



Fairy rings in turfgrass

Fairy rings are caused by dozens of different fungi, including mushrooms and puffballs. These fungi grow through the thatch and soil, consuming organic matter. They do not affect the turf directly, but they can alter the soil environment making it unfavorable to turfgrass. A layer of white, fungal mycelium is sometimes visible in the soil or thatch below the ring.

Symptoms:

Fairy rings develop as circles or arcs. They can range from a few inches to many feet across. There are three major types of fairy rings, as described in the photos below.



Type 1. Type 1 rings are the most serious. They lead to dead turf. Sometimes they have mushrooms or puffballs.



Type 2 (example 1): All Type 2 rings have a ring of dark green, stimulated growth. Some Type 2 rings have fungal structures (mushrooms or puffballs.)



Type 2 (example 2): Some Type 2 rings do *not* have mushrooms, only a ring or arc of green, stimulated turf.



Type 3: Type 3 rings show no change in the growth of the turf. There is only a ring or arc of fungal structures.

Why are they circles?

Fairy ring fungi start in the soil or thatch, and they grow outward, like a patch of mold growing outward as an expanding circle on a piece of rotten fruit or old bread. When two or more fairy rings meet, they do not grow together, and this leads to a wavy pattern. Large fairy rings can expand several feet per year. The fungi accumulate nutrients as they grow through the soil, then when it is time to reproduce they send up the mushrooms or puffballs to produce spores. So, every mushroom or puffball you see in the ring is all part of the same fairy ring organism. Not all mushrooms are from fairy ring fungi, though. There are many mushrooms that grow on decaying wood or other materials, and they are not associated with fairy rings.

Conditions:

Fairy rings tend to come and go. The mushrooms are most likely to pop up after a rain. Type 2 rings sometime develop into Type 1 rings when the weather is hot and dry. Fairy ring fungi make the soil water-repellent (hydrophobic). This leads to locally dry conditions that are highly stressful for the turf. In addition, fairy rings can lead to accumulations of potentially toxic levels of ammonium, and the low soil moisture can lead to a buildup of other salts as well. In putting greens, fairy rings are more common in sand-based greens, and especially in newly-constructed greens. But, they can occur anywhere.

Management:

Lawns and landscape:

Fairy rings in taller-cut turf usually don't cause severe damage. If the mushrooms are a nuisance they can be removed by mowing or raking. Some mushrooms can be poisonous so if children or pets are around this might be a good idea. If the green rings are a concern a light application of nitrogen or iron could help mask the symptoms. Do not go overboard on fertilizer, though—always keep in mind the best fertility practices for the species of turf at the site. If the fairy ring becomes severe (Type 1), core aeration and watering can help get water to the hydrophobic areas around the roots. Or, the affected area can be physically removed by trenching out the affected areas, but this is time-consuming.

Golf courses:

Cultural practices and fungicides can alleviate damage from fairy rings. Providing adequate water and fertilizer may prevent fairy rings, as fairy rings tend to be worse on “lean” turf. There are several fungicides labeled for fairy ring. See the table below. There are a couple of key factors to remember:

1) *Water rates:* In recent fungicide studies, higher water rates (for example, 4 gallons/1,000 ft²) have performed better than lower water rates (2 gallons/1,000 ft²). Always follow label instructions.

2) *Surfactants:* In several recent studies, the use of a surfactant/wetting agent with the fungicide has significantly increased the performance of the fungicide. In fact, in some studies, a wetting agent alone has reduced symptoms. Always follow label instructions. The wetting agent

Revolution at 6.0 fl oz/1,000 has been examined in several recent tests, and in many cases it increased the efficacy of the fungicide with which it was paired.

3) *Thatch*: In general, excessive thatch will hinder root growth, and it could interfere with fungicides getting down into the soil. So, manage thatch levels and organic matter.

4) *Fertility*: Fairy rings are more severe when turf is starved of nitrogen.

5) *Watering*: Hand watering (syringing) in damaged sites can help reduce turfgrass stress. A wetting agent may improve results.

Fungicides labeled for fairy rings:

*Always check the label. It is the responsibility of the user to read, understand, and follow the label.

*Mention of a product does not imply endorsement, nor does lack of mention of a product imply non-endorsement.

Active ingredient	Fungicide group	Efficacy notes	Typical Interval (days)	Example trade names
Azoxystrobin	Strobilurin/QoI	Good to excellent	28	Heritage
Flutolanil	Carboximide	Good to excellent	21-28 preventative 30 curative	Prostar
Hydrogen dioxide	Oxidizing agent	Limited data available	5-7	Zerotol
Pyraclostrobin	Strobilurin/QoI	Good to excellent	28	Insignia
Polyoxin D	Polyoxin	Good	7	Endorse ^{xx}
Triadimefon	DMI ^x	Good to excellent	14-21	Bayleton ^{xx}
Azoxystrobin + propiconazole	Strobilurin/QoI + DMI	Limited data available	28	Headway

^xDMI = sterol demethylation inhibitor

^{xx} Fairy ring is not listed on older labels of Bayleton or Endorse. These products did have a FIFRA Section 2ee recommendation. Newly revised, full Section 3 labels do include fairy ring.

References:

*Fungicide table modified with permission from *Chemical Control of Turfgrass Diseases 2008* by P. Vincelli and A.J. Powell, University of Kentucky

*Compendium of Turfgrass Diseases, Third Edition. 2005. RW Smiley, PH Dernoeden, BB Clarke. APS Press

*Treating fairy ring with fungicides, new soil surfactant. *Golf Course Management*, May 2007, pp 121-125. Fidanza MF, Wong FP, Martin B, McDonald S.

*New insight on fairy ring. *Golf Course Management* March 2007 pp. 107-110. Fidanza MF

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