CREEPING BENTGRASS (*Agrostis palustris* 'A-1')
Fairy ring; *Lycoperdon pusillum*

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Evaluation of spring fungicide applications for preventative control of fairy ring, 2007.

Early spring application of fungicides and fungicide-surfactant tank mixtures were evaluated for control of fairy ring. This trial was conducted at the Old Chatham Golf Club in Durham, NC on 'A-1' creeping bentgrass maintained under putting green conditions. Mowing was performed six times weekly at a height of 0.120 in. Clippings were collected and the site was irrigated to prevent drought stress. The plant growth regulator Primo was applied at 0.12 oz/1000 sq ft on 8, 16, and 29 May, 2 and 6 Jun, 9 and 18 Jul, and 1 and 9 Aug. Fertilizer was applied as 12-0-0 on 16 May (0.02 lb N/1000 sq ft), 2 Jun (0.04 lb N/1000 sq ft), and 27 Jul (0.02 lb N/1000 sq ft), 10-3-5 on 22 May and 29 May (0.1 lb N/1000 sq ft), and 20-5-20 on 6 Jun, 4, 6, and 18 Jul, and 1 and 9 Aug (0.1 lb N/1000 sq ft). Micro-nutrients were applied as Lesco Fe Plus on 16 May (2 oz/1000 sq ft), 2 Jun (4 oz/1000 sq ft), and 27 Jul (2 oz/1000 sq ft). Insect pests were controlled with Dursban on 22 May, 4 Jul (1.5 oz/1000 sq ft) and Scimitar on 4 Aug (10 oz/1000 sq ft). For control of non-target diseases, Daconil Ultrex 82.5WDG was applied on 22 and 29 May, 15 and 22 Jun, 9 and 27 Jul, and 12 Aug (5 oz/1000 sq ft), Signature 80WDG was applied on 15 and 22 Jun, 9 and 27 Jul, and 4 and 12 Aug (4 oz/1000 sq ft), Subdue 1.1ME was applied on 4 Jun and 4 Jul (1 oz/1000 sq ft), Banol 6SL was applied on 15 and 22 Jun (5 oz/1000 sq ft), and Fore 80WP was applied on 4 Aug (8 oz/1000 sq ft). Plots were 5 ft x 8 ft and arranged in a randomized complete block with four replications. Fungicides were applied in water equivalent to 2 gal per 1000 sq ft with a CO_2-powered sprayer at 40 psi using TeeJet 8004 nozzles. All treatments were immediately watered-in with 0.25-in. of irrigation applied by hand with a hose and shower nozzle. All treatments were initiated on 22 Mar and were reapplied at the appropriate intervals as indicated in the table. The severity of fairy ring symptoms was assessed on 2 Jul, 10 Jul, 26 Jul, 7 Aug, and 22 Aug using a 1 to 9 scale (9=most severe, 5=acceptable). Basidiocarp incidence was evaluated on 2 Jul, 10 Jul, and 26 Jul by counting the number of puffballs in each plot. Turfgrass quality was evaluated on 8 May, 30 May, 12 Jun, 10 Jul, 26 Jul, and 22 Aug using a 1 to 9 scale (9=best, 5=acceptable) based on color, density, and uniformity. Phytotoxicity was observed and evaluated on 10 Jul. Data were subjected to analysis of variance and means separation by Waller-Duncan k-ratio t test (k=100).

Fairy ring symptoms were first observed in the experimental area in early July, appearing as Type II symptoms (green rings) at this time. Significant differences were only detected on 2 Jul, although all treatments provided a numerical reduction in fairy ring severity as compared to the Revolution alone and control treatments. Very few Type I symptoms (turf necrosis) were observed in plots, and were limited to the Revolution-alone and untreated control treatments. All fungicide treatments in this study provided excellent control of fairy ring throughout the season, with the exception of the ProStar + Revolution treatment exhibiting Type II symptoms in early August. Basidiocarp formation was observed in the plot area on 10 Jul and 26 Jul. Although not statistically significant, a numerical increase of puffballs was observed in control plots and those treated with Revolution alone, ProStar + Revolution, and NCSU-EXP-5.

Phytotoxicity, evident as a general chlorosis and drought symptom, was observed in the experimental area on 10 Jul, during a particularly hot and dry period. Applications of Bayleton + Revolution and Banner MAXX caused the most injury, resulting in a significant decrease of turf quality as compared to untreated plots. Phytotoxicity was also statistically significant in Tartan + Revolution plots, but there was no significant decrease in turf quality. This effect was not persistent, as the turf soon recovered and no significant phytotoxic effects were observed in plots on subsequent rating dates.

Disease pressure was not particularly high in this trial, but early spring fungicide applications were found to be effective for fairy ring prevention. Revolution applied alone did not provide adequate control, but the addition of the DMI fungicides Bayleton, Lynx, and Tartan to Revolution as a tank-mix provided season long suppression. ProStar + Revolution did not control fairy ring for the whole season, with Type III symptoms occurring in late July and Type II symptoms beginning to appear in early August. Heritage TL, Tourney, and Banner MAXX also provided excellent control of fairy ring in this study without the addition of a surfactant.

Treatment, formulation, and rate per 1000 sq ft	Application code	Fairy ring severity[z]			Mushroom incidence[y]
		2 Jul	10 Jul	7 Aug	26 Jul
Bayleton 4SC 1.5 fl oz + Revolution L 6 fl oz	AD[x]	0.0 c[w]	0.0 a	0.5 a	0.0 a
Bayleton 4SC 1.5 fl oz + Revolution L 6 fl oz	AE	0.5 bc	0.0 a	0.5 a	0.0 a
Bayleton 4SC 1.5 fl oz + Revolution L 6 fl oz	AEI	0.0 c	0.0 a	0.0 a	0.0 a
Lynx 2SC 1.5 fl oz + Revolution L 6 fl oz	AD	0.0 c	0.0 a	0.0 a	0.0 a
Lynx 2SC 1.5 fl oz + Revolution L 6 fl oz	AE	0.0 c	0.0 a	0.0 a	0.0 a
Tartan 2.4SC 2 fl oz + Revolution L 6 fl oz	AD	0.0 c	0.5 a	0.0 a	0.0 a
Bayleton 4SC 2 fl oz + Revolution L 6 fl oz	A	0.0 c	0.0 a	0.0 a	0.0 a
ProStar 70WP 2.2 oz + Revolution L 6 fl oz	D				
ProStar 70WP 2.2 oz + Revolution L 6 fl oz	AD	0.0 c	0.0 a	1.3 a	2.3 a
Revolution L 6 fl oz	AD	2.0 ab	1.0 a	2.3 a	1.8 a
Tourney 50WG 0.37 oz	ACEG	0.0 c	1.0 a	0.0 a	0.0 a
NCSU-EXP-5 0.78 fl oz	ACEG	0.0 c	1.0 a	0.0 a	1.3 a
Heritage TL 0.8ME 1 fl oz	ACEG	0.5 bc	0.0 a	0.0 a	0.0 a
Banner MAXX 1.3ME 1 fl oz	ACEG	0.0 c	0.0 a	0.0 a	0.0 a
Untreated Control		3.5 a	1.5 a	1.5 a	1.0 a

[z]Fairy ring severity on a 1-9 scale, where 1-4=green rings and 5-9=necrotic rings.
[y]Mushroom incidence evaluated by counting the number of mushrooms in each plot.
[x]Application code indicates the application dates of each treatment: A-22 Mar, C-5 Apr, D-12 Apr, E-19 Apr, and G-3 May.
[w]Value are means of four replications. Means within columns followed by the same letter are not significantly different according to Waller-Duncan k-ratio t-test (k=100).

Treatment, formulation, and rate per 1000 sq ft	Application code	Turfgrass quality[z]			Phytotoxicity[y]
		12 Jun	10 Jul	26 Jul	10 Jul
Bayleton 4SC 1.5 fl oz + Revolution L 6 fl oz	AD[x]	7.8 a[w]	5.3 de	7.0 ab	5.5 ab
Bayleton 4SC 1.5 fl oz + Revolution L 6 fl oz	AE	8.0 a	5.8 cde	7.8 ab	5.5 ab
Bayleton 4SC 1.5 fl oz + Revolution L 6 fl oz	AEI	7.8 a	5.3 de	7.5 ab	1.0 d
Lynx 2SC 1.5 fl oz + Revolution L 6 fl oz	AD	7.8 a	7.5 a	7.8 ab	1.0 d
Lynx 2SC 1.5 fl oz + Revolution L 6 fl oz	AE	7.8 a	7.5 a	7.8 ab	1.0 d
Tartan 2.4SC 2 fl oz + Revolution L 6 fl oz	AD	7.3 a	6.8 abc	7.3 ab	3.5 bc
Bayleton 4SC 2 fl oz + Revolution L 6 fl oz	A	7.5 a	6.3 bcd	8.0 a	1.0 d
ProStar 70WP 2.2 oz + Revolution L 6 fl oz	D				
ProStar 70WP 2.2 oz + Revolution L 6 fl oz	AD	8.0 a	7.3 ab	6.5 b	1.0 d
Revolution L 6 fl oz	AD	7.3 a	7.3 ab	7.0 ab	0.0 d
Tourney 50WG 0.37 oz	ACEG	8.0 a	7.8 a	8.0 a	0.0 d
NCSU-EXP-5 0.78 fl oz	ACEG	8.0 a	7.8 a	6.8 ab	2.3 cd
Heritage TL 0.8ME 1 fl oz	ACEG	8.0 a	7.3 ab	7.3 ab	1.5 cd
Banner MAXX 1.3ME 1 fl oz	ACEG	7.8 a	5.0 e	7.0 ab	6.0 a
Untreated Control		7.8 a	6.8 abc	7.3 ab	0.0 d

[z]Turfgrass quality on a 1-9 scale, where 9=highest quality, and 5=acceptable.
[y]Phytotoxicity on a 0-9 scale, where 0=no phytotoxicity, and 9=entire plot severely injured or killed.
[x]Application code indicates the application dates of each treatment: A-22 Mar, C-5 Apr, D-12 Apr, E-19 Apr, and G-3 May.
[w]Values are means of four replications. Means within columns followed by the same letter are not significantly different according to Waller-Duncan k-ratio t-test (k=100).