

Each cultivar is replicated 4 times within each irrigation regime. Irrigation regimes are replicated three times. Fertility and other general maintenance practices are consistent among all plots, with fertility being maintained at approximately 0.5 lb nitrogen/1000 sq ft/month.

This is the third year of this research trial. In 2011, trends in the data showed that infrequent nighttime irrigation resulted in the most dollar spot among all of the cultivars. In 2012, very little disease developed in the study site, but what little disease did occur followed the trends observed in 2011. The 2013 season has resulted in tremendous dollar spot pressure to date, with the expectation of an increase in disease incidence through the next month or so. Dollar spot differences among irrigation regimes and cultivars can be seen, providing information regarding irrigation regime, based on time of day and frequency of application, combined with cultivar selection and their impact on dollar spot incidence.

## **Stop 2. Carl Schwartzkopf Lab at the Hancock Turfgrass Research Center (HTRC)**

Vijaya Shukla, Sanalkumar Krishnan, and Dr. Emily Merewitz

At Michigan State University, the HTRC lab has been established with an extremely generous donation from Mr. Carl Schwartzkopf, an MSU alumnus. His generous endowment facilitated the complete renovation of the HTRC laboratory. When complete, the HTRC lab will be fully equipped with new lab benches, growth chambers, a fume hood, gas and water supply on the lab benches, digital balances, incubators, shakers and centrifuges with thermal control, new computers, and advanced microscope equipment.

Thanks to Carl, this lab will allow students and researchers to accomplish turf studies at MSU more efficiently than ever before. These new facilities will be instrumental in the study of various research projects related to environmental stresses, turf pathogens, and best turf management practices. This field day stop will show off the new lab and describe various studies and types of equipment that will be utilized in the lab. As an example of the types of projects we will be conducting in the new lab, we will discuss a growth chamber study that aimed to evaluate the effects of Primo on turf hormones involved in biotic and abiotic stress responses in turfgrasses.

## **Stop 3. Summer Stress in Creeping Bentgrass and Annual Bluegrass Putting Greens**

Dr. Joe Vargas, Jr., Nancy Dykema, Eric Galbraith, and Nick Popiel

Summer Stress Syndrome has been associated with thinning and dying of turf during the warm summer months when turf goes under stress. It is especially problematic on low cut turf growing in poor environments. This includes greens growing in shaded areas or where there is limited air movement. Fungicides applied alone and in combination with other products on a preventive basis have been shown to prevent this decline from occurring. These products not

only manage disease problems, but also create a more dense turfgrass appearance and better turf color. Although growing conditions have not been particularly stressful compared with recent summers, turfgrass quality differences among treatments can be observed in these trials.

### 2013 Creeping bentgrass summer stress treatments

| Treatment Number | Treatment Name    | Rate | Rate Unit                  | Application Interval |
|------------------|-------------------|------|----------------------------|----------------------|
| 1                | Untreated Control |      |                            |                      |
| 2                | SA-0010236        | 10   | oz/1000 ft <sup>2</sup>    | 14 days              |
| 3                | SA-0010239        | 5    | fl oz/1000 ft <sup>2</sup> | 14 days              |
| 4                | SA-0290102        | 0.52 | fl oz/1000 ft <sup>2</sup> | 14 days              |
| 5                | SA-0290101        | 0.5  | fl oz/1000 ft <sup>2</sup> | 14 days              |
| 6                | Echo Dyad ETQ     | 5    | fl oz/1000 ft <sup>2</sup> | 14 days              |
| 7                | SA-0010233        | 5    | fl oz/1000 ft <sup>2</sup> | 14 days              |
| 8                | Echo 720          | 3.6  | fl oz/1000 ft <sup>2</sup> | 14 days              |
| 9                | SA-0010235        | 10   | fl oz/1000 ft <sup>2</sup> | 14 days              |
| 10A              | Eclipse           | 4    | fl oz/1000 ft <sup>2</sup> | 14 days +            |
| 10A              | Phyte-Off         | 2    | fl oz/1000 ft <sup>2</sup> | 14 days fb           |
| 10B              | Echo Dyad ETQ     | 5    | fl oz/1000 ft <sup>2</sup> | 14 days +            |
| 10B              | Phyte-Off         | 2    | fl oz/1000 ft <sup>2</sup> | 14 days fb           |
| 10C              | Echo Dyad ETQ     | 5    | fl oz/1000 ft <sup>2</sup> | 14 days +            |
| 10C              | Phyte-Off         | 2    | fl oz/1000 ft <sup>2</sup> | 14 days fb           |
| 10D              | Echo Dyad ETQ     | 5    | fl oz/1000 ft <sup>2</sup> | 14 days +            |
| 10D              | Phyte-Off         | 2    | fl oz/1000 ft <sup>2</sup> | 14 days fb           |
| 10E              | Echo Dyad ETQ     | 5    | fl oz/1000 ft <sup>2</sup> | 14 days +            |
| 10E              | Phyte-Off         | 2    | fl oz/1000 ft <sup>2</sup> | 14 days fb           |
| 10F              | Echo Dyad ETQ     | 5    | fl oz/1000 ft <sup>2</sup> | 14 days +            |
| 10F              | Phyte-Off         | 2    | fl oz/1000 ft <sup>2</sup> | 14 days fb           |
| 10G              | Echo Dyad ETQ     | 5    | fl oz/1000 ft <sup>2</sup> | 14 days +            |
| 10G              | Phyte-Off         | 2    | fl oz/1000 ft <sup>2</sup> | 14 days fb           |
| 10H              | Eclipse           | 4    | fl oz/1000 ft <sup>2</sup> | 14 days +            |
| 10H              | Phyte-Off         | 2    | fl oz/1000 ft <sup>2</sup> | 14 days fb           |
| 11               | QP Enclave        | 3    | oz/1000 ft <sup>2</sup>    | 14 days              |
| 11               | Foursome          | 0.4  | oz/1000 ft <sup>2</sup>    | 14 days              |
| 12               | QP Enclave        | 4    | oz/1000 ft <sup>2</sup>    | 14 days              |
| 12               | Foursome          | 0.4  | oz/1000 ft <sup>2</sup>    | 14 days              |
| 13               | QP Enclave        | 3    | oz/1000 ft <sup>2</sup>    | 14 days              |
| 13               | QP Fosetyl-Al     | 4    | oz/1000 ft <sup>2</sup>    | 14 days              |
| 13               | Foursome          | 0.4  | oz/1000 ft <sup>2</sup>    | 14 days              |
| 14               | QP Enclave        | 4    | oz/1000 ft <sup>2</sup>    | 14 days              |
| 14               | QP Fosetyl-Al     | 4    | oz/1000 ft <sup>2</sup>    | 14 days              |
| 14               | Foursome          | 0.4  | oz/1000 ft <sup>2</sup>    | 14 days              |
| 15               | FP 747            | 8    | fl oz/100 gal              | 14 days              |

|    |                |      |                |         |
|----|----------------|------|----------------|---------|
| 15 | Astron         | 2    | fl oz/1000 ft2 | 14 days |
| 15 | Echo Dyad ETQ  | 3.67 | fl oz/1000 ft2 | 14 days |
| 15 | Knife Plus     | 2    | fl oz/1000 ft2 | 14 days |
| 15 | PK Fight       | 3.25 | fl oz/1000 ft2 | 14 days |
| 15 | Power 12-6-0   | 10   | fl oz/1000 ft2 | 14 days |
| 15 | Protesyn       | 4    | fl oz/1000 ft2 | 14 days |
| 16 | Signature      | 4    | oz/1000 ft2    | 14 days |
| 16 | Daconil Ultrex | 3.2  | oz/1000 ft2    | 14 days |
| 17 | Signature      | 4    | oz/1000 ft2    | 14 days |
| 17 | Chipco 26GT    | 4    | fl oz/1000 ft2 | 14 days |

### 2013 Annual bluegrass summer stress treatments

| Treatment Number | Treatment Name    | Rate  | Rate Unit      | Application Interval |
|------------------|-------------------|-------|----------------|----------------------|
| 1                | Untreated Control |       |                |                      |
| 2                | SA-0010236        | 10    | fl oz/1000 ft2 | 14 days              |
| 3                | SA-0010239        | 5     | fl oz/1000 ft2 | 14 days              |
| 4                | SA-0290102        | 0.52  | fl oz/1000 ft2 | 14 days              |
| 5                | SA-0290101        | 0.5   | fl oz/1000 ft2 | 14 days              |
| 6                | Echo Dyad ETQ     | 5     | fl oz/1000 ft2 | 14 days              |
| 7                | SA-0010233        | 5     | fl oz/1000 ft2 | 14 days              |
| 8                | Echo 720          | 3.6   | fl oz/1000 ft2 | 14 days              |
| 9                | SA-0010235        | 7     | fl oz/1000 ft2 | 14 days              |
| 10A              | Escape            | 2.6   | fl oz/1000 ft2 | 14 days +            |
| 10A              | Phyte-Off         | 2     | fl oz/1000 ft2 | 14 days fb           |
| 10B              | Echo Dyad ETQ     | 5     | fl oz/1000 ft2 | 14 days +            |
| 10B              | Phyte-Off         | 2     | fl oz/1000 ft2 | 14 days fb           |
| 10C              | Escape            | 2.6   | fl oz/1000 ft2 | 14 days +            |
| 10C              | Phyte-Off         | 2     | fl oz/1000 ft2 | 14 days fb           |
| 10D              | Echo Dyad ETQ     | 5     | fl oz/1000 ft2 | 14 days +            |
| 10D              | Phyte-Off         | 2     | fl oz/1000 ft2 | 14 days fb           |
| 10E              | Escape            | 2.6   | fl oz/1000 ft2 | 14 days +            |
| 10E              | Phyte-Off         | 2     | fl oz/1000 ft2 | 14 days fb           |
| 10F              | Echo Dyad ETQ     | 5     | fl oz/1000 ft2 | 14 days +            |
| 10F              | Phyte-Off         | 2     | fl oz/1000 ft2 | 14 days fb           |
| 10G              | Escape            | 2.6   | fl oz/1000 ft2 | 14 days +            |
| 10G              | Phyte-Off         | 2     | fl oz/1000 ft2 | 14 days fb           |
| 10H              | Eclipse           | 4     | fl oz/1000 ft2 | 14 days +            |
| 10H              | Phyte-Off         | 2     | fl oz/1000 ft2 | 14 days fb           |
| 11               | 28364             | 3.3   | oz/1000 ft2    | 14 days              |
| 12               | 28364             | 4     | oz/1000 ft2    | 14 days              |
| 13               | 28364             | 3     | oz/1000 ft2    | 14 days +            |
| 13               | 21469             | 0.785 | fl oz/1000 ft2 | 14 days              |
| 14               | 27867             | 10    | fl oz/1000 ft2 | 14 days +            |

|                 |                  |      |                |           |
|-----------------|------------------|------|----------------|-----------|
| 14              | 28364            | 3.3  | oz/1000 ft2    | 14 days   |
| 15              | 28364            | 3.3  | oz/1000 ft2    | 14 days + |
| 15              | Daconil Ultrex   | 3.2  | oz/1000 ft2    | 14 days   |
| 16              | Appear           | 6    | fl oz/1000 ft2 | 14 days + |
| 16              | Daconil Action   | 3.5  | fl oz/1000 ft2 | 14 days   |
| 17              | Chipco Signature | 4    | oz/1000 ft2    | 14 days + |
| 17              | Daconil Ultrex   | 3.2  | oz/1000 ft2    | 14 days   |
| 18              | QP Enclave       | 3    | oz/1000 ft2    | 14 days   |
| 18              | Foursome         | 0.4  | oz/1000 ft2    | 14 days   |
| 19              | QP Enclave       | 4    | oz/1000 ft2    | 14 days   |
| 19              | Foursome         | 0.4  | oz/1000 ft2    | 14 days   |
| 20              | QP Enclave       | 3    | oz/1000 ft2    | 14 days   |
| 20              | QP Fosetyl-Al    | 4    | oz/1000 ft2    | 14 days   |
| 20              | Foursome         | 0.4  | oz/1000 ft2    | 14 days   |
| 21              | QP Enclave       | 4    | oz/1000 ft2    | 14 days   |
| 21              | QP Fosetyl-Al    | 4    | oz/1000 ft2    | 14 days   |
| 21              | Foursome         | 0.4  | oz/1000 ft2    | 14 days   |
| 22 <sup>a</sup> | FP 747           | 8    | fl oz/100 gal  | 7 days    |
| 22 <sup>a</sup> | Astron           | 1.5  | fl oz/1000 ft2 | 7 days    |
| 22 <sup>a</sup> | Echo Dyad ETQ    | 3    | fl oz/1000 ft2 | 7 days    |
| 22 <sup>a</sup> | Groom            | 0.1  | fl oz/1000 ft2 | 7 days    |
| 22 <sup>a</sup> | Knife Plus       | 1.5  | fl oz/1000 ft2 | 7 days    |
| 22 <sup>a</sup> | PK Fight         | 2.5  | fl oz/1000 ft2 | 7 days    |
| 22 <sup>a</sup> | Power 12-6-0     | 10   | fl oz/1000 ft2 | 7 days    |
| 22 <sup>a</sup> | Protesyn         | 3    | fl oz/1000 ft2 | 7 days    |
| 23 <sup>a</sup> | FP 747           | 8    | fl oz/100 gal  | 7 days    |
| 23 <sup>a</sup> | Astron           | 1.5  | fl oz/1000 ft2 | 7 days    |
| 23 <sup>a</sup> | Echo 720         | 2    | fl oz/1000 ft2 | 7 days    |
| 23 <sup>a</sup> | Groom            | 0.1  | fl oz/1000 ft2 | 7 days    |
| 23 <sup>a</sup> | Knife Plus       | 1.5  | fl oz/1000 ft2 | 7 days    |
| 23 <sup>a</sup> | PK Fight         | 2.5  | fl oz/1000 ft2 | 7 days    |
| 23 <sup>a</sup> | Power 12-6-0     | 10   | fl oz/1000 ft2 | 7 days    |
| 23 <sup>a</sup> | Protesyn         | 3    | fl oz/1000 ft2 | 7 days    |
| 23 <sup>a</sup> | Turf Screen      | 1.25 | fl oz/1000 ft2 | 7 days    |
| 24 <sup>a</sup> | FP 747           | 8    | fl oz/100 gal  | 7 days    |
| 24 <sup>a</sup> | Astron           | 1.5  | fl oz/1000 ft2 | 7 days    |
| 24 <sup>a</sup> | Groom            | 0.1  | fl oz/1000 ft2 | 7 days    |
| 24 <sup>a</sup> | Knife Plus       | 1.5  | fl oz/1000 ft2 | 7 days    |
| 24 <sup>a</sup> | PK Fight         | 2.5  | fl oz/1000 ft2 | 7 days    |
| 24 <sup>a</sup> | Power 12-6-0     | 10   | fl oz/1000 ft2 | 7 days    |
| 24 <sup>a</sup> | Protesyn         | 3    | fl oz/1000 ft2 | 7 days    |
| 24 <sup>a</sup> | Turf Screen      | 1.25 | fl oz/1000 ft2 | 7 days    |
| 25              | Signature        | 4    | oz/1000 ft2    | 14 days   |

|    |                |     |                |         |
|----|----------------|-----|----------------|---------|
| 25 | Chipco 26GT    | 4   | fl oz/1000 ft2 | 14 days |
| 26 | Signature      | 4   | oz/1000 ft2    | 14 days |
| 26 | Daconil Ultrex | 3.2 | oz/1000 ft2    | 14 days |

<sup>a</sup> Treatments 22-24 did not receive supplemental background fertilizer.

### 2013 Summer stress on creeping bentgrass putting green

NORTH



|    | A  | B  | C  | D  | E  | F  |
|----|----|----|----|----|----|----|
| 1  | 1  | 12 | 13 | 6  | 2  | X  |
| 2  | 2  | 11 | 14 | 17 | 15 | 5  |
| 3  | 3  | 10 | 15 | 4  | X  | 14 |
| 4  | 4  | 9  | 16 |    | 1  | 7  |
| 5  | 5  | 8  | 17 | 12 | 16 | 11 |
| 6  | 6  | 7  |    | 13 | 9  | 3  |
| 7  | 9  |    | 11 | 8  |    |    |
| 8  | 7  | 4  | 2  | 5  | 13 | 10 |
| 9  | 13 | 1  |    | 15 | X  | 17 |
| 10 | 6  | 16 | 12 | 3  | 14 | 12 |
| 11 | 10 | 8  | 17 | 7  | X  | 2  |
| 12 | 3  | 14 | 11 | 1  | 10 | 8  |
| 13 | 15 | 5  | 6  | 9  | 4  | 16 |

## 2013 Summer stress on an annual bluegrass putting green

**NORTH**  
↑

|    | A  | B  | C  | D  | E  | F  | G  | H  |
|----|----|----|----|----|----|----|----|----|
| 1  | 1  | 14 | 15 |    | 3  | 11 | 7  | 17 |
| 2  | 2  | 13 | X  | 26 | 16 | 5  | 21 | 8  |
| 3  | 3  | 12 | 16 | 25 | 19 | 20 | 2  | 15 |
| 4  | 4  | 11 | 17 | 24 | 6  | 1  | 22 |    |
| 5  | 5  | 10 | x  | 23 | 14 | 25 | 4  | 23 |
| 6  | 6  | 9  | 18 | 22 | X  | 9  | 26 | 12 |
| 7  | 7  | x  | 19 | 21 | X  | 18 | X  | 10 |
| 8  | 8  | X  | 20 | X  | 24 | 13 |    | X  |
| 9  | 18 | X  | 6  | 4  | 2  | 23 | 8  | 25 |
| 10 | X  | 12 | 14 | 24 | 11 | 5  | 26 | 16 |
| 11 | 2  | 15 | 22 | 10 | 21 | 17 | 14 | 9  |
| 12 | 13 | 5  | 3  | 25 | 7  | 12 | X  | 19 |
| 13 | 20 | X  | 17 | 9  | 15 | 10 | 1  | 13 |
| 14 | X  | X  | 7  | 19 | 4  | 18 | 3  | X  |
| 15 | 21 | X  | 1  | 11 | 26 | X  | 22 | 6  |
| 16 | 8  | 16 | 23 | X  | X  | 24 | X  | 20 |

## Stop 4. Annual Bluegrass Control in a Putting Green with Herbicide and Nitrogen Rate Regimes

Aaron Hathaway and Dr. Thomas A. Nikolai

Annual bluegrass control continues to be an important topic in golf course research. Winterkill and summer stress has forced superintendents to, at least, think about controlling annual bluegrass as it infiltrates into greens and fairways. Although a daunting task, there is no shortage of new products and ideas when it comes to controlling annual bluegrass.

Twelve different annual bluegrass control regimes were initiated on a creeping bentgrass putting green featuring a combinations of 5 different products and 2 different rates of biweekly nitrogen (Table 1). Methiozolin (PoaCure), amicarbazone (Xonerate), bispyribac sodium (Velocity), paclobutrazol (Trimmit), and flurprimidol (Cutless) were applied every 2 weeks starting on June 24, 2013 in combination with urea, as a tankmix, at 0.1 lbs N/M (low rate) and 0.2 lbs N/M (high rate). Although the high rate of N will help to mask some of the injury from some of these herbicides, the low rate of N could increase annual bluegrass control as increased N has been shown to favor annual bluegrass over creeping bentgrass. The 2 N rates