

Two tough fungi discovered in Denmark: Devours flies from within

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The fly species *Coenosia tigrina* with two large holes in the abdomen. The holes are an effect of infection with the fungus *Strongwellsea tigrinae*. The infective spores are discharged through these holes. Credit: University of Copenhagen

University of Copenhagen researchers have found and described two fungal species for the first time. The fungi infect adult flies and subsequently create a hole in the abdomen of their hosts' bodies. Infected flies then buzz around days as the fungi devour them from within and eject fungal spores from these holes in their bodies. The discovery marks a contribution to the mapping of global biodiversity. At the same time, the new studies open the door for potentially useful nature-made pharmacological discoveries.

Researchers from the University of Copenhagen's Department of Plant and Environmental Sciences and the Natural History Museum of Denmark have found and described two new [fungal species](#). Both fungi were discovered in the Capital Region of Denmark—with *Strongwellsea tigrinae*, being found in Jægerspris and *Strongwellsea acerosa*, on Amager.

The fungi infect two Danish fly species (*Coenosia tigrina* and *Coenosia testacea*). As they do, they create a large hole in the abdomen of their infected hosts. The flies buzz about for days as [fungal spores](#) are released into the air from this hole and drift upon new victims. If, for example, a fly comes by to mate, it risks becoming infected. The fungi are nourished from within the rear segments of flies' bodies right up until the end. After a few days, the fly lies on its back and spasms in its final hours of life.

"This is an exciting and bizarre aspect of biodiversity that we have discovered in Denmark," says Professor Jørgen Eilenberg of the Department of Plant and Environmental Sciences. He adds: "In and of itself, this mapping of new and unknown biodiversity is valuable. But at the same time, this is basic new knowledge that can serve as a basis for experimental studies of infection pathways and the bioactive [substances](#) involved."

The fungal parasites probably only infect a small percentage of these two fly species, which, ironically, live by preying on other flies. These fungi survive the stresses of winter with the help of their thick-walled, orange or yellow resting spores. The researchers believe that these resting [spores](#) germinate in spring and infect flies as they become active.

"It is fascinating how the life cycles of these fungi are so well adapted to the lives of the flies they target," says Professor Jørgen Eilenberg.

Could Pave the Way for New Medicines

The ability of these fungi to keep flies healthy enough to buzz around for days while being eaten from within has raised speculation among the researchers that the fungi may be producing substances which 'dope' their hosts. Research into other types of fungi, that infect cicadas, suggests that amphetamine-like substances may be at play.

We suspect therefore that these fungi may produce amphetamine-like substances which keep a fly's energy level high up until the end. At the same time, we have a theory that the [fungi](#) also produce substances which keep microorganisms away from the fly's fungal wound. We would definitely like to continue our research, as doing so has the potential to discover and later make use of these substances, perhaps in medicine," says Jørgen Eilenberg.

Provided by University of Copenhagen

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