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WEB OF DEATH: A NEW ZOMBIE FUNGUS INFECTING SPIDERS

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INTRODUCTION

Nature's interactions are astonishing and may have concerned interactions between species. Among the most fascinating are the parasitic relationships that push the boundaries of life and death. According to Mendes-Pereia *et al*. (2023), one of the greatest instances is the recently identified species of fungus Gibellula, which is harmful to spiders. In the British Isles, orb-weaving spiders are the target of this parasitic fungus. Due to its uncanny capacity to infect and control spiders, known as zombie fungus, it not only devours its host but also seems to control its behaviour before death. Enticed by the discovery, scientists have subsequently verified that this is a previously undiscovered species, adding it to the expanding list of parasites that are among nature's most dreadful.

THE DISCOVERY

This new species of *Gibellula* was first observed in Northern Ireland during the BBC *Winterwatch* series in 2021. Filming in an abandoned gunpowder store, naturalists stumbled upon a spider hanging lifelessly, its body overtaken by fungal growth. Initial observations suggested it was a species of *Gibellula*, a genus of fungi known to exclusively infect spiders. Entomopathogenic (insect- and arachnid-infecting) fungi are well-documented in tropical regions, but their presence in temperate climates like Ireland is unusual. The identification of this new species hints at a previously hidden diversity of parasitic fungi in the British Isles. However, after careful study, scientists determined it was a completely new species. In 2025, it was officially named *Gibellula attenboroughii* in honour of Sir David Attenborough, a lifelong advocate for biodiversity and natural history.

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Source: Evans et al., (2025)

THE INFECTION

The life cycle of *G. attenboroughii* is as horrifying as it is fascinating. Like other parasitic fungi, it begins with microscopic spores that attach to a passing spider's exoskeleton. Once in contact with the spider, the spores germinate and penetrate the host's body, infiltrating its internal tissues. As the fungus spreads, it produces chemicals that appear to manipulate the spider's nervous system. Infected spiders abandon their usual hiding spots and move to exposed locations—possibly a strategy engineered by the fungus to optimize spore dispersal. Once the host is in a favourable position, the fungus releases lethal toxins, ultimately killing the spider. After death, *G. attenboroughii* consumes the spider's internal organs, leaving the exoskeleton intact. The fungus then erupts outward, covering the spider's body with a distinctive white, coral-like growth. This structure produces new spores, which are released into the air to seek out the next host. This behaviour closely mirrors that of *Ophiocordyceps unilateralis*, the infamous "zombie-ant" fungus. However, while *Ophiocordyceps* is well-documented in ants, fungi that exert such extreme control over spiders are far rarer. Scientists are now studying whether *G. attenboroughii* uses similar biochemical mechanisms to hijack its host's mind.

THE IMPACT

The primary host of *G. attenboroughii* is the orb-weaving cave spider (*Metellina merianae*), a species commonly found in Ireland's subterranean environments. While these spiders are not currently considered endangered, the emergence of a specialized fungal pathogen raises questions about potential ecological impacts. If the fungus spreads widely, it could disrupt the delicate balance of ecosystems.

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Spiders play a crucial role as apex predators in these habitats, controlling insect populations. A decline in their numbers could trigger ripple effects throughout the food web, potentially altering the populations of prey species and other organisms. There is also the question of whether *G. attenboroughii* could prey on other spider species or other arachnids. Some related fungi have been known to infect multiple hosts, and scientists are monitoring whether this new species follows a similar pattern.

INSIGHTS AND THEORIES

The discovery of *G. attenboroughii* has sparked scientific curiosity, particularly regarding its behaviour-altering abilities. Researchers are investigating several key questions:

Why did this fungus evolve such precise host manipulation tactics? The ability to make spiders leave their hidden places and die in exposed areas suggests an advanced form of host control. This could provide insight into the evolutionary pressures shaping parasitic fungi.

How does the fungus control its host's movement? It is believed that fungal-produced chemicals interfere with the spider's nervous system, similar to how *Ophiocordyceps* manipulate ants.

Could climate change be a factor? Many entomopathogenic fungi thrive in warm, humid environments. If global temperatures are shifting, previously tropical fungal species might be expanding into new territories.

Is this a new species, or a variation of an existing one? Genetic analysis has confirmed that *G. attenboroughii* is distinct from other known *Gibellula* species, but its evolutionary origins remain unclear.

RISKS AND PERSPECTIVES

There is currently no proof that species other than its spider hosts are at risk from *G. attenboroughii*. *Gibellula* is extremely specialized, in contrast to several pathogenic fungi that may infect a variety of species. Scientists are eager to track its spread, though. Future studies might examine if the fungus is unique to Ireland's caverns and what would happen if it spreads outside of them. Additionally, greater knowledge regarding its host-specificity should be required. Since some entomopathogenic fungi are used to manage pests, might it be employed in biocontrol? Although it is doubtful that *G. attenboroughii* would target agricultural pests, research into its biology may provide beneficial uses in biotechnology or medicine. Further research is required to determine whether *G. attenboroughii* has any therapeutic qualities or not.

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CONCLUSION

The discovery of *G. attenboroughii* is a testament to the mysteries that still lie hidden in the natural world. It also serves as a reminder that life—even in the darkest caves—follows strange and sometimes terrifying rules. Parasitic fungi like *Gibellula* showcase the complexity of evolutionary adaptation, blurring the lines between predator and prey, host and parasite, life and death. With further research, we may not only learn more about these enigmatic organisms but also unlock new scientific insights. As we continue to explore Earth's most hidden corners, one thing is clear: nature's darkest secrets often lie in the shadows sometimes, in the webs of death.

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