This is
Warren's®
ADVENTURE
Turf-type Tall Fescue
Rated better than its top competitors.

9 = very best 1 = very poor

<table>
<thead>
<tr>
<th>Variety</th>
<th>Turf Quality</th>
<th>Spring Color</th>
<th>Brown Patch Resistance</th>
<th>Pythium Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warren's® ADVENTURE Sod</td>
<td>6.8</td>
<td>6.5</td>
<td>7.8</td>
<td>6.0</td>
</tr>
<tr>
<td>Apache</td>
<td>6.7</td>
<td>*</td>
<td>6.5</td>
<td>5.0</td>
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<tr>
<td>Olympic</td>
<td>6.5</td>
<td>5.8</td>
<td>5.8</td>
<td>5.3</td>
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<tr>
<td>Jaguar</td>
<td>6.1</td>
<td>*</td>
<td>7.3</td>
<td>6.0</td>
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<td>Rebel</td>
<td>5.9</td>
<td>7.4</td>
<td>6.5</td>
<td>6.0</td>
</tr>
<tr>
<td>Hound Dog</td>
<td>5.9</td>
<td>*</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>Falcon</td>
<td>5.8</td>
<td>5.6</td>
<td>6.3</td>
<td>7.0</td>
</tr>
<tr>
<td>Kentucky 31</td>
<td>3.4</td>
<td>4.0</td>
<td>6.5</td>
<td>6.8</td>
</tr>
</tbody>
</table>

Data from Adelphia and North Brunswick, New Jersey, 1980 thru 1983

No matter what demands you put on Warren's® new ADVENTURE Turf-type Tall Fescue — turf quality... color... density... texture... toughness... heat and drought tolerance... you can count on performance that's proven superior against leading competitors.

The finer blade of ADVENTURE provides a denser more attractive turf than the older unimproved varieties. It requires less water and fertilizer than Kentucky Bluegrass or perennial ryegrass and is suited for heavy shade conditions as well as full sun.

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P.O. Box 459, Suisun City, CA 94585
the Board of Directors has made continued improvements over the years. The latest, a $6.5 million improvement program begun early in 1985, is spotlighted by the addition of the turf track, nestled inside the dirt track and edged by burning bush shrubs.

Other improvements: a practically new centerfield with new fountains, flower planters, and alterations around the winner's circle; a new 500-foot tunnel from the infield to the main parking lot; new dining and entertainment areas; a remodeled lounge known as The Jockey Club; and a general repainting.

Superintendent Lehr oversaw construction of the fescue track (it's actually 90 percent fescue and 10 percent Kentucky bluegrass) that will host its first race in the spring of 1987. He assures a visitor he didn't choose the fescue turf arbitrarily. "We did tests on grasses before choosing. We also talked to a lot of turf people. It was almost unanimous—most recommended the Kentucky 31 fescues," says Lehr, another Louisville native who has worked his way up the corporate totem pole since joining Churchill Downs in 1967.

Ground was broken for turf track July 5, 1985, at 10 a.m. (Evidently, Lehr keeps records to the minute). The grass was sowed on Sept. 30, mowed on Nov. 5, and again on Nov. 18. A Rain Bird irrigation system was installed near the turf track, the only area at Churchill Downs that is irrigated. The system was turned on March 10 of this year.

The baby track experienced some kill over the winter but was resowed in March, fertilized shortly thereafter, and greened-up by April 1.

RVA Omnisports, based in Ontario, Canada, designed the mortar sand-based track.

Lehr says he chose the Rain Bird irrigation system because other Rain Bird users he spoke with noted the system's low maintenance requirements.

The Breeder's Cup
It's no secret that Churchill Downs built the 7/8-mile turf track with an eye on playing host to the annual Breeder's Cup, held each November. To date, no Breeder's Cup is scheduled for Churchill Downs, but there's a good chance that will change in the future.

Walter Hagan has recently been named turf track superintendent.

For Lehr, the turf track means even more responsibility. At 37, he handles the pressure smoothly though there's no doubt he's a man with a lot on his mind.

He credits his employees for his success. "It's frustrating at times, but our people go farther than expected when the chips are down. I've got good men under me and they feel the same as me—there's something special about working here and it leads to pride in your job," says Lehr, in between answering his walkie-talkie and the telephone.

Since 1967, he's seen every Kentucky Derby with the exception of the two he missed in 1969 and 1970 when he was serving in the Army. He'll probably see a lot more.

"I guess if I had to work somewhere for the rest of my life, I'd like to work here," says the blue-eyed father of two.

His co-worker and friend Lord has seen 35 Derbies. He can rattle off the names of most Derby winners, especially those in long-past years. He has trouble with the recent winners.

That could be because of the growing pressure Lord faces preparing the track for Derby Day. The greater the spectacle, the greater the pressure. The race becomes secondary for Lord.

Still, it's a job he wouldn't trade. "I love what I do. I couldn't imagine doing anything else," he says, inhaling a Marlboro.

After the Derby, Lord and crew take the role of landscape maintenance workers—flower care, spraying, mowing, fertilizing, pruning, and the other tasks presented in a 147-acre landscape.

In preparing for the Fall Meet (the fall racing season which runs from late October to late November), Lord plants chrysanthemums and other fall bloomers. The flowers, he says, cause his biggest worries but are most rewarding.

When they're right and Churchill Downs is at its finest, then the 365 days of toil and worry are worth it for the employees. WT&T
BROUWER TRIPLEX-376 . . . designed from "the grass up" for the professional. Compare the high quality engineering, rugged reliable performance, and you will be convinced that in the long-run your equipment investment should include a Brouwer Triplex-376. User experience has shown that dollar for dollar there is no better triplex mower on today's market. It is the perfect mower for a wide range of applications where grass requires the best in routine maintenance. Brouwer is committed to Quality and Value and backs this commitment with after-sales service that is second-to-none. Contact us for your local dealer information.

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TAKE-ALL PATCH: THE BENTGRASS DESTROYER

by Peter H. Dernoeden, University of Maryland

Take-all patch disease (formerly known as Ophiobolus patch) is an extremely destructive disease of bentgrass, caused by the fungus Gaeumannomyces graminis var. avenae.

Peter H. Dernoeden is associate professor of agronomy in the college of Agriculture at the University of Maryland in College Park.

Common in western Europe, Australia, and the United States, take-all patch was first reported in Holland (1931) on a bentgrass putting green.

Symptoms of the disease are most conspicuous in late April through June, and in autumn when cool, wet weather prevails. Affected bentgrass turf dies in circular patches a few inches in diameter and may progress to two or more feet in diameter.

When the disease is active, the outer perimeter of the patch assumes a bronzed appearance, eventually turning a bleached or tan color. The small circular patches increase in size over a number of years and dead bentgrass in the center of the patch is often replaced by broadleaf weeds (especially dandelions) and occasionally Poa annua.

Because the fungus attacks the
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TABLE 1
Evaluation of fungicides for curative control of take-all patch in a Penncross creeping bentgrass turf.

<table>
<thead>
<tr>
<th>Treatment and rate/1000 ft.2</th>
<th>Take-all severity*</th>
<th>Turf color**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>May 5</td>
<td>May 21</td>
</tr>
<tr>
<td>Bayleton 4.0 oz.</td>
<td>4.8c†</td>
<td>5.3b</td>
</tr>
<tr>
<td>Chipco 26019 4.0 oz.</td>
<td>6.8b</td>
<td>5.0b</td>
</tr>
<tr>
<td>Banner 3.0 fl. oz.</td>
<td>6.8b</td>
<td>6.3ab</td>
</tr>
<tr>
<td>Daconil 2787 8.0 fl. oz.</td>
<td>7.5ab</td>
<td>6.2ab</td>
</tr>
<tr>
<td>BMAS 1.0 fl. oz.</td>
<td>4.7c</td>
<td>2.0c</td>
</tr>
<tr>
<td>Untreated Control</td>
<td>9.0a</td>
<td>8.0a</td>
</tr>
</tbody>
</table>

*Severity was visually determined on a 0 to 10 scale where 0 = no disease and 10 = all turf dead in affected patches.

**Color was visually determined on a 0 to 10 scale where 0 = brown turf and 10 = dark green turf.

+ Means in a column followed by the same letter are not significantly different at the 5% level according to the Bayes LSD.

Evaluated fungicides for take-all control in Maryland in 1980 (table 1). In that study fungicides were applied on April 23, May 7, and May 23. Disease symptoms were conspicuous before application, developing around mid-April. The disease remained active until early July. All fungicides, except Daconil 2787, significantly reduced disease intensity within two weeks of the initial application.

Fungicide control
Fungicides were evaluated for take-all control in Maryland in 1980 (table 1). In that study fungicides were applied on April 23, May 7, and May 23. Disease symptoms were conspicuous before application, developing around mid-April. The disease remained active until early July. All fungicides, except Daconil 2787, significantly reduced disease intensity within two weeks of the initial application.

PMA (an organomercurial) provided excellent suppression of symp-
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The effectiveness of various fertilizers, sulfur and PMA in controlling take-all patch of Penncross creeping bentgrass turf in Easton, MD. Thatch depth and thatch and soil pH were measured in 1985 at the conclusion of the experiment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Application rate per 1000 ft²</th>
<th>Percent of plot area injured</th>
<th>Thatch depth (cm)</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1984</td>
<td>1985</td>
<td>1985</td>
<td></td>
</tr>
<tr>
<td>Ammonium sulfate</td>
<td>0.75 lbN</td>
<td>2.5a***</td>
<td>0.0a</td>
<td>3.2a</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>0.75 lbN</td>
<td>0.2a</td>
<td>0.0a</td>
<td>3.0abc</td>
</tr>
<tr>
<td>Urea</td>
<td>0.75 lbN</td>
<td>3.7a</td>
<td>0.3a</td>
<td>2.9ab</td>
</tr>
<tr>
<td>Sulfur 90G</td>
<td>0.75 lbS</td>
<td>4.7a</td>
<td>6.0bc</td>
<td>3.0abc</td>
</tr>
<tr>
<td>Sulfur 90G + ammonium sulfate</td>
<td>0.50 lbS + 0.5 lbN</td>
<td>1.2a</td>
<td>3.0ab</td>
<td>3.1ab</td>
</tr>
<tr>
<td>PMA 10L</td>
<td>1.0 fl oz</td>
<td>2.0a</td>
<td>8.7c</td>
<td>2.6cd</td>
</tr>
<tr>
<td>PMA 10L + Sulfur 90 G</td>
<td>1.0 fl oz + 0.75 lbS</td>
<td>0.3a</td>
<td>1.0ab</td>
<td>2.7bcd</td>
</tr>
<tr>
<td>PMA 10L + ammonium sulfate</td>
<td>1.0 fl oz + 0.75 lbN</td>
<td>10.7b</td>
<td>9.0c</td>
<td>2.8abcd</td>
</tr>
<tr>
<td>Untreated control</td>
<td>—</td>
<td></td>
<td>2.5d</td>
<td>6.9a</td>
</tr>
</tbody>
</table>


** Thatch depth was determined in July 1985 and pH was determined in June 1985. Soil for pH measurements was taken from a one inch zone just below the thatch layer.

*** Means separated at the 5% level by the Bayer LSD.

* Tomatoes throughout the test period. Unfortunately PMA is only registered for control of snow mold diseases.

However, fall and early winter applications (applied at a time legal for control of snow mold) have helped reduce take-all severity the following spring.

All fungicides had suppressed but not eradicated the disease by June 25. Repeat applications of PMA, however, discolored turf. The high rates of Bayleton and Banner elicited an unfavorable, blue-purple color in the turf.

Acidification of soil with ammonium sulfate is the primary cultural approach to control take-all patch.

Early studies used to establish this approach, however, evaluated excessively high levels of nitrogen (8.12, or 20 pounds of nitrogen per 1,000 sq. ft.) fertilizer to achieve successful suppression of disease symptoms.

A University of Maryland experiment, however, was initiated to determine how rapidly various acidifying agents would suppress take-all to acceptable levels with conventional-use rates and dates of application.

Because of the favorable test results achieved with PMA, it was applied preventatively with either sulfur or ammonia sulfate to see if accelerated take-all suppression could be achieved.

It should be noted that the sulfur used in this test was formulated as a granule (90G) rather than a powder of flowable form. The materials were applied in the fall and early spring at conventional-use rates as shown in table 2.

Data collected in June, 1984 indicated the two most effective treatments in reducing take-all were ammonium chloride and PMA plus ammonium sulfate.

Ammonium sulfate, which had eliminated the disease in two applications (0.78 pounds of nitrogen per 1,000 sq. ft.) in an English study did not reduce take-all severity to an acceptable level.

Sulfur, PMA plus sulfur, PMA plus urea reduced disease severity but to an unacceptable level of control.

Treatments were reapplied in the fall of 1984 and spring of 1985 and by June, 1985, plots treated with ammonium chloride and ammonium sulfate were free of take-all. Untreated plots had only a trace of disease activity.

The date was the opposite of that anticipated and may be related to the inability of granular forms of sulfur to rapidly acidify the thatch.

The view is supported by 1985 pH data in table 1, which shows that only ammonium chloride reduced pH of the thatch layer significantly when compared to untreated turf.

** Thatch levels**

Thatch depth, as expected, was higher in plots treated with fertilizer.

Interestingly, plots receiving only sulfur also had significantly more thatch than untreated turf.

The importance of thatch in the severity of take-all is unknown. However, it is likely that management of the thatch micro-environment will be a key factor in control of the disease.

The pH data in table 2 provide a good indicator of how slow the acidification process is in both thatch and soil.

But thatch and soil pH data may be misleading due to the buffering capacity of soil and organic matter, and our inability to accurately assess pH in soil water adjacent to roots, where take-all fungus resides.

It is probable that the soil water adjacent to and on roots has a much lower pH than may be indicated on a routine soil test, an important factor to remember when considering that acidification is believed to be the primary factor responsible for alleviating take-all with ammonium sulfate and ammonium chloride.

Some researchers say that the chloride anion lowers the water potential of a cell sap in roots and that this physiological response reduces the ability of the take-all fungus to...
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It's also theorized that acidification of the soil water either directly reduces growth of the take-all fungus or that it favors growth of other microorganisms, which effectively compete with or in some other way antagonize G. graminis var. avenae.

Ammonium chloride appears to be our most formidable weapon against take-all. The findings of our studies show ammonium sulfate does not rapidly reduce disease severity but it does work.

Combining the Maryland test results with information obtained elsewhere, one would recommend the use of ammonium chloride to combat take-all patch.

A second choice is a combination of ammonium sulfate with muriate of potash (KCL), and a phosphorus fertilizer.

The phosphorus could be eliminated where soil testing reveals existing moderate or high P levels.

PMA, where legal to apply, should be used in the fall for preventative control of snow mold disease and should provide additional benefit against take-all.

Three to four pounds nitrogen and potassium per 1,000 sq. ft. from the aforementioned fertilizers should be applied annually for at least two years.

Furthermore, the use of lime or topdressing soil with a pH above 6.0 should be avoided, and thatch should be controlled through aerification and/or verticutting.

The use of ammonium fertilizers will provide good winter color to turf but they also encourage growth (and therefore increased mowing) into early winter.

**LITERATURE CITED**


