The Plant Doctor
Slime Molds

Slime molds are the cause of many panicked calls to the MSU Extension Service and garden stores. "Everything was fine when we went to bed! But this morning, the yard (or bush) is covered with…something!"

The "something" may be gray, blue, yellow, orange, or almost any other color. It may look like an intricate fan or dog vomit. A close look at the mass shows either small pores (pin-sized holes) or round balls. If you rub the mass between your fingers, a sooty-like powder covers them. The mass covering your plant or mulch is a slime mold.

Slime molds live in areas with moisture and decaying organic matter such as thick leaves, wood mulch, or decaying trees. They are found all over the world, including in deserts and mountains, but they are more common in temperate areas.

There are many genera of slime molds. The most common slime mold in Mississippi turf is *Physarum*, which is usually grayish in color. The circular patches of yellow to pink growth in shredded wood mulched landscape beds are most often *Fuligo* sp.

Slime mold classification is disputed. Some authorities place them under fungi, others call them a class of amoeba, and some have even placed them in their own kingdom. They do seem to act more like amoebas than fungi. Like some fungi, slime molds have a complicated life cycle, with some reproducing sexually and some not. A very generalized summary follows.

Like amoebas, slime molds have no cell wall and spend most of their lives in a single cell (often haploid). Unlike amoebas, slime molds can become very large. During the single-cell stage, they move like amoebas, extending finger-like projections (called plasmodia). These projections pull the rest of the body along, letting the slime mold move as much as several feet per day.

Like amoebas, when slime molds find something to eat, they surround their food and then swallow it. Slime molds may feed indirectly on dissolved substances escaping from organic matter, but they usually feed on microorganisms such as bacteria. In fact, some slime molds encase a strain of food bacteria inside their spores, so newly hatched slime molds can start "farming" (Brock et al., 2011). If the environment turns very unfavorable, some slime molds can escape by forming a cell wall, which can survive a year or more. They become active again when conditions improve.

When certain conditions are triggered and two of the same type of slime mold cells meet, they cross-fertilize and forma a diploid plasmodium. This phase absorbs as many nutrients as rapidly as possible and becomes large, up to a square yard! The large area covered by the plasmodium is all one cell! This cell reacts to light and chemicals and uses these sensitivities to feed and move away from substances it considers dangerous. This stage also can produce a resistant structure (sclerotium) to escape unfavorable conditions.

Unknown cues start the reproductive process. The plasmodium crawls upward to a lighted, dry area. The entire surface of the plant or turf is often covered by slime mold, creating a dramatic appearance.

The plasmodium then clumps and produces grayish-white sporangium (plural sporangia), an environmentally resistant structure that produces spores (Dickinson, Nelson, and Weis, 2011). About the size of a pinhead, they grow perpendicular to the surface of the leaves. Once started, fruiting does not stop. The high area provides a launching point for the haploid spores, so they can travel farther.

Management

In most cases, control is not necessary. As soon as the area dries, the slime mold disappears. In unusual cases, the layer of crusty growth may become heavy enough to shade grass blades and cause yellowing.

If this happens, or if you just don't like the look of it, you can easily break up slime mold growth by sweeping with a broom, spraying the area with a garden hose, or spraying with a mild detergent solution (1 tablespoon of liquid detergent per gallon of water), which will destroy the growth. You can remove slime molds from lawns by mowing and collecting the clippings, poling with a switch of bamboo, or pulling a garden hose across the affected area.

Fun Facts about Slime Molds

You can raise slime molds. They are fascinating organisms and can make great science fair projects (for more information, see Steve Stephenson's 2000 book *Myxomycetes: A Handbook of Slime Molds*). Different types of decaying wood and forest debris can be collected and kept in a humid place or box; the different types of slime molds growing from them can be used for many experiments. The sporangia can be collected and stored in a refrigerator for later use.

You can grow slime molds in petri plates or storage containers that hold moisture. Place a moistened (not wet), heavy piece of porous paper (filter paper) in the container. Place a piece of sporangium on the moistened paper and close the top. They can be fed everything from water-soaked old-fashioned rolled oats (such as Quaker Oats) to Bonner's solution inoculated with a non-mucoid strain of *Escherichia coli*.

You will need to check the chamber every day and moisten it if needed with drops of water. You will see the hatched and active plasmodia. Then, add premoistened rolled oats to the surface of the paper in the pattern you wish. If you do not feed your plasmodia, they may form the resting sclerotium, which you can save.

Slime molds are extremely efficient in their movements—so much so that they can be used to design efficient transportation networks and computers.

For instance, scientists placed food in a way to mimic the population centers of the cities that surround Tokyo. The slime mold grew to form a network that rivaled the efficiency, reliability, and cost of Tokyo's train network (Tero et al., 2010). A similar effort modeled Canada's road network ("Slime mold mimics Canadian highway network").

Computer scientists are using slime molds to model the shape of a polygon linking points on a surface (Adamatzky et al., 2012). These calculations are necessary for computer games.

Slime molds don't like salt, but they can be trained to overcome the dislike by placing food on the far side of the salt barrier (Adamatzky, 2010). Slime molds that have been taught this trick pass it on to their progeny (Vogel and Dussutour, 2016)!

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