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Mushrooms, Puffballs, Fairy Rings, and Slime Molds in Turfgrass

How do you identify -- and treat -- mushrooms, puffballs, fairy rings and slime molds? Read on.

John E. Watkins, Extension Plant Pathologist

- [Mushrooms and Puffballs](#)
- [Fairy Rings](#)
- [Slime Molds](#)

Mushrooms and Puffballs

Some mushrooms and most puffballs are edible; some are foul-smelling, many are considered unsightly, and a few are poisonous; but when they appear on a lawn, most are considered a nuisance.

Mushrooms and puffballs are members of a large group of organisms devoid of chlorophyll called fungi. Mushrooms occur anywhere from the desert to the alpine tundra. When and where a mushroom or puffball will form is related both to its food source and the environmental conditions. Each species has its own set of optimum conditions.

Mushrooms and toadstools are one and the same. There are several thousand kinds or species of wild mushrooms and puffballs; each has distinct characteristics that enables it to be identified.

Figure 1. Mushroom growing on decaying log.

Mushrooms and puffballs are the fruiting bodies of particular fungi. Fruiting bodies are formed in response to certain environmental conditions, and their primary purpose is to produce spores of the fungus. The spores are similar to seeds of a plant and are the reproductive units of a fungus. To support the aboveground mushroom or puffball, the fungus produces a vast network of underground thread-like tissue called mycelium. The mushroom or puffball fruiting body is produced when the mycelium has become large enough and conditions are right. The mushroom or puffball produces and then releases spores. When these spores germinate, the cycle is repeated.



A typical mushroom (*Figure 1*) consists of a cap, flattened to rounded and borne umbrella-like at the end of a stalk. On the underside of the cap are thin plates of tissue, called gills. These produce the spores.

A puffball is generally spherical or pear-like and lacks a stalk (*Figure 2*). Young puffballs are uniformly white with a firm inside and a thin and fragile outer skin. As a puffball matures, all or a large portion of the white interior becomes yellow, then darker until it eventually becomes a dry, powdery, dark green to purple to brown spore mass. The thin outer skin may remain intact except for a hole at the top, or it may break away in large, irregular pieces. There are many kinds of puffballs, ranging in size from less than an inch to more than a foot, and weighing several pounds. Most puffballs become noticeable in late summer and fall.



Figure 2. Puffball.

Since mushroom and puffball fungi grow on decaying organic matter, they are most likely to form on tree stumps, tree roots, or in other spots in the lawn with high organic debris. Although they will eventually disappear naturally after the organic food base is exhausted, this can take up to 10 years or more for a large stump or root.

It is difficult to totally eradicate nuisance mushrooms and puffballs. Adequate control usually can be accomplished by digging up and destroying rotting stumps, roots, or other underground sources of organic debris. Mushroom problems can be prevented on new home sites by removing all discarded construction lumber from the site before sodding or seeding.

If you are concerned about mushrooms being poisonous to children and pets, break or mow them off as soon as they appear. **WARNING: Do not eat any mushrooms or puffballs found in the lawn without first having them identified by a competent authority.**

Fairy Rings

Ever wonder what that dark green circle of grass is in your lawn? Well, it's probably a "fairy ring." What does that mean?

Fairy rings occur wherever grass grows; throughout history their appearance has been surrounded by mystery and folklore.



Figure 3. Fairy ring in turf.

Early herbalists and botanists had no scientific explanations for the origins of "fairy rings." The appearance in turf of what seemed to be worn ground surrounded by a ring of much darker green grass was for centuries attributed to the dancing round and round of the "Little People."

In Germany, they are called "Hexen Rings" and are ascribed to the dancing of witches on the eve of May Day. In France, they are called "Ronds de Sorcieres." and enormous toads with bulging eyes are said to appear within the magic circle.

Despite such stories some considered it lucky to have fairy rings in a field near their house. You might, however, get a strong counter-argument from today's homeowners and turf managers who have fairy ring in their turf.

Mystery and mythology aside, fairy rings are caused by fungi. They may be produced by any of about 50 species of soil-inhabiting fungi. Fairy rings usually are caused by the common field mushroom, *Psalliota (Agaricus) campestris*; the fairy ring fungus, *Marasmius oreades*; or the poisonous mushroom, *Chlorophyllum molybdites*.

Mushrooms and puffballs active in the decay of buried stumps and other bits of wood can contribute to the formation of fairy rings. They usually appear in clumps or singly; when they appear in a circular pattern, they are called fairy rings.

Fairy rings are found in three general patterns: (1) mushrooms appear in circles and last for only a brief time, without the presence of a dark green ring; (2) grass growth is stimulated and a dark green ring, along with the presence of mushrooms, is produced; (3) circular patterns of dead grass develop in the center of the dark green ring, along with the presence of mushrooms.

Generally, fairy rings are first seen as a cluster of mushrooms or as a tuft of darker green grass. The dense, white mycelium of the fairy ring fungus moves outward through the soil from this spot and follows the enlarging dark green ring of grass.

The dark green rings of stimulated grass (*Figure 3*) commonly vary from 1 to 10 feet in diameter, but much larger ones have been observed. The width of the ring may be only a few inches or up to 2 feet.

The dark green rings are particularly visible on turfs yellowing from iron chlorosis and on turf in midsummer that is deficient in nitrogen or under moisture stress. The ring of dark green grass is caused by a rapid release of nitrogen in the soil. This is a result of the fairy ring fungus breaking down organic matter as it grows and makes nitrogen more available to the grass plant.

A concentric ring of thin, dormant, or dead grass (*Figure 4*) may develop inside the circle of lush grass. This dead zone usually is larger when the turf is suffering from moisture or nutritional stress.



Figure 4. Injury from fairy rings.

The fungus does not directly attack the grass plants. Its mycelium infiltrates the soil to a depth of 3 to 12 inches and becomes so dense it is impervious to water. The grass immediately above this mycelial mat eventually dies from lack of moisture.

As the fairy ring expands the older part of the mycelium mat dies, and grass or weeds can regrow in this older or center area. The fairy ring fungus never grows back into the ring, since it has exhausted the organic food source that existed there previously.

The fairy ring expands following the spread of the mycelium. The rate of outward growth is not predictable and depends on growing conditions favorable to the fungus species involved. Some rings disappear unexpectedly for a year or more and then suddenly reappear.

The life cycle of fairy ring fungi follows the same general pattern as previously described for mushrooms. The fairy ring fungi survive as dormant mycelium. This mycelium becomes active during periods of moderate, wet weather, and the ring continues to grow outward each year. Following rains, mushrooms or puffballs appear within the dark green ring or at the outer edge of the dead area.

Fairy rings usually are most severe in light-textured, low-fertility soils low in moisture. They can be

confused with some of the other ring or patch turfgrass diseases. A reliable diagnostic clue for fairy ring is the musty odor and white, moldy growth often present in the top inch or two of soil of affected turf, or the presence of mushrooms.

Fairy rings, as with other nuisance mushrooms or puffballs, are difficult to control since there are no effective and simple chemical procedures. The following options may be considered:

- **Prevention:** Before planting a new turf area or renovating an existing lawn, remove tree stumps and large roots, construction lumber, and other large pieces of organic matter.
- **Suppression:** Treatment of a turf with fairy ring sometimes can be accomplished by an increased watering and fertilizing program. This method is probably the most practical for home lawns.

Symptoms are "masked" by pumping large quantities of water 10 to 24 inches deep into the soil at 1-foot intervals within the ring, and up to 2 feet on either side of it. This can be accomplished by using a tree root feeder.

Keep the area in a water-soaked condition for four to six weeks by repeating the deep watering every two to three weeks during the growing season. Maintain adequate nitrogen fertility during the growing season to reduce the contrast in green color between the fairy ring and the rest of the turf. Don't overfertilize or apply excess manure because this may stimulate development of new fairy rings and may encourage other serious turf diseases such as leaf spot or brown patch.

- **Eradication:** If only one or two small rings are present, it might be practical to eliminate them. This is done by carefully removing the sod in a zone 2 feet on either side of the dark green ring of grass.

Dig out and discard all infested soil in the ring to a depth of 12 to 18 inches; or, if it is visible, to a few inches below the white mycelial mat. When doing this, be sure not to spill any of the infested sod or soil on the healthy turf. Replace soil in the trench with fresh topsoil, and then re-seed or sod that area.

- **Antagonism (Biological):** Fairy rings do not move across or overlap each other. When they occupy the same site, they will eliminate each other. This form of biological control is known as antagonism, and this approach can be used on turf with several fairy rings present. It involves applying glyphosate (Roundup, Kleenup) to the infested area.

After the turf has died, strip the sod, and rototill the entire area in different directions to thoroughly mix the mycelium from the different rings. Wet the soil to a depth of 8 inches using the wetting agent to increase water infiltration, and then sod or re-seed the area. Keep the area adequately watered and properly fertilized.

Slime Molds

Slime molds are primitive organisms that exhibit characteristics of both plants and animals, although they are considered fungi. Numerous species of slime mold occur on turf; the most common is *Physarium cinereum*.

Slime molds cause some concern to homeowners when they suddenly become visible after a warm summer rain. These organisms are not parasites and cause little more than some yellowing because they

shade the plant. They grow on the surface of leaves and stems feeding on decaying organic litter, other fungi and bacteria in the thatch layer, and in the soil.



Slime molds often appear on low cut, well-maintained turf with a thick, thatch layer. The thatch provides a ready supply of organic litter plus high populations of microorganisms as a food source.

Figure 5. Fruiting bodies of a slime mold plasmodium.

Slime molds usually reappear in the same area year after year, and last one to two weeks. Their appearance is at first slimy, then later crusty. A slime mold is composed of thousands of tiny, variously colored, usually purple, gray, white, or cream, sack-like spore enclosures called fruiting bodies (*Figure 5*). These form in small 4 to 6-inch patches in the turf and may be widely spread or clustered into groups (*Figure 6*).



Figure 6. Slime mold in a tall fescue turf.

Dormant periods in the life cycle of a slime mold are spent as microscopic spores in the soil and in the thatch. During or just after a warm rain or heavy watering, the spores absorb moisture until their walls crack open and release swarming-type spores. These unite in pairs and eventually produce a shapeless, slimy growth called a plasmodium.

The plasmodium works its way to the soil surface or out of the thatch layer and creeps over the grass blades, accounting for the slimy appearance. As the plasmodium dies, it becomes the variously colored mass of powdery fruiting bodies that coat the grass blades. The spores are spread by wind, water, mowing, and other activities on the turf.

Slime molds are more of a curiosity or nuisance than a threat to the turf. Control measures are usually not necessary, but if desired, they are relatively simple. Slime molds can be removed by vigorous raking, brushing, mowing, or hosing down with a fast stream of water. They probably will reappear after the next warm rain, but can be easily removed. Lowering the thatch layer should reduce the food base, and can be used as a preventative.

Mushrooms, puffballs, fairy rings and slime molds are part of nature. Some are a nuisance in the lawn, some are poisonous, but most are beneficial. They are one of nature's ways of recycling nutrients.

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