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A Look at Red Thread Disease of Turfgrasses

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Corticium red thread, sometimes called "pink patch," is a turfgrass disease caused by a fungus, *Corticium fuciforme*. Prior to 1976 only sporadic occurrences of this disease were recorded in New Jersey. In 1976 the disease was observed in the Rutgers turfgrass research area on slow-growing, low-fertility plots of *Lolium perenne* cv. Manhattan during May and June. The *Corticium* fungus was isolated and its identity confirmed at that time. In 1979 another outbreak of the red thread disease occurred in New Jersey; however, it appeared to be both more widespread and more severe. The disease also reccurred at the Rutgers turfgrass research plots.

HOSTS

In the United States Corticium red thread appears to be most severe on fine-leaved fescues; velvet bentgrass; and, more recently, on perennial ryegrass. Other grasses less severely infected are Kentucky bluegrass, annual bluegrass, bentgrass, and bermudagrass.* Red thread also attacks these grasses under nursery management.

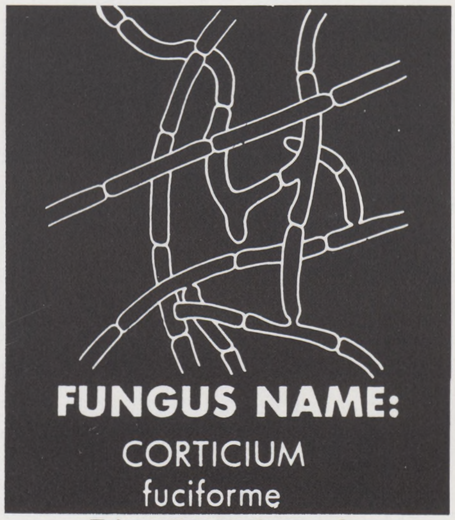
DISTRIBUTION

Red thread is known to occur in northern Europe, England, New Zealand, Austrialia, and the United States. In the United States the disease was first found in Rhode Island in 1932 where it was reviewed, researched, and reported by Erwin (1941). Currently the red thread disease is known to be injurious to turfgrasses in the Pacific Coast States; the Pacific Northwest; the Atlantic Northeast; and, occasionally, as far south as Louisiana (Filer, 1966).

SYMPTOMS

Red thread appears as irregularly shaped patches of blighted turfgrass of varying size. Small patches of infected leaves and leaf sheaths appear water-soaked at first. They die rapidly and fade to a bleached-tan color when dry. Where infection is severe, the diseased turf is yellowed or scorched in circular to irregular patches, varying from an inch to more than a foot in diameter. The spots may be scattered or a number of patches may merge to form a large, irregular area of blighted turfgrass having a reddish-brown cast.

The *Corticium* fungus forms conspicuous, coral-pink masses called "stromata" on leaves and leaf sheaths. In moisture-saturated air these gelatinous stromata may completely cover the leaves, being bound by a pink web of mycelium that also mats the leaves together. It is from these rather conspicuous, pink-colored stromata formed by strands of fungus hyphae that the disease name "Red Thread" is derived. These strands of hyphae often protrude from the tips of leaves or leaf sheaths as pointed, bright coral-pink to blood-red stromata which dry, harden, and ultimately resemble red threads.



Line Drawing of Red Thread Mycelium

The *Corticium* fungus is a Basidiomycete that grows slowly in culture, forming pink-colored colonies. Spores are not produced readily but the fungus is easily diagnosed microscopically on the basis of "knobs" called clamp-connections that develop at the cross-walls of the fungal hyphae. Such knobs also are characteristic of other Basidiomycetes such as fairy-ring fungi and wood-rotting fungi.

DISEASE DEVELOPMENT

Corticium red thread is an important disease on slow-growing, nitrogen-deficient turf in the cooler, more humid regions of the United States. Infection and disease development are favored by temperatures of 60-75°F. coupled with prolonged periods of light rain, fog, heavy dew, and moisture-laden air. The disease is, therefore, more prevalent during periods of damp weather in the spring and fall seasons of the year.

(cont. on pg. 3)

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Line drawing: courtesy of Mallinckrodt, Inc.

***In Rhode Island red thread was noted on 5 of 55 cultivars of Kentucky bluegrass, and only in the second year of a five-year test. The disease was extensive enough in Pennsylvania to warrant ranking 43 Kentucky bluegrass cultivars at 1 of 9 locations. There, Nugget, South Dakota Certified, and Windsor were most susceptible.**

Comments and Opinions

The "Dog Days" of Summer

Periods of turf trouble in July and August are often referred to as "dog days." Denny Lyon, editor of the *Rocky Mountain Reporter,* jokingly or not-so-jokingly reports employees can be a cause. He writes they often highlight dog days with such items as "---all the night watermen quitting the same week, all the intellectuals deciding they need to leave for school two weeks before it starts, and all the unintellectuals caring less whether they work or get fired, as welfare and unemployment pay about the same; and do not try to hire anybody during dog days - there isn't anyone. Dog days are here the day the stunt driver you've been threatening to fire all summer wraps the "Cushman" around the tree (he lives, the Cushman and the tree are both killed)."

Mr. Lyons does not explain how all this kills the grass, but we know it does not take much to kill the grass when summer stress occurs. Various explanations have been given for summer failure such as: "It was a bad 'Poa annua' year. . ." "My water pump broke . . ." "The grass dies every year (but it always comes back) . . ." or it was a "hellish period of the worst summer days ever." This year we can add another for our area. The weather was very gentle during June and July. Then it turned moderately hot and very humid at the end of July. This did not alarm us too much because the worried summer feeling usually begins when a few days of 95-100°F. occur. But the moderately hot and very humid weather continued with almost no let-up into early September. At various stages during this stress period, growers were losing more grass than might be expected as they watched the thermometer.

What did this tell us about summer injury? Certainly, it reminds us that the line between survival and failure of bentgrass and annual bluegrass is very thin. Also, it seems to tell us some of the causes of failure develop cumulatively, whether the reason is disease, drought, or root failure. Apparently these causes developed gradually while we were lulled by the lack of 90° weather. From now on, we will keep our guard up for sneaky summer stress with the same intense watchfulness on water and disease control that we give the short, more severe "block-buster" spells of bad weather.

R.E.E.

Some Comments on the Suspension of 2,4,5-T and Silvex

Most of you are aware (some of you are painfully aware) that 2, 4, 5-T and silvex have been suspended from all use by EPA. The two chemicals are quite similar. Several items about silvex may be of interest to you.

1. The chemical silvex is used in producing such commodities as timber, forage of grazing lands, rights of way, rice fruits, sugar cane, and turf.

2. Silvex has been in use for approximately 25 years.

3. Authorities agree that two to three million pounds are used annually in the United States.

4. Approximately 700,000 lbs. or as much as one-third of the production is used on turf.

5. The franchised lawn trade is one of the big users of silvex.

6. Golf courses appear to use little silvex.

7. Silvex is most commonly used with other herbicides. For example, it is used to compliment 2, 4-D. It adds to the punch of 2, 4-D on such weeds as dandelion but, more importantly, it improves control on a number of hard-to-kill weeds such as oxalis and wild violet.

8. While MCPP is an adequate substitute for silvex on some hard-to-kill weeds, it is somewhat less effective and more expensive.

9. Use of dicamba as a substitute with 2, 4-D is a very effective combination on some hard-to-kill weeds, but it is avoided on many sites where trees and shrubs are present, because dicamba is more dangerous to these plants.

10. The most effective combination of wide-spectrum herbicides for control of the assortment of hard-to-kill broadleaf weeds appears to be 2, 4-D, silvex, and dicamba.

11. Silvex is clearly a useful herbicide tool that cannot be completely replaced at the present. Its suspension narrows the assortment of useable chemicals and will increase the use of other herbicides on those weeds where silvex is more effective.

12. The abrupt suspension of silvex has trapped large quantities of silvex in warehouses that will require costly disposal in concentrated burial sites. This will be very costly to taxpayers and the consumer public. Burial of large quantities of chemical such as silvex is a very questionable practice when its use for 25 years has not shown

clear risk to man. There are many other unquestioned serious dangers that the U.S. government should concentrate on rather than be so deeply enmeshed in expenditure of millions on silvex. It is unimaginable that anyone would object to a government ban on silvex or 2, 4, 5-T that had high levels of dioxin.

13. Dioxin comes from various sources in addition to 2, 4, 5-T and silvex. No one questions the danger of dioxin at high levels. What is a dangerous level in a herbicide? Long-term effects were not found from much larger quantities of dioxin spilled from an industrial accident in Italy.

The more dioxin-prone 2, 4, 5-T routinely has a dioxin content less than .01 ppm. The 2, 4, 5-T and silvex produced annually in the United States is estimated to contain a total of 29 gms. of dioxin. It is hard to visualize how this quantity of chemical, which is light-sensitive, spread over large acreages of plant foliage can be a hazard. It has been estimated that an animal the size of a deer and the sensitivity of a guinea pig must consume all the vegetation on nine acres, without excretion, to get a lethal dose.

R.E.E.

RED THREAD

(cont. from pg. 1)

The fungus, *Corticium fuciforme,* is capable of growing over a wide range of temperatures. Growth occurs from slightly above 32°F. to about 86°F. with optimum growth at 60-70°F. Disease development occurs at soil temperatures between 40-54°F. The extremes of summer heat and winter cold decrease or check fungal growth and disease development but they fail to kill the parasitic fungus.

NUTRITION

Deficient calcium nutrition has been reported to increase the susceptibility of creeping red fescue to the red thread disease. In contrast, increased nitrogen fertility has been reported to decrease the severity of red thread under turf-management conditions. Goss and Gould (1971) found that nitrogen interacts with phosphorus and potassium to reduce the severity of red thread in bentgrass and fescue lawns.

Interesting interactions among chemical growth retardants and turfgrass cultivars with regard to Corticium red thread also were noted at Rutgers in June 1979. Maleic hydrazide, a leading growth retardant, applied at the recommended rate in early May, markedly increased the severity of infection and the intensity of symptom expression in perennial ryegrass. This treatment with MH-30 could be detected from a distance of 50 feet in each of the four replicates. Other growth retardants (at various rates) and nontreated check strips were relatively free from symptoms of red thread. The only other grass so treated, Delta Kentucky bluegrass, showed no symptoms of the red disease.

DISEASE SPREAD

The *Corticium* fungus survives from season to season as fragments of dried stromata (red threads) and as dormant mycelium in the leaves of infected plants. The dry, thread-like stromata are very brittle and break easily. The fungus is disseminated to healthy turf as bits of stromata and infected leaf parts. Spreading occurs mechanically by mowers, shoes, wind, and flowing water. Basidiospores do not appear to be of major importance in the spread of the fungus. Radial movement from infection centers is accomplished by mycelial growth which, under favorable weather conditions, can be very rapid.

DISEASE CONTROL

With turfgrasses grown under low-nitrogen fertility, the application of readily available nitrogenous fertilizers during periods of high-disease incidence will aid in reducing disease injury as well as promote faster plant recovery. Gould and co-workers (1967) reported that "six pounds of nitrogen per 1,000 square feet per season is essential for the production of good quality turf and also helps to reduce the incidence of red thread when grass is growing rapidly." Results of research relating to turfgrass nutrition also indicate that the application of lime as a calcium supplement is beneficial in reducing the incidence of red thread in turfgrasses.

To be effective, fungicides should be applied on a preventative basis as closely spaced applications made at ten-day intervals when daytime air temperatures stabilize at 68-75°F. (Curative applications generally are not effective.) According to Gould *et al* (1967) cadmium-containing fungicides provide the longest residual control. One application gave significant reduction of the disease but two or more applications were necessary for prolonged control. Where usage of cadmium compounds on turf is restricted by the EPA, protectant (contact) fungicides should be used on a preventative schedule. The most effective fungicides are reported to be Dyrene (anilazine), Tersan 75 (thiram), and Chipco — 26019 (also called Rovral or iprodione).

(cont. on pg. 4)

Always do right. This will always gratify some people and astonish the rest.

Mark Twain

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ABSTRACT

Factors Influencing the Volatilization of Mercury (Hg) From Soil

R.D. Rogers and J.C. McFarlane
J. Environ. Qual. 8:255-260.

Mercury volatilization from soils amended to 1 ppm mercury with mercuric nitrate decreased substantially within 1 week after application. During the first week, 20 percent of the applied mercury was lost from a silty clay-loam soil and 45 percent was lost from a loamy sand soil. Volatilization of Hg from the loamy sand soil resulted in a concurrent decrease in ammonium nitrate-extractable mercury. How the mercury is bound in the soil is not known but it has been shown that Hg is tightly complexed on organic matter. The volatility increase of Hg in response to an increase in Hg concentration indicates the organisms responsible for volatilization are capable of processing large quantities of Hg.

Comment: We have wondered what has happend to the Hg that no longer seems to be present in some of our old mercury-treated greens. This research tells us something about the escape of Hg. Also, it tells that mining these old greens for Hg would be folly.

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