- STOP 3 -

CONTROL OF ANTHRACNOSE ON ANNUAL BLUEGRASS FAIRWAYS

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Anthracnose caused by the fungus Colletotrichum graminicola is a serious disease of annual bluegrass fairways in Michigan. It is the purpose of this study to 1) develop a prediction model that will accurately forecast when anthracnose will occur, and 2) study the effect of nitrogen fertility on anthracnose development.

The first objective, developing a prediction model, is based on environmental conditions that are favorable for disease development. We are currently monitoring air temperature and humidity, soil temperature, leaf wetness, and spore populations. Additionally, we are planning to monitor soil moisture because it appears to be an important aspect in anthracnose development. The Soils Research Center at Michigan State University is the site of the major environmental monitoring station. A second, more limited station, is located in Sylvania, Ohio. In 1982, monitoring of environmental conditions will be started at the Hancock Turfgrass Research Center.

We are currently gathering data and analyzing it in the hope of developing the model to test by next summer. The purpose of the model will be to increase the efficiency of fungicide applications for the control of anthracnose.

Fertility Experiment

We, along with Dr. Rieke, are looking at the effect of nitrogen fertility on anthracnose development. Three nitrogen fertilizers, 1) urea, 2) IBDU, and 3) sulfur-coated urea (SCU),along with different timings and rates of these fertilizers are being studied. In conjunction with nitrogen fertilization, the effect of fungicide applications to control anthracnose is also included.

The rates at which the nitrogen fertilizers are being applied are 3 lbs/1000 sq ft./yr and 6 lbs/1000 sq ft./yr. A spring and a fall timing schedule is being used. Table 4 shows when the nitrogen fertilizer treatments were applied and the rate. All treatments were applied on the fifteenth of each month. The fungicide treatment (Bayleton at 2 oz/1000 sq ft.) was applied bi-weekly beginning June 1 and continuing until September 1.

The most effective control of anthracnose was the fungicide treatment. The plots that did not receive fungicide applications were significantly higher in anthracnose incidence than the fungicide treated plots (Table 5). The type of fertilizer, so far, has had no effect on anthracnose severity but the time and rate at which the nitrogen fertilizers were applied does have an effect (Table 2). Applying high rates of nitrogen (6 lbs/1000 sq ft./yr) increases the severity of anthracnose compared to the lower rate (3 lbs/1000 sq ft/yr). Nitrogen applications in the spring increased the severity of anthracnose compared to the fall treatments.

At this stage, fungicide applications are the most effective single control treatment of anthracnose but applied in combination with moderate nitrogen rates (3 lbs/1000 sq ft./yr) and minimal applications of nitrogen in the spring the best results can be attain.

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Table 4. Time and rate at which urea, IBDU, and SCU were applied.

Time	April	May	June	July	Aug	Sept	Oct	Nov	Total N
Spring	3/4*	3/4	1/2	0	1/2	1/2	0	0	3
Spring	1½	1½	1	0	1	1	0	0	6
Fall	0	0	½	½	½	½	0	1	3
Fall	0	0	1	1	1	1	0	2	6

Table 5. The effect of rate, type and timing of nitrogen fertilization and fungicide applications on anthracnose development.

N source	Fungicide				No Fungicide			
	Spring		Fall		Spring		Fall	
	1980	1981	1980	1981	1980	1981	1980	1981
Urea:								
3 lbs/yr	1.7[a]	0.0	0.0	0.0	25.0	23.3	26.7	13.3
6 lbs/yr	6.7	3.3	0.0	0.0	46.7	61.7	35.0	29.3
IBDU:								
3 lbs/yr	3.3	0.0	0.0	0.0	31.7	13.3	21.7	10.0
6 lbs/yr	0.0	8.3	1.7	0.0	31.7	55.0	31.7	9.0
SCU:								
3 lbs/yr	1.7	2.7	0.0	0.0	21.7	24.3	23.3	11.7
6 lbs/yr	3.3	4.3	1.7	3.3	46.7	42.0	25.0	41.7
Control	2.3	2.0			45.3	52.3		

Source of variation	d.f.	Mean Squares	
		1980	1981
Fungicide (Fu)	1	15022.22*	13750.35*
Fertilizer (Fe)	2	46.18	258.93
Rate (R)	1	672.22*	3081.12*
Timing (T)	1	355.56*	1634.01*
Fu x Fe	2	25.35	285.10
Fu x R	1	450.00*	1850.35*
Fe x R	2	75.35	4.62
Fu x T	1	88.89	833.68
Fe x T	2	12.85	158.60
R x T	1	88.89	360.01
Fu x Fe x R	2	19.79	19.68
Fu x Fe x T	2	21.18	98.76
Fu x R x T	1	88.89	125.35
Fe x R x T	2	162.84	692.35

[a]values are based on a percent infected area

*significant at the 0.05 level