

# Evaluation of an Inorganic Soil Amendment to Reduce and Manage Fairy Ring Symptoms in Turfgrass

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## Objectives:

*Examine the use of an inorganic soil amendment in combination with cultural practices as well in combination with a standard fungicide/soil surfactant program for the management and control of fairy ring symptoms in golf course turf.*

Fairy ring is both a difficult issue as well as an enigma for golf course superintendents because fungicides are not always effective on greens. Why? Multiple basidiomycete fungi cause this disorder of turf and so depending on location, the causal organism varies as does fungicide efficacy. Also, fairy ring is most troublesome at the worst time for cool-season turf since many causal fungi are thermophiles – active at midsummer when physiological stress for C3 turf peaks and when C3 recuperative potential is lowest.

The CDGA has intensively studied fairy ring on Chicago greens since 2006 (nearly always puffball/*Lycoperdon* types). In 2006 we undertook a collaborative effort with Dr. Jack Fry and Dr. Mike Fidanza to determine which fungicides work best preventively. In the Illinois study at Twin Orchard Country Club in Long Grove we found type 2 fairy ring suppression on a practice putting green varied according to fungicide family. The QoIs (quinone outside inhibitors) Heritage and Insignia did not suppress fairy ring well or at all. In contrast, the DMIs (demethylase inhibitors) Bayleton and Banner Maxx did suppress the dark green ring or arc symptoms. Also, a carboximide fungicide, ProStar, worked to suppress fairy ring. From that time forward DMI fungicides were extensively used for fairy ring prevention on Chicago greens using 2 applications, usually 21 to 28 days apart prior summer start in June.

## DMI Fungicides Cause Phytotoxicity Given High Rates.

More research is needed, but multiple CDGA studies have yielded important facts on strategies for fairy ring

suppression on golf greens in Chicago. One lesson is that nearly all standard products that work must be used at high rates. It means DMI fungicides, although highly effective in suppression of fairy ring, can cause unacceptable visual quality for golf greens.

## Why Alternatives to Fungicides are Needed for Control of Fairy Ring:

- Fairy ring development is variable year to year, with hot summers having most activity.
- Preventive DMI fungicide approach is best current method in Chicago – two applications prior to summer – but can be phytotoxic (turf chlorosis or bronzing with thinning).
- Curative control by ProStar in midsummer when peak heat stress exists (to avoid phytotoxicity by DMI fungicides) – but sometimes ProStar is reported to not work.
- Even when fungicides can suppress this disease, complete control is often lacking.
- At midsummer cultural practices of needle tining, wetting agent use, and judicious N fertility (e.g. urea) may be our most effective way to deal with fairy ring as together they can mask arc/ring symptoms and alleviate associated localized dry spot.
- More research can broaden our current knowledge of alternative approaches. This will allow superintendents avoid the negative effects of DMI phytotoxicity on golf greens and/or the high cost of fungicides at high label rates necessary for fairy ring.



## 2012 USGA STUDY – Black Sheep Golf Club

**Site Description.** Alternatives and fungicides were evaluated to suppress large active type 2 fairy ring – an area of a fairway with a history of on number 19 at Black Sheep Golf Club in Sugar Grove, IL; a far west Chicago suburb. The fairway is located in an area of clay-loam soil of high PH (7.4 to 7.7) typical of fertile Illinois farmland – the entire course is surrounded by corn and soybeans. The course was built in 2002 and golf surfaces are creeping bentgrass (*Agrostis stolonifera*), 50:50 blend of L-93 plus SR1119. Levels of *Poa annua* are virtually non-existent. The turf is mowed twice

weekly to a height of 0.5 in. and N fertility is kept to approximately 0.5 lbs/N per 1,000 ft<sup>2</sup> per year. Surfaces are kept dry and turf is only watered as needed to avoid excessive wilt stress. Dollar spot and take-all are the other fairway diseases active at the site.

**Study Procedure.** Individual plots were 4 ft x 6 ft and arranged in a randomized complete block design that used 4 replications (only 3 of 4 were used for statistical analysis using LSD by ARM). To do this study we chose three large type 2 fairy rings. A piece of plywood was used as a template to mark each rectangular plot (corners only) at first treatment. Thereafter paint marks

**Table 1. Treatments and rates of suppression of fairy ring on a golf course fairway at Black Sheep Golf Club, Sugar Grove IL in 2012**

Nbr	Treatments and Rate per 1,000 sq ft	Strategy Type
1	Aeration	Cultural
2	Aeration <i>followed by</i> Revolution 6.0 fl oz	Cultural and Soil surfactant
3	Aeration + Revolution 6.0 fl oz + Prostar 4.5 oz	Cultural + Soil surfactant + Fungicide
4	Aeration <i>followed by</i> Ecolite 50 lbs	Cultural + Alternative (zeolite)
5	Aeration <i>followed by</i> Ecolite 50 lbs <i>followed by</i> Revolution 6.0 fl oz	Cultural + Alternative + Soil surfactant
6	Aeration <i>followed by</i> Ecolite 50 lbs <i>followed by</i> Revolution 6.0 fl oz <i>followed by</i> Prostar 4.5 oz	Cultural + Alternative + Soil surfactant + Fungicide
7	Untreated (Healthy Turf)	....
8	Untreated (Fairy Ring Affected)	....

**Aeration:** Solid or needle tine; or whatever aeration practice can be done at each location for minimal disruption.

**Soil surfactant:** Revolution from Aquatrols at 6 fl oz per 1000 sq ft preferred; or whatever soil surfactant can be used. Apply in minimum of 2 gal water carrier per 1000 sq ft; and immediately water-in with irrigation (enough irrigation water so that material does not dry on turf canopy).

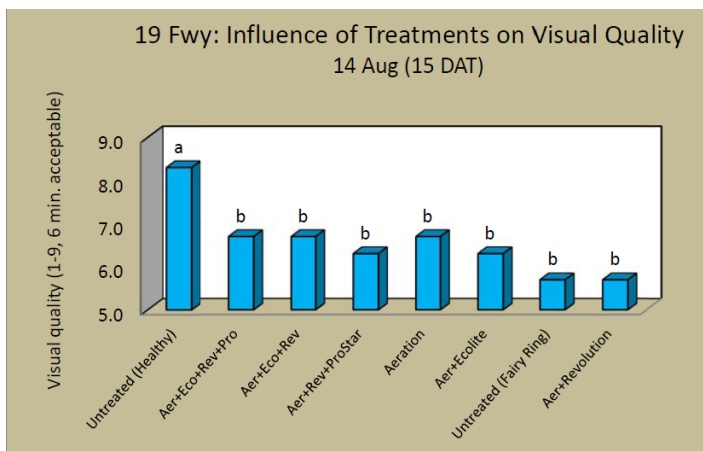
**Ecolite:** This zeolite product is from EarthWorks. Apply this product at 50 pounds/1000 sq ft. Immediately water-in with irrigation (enough irrigation water so that material does not remain or dry on turf canopy).

**Fungicide:** Prostar 70WP from Bayer at 4.5 oz/1000 sq ft preferred. Apply in minimum of 2 gal water carrier per 1000 sq ft; and immediately water-in with irrigation (enough irrigation water so that material does not dry on turf canopy).

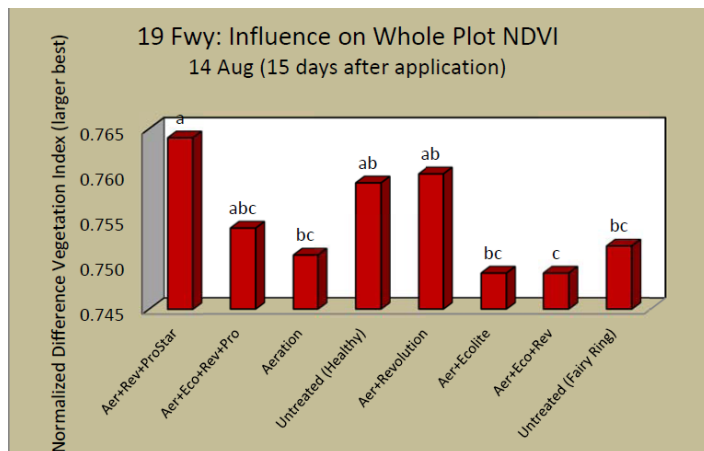
were maintained to aid subsequent data collection. Fairy ring symptoms were only faintly visible on 19 fairway when an 11 July diagnostic visit occurred to verify take-all activity on greens at Black Sheep. On 30 July application of 8 treatments (material and methods table) occurred and 19 fairway type 2 fairy ring symptoms had increased somewhat, now moderately visible. A total of 8 treatments were used. Granular treatments were carefully spread on individual plots by hand and all liquid treatments were delivered using a CO<sub>2</sub>-powered backpack sprayer with 8004 TeeJet flat fan with 3 nozzles at 40 psi in water equivalent to 2 gal/1000 ft<sup>2</sup>. Immediately following application, all treatments were watered in by hand by the assistant superintendent Josh Therrien with 0.1 to 0.2 inch of water. Also, a Toro ProCore 648 aerifier with needle tines was operated by Josh for designated treatments.

Per plot, fairy ring/arc was visually evaluated as green color intensity (0–4 scale, 4 darkest green) and stimulated turf growth of ring/arc was measured (inches) when visibly different. Normalized Difference Vegetation Index (NDVI) was taken using 3 subsamples per plot with the handheld Field Scout TCM 500 (Spectrum Technologies, Plainfield, IL). Visual quality was rated (1–9 scale, where 1 = entire plot area brown or dead; 6 = minimum acceptable color and quality for a putting green in summer; and 9 = optimum greenness, texture and density) to monitor for acceptable quality and quantify any phytotoxicity. On 30 Jul (study start) and 5 Sep (study end), soil samples were taken using a 0.75 inch diameter probe to a 2 inch depth with a systematic pattern of 4 holes (1 row within green ring) across mid-plot. Upper verdure/thatch of each core was not discarded.

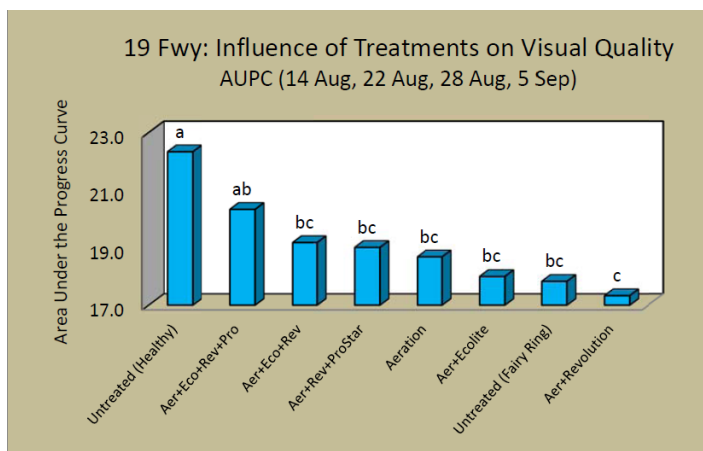
**Figure 1. Visual Quality (1–9). Number 19 fairway at Black Sheep GC, Sugar Grove, IL in 2012.**



**Figure 3. Plot Color (NDVI). Number 19 fairway at Black Sheep GC, Sugar Grove, IL in 2012.**



**Figure 2. Visual Quality (AUPC). Number 19 at Black Sheep GC, Sugar Grove, IL in 2012.**



**Figure 4. Plot Color (NDVI). Number 19 fairway at Black Sheep GC, Sugar Grove, IL in 2012.**

