

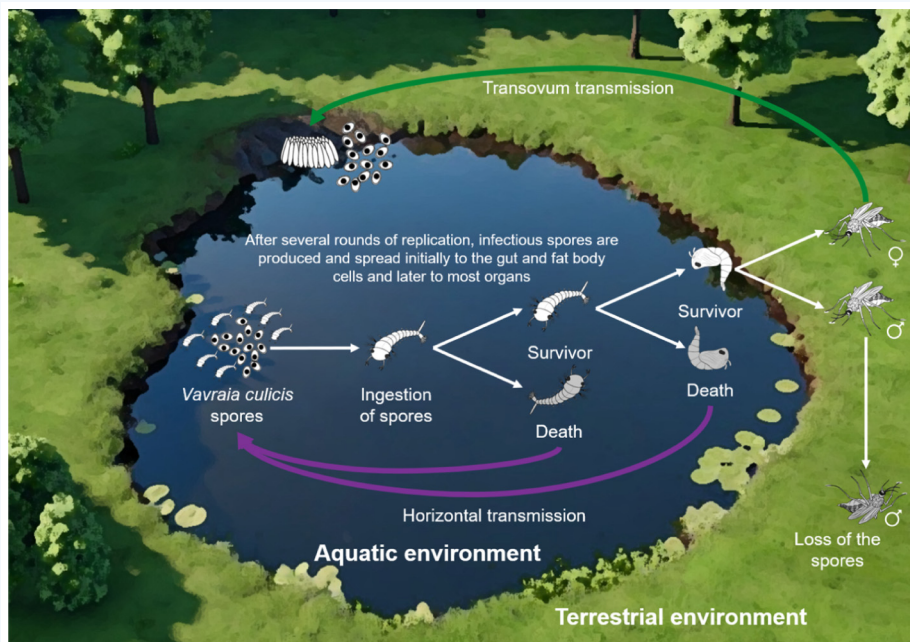
Vavraia culicis

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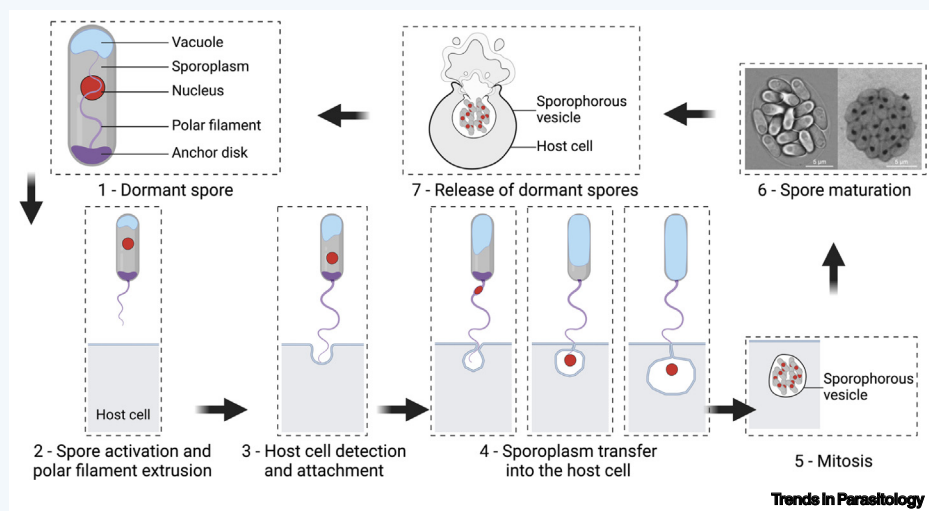
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Trends in Parasitology

Vavraia culicis (previously *Pleistophora culicis*) is a microsporidian and an obligate intracellular parasite. It infects several genera of mosquitoes. It begins and ends its development with aquatic spores that are ingested by mosquito larvae. Once inside the host, the parasite uses its polar tube to inject its sporoplasm into host cells, replicating and producing the infective stage: spores. Since they do not have their own mitochondria, microsporidians hijack their hosts to manipulate their metabolism. Transmission occurs when aquatic stages die and release spores, when females lay eggs that are covered with spores, or when dead adults happen to end up on the surface of a breeding site. *V. culicis* has been suggested as a biological control agent of vector-borne diseases due to its impact on longevity and other life-history traits. In particular, it impedes the development of malaria parasites (*Plasmodium* spp.) in *Anopheles* mosquitoes and it restores sensitivity to insecticides.



Trends in Parasitology

KEY FACTS:

V. culicis impedes the development of *Plasmodium* in *Anopheles*, making it a potential biological control agent for malaria transmission that might need to be seasonally reintroduced.

The genome of *V. culicis* is approximately 6.1 Mb (2773 proteins) and encodes mainly infective and translational tools.

V. culicis contains only mitosomes, requiring the machinery of the host to generate ATP.

Despite its small genome, experimental evolution studies demonstrated that this organism could evolve rapidly.

Host resource usage, dynamics, and transcriptomic response have been described for *Anopheles* and *Aedes* mosquitoes upon infection with this microsporidian parasite.

DISEASE FACTS:

Originally discovered in *Aedes albopictus*, it has been found in several other mosquito genera, including *Culex*, *Anopheles*, *Culiseta*, *Ochlerotatus*, and *Orthopodomyia*.

It is the most studied microsporidian infecting mosquitoes, with several life history traits and infection parameters well documented across several species.

V. culicis elicits a weak immune response in both *Anopheles* and *Aedes*, with hosts primarily investing in phagocytosis-mediated defence (e.g., CLIP proteins) and disease tolerance mechanisms (e.g., antioxidants).

V. culicis induces self-medication behaviour in mosquitoes, allowing them to increase their reproductive success.

TAXONOMY AND CLASSIFICATION:

- KINGDOM:** Fungi
- PHYLUM:** Microsporidia
- FAMILY:** Pleistophoridae
- GENUS:** *Vavraia*
- SPECIES:** *V. culicis*

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Acknowledgments

L.M.S. and T.G.Z. were supported by SNF grant 310030_192786. The background of Figure 1 was created using OpenAI Da Vinci 2 (GPT-4 Turbo, December 2024) and then edited in Adobe Photoshop 2022 (version 23.0.0). The micrograph of the parasite in Figure 2 was adapted from Vávra and Becnel (2007), while the illustration of the infection process was generated in Biorender.com.

Declaration of interests

The authors declare no competing interests.

Resources

www.ncbi.nlm.nih.gov/datasets/genome/GCF_000192795.1/

<https://microsporidiadb.org/micro/app>

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