

Sexual reproduction without mating

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Fructification of Tawaka in the laboratory. Credit: Florian Hennicke

One of the organisms attacked by the fungus *Cyclocybe parasitica* is the Tawa tree (*Beilschmiedia tawa*), which is relevant to the timber industry in New Zealand. *Cyclocybe parasitica* is widespread in the Pacific region and has long been known to the Maori, the indigenous people of New Zealand, under the name Tawaka as an edible wild mushroom.

Biology student Hannah Elders, supervised by Florian Hennicke at the Department of Evolution of Plants and Fungi, studied the sexual behavior of the Tawaka fungus. The two researchers were able to show that the Pacific Tawaka, like its European relative, the Sword-belt Mushroom (*Cyclocybe aegerita*), which is also edible, is able to develop a [complex structure](#) reserved for the [sexual reproduction](#) of two partner individuals, the so-called fruiting body, on its own. The specialist term for this is monokaryotic fruiting in the narrow sense.

Sister strains can form different monokaryotic fruiting structures on their own

Elders and Hennicke not only identified a competent strain of this fungus that can produce almost fully developed fruiting bodies. They also characterized sister strains that were capable of producing precursors of these fruiting bodies to varying degrees, one precursor of which, the so-called stromatic type, was previously only known from bracket fungi. Furthermore, tissue sectioning techniques and microscopy succeeded in revealing the exact anatomical differences between the complex multicellular structures of these sister [strains](#).



Fruiting bodies of the Sword-belt Mushroom from a German mushroom farm
Credit: Florian Hennicke

"The results of the work are also interesting in terms of reproductive biology, as it examines a question of fungal research that has been unsolved for decades in a new context: The question of whether wild Sword-belt Mushroom populations whose main reproductive strategy is based on monokaryotic fruiting in the narrow sense occur in nature," says Florian Hennicke. They also discuss the question of how this type of reproduction would provide agarics with greater ecological fitness, i.e. by recombining [genetic information](#) despite the absence of a mating partner. Greater ecological fitness conferred in this way may, for example, allow the fungi to become established in a previously unsuitable habitat, as is normally possible with reproduction with a male

and a female mate.

More information: Hannah Elders et al, The Pacific Tree-Parasitic Fungus *Cyclocybe parasitica* Exhibits Monokaryotic Fruiting, Showing Phenotypes Known from Bracket Fungi and from *Cyclocybe aegerita*, *Journal of Fungi* (2021). [DOI: 10.3390/jof7050394](https://doi.org/10.3390/jof7050394)

Axel Orban et al, Transcriptome of different fruiting stages in the cultivated mushroom *Cyclocybe aegerita* suggests a complex regulation of fruiting and reveals enzymes putatively involved in fungal oxylipin biosynthesis, *BMC Genomics* (2021). [DOI: 10.1186/s12864-021-07648-5](https://doi.org/10.1186/s12864-021-07648-5)

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