

Fairy Ring Suppression by Preventive Fungicide Applications Alone and with a Wetting Agent

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Objective: To evaluate fungicides known capable of suppressing fairy ring and determine if wetting agent addition could improve control

Introduction: Of all turfgrass problems, fairy ring can be difficult to control and research is lacking. Approximately 54 soilborne basidiomycete fungi can cause fairy ring. Two groups are recognized based on their aboveground fruiting structure; Agaricales = puff balls and Lycoperdales = mushrooms. On putting greens most fungi are active in the organic thatch layer (lectophilic), and its degradation releases nutrients and enhances plant growth in rings. Additionally, a buildup of fungal mycelium at the advancing edge of radial growth causes hydrophobic conditions which leads to midday wilt stress and potential plant death. Others speculate a fungal toxin produced in the thatch layer builds up killing the plant crown. Fairy rings are classified into 3 types based on ring symptom affecting turfgrass. Type 1 rings kill the turfgrass (see image, *John Kramer 8-7-06*), type 2 rings are green due to enhanced turfgrass growth, and type 3 rings are fruiting structures alone. The symptoms can be a combination of the types or progress from one into another (e.g. type 2 to type 1).



Materials and Methods: This study was conducted on a creeping bentgrass/*Poa annua* putting green at Twin Orchard Country Club in Long Grove, IL; a north Chicago suburb. In July 2005, this putting green had an abundance of fairy ring that was well distributed throughout. Fungicides and wetting agent were applied preventively at manufacturer's recommended rates for fairy ring. Nearly identical studies were conducted at K-State by Jack Fry, and Penn State by Mike Fidanza. Fungicides (see table) were applied approximately every 28 days (6 June, 27 June, and 31 July) with a CO₂-powered backpack sprayer with 8004 TeeJet nozzles at 35 psi in water equivalent to 2 gal/1000 ft². Fungicides without wetting agent were not watered in after application, and plots with wetting agent (Revolution 6 oz per 1,000 ft²) were given ¼ inch water. Plots were 4 ft x 6 ft and arranged in a randomized complete block design with four replications. Plots were rated twice monthly from June to August. Fairy ring was quantified for presence (%), ring intensity (0-4 scale, 4 greatest), and number. Visual quality was also rated (0-9 scale, 9 best and 6 acceptable).

TREATMENTS - 28D WITH AND WITHOUT WETTING AGENT	RATE PER 1,000 FT ²
No Fungicide	na
Bayleton	2 oz
ProStar	4.5 oz
Headway	3.0 oz
Heritage TL	2.0 fl oz
Banner MAXX	2.0 fl oz
Insignia	0.9 oz

Results: Fairy ring symptoms began about one week after initial application and lasted until the end of August (Fig. 1A). Symptoms were well distributed throughout the study area. Only type 2 fairy ring (green rings) occurred and never developed fruiting structures. The wetting agent did not affect fungicide efficacy likely because type 1 rings did not develop. Fairy ring fluctuated with rain events and was highly visible on 20 June, 17 Jul, and 10 Aug. All methods to quantify fairy ring were useful, but a reduction by treatments did not occur on all dates. Percent ratings detected treatment effects on 31 July when up to 16 % fairy ring was present in untreated plots (Fig. 1B). Ring number ratings detected treatment effects on 10 August when Prostar (flutaloniol) and Headway (azoxystrobin and propiconazole formulation) reduced their number (Fig. 1C). Fairy ring intensity ratings detected treatment differences on 31 July, 10 and 28 August. Bayleton (triadimefon) reduced visual intensity the end of July. In August, all but Heritage (azoxystrobin) and Insignia (pyraclostrobin) reduced intensity of rings (Fig. 1D). In conclusion, multiple fungicides could suppress (reduced intensity on 3 dates) fairy ring but none could provide complete control. Some treatments reduced visual quality due to a growth regulator/phytotoxicity effect that can thin and/or bronze turfgrass during conditions of high temperatures and should be considered during summer (Fig 1E.)

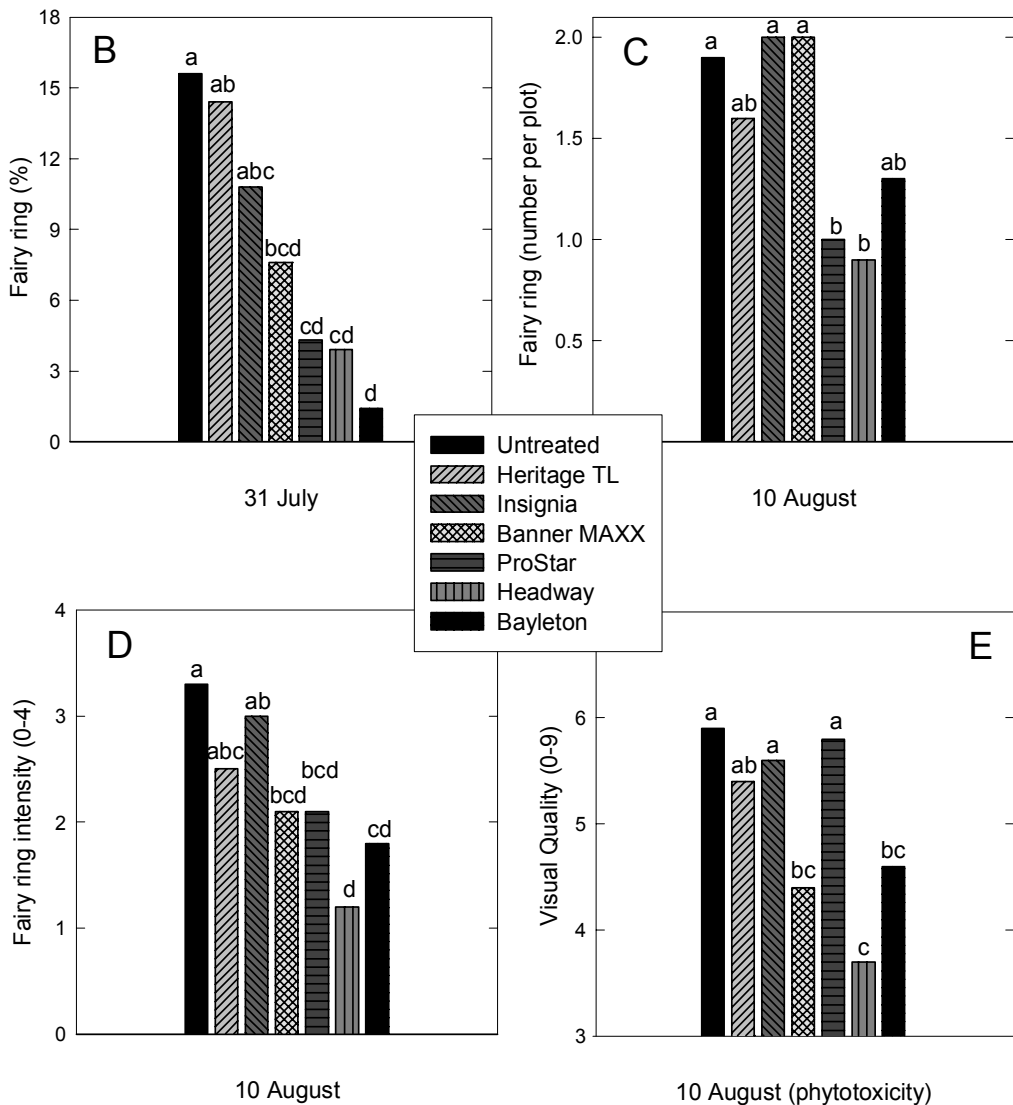
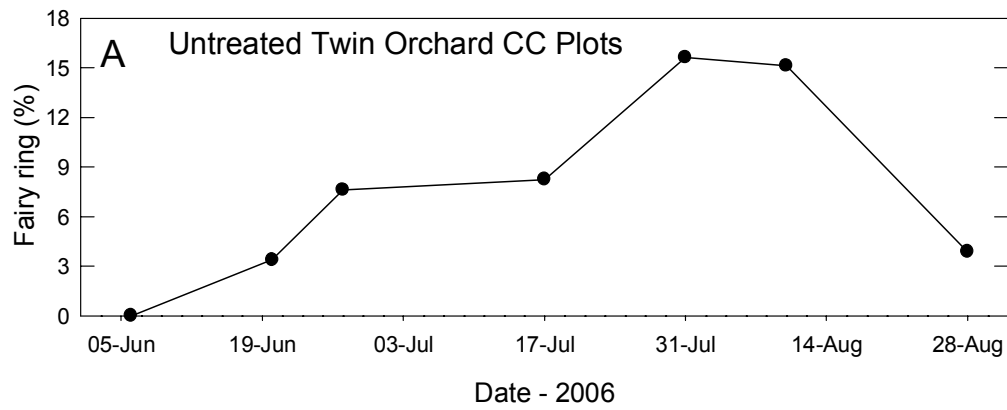


Figure 1. (A) Fairy ring disease progression of a bentgrass/*Poa annua* green, and (B) its suppression with fungicides by visually estimating percent damage, (C) number of rings, (D) intensity of rings, and (E) overall visual quality during peak high temperature stress at Twin Orchard CC Long Grove, IL in 2006.