BIOMEDICAL SCIENCE JOURNAL FOR KIDS

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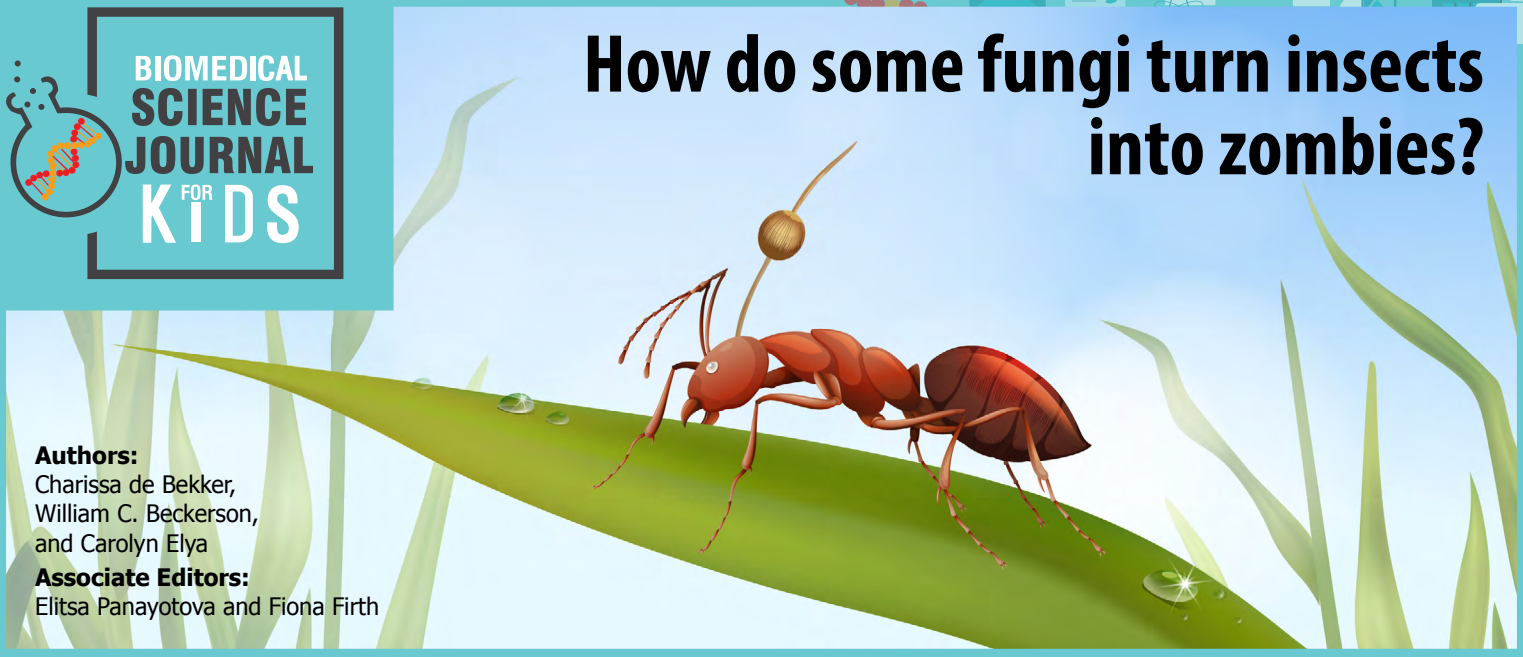
How do some fungi turn insects into zombies?



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Abstract

LOWER READING LEVEL

Did you know some fungi can turn insects into zombies, like in the movies? These fungi control what the insects do! They make them do strange things, like walking a lot, climbing tall plants, and hanging high up. They do this so that they can infect more insects.

There are many types of these fungi, but they all change the insects' behavior in similar ways. But how do they do that? And why do they all seem to change the same behaviors? We looked into many studies about zombie-making fungi. We found out that each fungus has its own tricks to control the insects! We think the fungi change the same behaviors because these are the behaviors that help the fungi infect as many insects as possible.

Introduction

Have you ever seen a zombie movie? They are a bit scary! In some stories, dead things come back to life. In other stories, a virus (or something else) changes people's behavior. They are not themselves anymore.

Something similar happens in real life, although not to people! There are some **fungi** that can change insects' behavior. Like all living things, these fungi want to spread. Fungi spread with tiny cells, called **spores**. They use tricks to control the insects so they can spread these spores better. For example, one fungus infects flies, making them climb and stick to plants. The fungus grows and releases spores from up high to spread in the wind.

There are many types of fungi that infect insects. Sometimes the infection kills the insect quickly. But other fungi have a special relationship with their **host**, the insect. They live together for a while, and the fungus changes the insect's behavior. These fungi wait until their host is in the right place before eventually killing the insect. We call these fungi zombie-making fungi. And guess what? There are even more of them than we thought!

It's amazing that these fungi **evolved** independently. Each one has evolved alongside its host over millions of years!

The wasp is stuck to the leaf as the fungus grows from its body. **Photo:** Roel Fleuren

And each one has its own way of controlling insects. But, all infected insects do similar things. We wanted to know how the fungi do this and why controlling insects is such a popular **strategy** for fungi.

Methods

We looked at what other scientists have learned about zombie-making fungi. We asked ourselves these questions:

- How do these fungi control the behavior of the insects?
- Why does this happen so often in Nature?

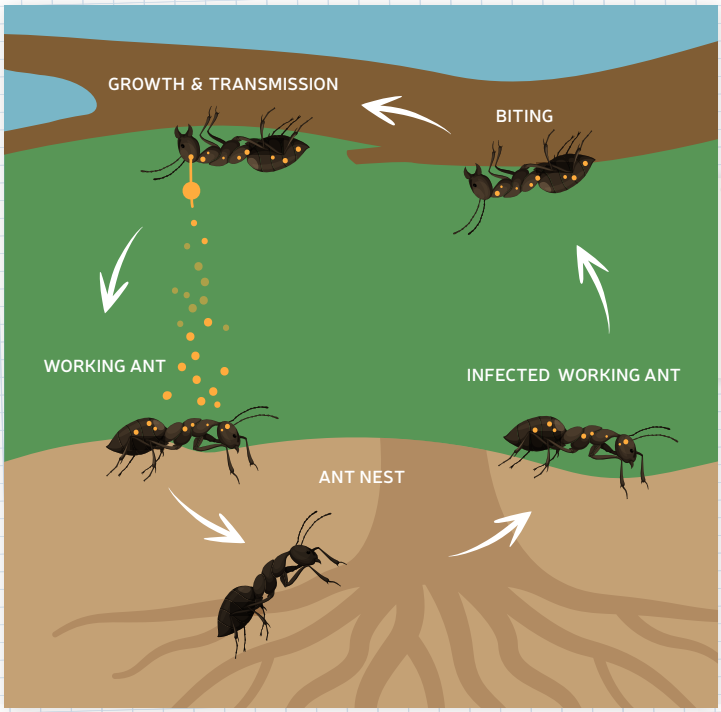

Figure 1:
This is how the fungi turn insects into zombies!

What do all the types of changed behaviors have in common?

Results

Zombie-making fungi have really cool ways of controlling insects. You can see some examples in Figure 2. All these changed behaviors help the fungi spread.

So how do they manage to change the insects' behavior? Zombie-making fungi have two main ways to do that:

- They physically change the insects' bodies. For example, they make the insect spread its wings so that they don't get in the way of the spores. This is quite a common change in behavior. Other changes are unique. For example, one fungus takes over some of the host insect's organs.
- They can also release some chemicals that make the insects feel funny. Like drugs, they affect their brain and make them do strange things.

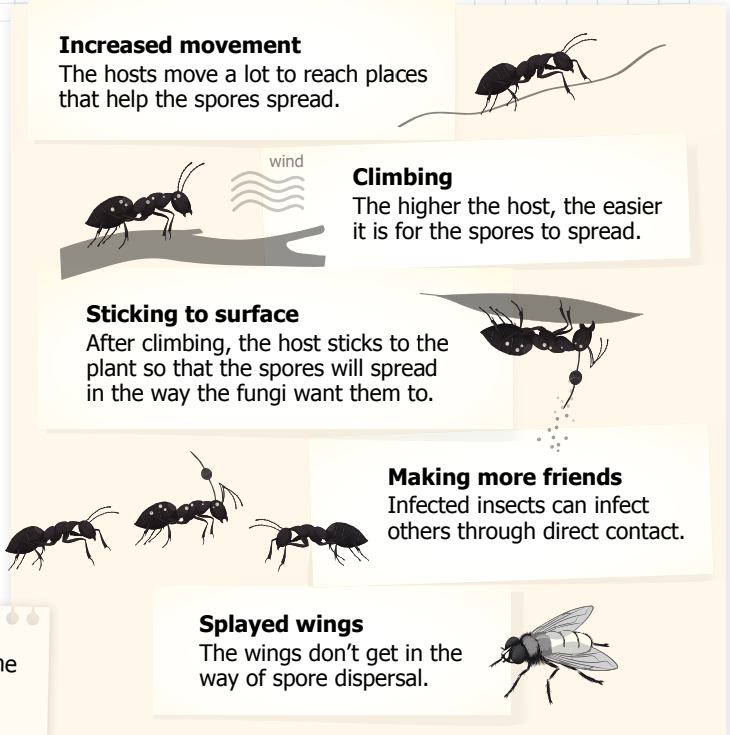

Figure 2: Some unusual things that the insects will do once they are infected.

Discussion

The changed behavior is often the same in different insect hosts. But different fungi use different tricks to control insects. It's like they have their own special superpowers! Why do these behaviors happen so often?

One reason is that these fungi are really good at finding the easiest behaviors to change in insects. Animals, including insects, change their behavior because of their changing surroundings. Zombie-making fungi take advantage of this. It's like they **hack** the insect's brain.

Another reason behind the similar behaviors is that they do help the fungi spread. For example, high positions make it easier for the spores to spread further using the wind.

Other behaviors help the fungi avoid the insects' protective systems. For example, ants live in colonies. When one ant is sick, the others can tell and get rid of it so that it doesn't infect anyone else. Zombie ants avoid this by wandering away from the colony.

Zombie-making fungi can sometimes use the insects' immune system. When we get sick, our bodies release substances that change our behavior. For example, we often don't want to eat when we're sick. This way our body preserves energy. It's the same with insects. And zombie-making fungi love to use that against them!

Conclusion

Zombie-making fungi are truly amazing! They have special ways to infect and control insects. It shows us how incredible Nature is and how everything is connected. Our actions can affect other living things too! That's why it's important for us to make good choices that help the environment. We can reduce waste, save resources, and support efforts to protect animals and plants.

Glossary of Key Terms

Evolve - the way groups of living things change and develop over a really long time. Evolution is like a big story of how animals and plants have changed and adapted to survive in different environments.

Fungus/fungi - a special group of living things. It includes things like mushrooms and molds. They usually grow in damp places and get their food by breaking down dead plants and animals.

Hack - to get inside a computer (or brain) in a sneaky way, using different tricks.

Host - like a home for a tiny creature (called a parasite) that lives inside or on another living thing (the host). The parasite relies on the host for food and shelter. Usually this relationship is bad for the host.

Spores - fungal spores are like tiny seeds that fungi make to spread and grow. Just like plants have seeds, fungi have spores. When the conditions are right, the fungi release the spores in the air (or water).

Strategy - a plan or a clever way to reach a goal. For example, when you play a game you think ahead and find the best way to win.

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Check your understanding

1. What do zombie-making fungi make their insect hosts do? Give a few examples.

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2. Why do zombie-making fungi change their host insects' behavior?

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3. Zombie-making fungi need hosts to survive and spread. Can you think of other living beings that need a host to survive?

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4. Pretend you're an insect journalist reporting on the invasion of zombie-making fungi. Write a newspaper headline that would grab everyone's attention and write a short article to explain the situation.

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5. If you could be transformed into any insect temporarily, which insect would you choose and how would you try to outsmart a zombie-making fungus that's trying to control you and your behavior?

REFERENCES

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