IPM OF TURFGRASS DISEASES AND INSECT

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Integrated Pest Management (IPM) implies using all of the tools available for managing turfgrass pest including chemical, biological, genetical, and cultural. The basic idea being to spread the work load of managing a turf pest around so no one component has to do all the work. IPM is often viewed as being anti-chemical, but much of that comes from the fact that the primary way of managing turfgrass pests has been chemical. IPM tries to incorporate the other means of managing turfgrass pest.

BIOLOGICAL, CULTURAL, AND GENETICAL IPM

Helminthosporium melting-out

Melting-out caused by Dreschleria poae often mistakenly called "leaf spot" is and example of a turfgrass disease that can be managed using all 4 means of control.

Cultural: The literature says that nitrogen only makes this disease more severe. Unfortunately this was based on greenhouse data and not on field data. Field data clearly shows that moderate levels of nitrogen will reduce the severity of this disease. It will actually manage the disease without fungicides applications being necessary in years of moderate disease pressure and it will also make fungicide application more effective.

Biological: Melting-out can be managed biologically through the use of daily irrigation. The use of daily irrigation has been shown to support high populations of bacteria that produce substance that prohibit the germination of D. Poae spores. Daily irrigation plus moderate levels of nitrogen can manage this disease without fungicides.

Necrotic Ring Spot

Necrotic ring spot caused by Leptospheria korrae is the most commonly occurring patch disease on Kentucky bluegrass turfs. For many years this disease was called **Fusarium** blight but critical research has shown the true cause of this disease to be L. korrae and not species of Fusaria. Once the real cause

of the disease was known developing a integrated management program for the disease became a lot easier.

Necrotic ring spot is the one turfgrass disease that a true IPM program has been developed. The IPM system for managing necrotic ring spot includes all 4 means of managing plant diseases, biological, cultural, genetical, and chemical.

Biological:The disease is active in the cool weather even though the symptoms are also seen in the warm weather of the summer. The summer symptoms are the result of the turfgrass not being able to take up adequate amounts of water during the summer stress period because the fungus destroyed the root system during the cool weather. What we are trying to do is keep these weakened plants alive during the warm weather of the summer. The best way to accomplish this is through the use of light frequent daily irrigation. Preferably applied around noon time to 4 o'clock in the afternoon. This not only supplies adequate water during the stress period of the day but also cools off the plants to allow them to get through the stress period. Research has shown summer symptoms can be completely eliminated through the use of daily irrigation.

The daily irrigation regime also keeps the thatch and soil more moist than a conventional deep infrequent irrigation system which results in high populations of bacteria being maintained. These bacteria have been shown to produce anti-fungal compounds that are inhibitory to the growth of L. korrae in laboratory cultures studies. These bacteria are believed to aid in the prevention of new infections in the late summer and early fall.

Lawn Restore and Turf Restore have been shown to biologically manage this disease. The products contain beneficial organisms as well as a food source to stimulate the growth of the natural microflora. These organisms have also been show to inhibit the growth of L. korrae in laboratory antagonism studies.

Cultural:Successful management of necrotic ring spot requires adequate levels of nitrogen. It obviously requires adequate levels of P and K as well, but the soil can be tested to determine the level of these nutrients and they can be added accordingly to bring soil levels of these nutrients up to acceptable levels. Nitrogen on the other hand is not held by the soil and must be applied every year.

Improved Kentucky bluegrass cultivars require between 4 to 5 lbs of actual nitrogen per 1000 sq. ft. per season. The slow release forms of nitrogen contained in fertilizer like Turf and Lawn Restore, IBDU, UF etc. are also more effective in managing the disease than fast release fertilizers like urea.

As already mentioned under biological management, daily irrigation applied from mid- day through 4 o'clock well help cool off the turfgrass plants allowing the plants with a depleted roots system to survive.

Chemical: Curative: The bendzimidazole-type fungicides like Tersan 1991, Fungo 50, or Cleary's 3336 work the best. This is because they have cytokinin properties which tend to stimulate growth. To be effective these fungicides need to be drenched in to the soil before they dry on the foliage, since they are only translocated upward and we are dealing with a root disease. Best results are obtained when the turf is irrigated before the fungicides are applied.

Preventive: The DMI Fungicides like Rubigan and Banner or the dicarboximide fungicide Chipco 26019 work best preventively. Part of the reason they do not work well preventively is the Rubigan and Banner have plant growth regulator properties which when used at high rates to control necrotic ring spot slow down the growth of the plant. So even if they stop further infection by the fungus, recovery is not evident because of the slow recovery of the plants. These fungicides are systemic in both directions and therefore do not have to be drenched in to the soil to be effective.

Our studies have clearly shown that unless adequate nitrogen is applied these fungicides will not be effective.

Genetical: The Kentucky bluegrass cultivars that have proven to be resistant in inoculated field trials in the U. S. were Midnight, Eclipse, Monoply, Able 1, Mystic, and America.

INSECT MANAGEMENT

Daily irrigation has been shown to manage chinch bug, grubs and bill bugs. The exact mechanisms are not completely understood, but it is believed to involve biological control of these insects by

microorganisms like the fungus Baveria which has been shown to attack chinch bugs under daily irrigation regimes. Daily irrigation also reduced heat and drought stress which may be important in turfgrass plants surviving attacks by these insects.