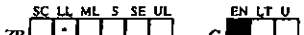


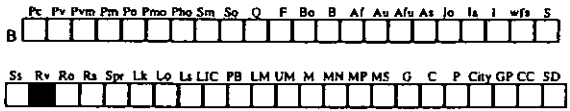


227. Tipula (Pterelachisus) mutila Wahlgren, 1905

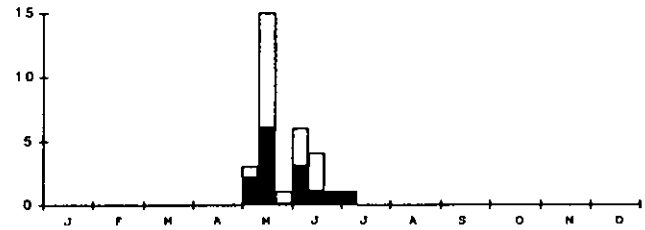


N ind 1 R ♂/♀ 0/1
N occur 1
R ind/occur 1

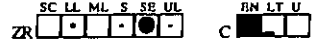


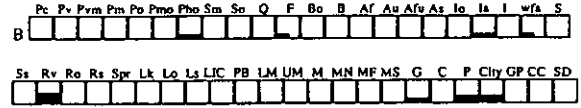


228. Tipula (Pterelachisus) pabulina Meigen, 1818

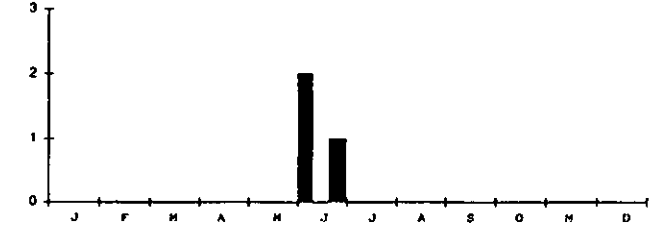


N ind 31 R ♂/♀ 1.21
N occur 15
R ind/occur 2.07





229. Tipula (Pterelachisus) pauli Mannheims, 1964



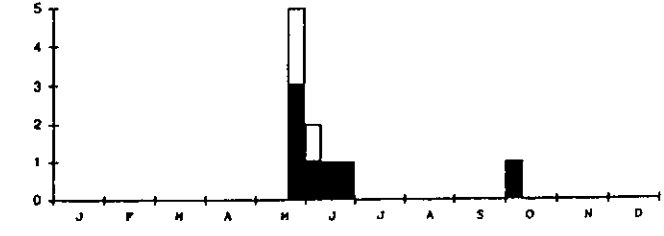
N ind 3 R ♂/♀ 0/3
N occur 2
R ind/occur 1.50

ZR SC LL ML S SE UL
C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af As Afo As Io Is I wfa S

St Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

230. Tipula (Pterelachisus) pseudoirrorata Goetghebuer, 1921



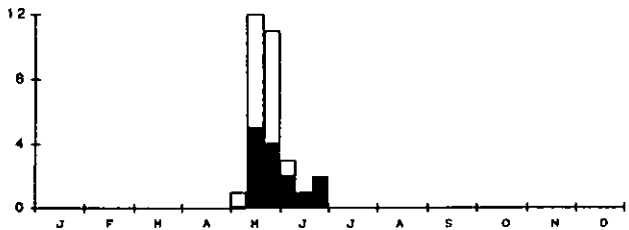
N ind 10 R ♂/♀ 0.43
N occur 6
R ind/occur 1.67

ZR SC LL ML S SE UL
C EN LT U

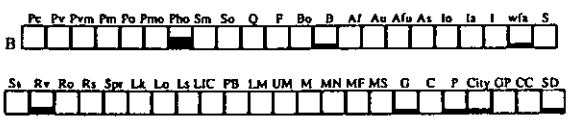
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af As Afo As Io Is I wfa S

St Rv Ro Rs Spr Lk Lo La LIC PB LM UM M MN MF MS G C P City GP CC SD

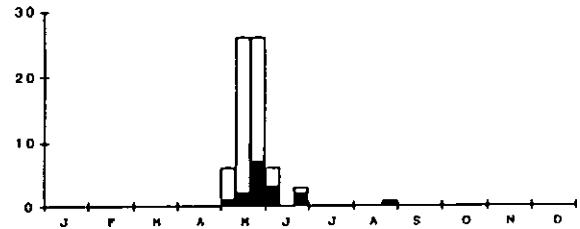
231. Tipula (Pterelachisus) pseudovariipennis Czizek, 1912



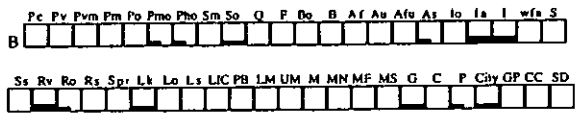
N ind 31 R ♂/♀ 1.21
N occur 18
R ind/occur 1.72



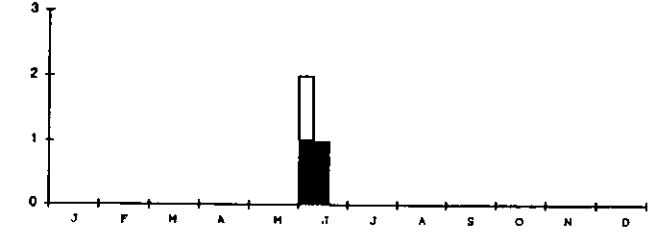
232. Tipula (Pterelachisus) submarmorata Schummel, 1833



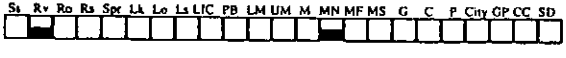
N ind 68 R ♂/♀ 3.25
N occur 37
R ind/occur 1 84



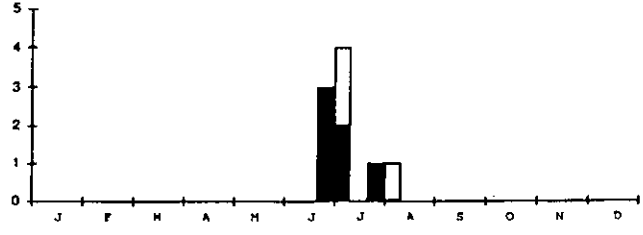
233. Tipula (Pterelachisus) trifascingulata Theowald, 1980



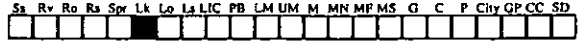
N ind 3 R ♂/♀ 0.50
N occur 3
R ind/occur 1.00



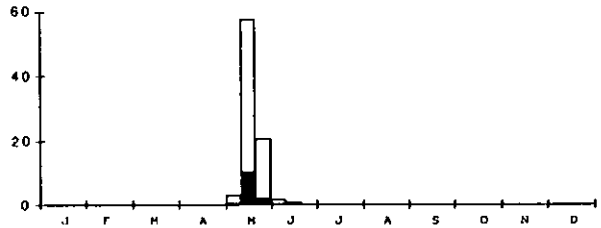
234. Tipula (Pterelachisus) truncorum Meigen, 1830



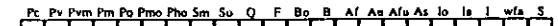
N ind 9 R ♂/♀ 0.50
N occur 9
R ind/occur 1.00

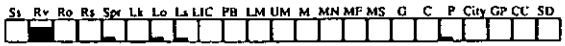


235. Tipula (Pterelachisus) varipennis Meigen, 1818

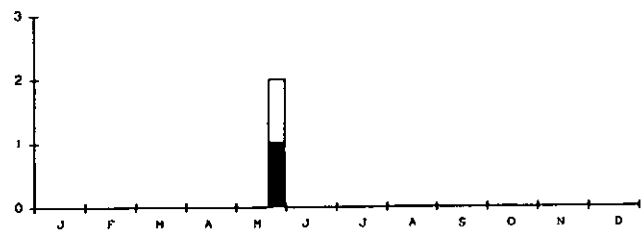


N ind 86 R ♂/♀ 6.17
N occur 27
R ind/occur 3.18

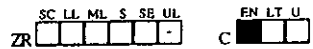


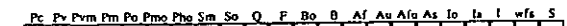


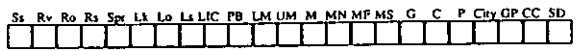
236. Tipula (Pterelachisus) wahlgreni Lackschewitz, 1925



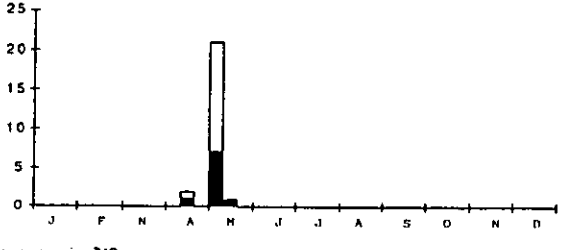
N ind 2 R ♂/♀ 1.00
N occur 1
R ind/occur 2.00



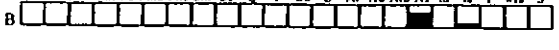


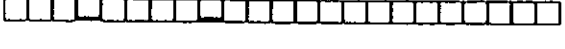


237. Tipula (Savtshenkia) grisescens Zetterstedt, 1851

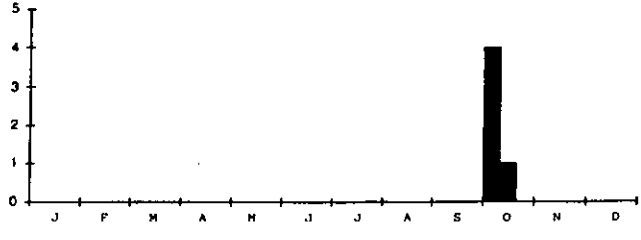


N ind 24 R ♂/♀ 1.67
N occur 6
R ind/occur 4.00

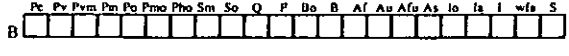




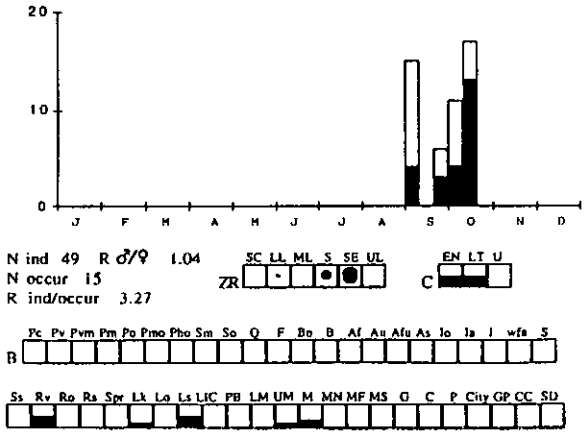
238. Tipula (Savtshenkia) invenusta Riedel, 1919



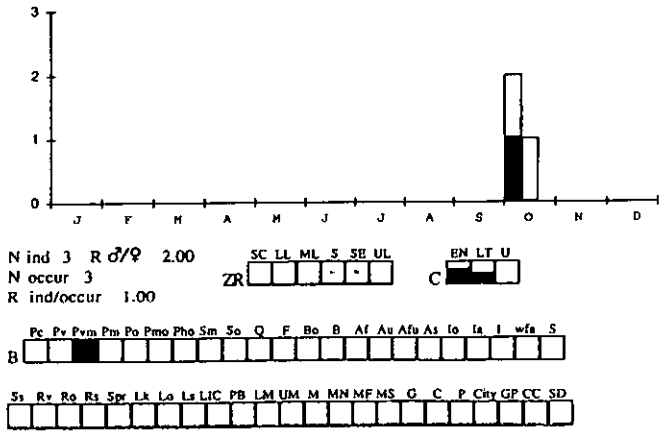
N ind 5 R ♂/♀ 0/5
N occur 3
R ind/occur 1.67



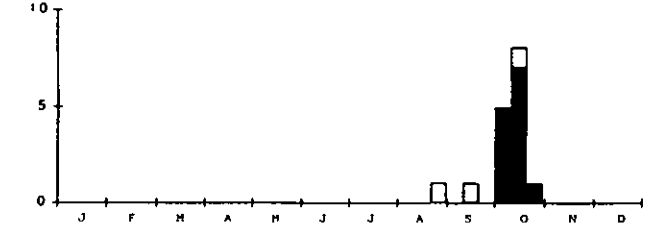
239. Tipula (Savtshenkia) limbata Zetterstedt, 1838



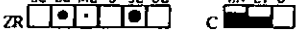
240. Tipula (Savtshenkia) obsoleta Meigen, 1818

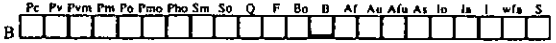


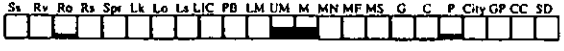
241. Tipula (Savtshenkia) signata Staeger, 1840



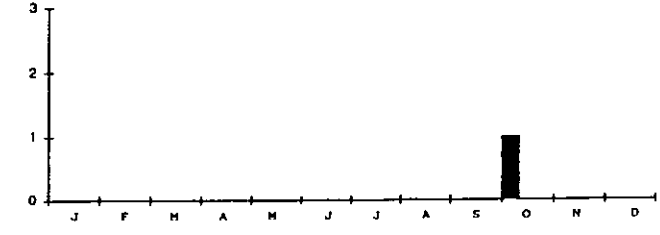
N ind 16 R ♂/♀ 0.23
N occur 7
R ind/occur 2.29



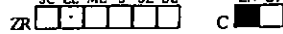


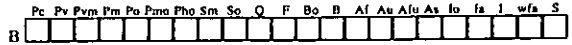


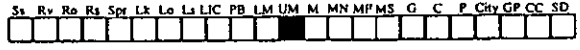
242. Tipula (Savtshenkia) staegeri Nielsen, 1922



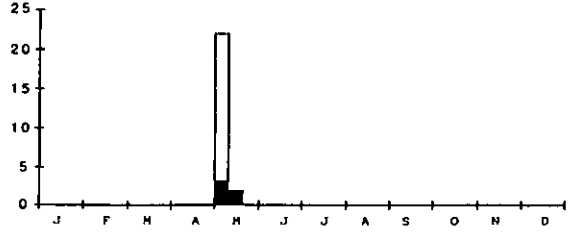
N ind 1 R ♂/♀ 0/1
N occur 1
R ind/occur 1.00



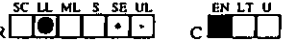


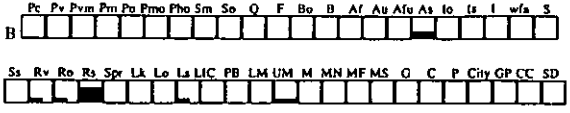


243. Tipula (Savtshenkia) subnodicornis Zetterstedt, 1838

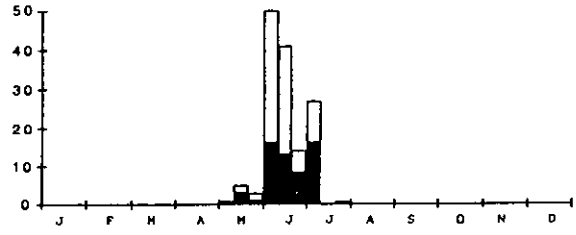


N ind 24 R ♂/♀ 3.80
N occur 5
R ind/occur 4.80

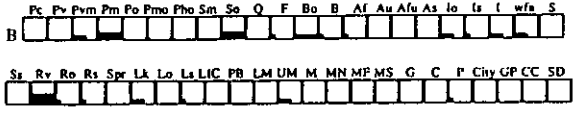




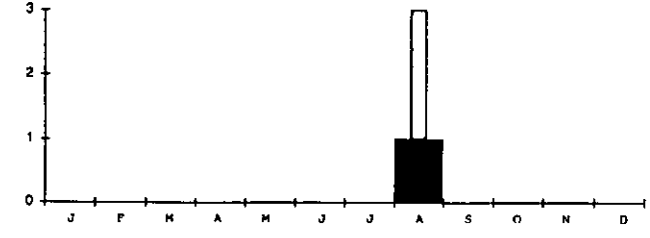
244. Tipula (Schummelia) variicornis Schummel, 1833



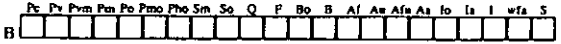
N ind 142 R ♂/♀ 1.23
N occur 35
R ind/occur 4.06

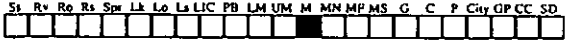


245. Tipula (Tipula) oleracea Linnaeus, 1758

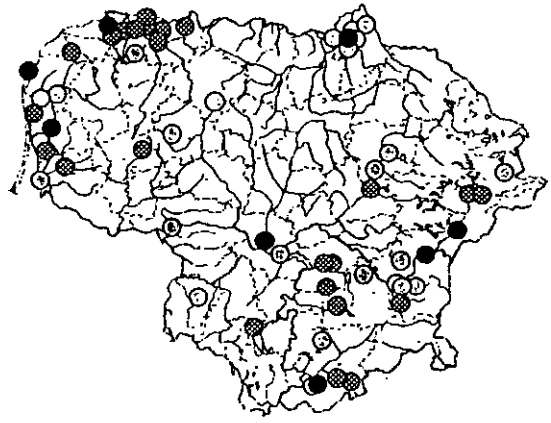


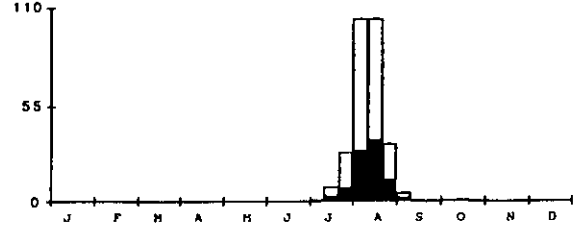
N ind 5 R ♂/♀ 0.67
N occur 5
R ind/occur 1.00



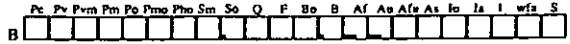


246. Tipula (Tipula) paludosa Meigen, 1830

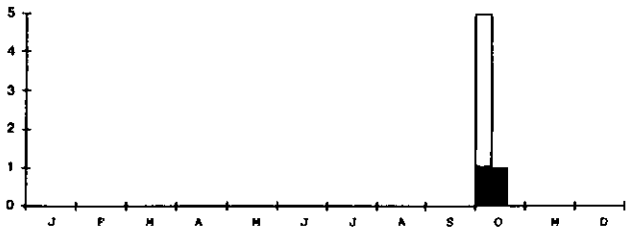




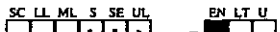
N ind 309 R ♂/♀ 2.42
N occur 103
R ind/occur 3.00

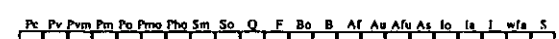


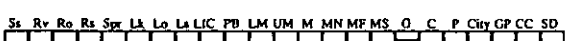
247. Tipula (Tipula) subcunctans Alexander, 1921



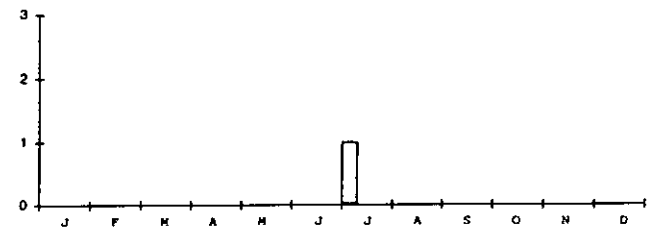
N ind 6 R ♂/♀ 2.00
N occur 3
R ind/occur 2.00



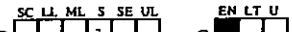


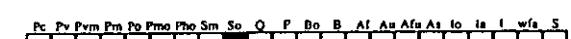


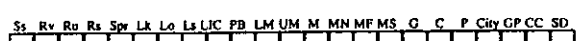
248. Tipula (Vestiplex) excisa Schummel, 1833



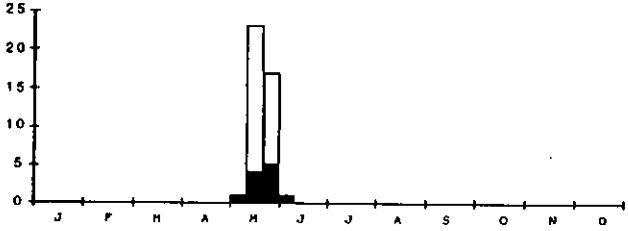
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



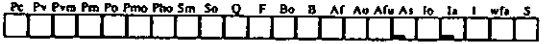


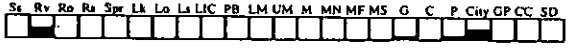


249. Tipula (Vestiplex) hortorum Linnaeus, 1758

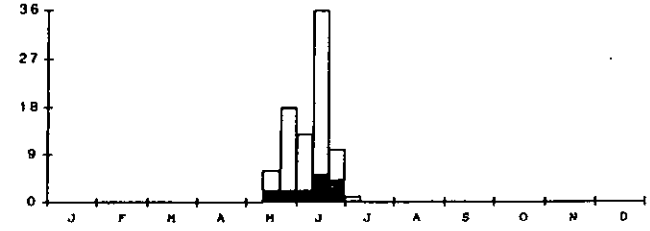


N ind 48 R ♂/♀ 2.29
N occur 20
R ind/occur 2.40

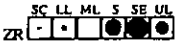


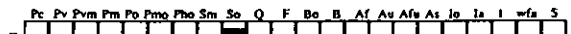


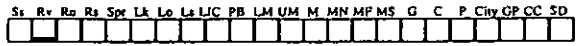
250. Tipula (Vestiplex) nubeculosa Meigen, 1804



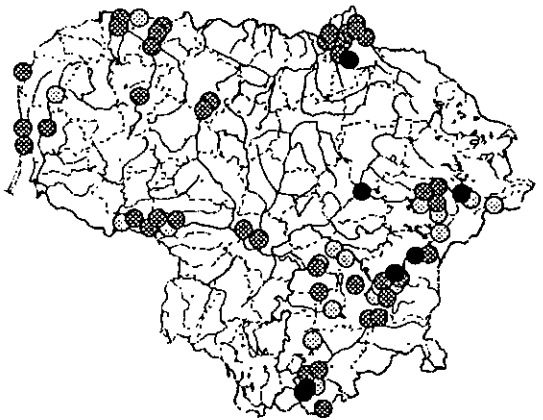
N ind 84 R ♂/♀ 4.60
N occur 16
R ind/occur 5.25

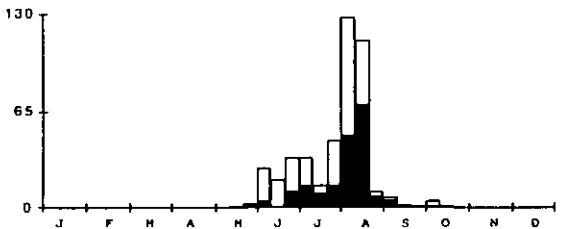




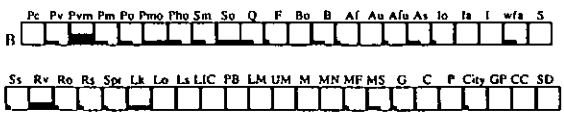


251. Tipula (Vestiplex) scripta Meigen, 1830

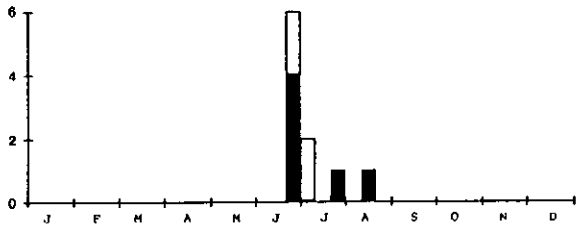




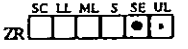
N ind 449 R ♂/♀ 1.37
N occur 128
R ind/occur 3.51

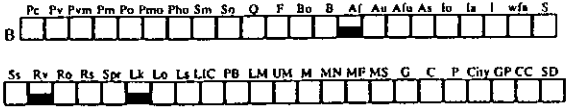


252. Tipula (Yamatotipula) caesia Schummel, 1833

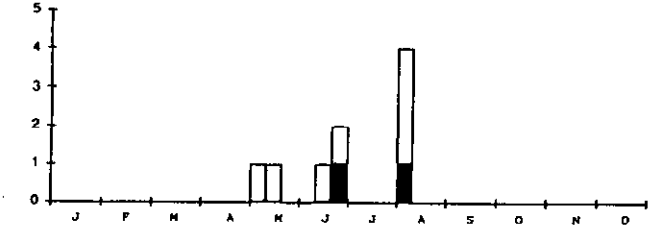


N ind 10 R ♂/♀ 0.67
N occur 8
R ind/occur 1.25

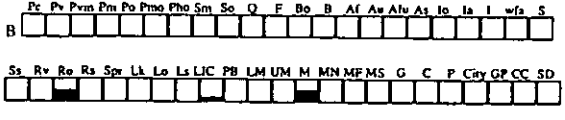




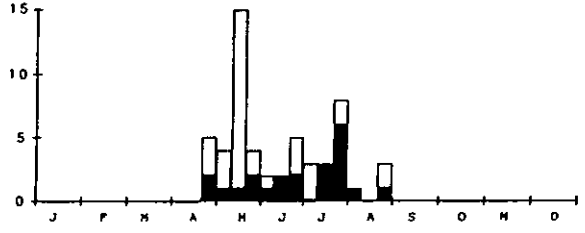
253. Tipula (Yamatotipula) coerulescens Lackschewitz, 1923



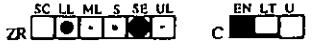
N ind 9 R ♂/♀ 3.50
N occur 7
R ind/occur 1.29

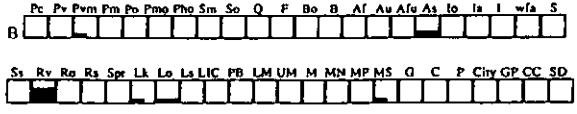


254. Tipula (Yamatotipula) couckei Tonnoir, 1921

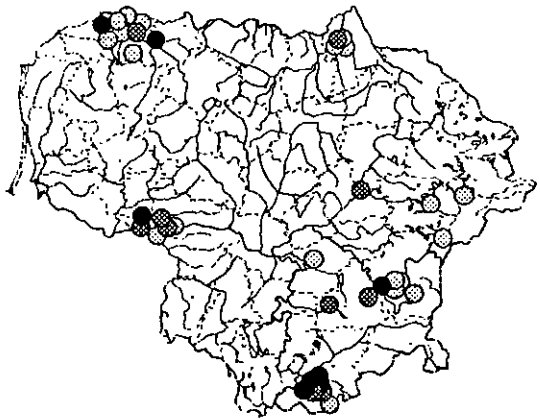


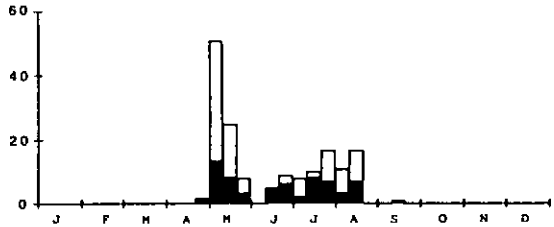
N ind 56 R ♂/♀ 1.43
N occur 35
R ind/occur 1.60



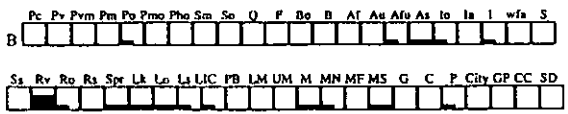


255. Tipula (Yamatotipula) lateralis Meigen, 1804

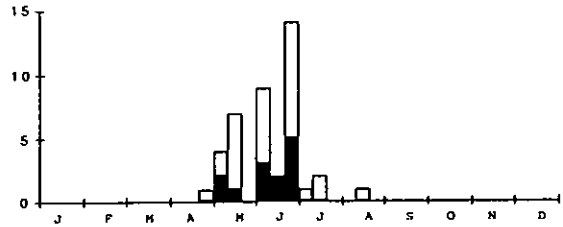




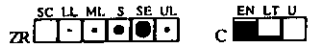
N ind 154 R ♂/♀ 1.41
N occur 59
R ind/occur 2.61

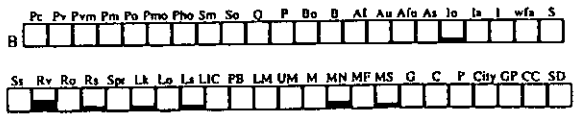


256. Tipula (Yamatotipula) marginella Theowald, 1980

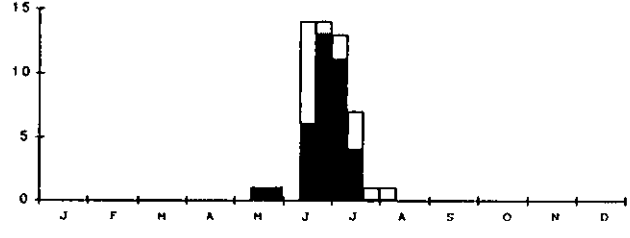


N ind 41 R ♂/♀ 2.15
N occur 17
R ind/occur 2.41

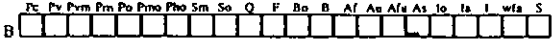


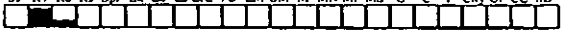


257. Tipula (Yamatotipula) montium Egger, 1863

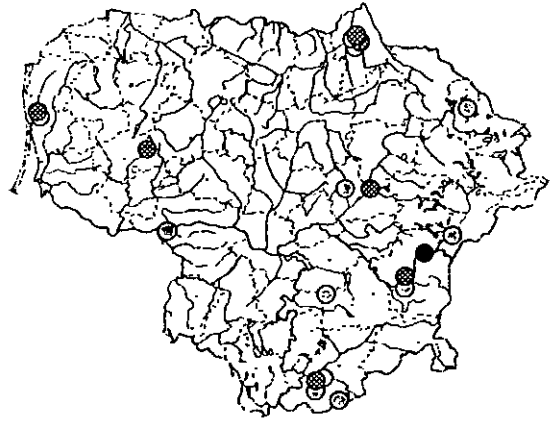


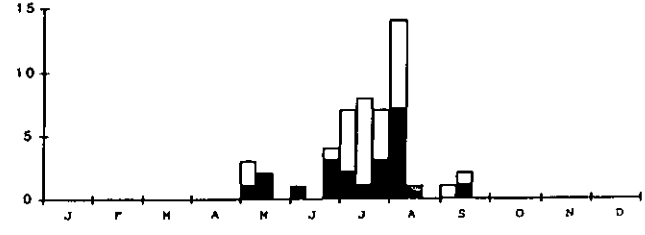
N ind 51 R ♂/♀ 0.46
N occur 23
R ind/occur 2.22



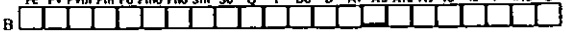


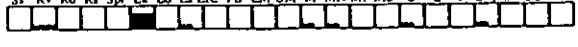
258. Tipula (Yamatotipula) pierrei Tonnoir, 1921



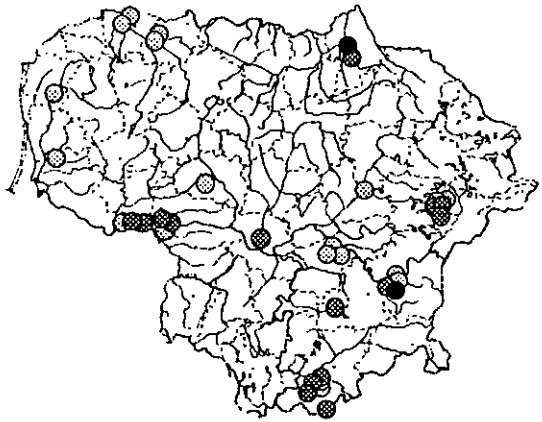


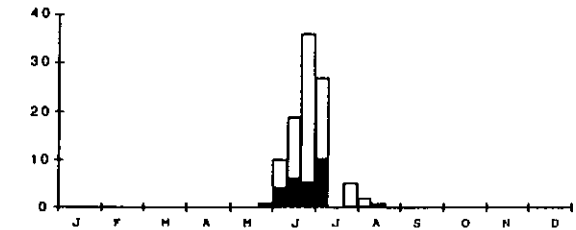
N ind 49 R ♂/♀ 1.33
N occur 32
R ind/occur 1.53



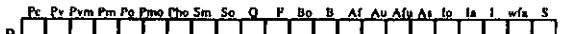


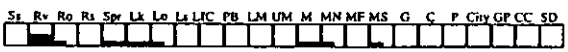
259. Tipula (Yamatotipula) pruinosa Wiedemann, 1817



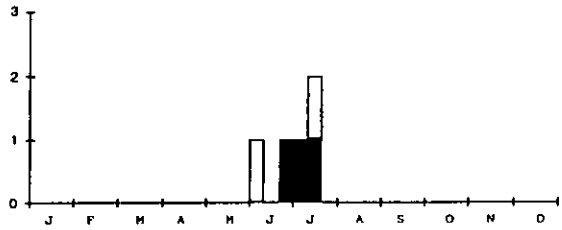


N ind 91 R ♂/♀ 1.90
N occur 44
R ind/occur 2.07

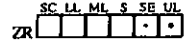


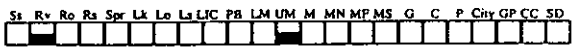


260. Tipula (Yamatotipula) quadrivittata Staeger, 1840

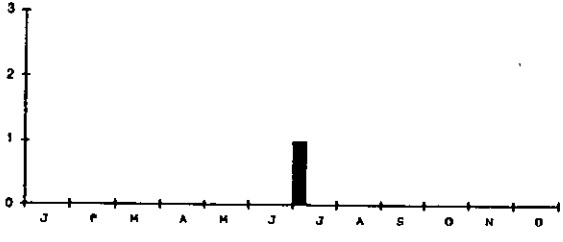


N ind 5 R ♂/♀ 0.67
N occur 4
R ind/occur 1.25

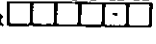


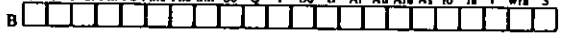


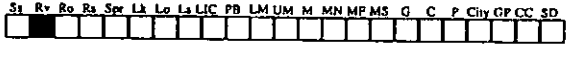
261. Ctenophora (Cnemoncosis) festiva Meigen, 1804



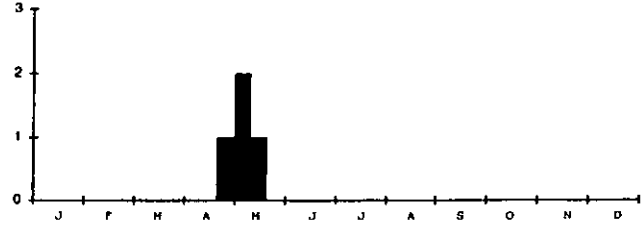
N ind 1 R ♂/♀ 0/1
N occur 1
R ind/occur 1.00



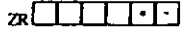


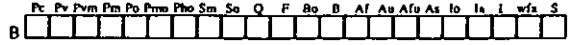


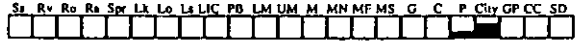
262. Ctenophora (Ctenophora) flaveolata (Fabricius, 1794)



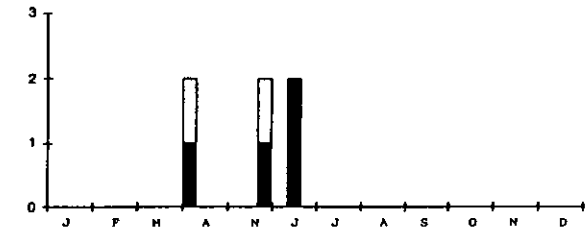
N ind 4 R ♂/♀ 0/4
N occur 4
R ind/occur 1.00



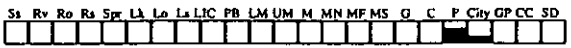




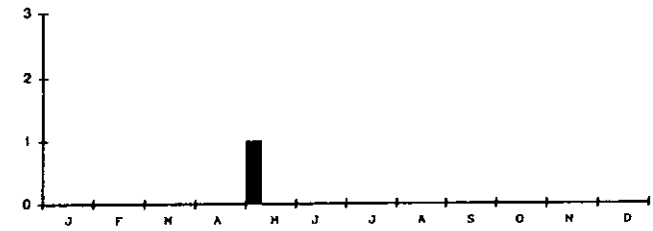
263. Ctenophora (Ctenophora) guttata Meigen, 1818



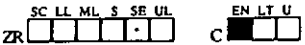
N ind 7 R ♂/♀ 0.40
N occur 5
R ind/occur 1.40

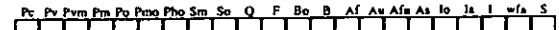


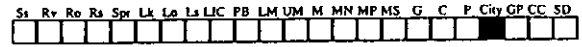
264. Ctenophora (Ctenophora) pectinicornis (Linnaeus, 1758)



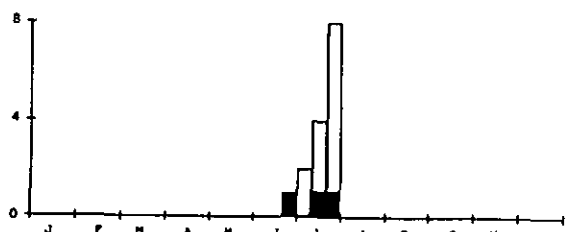
N ind 1 R ♂/♀ 0/1
N occur 1
R ind/occur 1.00



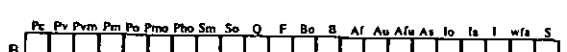


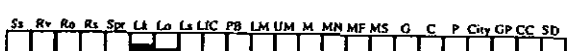


265. Dictenidia bimaculata (Linnaeus, 1761)

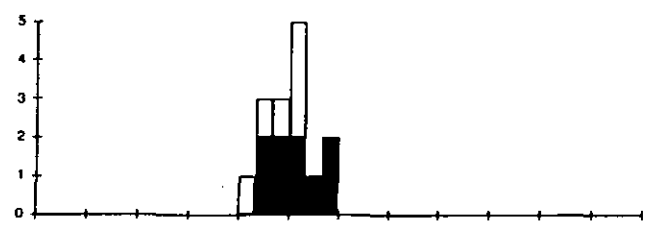


N ind 15 R ♂/♀ 4.00
N occur 11
R ind/occur 1.36

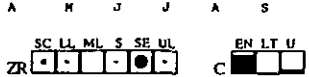


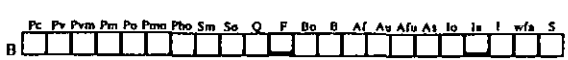


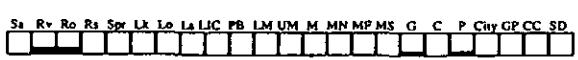
266. Tanyptera atrata (Linnaeus, 1758)



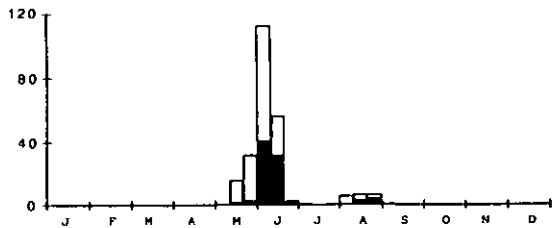
N ind 20 R ♂/♀ 0.54
N occur 13
R ind/occur 1.54



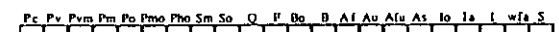


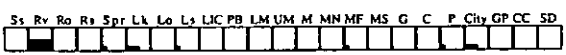


267. Cylindrotoma distinctissima (Meigen, 1818)

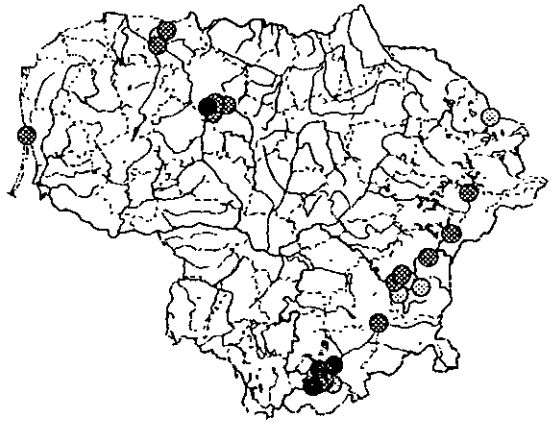


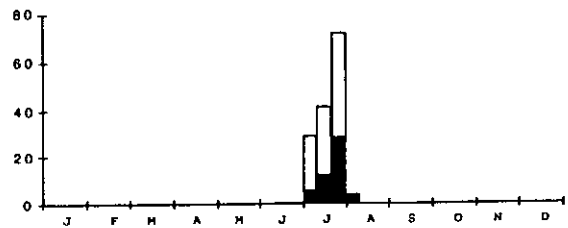
N ind 234 R ♂/♀ 1.80
N occur 50
R ind/occur 4.68



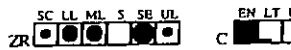


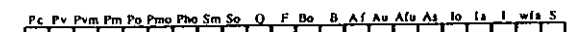
268. Diogma glabrata (Meigen, 1818)

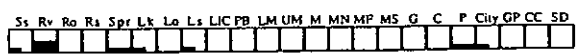




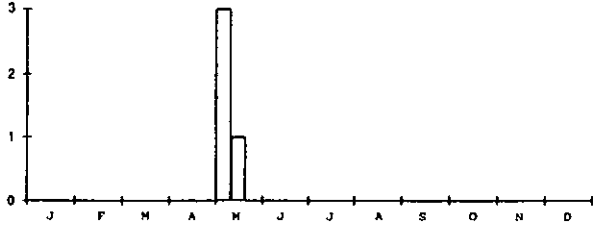
N ind 154 R ♂/♀ 1.89
N occur 46
R ind/occur 3.35







269. Phaiacrocera replicata (Linnaeus, 1758)



N ind 4 R ♂/♀ 4/0
N occur 3
R ind/occur 1.33

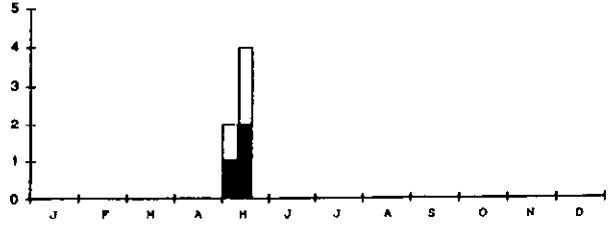
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I w/a S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

270. Triogma trisulcata (Schummel, 1829)



N ind 6 R ♂/♀ 1.00
N occur 3
R ind/occur 2.00

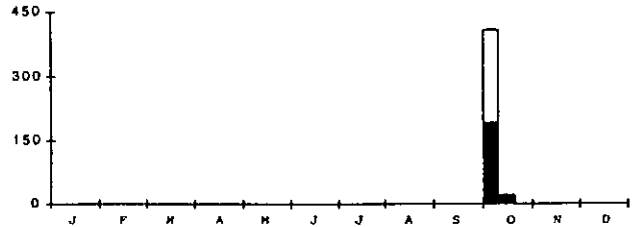
ZR SC LL ML S SE UL

C EN LT U

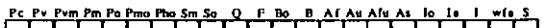
B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo fl Af Au Afu As Io Ia I w/a S

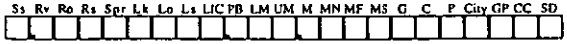
Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

271. Trichocera (Metatrichocera) forcipula Nielsen, 1921

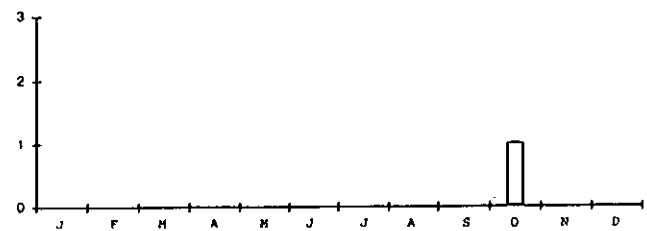


N ind 431 R ♂/♀ 1.11
N occur 7
R ind/occur 61.57

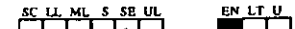


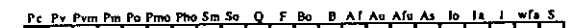


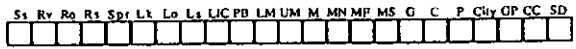
272. Trichocera (Metatrichocera) inexplorata Dahl, 1967



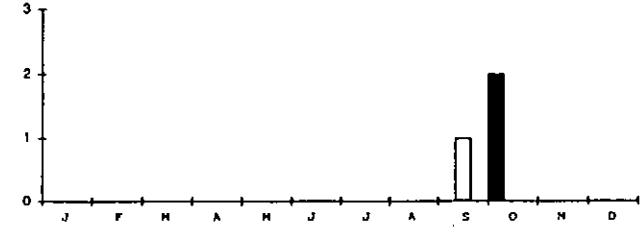
N ind 1 R ♂/♀ 1/0
N occur 1
R ind/occur 1.00



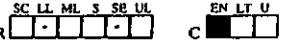


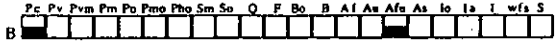


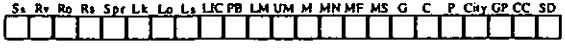
273. Trichocera (Trichocera) annulata Meigen, 1818



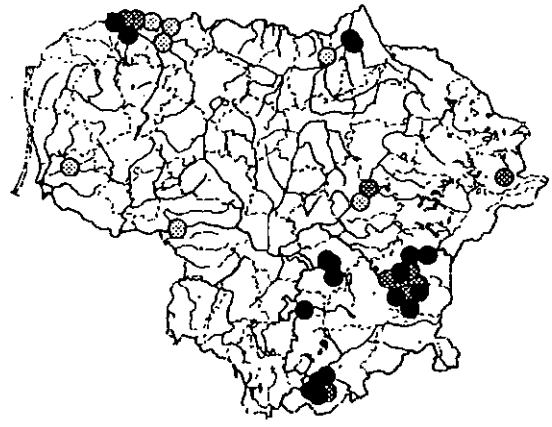
N ind 3 R ♂/♀ 0.50
N occur 3
R ind/occur 1.00

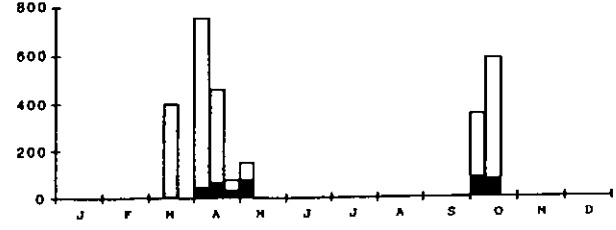




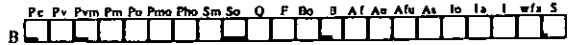


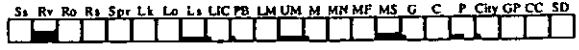
274. Trichocera (Trichocera) hiemalis (De Geer, 1760)



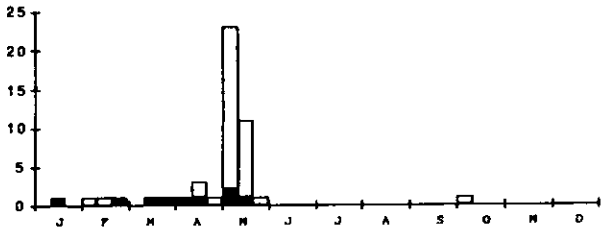


N ind 2925 R ♂/♀ 6.97
N occur 61
R ind/occur 47.95

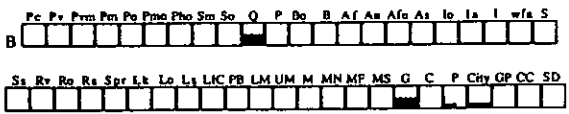




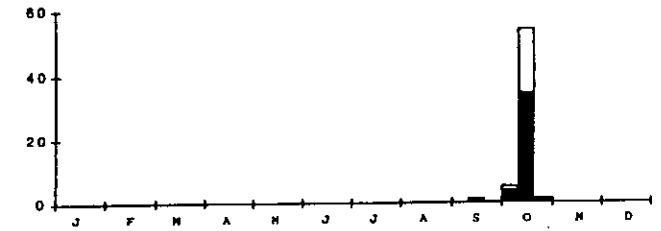
275. Trichocera (Trichocera) maculipennis Meigen, 1818



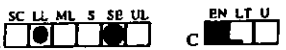
N ind 49 R ♂/♀ 3.36
N occur 15
R ind/occur 3.27

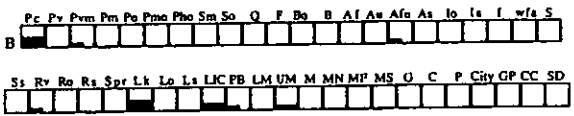


276. Trichocera (Trichocera) major Edwards, 1921

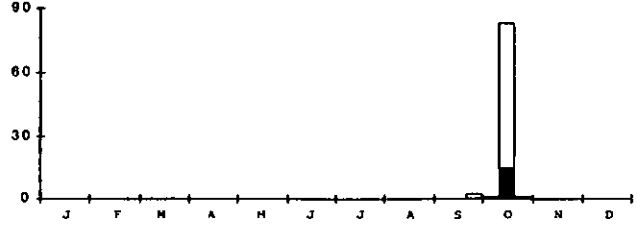


N ind 61 R ♂/♀ 0.61
N occur 12
R ind/occur 5.08

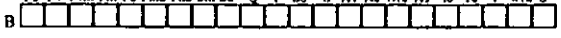


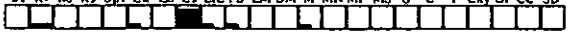


277. Trichocera (Trichocera) parva Meigen, 1804

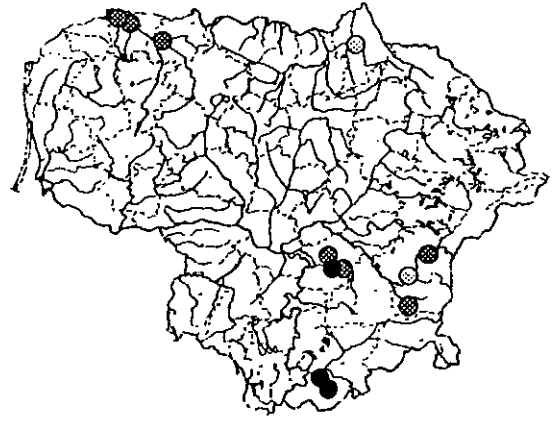


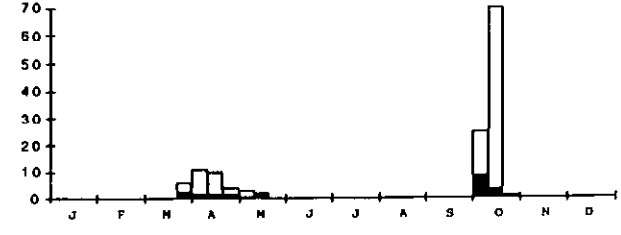
N ind 87 R ♂/♀ 5.21
N occur 6
R ind/occur 14.50



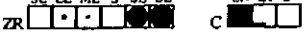


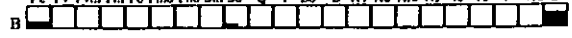
278. Trichocera (Trichocera) regelationis (Linnaeus, 1758)



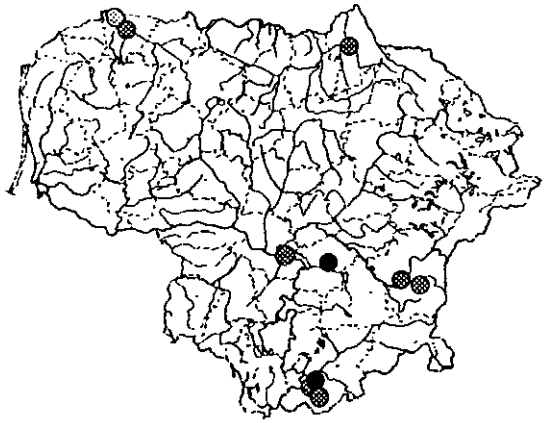


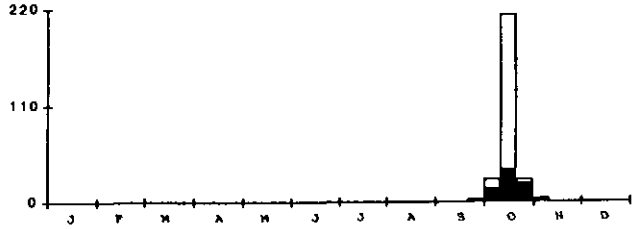
N ind 132 R ♂/♀ 6.71
N occur 15
R ind/occur 8.80



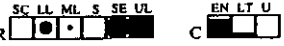


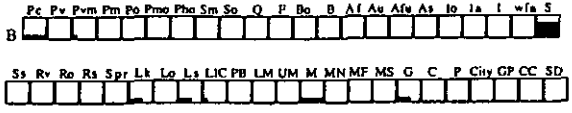
279. Trichocera (Trichocera) rufescens Edwards, 1921



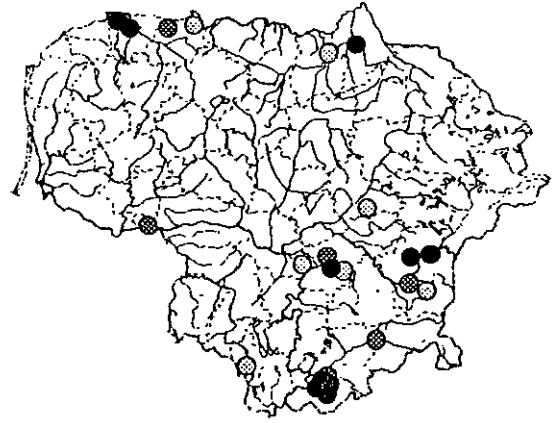


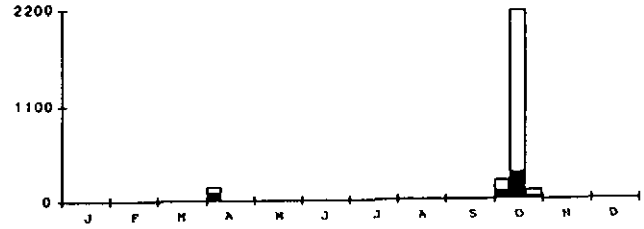
N ind 270 R ♂/♀ 2.77
N occur 13
R ind/occur 20.77



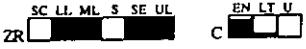


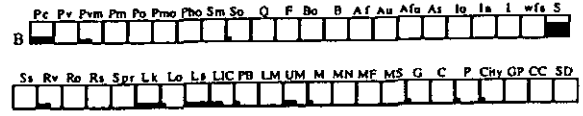
280. Trichocera (Trichocera) saltator (Harris, 1776)



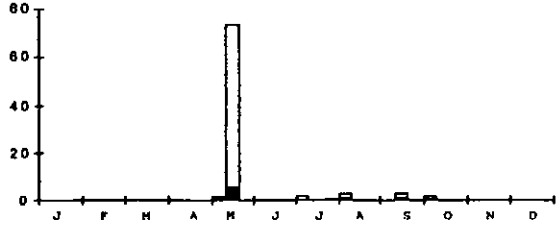


N ind 2649 R ♂/♀ 5.07
N occur 32
R ind/occur 82.78

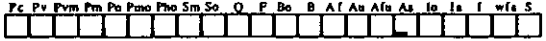


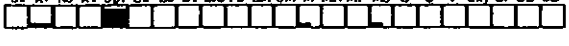


281. **Ptychoptera albimana (Fabricius, 1787)**

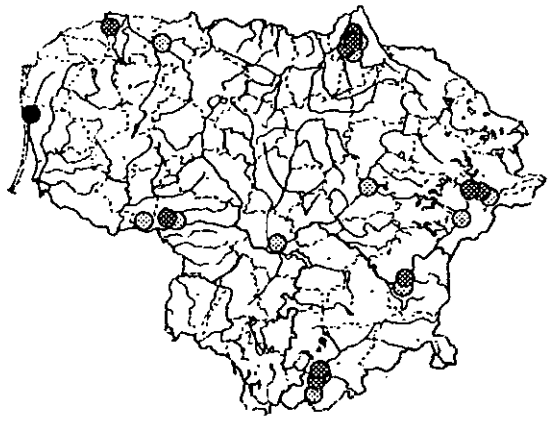


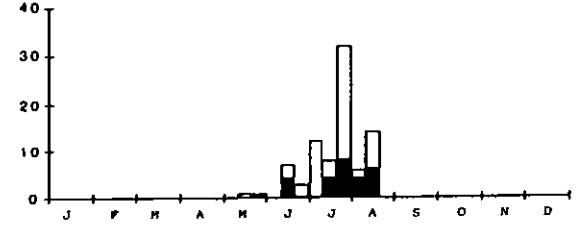
N ind 87 R ♂/♀ 8.44
N occur 14
R ind/occur 6.21



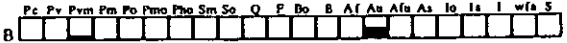


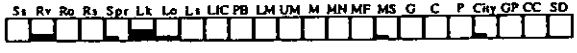
282. **Ptychoptera contaminata (Linnaeus, 1758)**



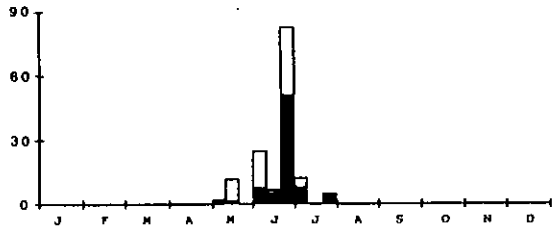


N ind 84 R ♂/♀ 1.96
N occur 32
R ind/occur 2.62

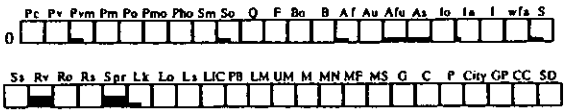




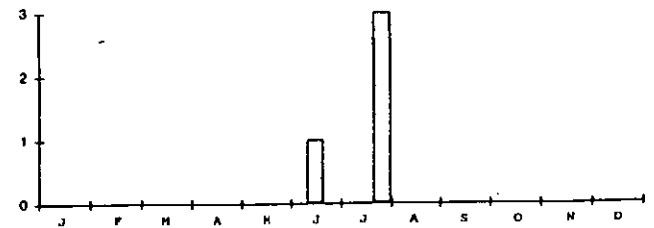
283. Ptychoptera lacustris Meigen, 1830



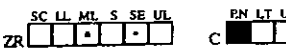
N ind 147 R ♂/♀ 0.90
N occur 25
R ind/occur 5.88

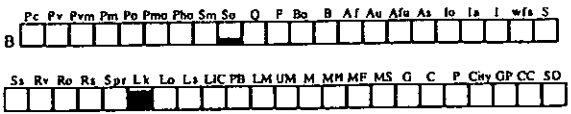


284. Ptychoptera minuta (Tonnoir, 1919)

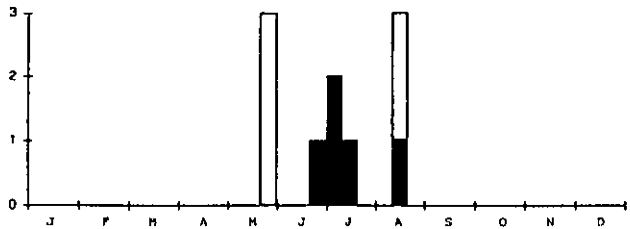


N ind 4 R ♂/♀ 4/0
N occur 2
R ind/occur 2.00





285. Ptychoptera paludosa Meigen, 1804



N ind 10 R ♂/♀ 1.00
N occur 7
R ind/occur 1.43

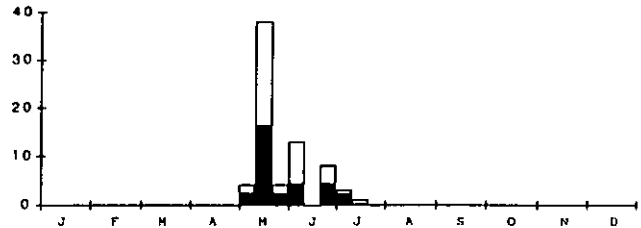
ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD

286. Ptychoptera scutellaris Meigen, 1818



N ind 71 R ♂/♀ 1.37
N occur 17
R ind/occur 4.18

ZR SC LL ML S SE UL

C EN LT U

B Pc Pv Pvm Pm Po Pmo Pho Sm So Q F Bo B Af Au Afu As Io Ia I wfa S

Ss Rv Ro Rs Spr Lk Lo Ls LIC PB LM UM M MN MF MS G C P City GP CC SD