

Flower attracts insects by pretending to be a mushroom

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Figure 1: The forest floor of Kuroshima covered in *Aspidistra elatior* plants .
Credit: Kobe University

The mysterious flowers of *Aspidistra elatior* are found on the southern Japanese island of Kuroshima. Until recently, scientists thought that *A. elatior* has the most unusual pollination ecology among all flowering plants, being pollinated by slugs and amphipods. However, direct observation of their ecosystem has revealed that they are mainly pollinated by fungus gnats, probably thanks to their resemblance to mushrooms.

This discovery was made by Project Associate Professor SUETSUGU

Kenji (Kobe University Graduate School of Science) and Senior Researcher SUEYOSHI Masahiro (Forest Zoology Group, Kyushu Research Center). The findings were published on November 14 in the online edition of *Ecology*.

Aspidistra elatior is a popular houseplant, known as the "cast iron plant" for its ability to withstand neglect. It can be found growing all over the world, but is indigenous to southern Japanese islands. Its purple, fleshy [flowers](#) bloom directly above the soil, almost burrowing into the ground and often hidden by leaf litter. Their appearance has been compared to mushrooms – one of the foods of choice for the [fungus](#) gnats that visit these flowers. The oddly-shaped flowers of *A. elatior* are probably a clever strategy: mimicking mushrooms in order to trick fungus gnats into pollinating them.

Flying insects such as honeybees and bumblebees are essential pollinators for many plants. However, some plants use other animals for pollination. For example, some banana species use bats, and a species called banksia uses opossums. Reports of slug pollination for *A. elatior* date from over 100 years ago, when slugs were observed visiting plants in Europe. This theory is still widely accepted and even appears in textbooks. However, the observation has a flaw – it was not made in the plant's natural habitat. Furthermore, visiting a plant does not mean the animal acts as a pollinator. On the contrary, slugs are known for eating leaves and flowers, and they may have been damaging the plants.



Figure 2: *Aspidistra elatior* flower blooming half-buried in the earth . Credit: Kobe University

In 2009 there were reports of fungus gnats visiting the *A. elatior* flowers. But this observation was also made outside the plant's native habitat, and it was only a single report – not enough for conclusive proof of pollination by fungus gnats.

This time the research team took a different approach. "For two years we observed the animals that visited these flowers in their native habitat, continuously, day and night." The result? "We discovered that no slugs visited, and hardly any beach fleas. The candidate that emerged as an effective pollinator was the fungus gnat. Fungus gnats that visited the plants quickly dived into the center of the flowers, attached a large amount of pollen to their bodies, and flew away." The team also saw fungus gnats arriving at *A. elatior* flowers carrying pollen from other flowers, and observed that the flowers they visited produced fruit. This proved that fungus gnats were the true pollinators.

Professor Suetsugu comments: "We believe that the similar appearance of *A. elatior* and mushroom fruit bodies may help attract fungus gnats. In addition, *A. elatior* emits a strong musty odor. Therefore, the fungus gnats may be deceived by both visual and chemical mimicry."

These findings have overturned a widely accepted theory, and clarified that like most [plants](#), *A. elatior* are pollinated mainly by flying insects. In other words, this plant, although mysterious, may not be so strange after all.



Figure 3: A species of fungus gnat that visits *A. elatior*. Large amounts of *A. elatior* pollen grains are attached to its body. Credit: Kobe University

More information: Kenji Suetsugu et al. Subterranean flowers of *Aspidistra elatior* are mainly pollinated by not terrestrial amphipods but fungus gnats, *Ecology* (2017). [DOI: 10.1002/ecy.2021](https://doi.org/10.1002/ecy.2021)

Provided by Kobe University

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