

DISEASES OF COOL-SEASON TURF

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Necrotic ring spot on Kentucky bluegrass is a serious problem for the lawn care industry.

Managing high quality turf is an exacting task due, in no small measure, to problems associated with fungal disease.

Each year, the potential exists for a succession of turf diseases. Resting structures of fungal pathogens present in previously-infected plant parts, in thatch or in the soil, resume vegetative growth and generate new inoculum. Each of the varied disease-causing fungi responds to particular environmental conditions that are

conducive to renewing this activity.

Even under adverse conditions, sufficient new fungal growth and/or sporulation occurs. These ensure the survival and carry-over of each species. Given optimum condition, then, a large-scale build-up of inoculum can occur. Large amounts of inoculum, however, do not inevitably mean widespread disease.

Specific environmental conditions (not necessarily the same as those favoring inoculum build-up) are

needed for infection of susceptible grass plants and for consequent disease symptoms. The disease-causing fungi invariably are present in turf. But unless the appropriate environmental conditions favorable to all these processes are met, outbreaks of a particular disease will be minor or apparently absent for the growing season.

The interactions involving grass hosts, fungal pathogens and environmental factors ultimately determine whether particular pathogens are favored at the expense of the grass host, so allowing disease to develop. The turf manager must anticipate these situations and make timely management decisions to maintain the balance in favor of the grass host.

Contributory factors

Factors which may contribute to reducing the incidence of disease are:

- judicious changes in irrigation and fertilizer practice;
- modification of soil pH;
- improvement of soil aeration and drainage;
- removal of thatch and clippings;
- adjustments in mowing height and mowing frequency;
- dew dispersal and improved air drainage;
- restraints on the amount of wear;
- incorporation of organic amendments;
- weed control;
- insect control;
- nematode control; and
- use of resistant varieties.

But even the most skilled turf manager cannot rely entirely on cultural tactics to eliminate the risk of disease

in high quality turf. This must be supplemented with with chemical control measures.

Preventive, rather than curative, measures afford the most effective protection against turf diseases. No fungicide offers a complete spectrum of turf disease control. But, for most diseases, a range of reliable products is available and (in spite of enormous development costs) the introduction of new materials continues.

Fungicide arsenals

With fungicide tolerance on the increase, the arsenal of turf fungicides must be as large as possible. This ensures that control programs can involve the alternate use of several effective products and so lessen the risk of tolerance build-up.

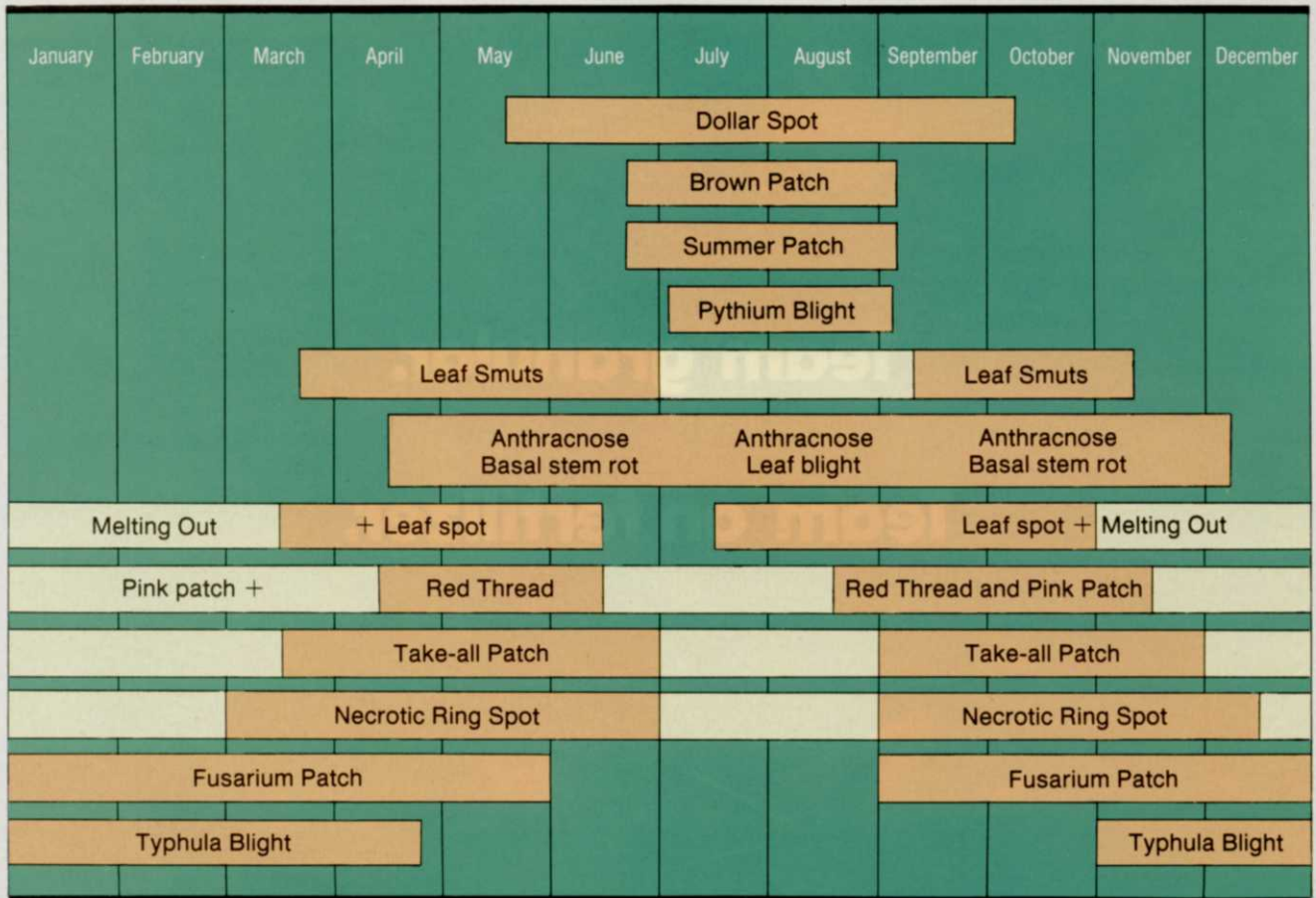
In the absence of a chemical cure-




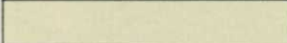
Take-all patch, which has destroyed this Pennncross creeping bentgrass, is a serious problem on sand greens.

CALENDAR

Common Diseases of Cool-Season Turf



 Persistent symptoms often still visible.

 Pathogen most active.

COOL-SEASON TURF DISEASES
TURF DISEASE AND CONTROLS

Disease	Causal Agent	Hosts	Biological and Cultural Control	Chemical Control
Anthracnose	<i>Colletotrichum graminicola</i>	Annual bluegrass Fine-leaf fescue Kentucky bluegrass Perennial ryegrass Creeping bentgrass	Adequate nitrogen. Cool grass by syringing.	Maneb plus zinc sulfate, chlorothalonil, benomyl, thiophanate-methyl, thiophanate, thiophanate-methyl + mancozeb, triadimefon, propiconazole
Brown patch	<i>Rhizoctonia solani</i>	All major turfgrass species	Reduce nitrogen. Remove "dew." Increase air movement.	Mancozeb, maneb + zinc sulfate, chlorothalonil, vinclozolin, benomyl, thiophanate-methyl, thiophanate, thiram, thiophanate-methyl + maneb, thiophanate + thiram, PCNB, iprodione, propiconazole
Dollar spot	<i>Lanzia spp.</i> <i>Moellerodiscus spp.</i> (<i>Sclerotinia homoeocarpa</i>)	Annual bluegrass Creeping bentgrass Colonial bentgrass Fine-leaf fescues Kentucky bluegrass Perennial ryegrass Tall fescue	Increase nitrogen. Remove "dew."	Benomyl, thiophanate, thiophanate-methyl, chlorothalonil, anilazine, fenarimol, cadmium compounds, thiophanate + thiram, thiram, thiabendazole, benomyl, iprodione, thiophanate-methyl + maneb, vinclozolin, triadimefon, propiconazole
Summer patch	<i>Magnaporthe sp.</i>	Annual bluegrass Kentucky bluegrass	Light, daily watering during the summer.	Fenarimol, thiophanate-methyl, thiophanate, triadimefon, iprodione, benomyl propiconazole
<i>Helminthosporium</i> Diseases Brown blight Leaf spot and Melting-out Net blotch Read leaf spot Leafspot, root and crown rot Zonate Leaf spot	(<i>Drechslera</i>) <i>D. siccans</i> <i>D. poae</i> <i>D. dictyoides</i> <i>D. erythrospila</i> <i>Bipolaris</i> <i>D. sorokiniana</i> <i>Bipolaris</i> <i>D. gigantea</i>	Ryegrass Kentucky bluegrass Fescue Creeping bentgrass All major turfgrass species All major turfgrass species	Remove clippings. Raise cutting height. Plant resistant cultivars. Moderate spring nitrogen. Daily irrigation.	Mancozeb, chlorothalonil, iprodione, anilazine, maneb + zinc sulfate, PCNB, vinclozolin

all, accurate diagnosis is crucial to any successful disease control program. Prescribing the wrong fungicide is a waste of resources. In some instances, it may promote or aggravate a particular disease problem. Regional and even very local differences in the effectiveness of fungicides, when employed on ostensibly similar turf disease symptoms, have puzzled both pathologists and turf managers alike. Recent and ongoing research at several locations nationwide has helped resolve some of these inconsistencies.

Misidentification or failure to identify the primary pathogen (or

pathogens) is a principle cause of the confusion. Difficulties in diagnosis occur when different pathogens produce disease symptoms that are essentially identical under field conditions. The situation is compounded when two or more pathogens are involved concurrently in disease complexes with similar symptoms.

Multiple pathogens

Multiple pathogen involvement has been demonstrated for Corticium disease, now split into red thread and pink patch, with *Laetisaria fuciformis* and *Limonomyces roseipellis* as the

respective causal agents.

Dollar spot presents a similar situation but has to date defied attempts to identify conclusively the inciting fungi. Additional species of *Rhizoctonia* may accompany or replace *R. solani* in causing brown patch in some locations. *Colletotrichum graminicola*, the anthracnose fungus, may act alone or, frequently, in combination with *Helminthosporium* species (now called *Drechslera* or *Bipolaris*), or with the take-all patch fungus *Gaeumannomyces graminis* var. *avenae*.

Take-all patch and other similar

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Disease	Causal Agent	Hosts	Biological and Cultural Control	Chemical Control
Take-all patch	<i>Gaeumannomyces graminis</i>	Creeping bentgrass Colonial bentgrass Velvet bentgrass	Reduce soil pH. Avoid liming, Use acidic fertilizers, Sulfur	Fenarimol
Pythium blight (cottony blight)	<i>Pythium spp.</i>	Perennial ryegrass Creeping bentgrass Annual bluegrass	Improve soil drainage. Increase air circulation.	Chloroneb, ethazol, metalaxyl, propamocarb
Red thread	<i>Laetisaria fuciformis</i>	Creeping bentgrass Colonial bentgrass Kentucky bluegrass Annual bluegrass Perennial ryegrass Fine-leaf fescue Tall fescue	Increase nitrogen.	Anilazine, iprodione, triadimefon, vinclozolin, chlorothalonil propiconazole
Pink patch	<i>Limonomyces roseipellis</i>	as for red thread	Increase nitrogen.	Iprodione, triadimefon
Snow molds Typhula blight Fusarium patch	<i>Typhula spp.</i> <i>Fusarium nivale</i>	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	<i>Leptosphaeria korrae</i>	Kentucky bluegrass Annual bluegrass Fine leaf fescues	Nitrogen to promote recovery. Light daily irrigation. Organic amendments.	Iproione, fenarimol, benomyl, thiophanate, thiophanate-methyl propiconazole
Stripe smut Flag smut	<i>Ustilago striiformis</i> <i>Urocystis agropyri</i>	Kentucky bluegrass Creeping bentgrass	Reduce nitrogen. Prevent summer dormancy.	Fenarimol, triadimefon, benomyl propiconazole.

patch diseases caused by soil-borne, root infecting fungi, generate the symptoms that are most commonly misdiagnosed.

Fusarium blight is a prime example. Over the years, the designated name became a catch-all for any of the summer-season patch disease symptoms in Kentucky bluegrass turf. It is now recognized that at least two additional diseases can be separated out: necrotic ring spot (causal agent *Leptosphaeria korrae*), and summer patch (causal agent a species of *Magnaporthe* and not *Phialophora graminicola*).

Necrotic ring spot bears a striking resemblance to yellow patch caused by *Rhizoctonia cerealis* and has un-

doubtedly been confused with this disease. In any event, it now figures as one of the major headaches for the lawn care industry wherever Kentucky bluegrass sod is employed.

Summer patch is similarly damaging to Kentucky bluegrass turf but is also commonly encountered on the annual bluegrass component of golf greens. There it produces symptoms similar to take-all patch.

The latter is a serious disease of bentgrasses. It is increasingly common on newly-established creeping bentgrass greens built with sand as the growing medium. *Fusarium blight*, incited by *Fusarium colmarum* and *F. poae*, is still out there somewhere. But, after nearly 25 years of

confusion, the incidence and severity of this disease needs to be re-evaluated.

The key

For all of these patch diseases, more definitive diagnostic techniques are needed. Careful microscopic examination of the diseased plants followed by isolation and culturing of the causal agents provide the only certain means of identification and the key to any control measures. **LM**

Next month: disease of warm season turf.