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. Sometimes, a layer of white, fungal mycelium is 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.

Why are they circles?
Fairy ring fungi start in the soil or thatch and grow outward, like a patch of mold growing 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. 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. Although, not all mushrooms are from fairy ring fungi. 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 appear 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. The low soil moisture can lead to a buildup of other salts. 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 do not cause severe damage. If the mushrooms are a nuisance, they can be removed by mowing or raking. Some mushrooms are poisonous, so if children or pets are around removal is 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 over fertilize. 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 aerification and watering can help move water to the hydrophobic areas around the roots. Affected areas 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 factors to remember:

1) **Water rates:** In recent fungicide studies, higher water application rates (for example, 4 gallons per 1,000 square feet) have performed better than lower water rates (2 gallons per 1,000 square feet). 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 fluid ounces per 1,000 square feet 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, interfering with fungicides getting 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.

**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.

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Fungicide Group</th>
<th>Efficacy Notes</th>
<th>Typical Interval (days)</th>
<th>Example Trade Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>azoxystrobin</td>
<td>Strobilurin/QoI</td>
<td>Good to excellent</td>
<td>28</td>
<td>Heritage</td>
</tr>
<tr>
<td>flutolanil</td>
<td>Carboximide</td>
<td>Good to excellent</td>
<td>21 to 28 preventative 30 curative</td>
<td>Prostar</td>
</tr>
<tr>
<td>hydrogen dioxide</td>
<td>Oxidizing agent</td>
<td>Limited data available</td>
<td>5 to 7</td>
<td>Zerotol</td>
</tr>
<tr>
<td>pyraclostrobin</td>
<td>Strobilurin/QoI</td>
<td>Good to excellent</td>
<td>28</td>
<td>Insignia</td>
</tr>
<tr>
<td>polyoxin D</td>
<td>Polyoxin</td>
<td>Good</td>
<td>7</td>
<td>Endorse$^2$</td>
</tr>
<tr>
<td>triadimefon</td>
<td>DMI $^1$</td>
<td>Good to excellent</td>
<td>14 to 21</td>
<td>Bayleton$^2$</td>
</tr>
<tr>
<td>azoxystrobin + propiconazole</td>
<td>Strobilurin/QoI + DMI</td>
<td>Limited data available</td>
<td>28</td>
<td>Headway</td>
</tr>
</tbody>
</table>

$^1$ DMI = sterol demethylation inhibitor

$^2$ 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.
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.

References

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

