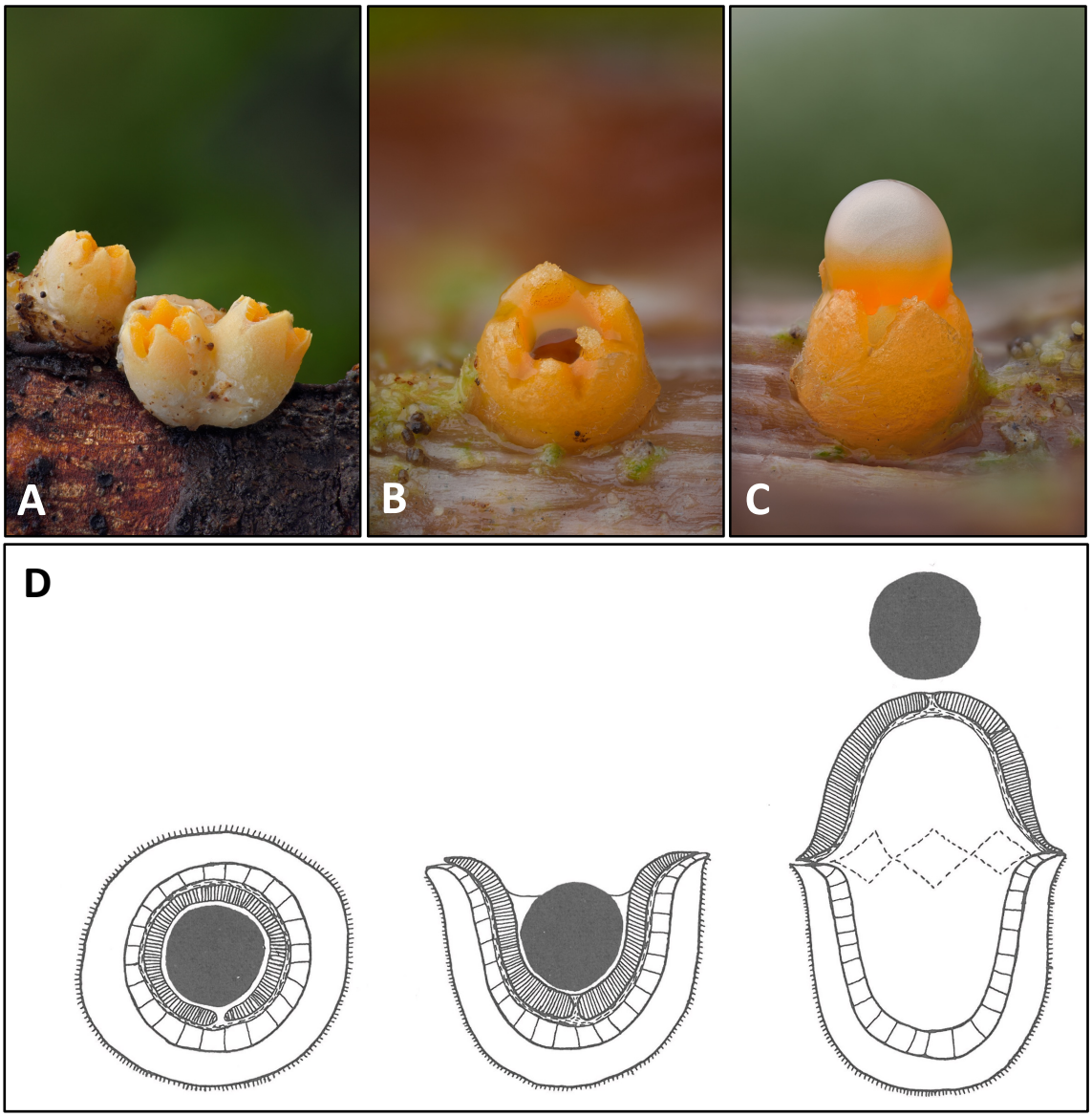
The Amazingly Curious Microbial Phenomena Gallery

The artillery fungus: *Sphaerobolus stellatus*

(Nicholas Money)



How the artillery fungus works. (A) Trio of fruit bodies that opened very recently showing toothed or star shape produced by the fracture of the outer skin surrounding the upper surface of the sporangium that is visible in (B). (C) Fruit body that has just discharged it sporangium with an everted membrane that is connected to the outer cup on the tips of the triangular teeth. (D) Diagram of developing fruit bodies in cross section, revealing the inner membrane that everts at high speed, propelling the sporangium into the air. Photographs by Timothy Boomer (https://wildmacro.com/) with permission.

Claim to fame: fires its spores at speeds up to 44 km/h over a distance of 6 meters

A tiny mushroom called the artillery fungus uses a very unusual mechanism to disperse its spores. The white fruit body of this species is only 2 mm in diameter and opens into a star shape that cradles a sphere called a sporangium that contains up to 10 million microscopic spores. The next thing that happens is one of the hidden wonders of nature: the artillery fungus spits its sporangium into the air with an audible 'Pop!', and the projectile flies in an arc through the air, covering a distance of 6 meters.

Reproduction is essential to life. Without reproduction, organisms become extinct. So, lots of energy is invested in reproduction and dispersal to new territory. Fungi reproduce by producing spores and have developed an amazing diversity of spore types and dispersal mechanisms. There is more to mushrooms than umbrella-shaped fruit bodies with gills beneath their caps. Some have pores rather than gills, others form teeth, and there are brackets and jellies and coral fungi that grow on fallen logs, and puffballs and stinkhorns, and enough to fill a lifetime of study. One thing that all of them have in common is their biological purpose, which is to produce and disperse microscopic spores.

Sphaerobolus: the spore thrower. The Latin name of the artillery fungus, *Sphaerobolus stellatus*, means star-shaped sphere thrower, and it has intrigued mycologists – scientists who study fungi – since the 1700s. This species is very widespread, but few people have paid enough attention to find it. It often grows in patches of a few hundred fruit bodies in flower beds. If you find the fungus and look carefully with a magnifying lens, you will see translucent membranes that look like little balloons projecting from the middle of some of the fruit bodies. When these membranes flip outwards, they catapult their sporangia into the air. They work like jumping popper toys.

Spore dispersal depends on grazing animals. The artillery fungus evolved as a coprophilous, or dung-loving fungus, whose feeding colonies or mycelia grow in the feces of herbivorous animals. By shooting its sporangia a long way from the dung where it is growing, the fungus increases the probability that it will be eaten by an herbivore browsing on fresh grass. The spores are not digested as they pass through the animal digestive system, and are released in fresh dung where they germinate and create new mycelia. This repetition of feeding and reproduction, followed by feeding and reproduction in the next generation, is the foundation of the life cycle of every living thing.

Sphaerobolus is an amazingly curious fungus!

The importance of *Sphaerobolus* for us

The biosphere produces an enormous amount to waste: just think of all the poo and dead bodies! Without recycling, we would all live on enormous mountains of waste. But microbes to the rescue! They degrade biological waste, using these materials as food and fertilizing the soil: microbes vitalise the biosphere! The artillery fungus not only recycles animal poo, but also dead plants, serving as a powerful agent in the cycling of nutrients on the planet.