

NOTE: THE FOLLOWING INFORMATION IS OFFERED AS A GUIDE FOR PROSPECTIVE CHALLENGES TO MANAGING SEASHORE PASPALUM. ALL TURFGRASSES ARE SUBJECTED TO INSECT, DISEASE, AND WEED PRESSURES. PROPER MANAGEMENT IS THE KEY TO SUCCESS. YOU MUST CHECK ALL LABELS OF THE PESTICIDES TO BE USED ON THIS GRASS FOR LEGAL AND PROPER USE. MENTION OF A PARTICULAR PRODUCT IS NOT AN ENDORSEMENT OF THAT PRODUCT BUT REFLECTS WHAT IS KNOWN AT THE PRESENT TIME. ENVIRONMENTAL INTERACTIONS, INCLUDING SALINITY THAT IMPACT SPECIFIC SITES, MAY GIVE VARIABLE RESULTS IN THE USE OF SOME PRODUCTS.

FAIRY RING

SUPERFICIAL FAIRY RING

PINK PATCH

BASIDIOMYCETES

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Fairy ring

(*Lepiota sordida*, *Marasmius oreades*, *Lycoperdon perlatum*, *Agaricus campestris*, *Chlorophyllum molybdites*, *Marasmius oreades*, *Tricholoma sordidum*, *Vascellum pretense*, *Collybia* spp., *Hygrocybe* spp., *Lepiota* spp., *Lepista sordid*, *Psalliota* spp., *Scleroderma* spp.)

NOTE: a composite of information has been assembled here and publications by Mike Fidanza at Penn State University as well as other researchers have contributed to this information package.

Symptoms: fungi inhabit root zone, form surface mushrooms/puff balls (type 3); dark green or brown outer ring of dead turf (type 2); inner ring has green grass; occurs in same location from one year to the next and spreads

outward; areas turn hydrophilic during drought (type 1). **THIS IS A SOIL PROBLEM AND DOES NOT DIRECTLY INFECT THE TURFGRASS BUT CAN EVENTUALLY IMPACT THE TURF TISSUE AND ROOT SYSTEM.** Up to sixty different fungi may be involved or associated with the symptoms, mainly from changing the soil's physical and chemical properties, especially creating hydrophobic or water repellant problems in the soil profile (type 1) during summer drought conditions.

These fungi grow on some source of organic matter (thatch material, old stumps or dead tree roots buried beneath the area).

→ **Type 1** fairy rings are the most damaging to turfgrass when encouraged by cyclic drought stress, inadequate or inefficient irrigation water distribution, and infrequent aeration. The loss of turfgrass canopy density is due to the significant reduction of plant-available soil water, inhibition of key nutrients (especially nitrogen) in the impacted soil profile zone, and accumulation of toxic levels of ammonium and/or sulfides in the rhizosphere (which also indicates loss of bacterial activity needed to process these two toxic compounds).

→ **Type 2** fairy rings result from the release of nitrogen or other nutrients in the soil profile as organic matter is degraded by the fungi, especially in low nitrogen or iron imbalanced soils.

→ **Type 3** fairy rings are enhanced by poor soil drainage and improper, excess irrigation scheduling and volume applications.

Contributors to persistence of fairy ring symptoms: reduced fertility practices, lower mowing height of cuts, increased use of sand topdressing, and longer duration wet/dry irrigation cycles that result in the development of localized dry spot and increased soil water repellency for type 1 and type 2 symptoms plus scalping problems associated with type 2 fairy ring symptoms.

Cultural control:

- avoid irrigation water containing algae
- use only well decomposed organic matter
- control thatch

- remove excess woody limbs/undecomposed roots
- avoid 85:15 greens mixes and higher mixes such as 80:20 or other mixes with more organic matter)
- maintain field capacity with irrigation
- apply medium levels of N
- apply wetting agents with aeration
- balance nutrition for the site

Suggested Chemical Control: (ROTATE MODE-OF-ACTION CHEMISTRIES IF AT ALL POSSIBLE)

flutolanil (ProStar, Contrast, Pedigree) *** primary fungicide

pydiflumetofen (Posterity)

Basidiomycete fungicides: bicoral, polyoxin, mepronil, bitertanol, flutolanil

Sodium tetraborohydrate decahydrate + orange oil + surfactant (Bionx)

azoxystrobin (Heritage)

Heritage Action (azoxystrobin + acibenzolar-s-methyl for stress tolerance inducement)

azoxystrobin + propiconazole (Headway, Quilt)

azoxystrobin + cyproconazole (Quadris Xtra)

triadimefon (Bayleton) + Revolution Wetting Agent (excellent preventative control)

tebuconazole (Mirage™ StressGard™, Clearscape ETQ, Lynx, Torque, Skylark, Muscle®, Fame) (excellent preventative control)

fluxapyroxad + pyraclostrobin (Lexicon)

metconazole (Tourney) (note: do not use a wetting agent when this fungicide is used as a preventative control) --do not apply on bermudagrass

ammonium chlorides (Agrisan 20, Pro-Tech)

triticonazole (Trinity)

triticonazole + trifloxystrobin (Armada, Tartan)

pyraclostrobin (Insignia)

pyraclostrobin + triticonazole (Pillar G)

polyoxin D (Endorse)

azoxystrobin + tebuconazole (ArmorTech ZOXY-T; Strobe T)

prothioconazole (Densicor)

Suppression Program: Signature + Tartan + ProStar over 8-week period, using 2 products per week (contact Bayer for protocol and rates)

Note: Since these fungi colonize the soil profile in organic prone zones (feeds on thatch and organic matter in the upper soil profile and thereby changes the physical and/or chemical properties of the soil, often leading to hydrophobicity), fungicide applications should be on a preventative basis and not curative due to fungicides not effectively changing the soil environment; therefore, sufficient volumes of water should be applied to integrate those fungicides into the affected soil zone (application of 2 gals water per 1000 sq.ft. followed by 0.25 inch irrigation cycle before the spray dries on the turfgrass foliage. Or tank mix the fungicide with a soil penetrant to promote movement into the soil profile with an appropriate aeration event.

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SUPERFICIAL FAIRY RINGS

Causal agents:

Clavaria spp., *Clitocybe* spp., *Coprinus kubickae*, *Hygrophorus* spp., *Melanotus phillipsii* (white blight on tall fescue), *Psilocybe* spp., *Trechispora alnicola* (yellow ring), *Trechispora cohaerens*, *Trechispora farinacea*

Symptoms: sunken patches with felted white mycelium; well defined border between healthy and affected areas; generally, 1 inch ring at the border area; green smoky ring in high humidity areas; generally, not blighted on patches that are affected. Saprophytic fungi without host range; colonize thatch and pseudo thatch areas.

Type A: sparse to copious mycelia with or without fruiting bodies on shoot bases and in the thatch; minimal visual effect on grass growth

Type B: stimulated growth and/or shoot discoloration; grass is generally not severely injured. Thatch decomposition is evident.

Type C: severe grass injury; adjacent grass growth may or may not be stimulated

Source: T.Tani and J.B. Beard. 1997. Color Atlas of Turfgrass Diseases. P. 183-186.

From M, Figanza. Fairy Ring 101. USGA Green Section Record (March-April 2009): 8-10.

<u>Active Ingredient</u>	<u>Trade Name</u>	<u>Manufacturer</u>	<u>Remarks</u>
Azoxystrobin	Heritage 50WDG	Syngenta	0.4 oz, 28-day interval, 4-gal water/1000 sq.ft.
Azoxystrobin	Heritage TL	Syngenta	2 fl.oz., 28-day interval, 4 gal water/1000 sq.ft.
Azosystrobin + Propiconazole	Headway 1.39EC	Syngenta	3 fl.oz., 28-day interval, 4 gal water/1000 sq.ft.
Fluoxastrobin	Disarm 480SC	Arysta	0.36 fl.oz., 28-day interval
Flutolanil	Prostar 70WP	Bayer	Preventative: 2.2 oz, 21–28-day interval
	Pedigree		Curvative: 4.5 oz, 30-day interval
Metconazole	Tourney 50WDG	Valent	Label addition pending
Polyoxin-D	Endorse 2.5WP	Cleary	4.0 oz, 2-3 applications, 7-day interval
	Affirm		minimum 2 gal. water/1000 sq.ft., include soil surfactant, irrigate to 0.5-1.0-inch soil depth
Pyraclostrobin	Insignia 20WDG	BASF	0.9 oz., 28-day interval
Tebuconazole	Lynx 25C	Bayer	

	Mirage™StressGard™ Bayer		
	Torque	Cleary	
	Muscle®	Sipcam Advan	
	ArmorTech TEB360	United Turf Alliance	
	Clearscape ETQ	Sipcam Advan	
	Fame	FMC	
Triadimefon	Bayleton 50WDG	Bayer	1-2 oz., 14–21-day intervals
Triadimefon	Armada 50WDG	Bayer, Tartan	
+ trifloxystrobin			

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Pink Patch

(Limonomyces rosipellis) =basidiomycete fungus similar to fairy ring fungi; soil borne pathogen

Similar to red thread with circular, pinkish red to tan patches 2-4 inches (5-10 cm) in diameter. On paspalum, generally attacks on dead shoot tissue.

Infestation rate is very slow, and damage is generally minimal. The organism is active during consistently wet conditions with cooler temperatures. Capable of growth from 40-90°F (4-32°C)

Cultural control: core or tine aeration, drainage, phosphorus applications as needed based on chemical soil test, remove excess thatch.

Suggested Chemical Control: (ROTATE MODE-OF-ACTION CHEMISTRY)

Benomyl and thiophanate-methyl fungicides are ineffective; more effective= tolclofos-methyl, propiconazole, iprodione, fenarimol, chlorothalonil, vinclozolin, tebuconazole, iprodione + trifloxystrobin (Interface™) or triadimefon and azoxystrobin (Heritage) are effective fungicides. Good

fungicide combinations: Prostar (flutolanyl) + Insignia (pyraclostrobin), Medallion (fludioxanil) + Signature (forsetyl AL) with wetting agent and aeration. Fluazinam (Secure) + Daconil Action.

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Basidiomycetes

Diseases associated with Gasteromycetes fungi that produce mushrooms and puffballs (this latter one: that contain spores, are initially white in color and egg-shaped (order: *Agricales*). Diseases caused by these fungi: fairy ring, superficial fairy ring, white blight, yellow ring, localized dry spot.

References:

P. Dernoeden, J. Kaminski, and C. Haspell. 2011. Thatch collapse: A disease of fine-leaf fescue. *Golf Course Management* May: 88-90.

P. Munro. 2003. Basidiomycete fungi: The fairy ring disease. *New Zealand Turf Management Journal* 18(1):4-8. TGIF#85378.