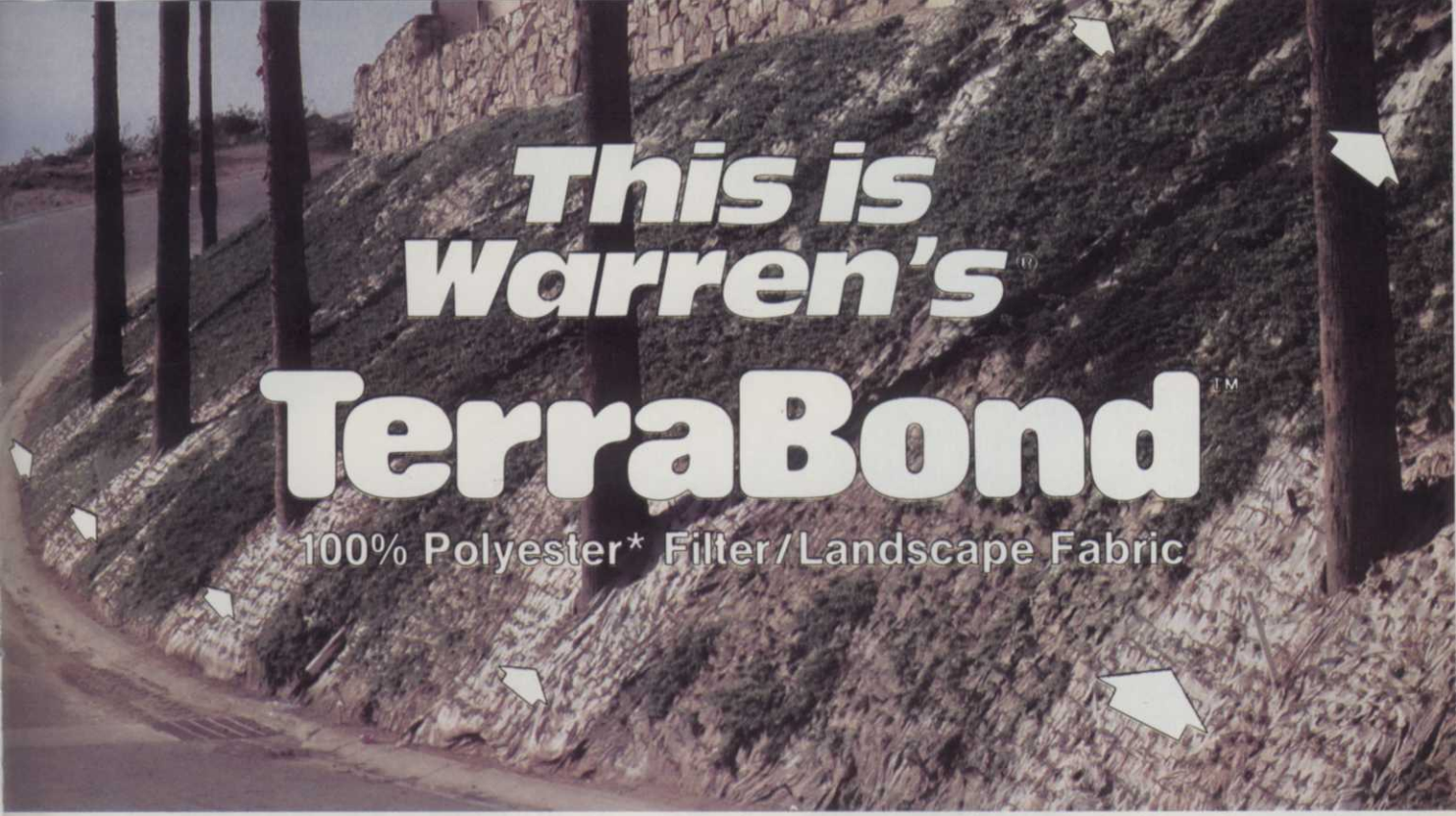

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Circle No. 161 on Reader Inquiry Card

From the turf care group at Union Carbide

TABLE 2 *continued*

Disease	Causal Agent	Hosts	Biological and Cultural Control	Chemical Control
Take-all patch	*Gaeumannomyces graminis*	Creeping bentgrass Kentucky bluegrass Velvet bentgrass	Reduce soil pH. Avoid liming, Use acidic fertilizers. Sulfur.	fenarimol
Pythium blight (cottony blight)	*Pythium spp.*	Perennial ryegrass Creeping bentgrass Annual bluegrass	Improve soil drainage. Increase air circulation.	chloroneb, ethazol, metalaxyl, propamocarb
Red thread	*Laetisaria fuciformis*	Creeping bentgrass Colonial bentgrass Bermudagrass Annual bluegrass Perennial ryegrass Fine leaf fescues	Increase nitrogen.	anilazine, iprodione, triadimefon, vinclozolin, chlorothalonil
Pink patch	*Limonomyces roseipellis*	Perennial ryegrass Creeping bentgrass Fine leaf fescue	Increase nitrogen.	Try red thread fungicides
Snow molds *Typhula* blight *Fusarium* patch	*Typhula spp.* *Fusarium nivale*	Annual bluegrass Colonial bentgrass Creeping bentgrass Fine-leaf fescues Kentucky bluegrass Perennial ryegrass Tall fescue Velvet bentgrass	Avoid early fall nitrogen fertility that leads to lush growth.	Mercury compounds, PCNB products, chlorothalonil, chloroneb. These products may have to be used in combination for effective snow mold management. Benomyl, iprodione or mancozeb will control *Fusarium* patch where it occurs alone.
Necrotic ring spot	*Leptosphaeria korrae*	Kentucky bluegrass	Nitrogen to promote recovery. Light daily irrigation. Lawn Restore, Green Magic, Strengthen & Restore.	iprodione, fenarimol, benomyl, thiophanate, thiophanate-methyl

**The order in which fungicides are presented does not imply the order of their effectiveness.*

weeds when the cool weather of the fall returns.

Cultural management of *Pythium* blight consists of reduced nitrogen levels just prior to the advent of warm weather and improved drainage. Concerning the latter, in marginal areas of the cool season grass regions, *Pythium* blight is only a problem in areas of poor soil drainage, where water stands for prolonged periods.

In regions where severe *Pythium* blight damage occurs, it is always most severe in poorly drained soil areas. So good *Pythium* blight management begins with improving soil drainage.

As far as chemical management is concerned, two systemic fungicides, metalaxyl and propamocarb hydrochloride, are available to manage the disease for up to three weeks. They appear to be slower acting than chloroneb or ethazol.

Little spread of the disease occurs after these systemic fungicides are applied, although the mycelium of the fungus may remain evident on the previously infected tissue for a couple of days. No actual resistance to these two fungicides has been reported, but the possibility exists.

It would be wise, therefore, to follow each systemic fungicide application with a contact fungicide (chloroneb or ethazol) application so if resistance does occur following a systemic fungicide application, the contact fungicide will prevent the resistant strain from devastating the turf.

Anthracnose

Anthracnose, caused by *Colletotrichum graminicola*, is primarily a disease of annual bluegrass, although it will attack the fine-leaf fescues, perennial ryegrasses, and seaside creeping bentgrass.

Annual bluegrass dies from anthracnose during heat-stress periods of the summer, and not due to heat alone, as was once believed. If proper cultural management is followed and effective fungicides are used, annual bluegrass will survive the summer heat stress period like any other perennial.

One good cultural practice consists of deep, vertical mowing early in the spring, as soon as growth is initiated for the season. This will allow for the

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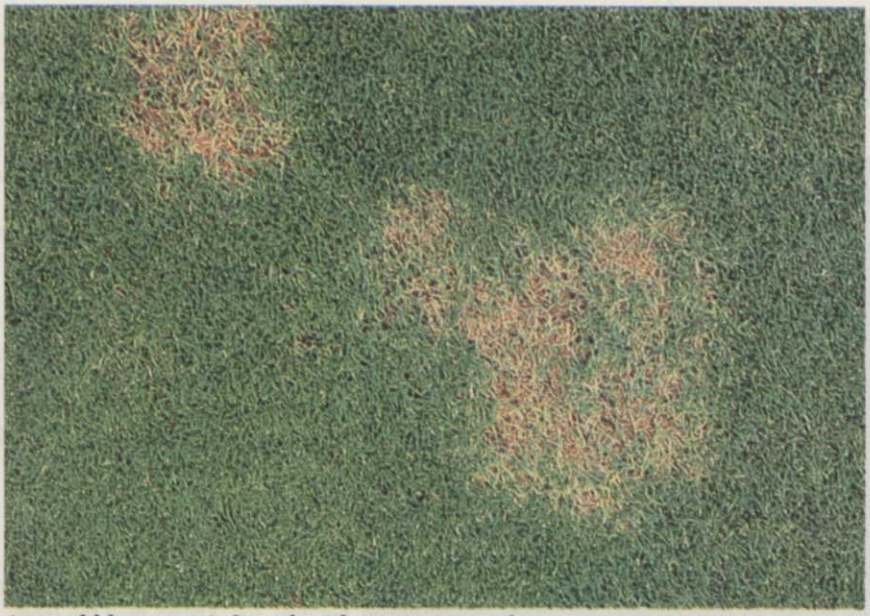

Annual bluegrass infected with summer patch.

production of new, juvenile growth which should be more resistant to heat stress. Coring should follow a week or two later for good root growth.

A second coring cultivation should be done following heavy seedhead production in the late spring to provide an optimum medium for maximum root growth (the coring holes) in the few remaining weeks prior to the heat stress period.

If only one coring operation a year can be done, this is the time to do it, because over 70 percent of the annual bluegrass roots disappear during heavy seedhead production.

A third coring operation should be done when the cool nights of late summer and early fall return. Light nitrogen applications should be made, i.e. ½ pound actual nitrogen per 1000 sq. ft. in June, July, and August for a healthier annual bluegrass plant and to reduce the amount of inoculum produced by *C. graminicola* for subsequent infection during the remainder of anthracnose season.

Finally, one of the effective fungicides mentioned in Table 2 should be used to assure healthy turf. A computer model has been developed which predicts the occurrence of anthracnose based on average daily temperatures and continuous hours of leaf wetness. Fungicides for the management of anthracnose can now be applied when the disease occurs, instead of on a calendar basis.

The snow molds

There are two prevalent snow molds in the U.S., *Typhula* blight (gray snow mold) and *Fusarium* patch (pink snow mold).

Gerlachia (Fusarium) Patch: Fusarium patch, caused by *Fusarium nivale*, becomes a problem in the fall when the temperature drops into the low 60s or lower, and continues at these levels through the spring. Disease activity may continue until the daytime temperature climbs back in the 70s.

It is usually first noticed in the shaded areas of greens, tees and fairways. *Fusarium* patch does not need snow cover to become active, only cool, wet weather. Annual bluegrass is especially susceptible to *Fusarium* patch. In the spring, the disease is often mis-diagnosed as copper spot, because of the small copper colored spot that it causes.

However, copper spot is a disease that occurs in warmer weather. Keeping the nitrogen at low levels during the time when *Fusarium* patch may be active is important in helping manage the disease.

Typhula blight: *Typhula* blight is caused by two species, *Typhula incarnata* and *T. ishikariensis*. *T. incarnata* is the primary species in the eastern U.S. and in southern and mid-regions of the Midwest and western U.S.

*T. ishikariensis*is most prevalent in the more northern snow mold regions, especially where prolonged periods of permanent snow (two or more months) exist in the midwestern and western U.S.

The two *Typhula* species are easily distinguished from each other when observed soon after the snow melts. *T. incarnata* produces grayish spots in the turf, with scattered, fairly large, brown sclerotia evident, whereas *T. ishikariensis* spots have a reddish cast to them and contain numerous small, dark black sclerotia.

Nitrogen is important for recovery of the patches caused by necrotic ring spot.

Typhula blight only occurs under snow cover. It does not occur in the cool, wet weather of fall and spring, except under leaf piles.

Knowing which species you have is important in chemically managing the disease. Many fungicides, including the mercuries, chloroneb, PCNB, triadimefon and chlorothalonil, will manage *Typhula* blight caused by *T. incarnata*. They do not all manage *Typhula* blight caused by *T. ishikariensis*. The picture also is more confusing state by state.

For example, in Michigan the mercuries, PCNB, and chlorothalonil will manage both species, but triadimefon and chloroneb will not manage *Typhula* blight caused by *T. ishikariensis*.

In northern Wisconsin and Minnesota, combinations of the mercuries and PCNB are required to manage both species. You should check with your local turfgrass experts to find out which fungicides are effective in your area.

Melting out

This disease is often incorrectly referred to as leaf spot. To be correct, melting out caused by *Dreschlera poae* (formerly *Helminthosporium vagans*), is a cool-season disease of Kentucky bluegrass that occurs in the cool, wet weather of the spring.

The disease starts out as spots on the leaf blades and, in a two- to three-week period, rapidly moves down the leaf sheath and into crowns and roots.

The entire grass plant is often killed

continued on page 60

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Necrotic ring spot on Kentucky bluegrass.

or severely damaged during this period, which is where the term melting out arises. The entire stand of Kentucky bluegrass seems to melt away.

Leaf spot, on the other hand, is a warm weather disease of many grass species, caused by the fungus *Bipolaris sorokiniana* (formerly, *Helminthosporium sativum*).

Ignore the idea... that the lawn doesn't need watering because we just had a heavy rain.

There are many Kentucky bluegrass cultivars that are resistant to melting out, the first of which was Merion.

Some of the newer Kentucky bluegrass cultivars—Parade, Baron, Cheri, Majestic, etc.—have some resistance to melting out, although it is not the same excellent resistance Merion had.

Consequently, stands of some of the newer Kentucky bluegrass cultivars may be thinned by melting out in the spring, allowing for invasion by crabgrass, quackgrass, tall fescue, and/or broadleaf weeds. This means cultural, biological and chemical management practices to reduce the severity of melting out will have to be incorporated into your turf management programs.

Helminthosporium melting out is one of the oldest, most-written-about turfgrass diseases. Unfortunately, much of what has been written about the disease, is based on "folk lore" and not on good scientific data.

First, much of the older literature refers to melting out and having a "leaf spot stage" in the spring during the cool, wet weather and a "melting-out stage" in the spring during the hot weather of the summer.

But, anyone who is familiar with the disease knows all the damage is done during the cool, wet weather of spring. With the arrival of warm weather, the turf begins to recover.

Secondly, practically all the literature advises against the application of spring nitrogen, because it will increase the severity of *Helminthosporium* melting out.

It appears the research that lead to this erroneous conclusion was based on greenhouse data and not field data.

At Michigan State University, data from the last four years suggests that just the opposite is true. Nitrogen in the spring actually reduces the severity of *Helminthosporium* melting out.

We recommend two nitrogen applications during the spring period to help manage *Helminthosporium* melting out, each between ½-1 pound of actual nitrogen/1000 sq.ft.

The third management practice is biological in nature. It consists of daily irrigation to keep the mat or thatch moist and to encourage the build-up of antagonistic micro-organisms that prevent the fungus *D. poae* from sporulating, germinating, or infecting.

These antagonistic micro-organisms may even possibly destroy *D. poae*. While the causes have not been discovered, the results have shown a dramatic reduction in the amount of *Helminthosporium* melting-out, where light, daily irrigation has been applied.

The actual concept may be hard to grasp since the disease occurs under cool, wet weather conditions, but apparently just a few days without rain allows the top of the thatch to become dry and allows the *D. poae* fungus to grow and infect these grass plants.

Remember, the key to having the daily irrigation program work is daily irrigation. You have to ignore the idea that the lawn doesn't need watering because we just had a heavy rain. You aren't irrigating the turf, you're irrigating the thatch to keep it moist.

This is not to say we have eliminated the need for fungicides in managing this disease. That may some day be a reality, but much more research needs to be done on the mechanisms involved in biological and cultural management of *Helminthosporium* melting out.

In the meantime, there are many excellent fungicides for the management of *Helminthosporium* melting out listed in Table 1. Also, remember, following good cultural and biological practices will help improve the disease management obtained with the fungicides.

For people in the lawn care industry, there are now three excellent fungicides which will manage *Helminthosporium* melting out during the three to four weeks it is normally a problem in the spring; iprodione, vinclozolin, and chlorothalonil.

There is a possibility that anilazine may also manage the disease for the desired period of time, although more research is needed.

Remember, maintaining adequate levels of nitrogen will make these fungicides more effective.

Red thread

Red thread was believed to be caused by *Corticium fuciforme*, but new evidence has shown the correct name to be *Laetisaria fuciformis*. Also, the disease complex formerly referred to as