Interactions between trinexapac-ethyl and fungicides for control of dollar spot on creeping bentgrass

Justin Stewart and Dr. Richard Latin

Objective

Investigate the effect of trinexapac-ethyl (TE), on the performance of chlorothalonil and propiconazole for the control of dollar spot on creeping bentgrass.

Rationale

Dollar spot, caused by *Sclerotinia homoeocarpa*, is a common disease of golf course turf. Although it can affect all cool season turf species, it tends to be of greatest concern on creeping bentgrass and *Poa annua*. Even moderate levels of infection can result in a decline in turf quality, appearance and playability. The disease is regularly managed with repeated applications of contact and/or penetrant fungicides. *Sclerotinia homoeocarpa* may be active over an entire growing season (May - October), therefore control of the disease with fungicides can represent a significant expense for golf course superintendents.

Growth regulators such as TE are commonly used on golf courses to suppress plant growth, reducing the need for mowing (especially on fairways). The effects on the plant and a reduction in mowing could influence the levels of fungicide in or on leaf tissues and therefore could affect fungicide performance. Consequently, it is important for golf course superintendents to understand the effects that TE has on a fungicides ability to control disease.

The overall objective of the research is intended to investigate the interaction between trinexapac-ethyl and two fungicides for control of dollar spot on creeping bentgrass. This report describes results conducted on creeping bentgrass greens. Experiments to determine the effects of TE applications on fairway height creeping bentgrass are in progress. Knowledge gained through this research will increase awareness of the influence of TE on fungicide performance and provide superintendents with valuable information for planning effective approaches to disease management.

How it was done

The research was conducted at Purdue's Daniel Turfgrass Research Center. The experimental site was a stands of creeping bentgrass (cultivar 'Penncross') maintained at greens height approximately 0.125 in. Experiments were established to address preventative control of dollar spot. Treatments were applied before any disease was present during the spring. Experiments consisted of four replications, each with seven randomly distributed 1 x 2 meter plots.

Treatments were applied using a custom CO_2 pressurized boom sprayer with three flat fan nozzles (Tee-Jet 8004 EVS). Trinexapac-ethyl (Primo Maxx®) was applied at a rate of 0.125 oz/1000ft^2 on 14-day intervals while propiconazole (Banner Maxx®) and chlorothalonil (Daconil Ultrex®) were applied at 1.0 oz/1000ft^2 at 3.2 oz/1000ft^2. Both fungicides were applied as single applications approximately seven days after the initial TE application. A check plot consisting of iprodione (Chipco 26GT) and thiophanate-methyl (Cleary's 3336) at rates of 4.0 oz/1000ft^2 was added and applied at 14-day intervals in order to aid in visual estimations.

Disease severity was evaluated by counting dollar spot infection centers three times per week. Clippings were harvested and weighed five days after each TE treatment to account for the reduction in plant growth. Weather during the course of the experiment in both years was moderately favorable for dollar spot development.

Results to date

- As expected, fungicide-treated plots resulted in less disease than those not treated with fungicide.
- In both 2004 and 2005 experiments, plots treated with TE alone showed no significant differences compared to untreated plots.
- No significant differences were found between plots treated with propiconazole and those treated with TE + propiconazole in 2004 (Table 1).
- In 2005, plots treated with TE + propiconazole displayed significantly less disease compared to plots treated with propiconazole alone (Table 2).
- Plots treated with TE + chlorothalonil were significantly different from plots treated with chlorothalonil alone at days 8 through 12 and at day 19 in 2004. However, these same treatments were not found to be significantly different in 2005.
- In no instance did we observe more disease in plots treated with TE and fungicide compared with plots treated with fungicide alone.

Table 1. Disease severity after treatments of trinexapac-ethyl and fungicide applications on greens height creeping bentgrass, 2004.

	Days after fungicide application									
Treatments*	-7‡	1	3	5	8	10	12	15	17	19
	Infection centers per plot **									
Untreated	--	24.25a	35.75a	64.50a	78.50a	94.25a	113.25a	120.50a	117.25a	113.50a
Primo Maxx	--	9.75a	18.75ab	45.25ab	60.25ab	71.50a	72.75ab	87.75a	87.00a	70.50ab
Primo Maxx+Banner Maxx	--	11.75a	18.75ab	8.00d	13.25c	18.75b	25.25d	29.50c	39.50bc	32.75c
Primo Maxx+Daconil Ultrex	--	9.00a	11.25b	7.50cd	12.00c	16.25b	18.00d	35.75bc	38.00bc	38.75bc
Banner Maxx	--	16.00a	18.00ab	18.25cd	17.50c	24.75b	27.75cd	42.00c	41.75c	37.50bc
Daconil Ultrex	--	17.50a	20.50ab	22.50bc	43.00b	52.50a	59.00bc	85.50ab	81.75ab	83.50a

‡Initial application of trinexapac-ethyl was applied 7-days prior to fungicide spray
*Treatment rates are described in the narrative above
**Values followed by the same letter are not considered to be significantly different at alpha = 0.05

Table 2. Disease severity after treatments of trinexapac-ethyl and fungicide applications on greens height creeping bentgrass, 2005.

	Days after fungicide application									
Treatments*	-7‡	1	3	5	8	10	12	15	17	19
	Infection centers per plot **									
Untreated	--	3.44a	4.32a	5.48a	7.00a	8.50a	13.00a	14.25a	11.25a	11.25a
Primo Maxx	--	3.46a	4.16a	5.03ab	6.00ab	7.75ab	10.25abc	11.00abc	9.50ab	9.50ab
Primo Maxx + Banner Maxx	--	0.93b	1.27c	1.76d	2.75c	4.00c	8.50abc	9.50abc	8.75ab	8.50ab
Primo Maxx + Daconil Ultrex	--	1.86ab	2.26abc	2.77bcd	3.50bc	4.00c	6.00c	6.50c	6.00b	6.25b
Banner Maxx	--	2.29a	2.94ab	3.85abc	5.50ab	6.00abc	10.75ab	12.50ab	12.25a	10.50ab
Daconil Ultrex	--	2.78a	3.25ab	3.81abc	4.75ab	4.75bc	6.75bc	7.25bc	7.25ab	6.75b
Check†	--	1.83ab	2.16bc	2.64cd	3.25bc	4.50c	7.00bc	8.00bc	8.50ab	7.50ab

† Check plots (Cleary's 3336 + Chipco 26GT) were added in 2005 to help assess visual disease ratings
‡Initial application of trinexapac-ethyl was applied 7-days prior to fungicide spray
*Treatment rates are described in the narrative above
**Values followed by the same letter are not considered to be significantly different at alpha = 0.05