

## PACE Turfgrass Research Institute, 1997 Field Research Update by Wendy Gelernter, Ph.D. and Larry Stowell, Ph.D.

During 1997, PTRI has completed (or will soon complete) 17 research trials on Southern California golf courses (see listing below). In this issue of PACE Insights, we have summarized results from some of these trials that may be of use as you plan your 1998 turf management programs. Full reports will be published in the PTRI 1998 Annual Report, as well as on the PACE/PTRI website (<http://www.pace-ptri.com>).

### PACE TURFGRASS RESEARCH INSTITUTE 1997 RESEARCH PROJECTS

#### DISEASE MANAGEMENT TRIALS

- Evaluation of fungicides and wetting agents for management of localized dry spot and fairy ring
- Evaluation of fungicides for control of brown patch on kikuyugrass fairways
- Reducing summer stress on greens with Alette combinations
- Efficacy of procymidone for control of dollar spot
- Evaluation of fungicides for control of anthracnose on greens
- Evaluation of fungicides for control of summer patch on greens

#### INSECT MANAGEMENT TRIALS

- Evaluation of insecticides for control of black cutworms
- Evaluation of insecticides for control of black turfgrass ataenius
- Predicting the timing of adult populations of the black turfgrass ataenius and the masked chafer using degree day models
- Black light turf insect monitoring study

#### GROWTH REGULATION AND WEED MANAGEMENT

- Evaluation of pre-emergent herbicides for control of crabgrass
- Evaluation of *Poa annua* control products on overseeded turf
- Evaluation of Primo rates and application timing strategies for improved transition and turf quality on fairways

#### FERTILIZERS, ADJUVANTS AND MICROBES

- Evaluation of gypsum and lime for soil sodium management
- Evaluation of sodium thiosulfate for management of high sodium soils

#### VARIETY TRIALS

- Poa annua* invasion of 14 bentgrass varieties: Southern California results
- Evaluation of new paspalum varieties

#### COOPERATOR

- David Major, Del Mar CC
- Alan Andreasen, El Niguel CC
- Candice Combs, Balboa Park GC
- Bill Gallegos, Los Coyotes CC
- Bill Gallegos, Los Coyotes CC
- John Harkness, Arrowhead CC
- Bruce Duenow, La Jolla CC
- Bill Gallegos, Los Coyotes CC
- Hi-Lo Desert Golf Course Superintendents Association
- 13 California superintendents
- Bruce Duenow, La Jolla CC
- Bill Kostas, Desert Dunes GC
- Mike Kocour, The Springs Club
- Ron Nolf, Vista Valley CC
- Ron Nolf, Vista Valley CC
- Reed Yenny, Mesa Verde CC
- Kevin Kienast, Pala Mesa Resort
- Don Parsons, Old Ranch CC

## I. Evaluation of pre-emergent herbicides for control of crabgrass

**Cooperator:** Bruce Duenow, La Jolla Country Club

**Sponsors:** Randy Smith, Rohm and Haas, and Dennis Shepard, Novartis

**Summary of Results:** In a replicated field trial conducted on a hybrid Bermudagrass tee at La Jolla County Club, La Jolla, CA, residual activity, various formulations, rates and application timings for the herbicides Dimension, Barricade, and Pendulum were evaluated for pre-emergent control of smooth crabgrass, *Digitaria ischaemum*. Graphed results are shown in Figure 1.

- In warm winter climates such as California, it is possible that applications of pre-emerge herbicides for control of crabgrass can be made later than the manufacturers currently recommend (current recommendations are to treat when soil temperatures reach 50 - 55° F), thus extending the activity of these products into the summer months. This is based on our observation that soil temperatures at La Jolla CC reached 50 - 55° F on 3/3/97, but crabgrass seedlings didn't emerge until 5/5/97 -- a full two months later. We will investigate this further in 1998. Because the data is preliminary now, it's best to stay with the manufacturer's recommendations for timing until we can confirm this observation.
- The best performance (100% control for 4 1/2 months) came from Dimension 1EC at either 1.5 oz/1000 (applied once on 3/3/97) or 0.75 oz/1000 (applied twice on 3/3/97 and 5/5/97), Pendulum 60 DG, at 1.8 oz/1000 (applied once on 3/3/97), a single application of Barricade 65 WG, applied at 0.55 oz/1000, and split applications of Barricade 65 WG (applied 3/3/97 and 5/5/97) at either 0.28 oz/1000 followed by 0.28 oz/1000, or 0.37 oz, followed by 0.18 oz/1000.
- Lower rates of Barricade did not perform as well as either the high rate of Barricade or the split applications of Barricade, and the granular formulation of Dimension did not perform as well as the Dimension 1EC formulation.
- The most effective products had a residual activity of 140 days (4 1/2 months).

## II. Efficacy of procymidone and Chipco 26019 for control of dollar spot

**Cooperator:** Bill Gallegos, Los Coyotes Country Club, Buena Park, CA.

**Sponsor:** Pam Knoepfli, Valent

**Summary:** A serious infestation of dollar spot, *Sclerotinia homeocarpa*, on a bentgrass nursery at Los Coyotes Country Club, Buena Park, CA, was curatively controlled by all three rates of procymidone (a non-registered, experimental compound), as well as by the commercial standard, Chipco 26019 Flo (iprodione). Graphed results are shown in Figure 2.

- Products were applied when symptoms of dollar spot first appeared. Control was maintained over a four week period with a single application of either procymidone (1, 3 or 5 oz/1000) or Chipco 26019 Flo (4 oz/1000), although there were trends (non-significant) indicating that 14 day applications of the lowest rate of procymidone tested (1 oz/1000 sq ft) may be necessary to obtain optimal control over a four week period.
- 100% control of dollar spot symptoms was achieved in treated plots, but only by 4 weeks after application. While the fungicides probably controlled the dollar spot fungus rapidly, it took the turf several weeks to recover from the infection and to re-grow new turf.
- Although well controlled by several different fungicides (chlorothalonil, iprodione, thiophanate methyl, propiconazole, fenarimol, vinclozolin), dollar spot resistance has been documented to all but chlorothalonil (Vargas, 1994). For this reason, sources of new active ingredients, with new modes of action (such as procymidone) are of interest. In addition, incidences of dollar spot are expected to increase as the newly registered fungicide, Heritage (azoxystrobin) is utilized more on golf courses because this broad spectrum product is highly active against a wide variety of turfgrass diseases, with the important exception of dollar spot.

## III. Evaluation of fungicides and wetting agents for management of localized dry spot and fairy ring

**Cooperator:** David Major, Del Mar Country Club, Rancho Santa Fe, CA

**Sponsors:** David Bower, United Horticultural Products, Steve Stringer, AgrEvo and Dan Wickham, Zeneca

**Summary of Results:** In a replicated field trial performed on a bentgrass (Pennlinks) putting green at Del mar Country Club, Rancho Santa Fe, CA, the wetting agents Respond and Primer and the fungicides Heritage and ProStar were evaluated for their ability to control localized dry spot (LDS) and

fairy ring, caused by the fungus *Agrocybe pediades*. Graphed results are shown in Figures 3 and 4.

- Two types of symptoms were detected in the plots: 1) Type B fairy ring symptoms: dark green circles of stimulated turf growth, with thatch degradation leading to low spots in the turf, and 2) Type C fairy ring (also frequently called localized dry spot) symptoms: dry spots with irregular areas of dead or dying turf and extreme hydrophobicity underneath
- Both Type B and Type C fairy ring symptoms were controlled well (100% control) by monthly applications of ProStar (6 oz/1000) plus the wetting agent Respond (3 oz/1000), Heritage (0.4 oz/1000) and Heritage (0.4 oz/1000) plus Respond (3 oz/1000). Addition of Respond appears to have improved performance of Heritage in some cases.
- It was not necessary to irrigate following treatment with the above products, although 1/10inch of irrigation following application did not have a harmful effect on activity.
- When applied by themselves, wetting agents such as Primer (6 oz/1000) and Respond (3 oz/1000) had little or no effect on fairy ring symptoms. However, these same products helped reduced symptoms of localized dry spot when applied on a monthly basis. For optimum efficacy, the Respond should be watered in with approximately 1/10: water. In contrast, it was not necessary to irrigate following Primer applications.
- It is important to note that while wetting agents can manage the symptoms of LDS (as can cultural practices such as verticutting, aerification, topdressing and hand watering), a fungicide such as ProStar or Heritage is necessary to kill the fungus that causes dry spot and fairy ring.

#### IV. Evaluation of insecticides for control of black cutworms

**Cooperator:** Bruce Duenow, La Jolla Country Club, La Jolla, CA.

**Sponsors:** Randy Smith, Rohm and Haas and Robert Brown, Troy Biosciences

**Summary:** Two new "soft" insecticides with enhanced safety features were tested for control of black cutworm larvae on a bentgrass nursery at La Jolla Country Club, La Jolla, CA. Products tested include Mach 2 (halofenizide), an insect growth regulator that kills insects by interfering with their ability to shed their skins (molt) and Naturalis T

which is based on the insect pathogenic fungus, *Beauveria bassiana*, which kills caterpillars through growth of the fungus inside the insect. These products were compared against the current standard product for black cutworm control, Dursban (chlorpyrifos). Graphed results are shown in Figures 5 and 6.

- When applied every 1-2 weeks, Mach 2 (0.75 or 1.5 oz/1000) performed as well (85% - 100% control) as one application of Dursban (1.5 oz/1000) during the four week trial. A single application of Mach 2 performed well for up to 3 weeks, but by the fourth week of the trial, some decline in activity was seen.
- Based on the results above, Mach 2 did not have the residual activity of Dursban. However, when applied every 1 - 2 weeks, it provided excellent control of black cutworm larvae, and should be considered for use once it is registered in California.
- Naturalis-T did not perform as well as Dursban or Mach 2, at any of the rates tested. Control levels ranged from 0% to 63% control. The highest level of control was obtained from weekly applications of Naturalis at 1 oz/1000, and the worst control was seen with the lowest rate of the product that was tested (0.5 oz/1000 applied every 2 weeks).

#### V. Predicting the timing of adult populations of the black turfgrass ataenius and the masked chafer using degree day models

**Cooperators and Sponsors (1994 - 1997):** Hi-Lo Desert Golf Course Superintendents Association; Doug Anderson, the Vintage Club; Brian Darrock, Fairbanks Ranch CC; Ray Davies, Virginia CC; Bruce Duenow, La Jolla CC; Bill Gallegos, Los Coyotes CC; Mike Gleason, Callaway Golf; Cal Hardin, Morningside CC; Chris Harvell, PGA West; Jim Husting, Woodbridge CC; Mike Kocour, The Springs Club; Eric Lover, Dove Canyon CC; David Major, Del Mar CC; John Martinez, Arrowhead CC; Ben McBrien, SeaCliff CC; Mark Phillips, Monarch Beach Links; Kurt Rahn, Leisure World; Mark Schaer, San Luis Rey Downs; Bruce Williams, Los Angeles CC; Reed Yenny, Mesa Verde CC

**Summary:** A study was conducted to determine whether temperature, in the form of a degree-day model, could be utilized to more accurately predict when black turfgrass ataenius (BTA) and masked chafer adults would appear on golf courses, and therefore aid in insect management decisions.

- As with other degree day models developed for insects, our models only roughly predicted when BTA and masked chafer adults would appear, and therefore should not be used as stand-alone tools for timing preventive applications. Instead, the degree day model should be used in conjunction with black light trapping and scouting to develop grub management programs.

The model that was developed predicted the appearance of BTA adults using a value of 680 degree days between BTA generations, a minimum threshold of 50° F and a maximum threshold of 75° F. When compared to black light trap data, the model's predictions were not very accurate, with a spread of 35 days around the actual peak, and ranged from as much as 15 days before the actual peak to as much as 20 days after the actual peak. However, for courses in the Low Desert, accuracy was much better, with a spread of only 16 days, and ranged from 2 days before the actual peak to as

much as 14 days after the actual peak of BTA adults.

- In contrast, for masked chafers, a comparison of the degree-day approach (a model based on 1861 degree days between January 1 and the first masked chafer peak, and a minimum threshold of 50° F and a maximum threshold of 75° F was developed) vs. the calendar approach to predicting the occurrence of adults revealed that a calendar approach was much more precise. During 1994, 1995 and 1996, non-Desert courses had masked chafer peaks between 6/24 and 6/29, and Desert courses had peaks between 6/9 and 6/11.

## References

Vargas, J.M. 1994. Management of Turfgrass diseases. Lewis Publishers, Boca Raton, FL. 294 pp.

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