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Non-Target Effects of Fungicides

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Arriving at the decision of whether to apply a fungicide to any turf area is often difficult and based on economic considerations. Aside from cost, the primary determinants in using a fungicide are based on the prevailing environmental conditions, the susceptibility of the host species and cultivars present, and the pathogen(s) involved. Unique factors in turfgrass pathology include the intensity and nature of turfgrass cultivar, which greatly influence plant vigor and therefore the severity of diseases.

Promoting vigorous grass growth through sound cultural practices is the first step in minimizing disease injury. Frequently, however, environmental stresses, traffic and poor management practices weaken plants, predisposing them to invasion by fungal pathogens. When disease symptoms appear, it is imperative that a rapid and accurate diagnosis of the disorder be made. The prudent manager also attempts to determine those environmental and cultural factors that have led to the development or contributed to the intensity of the disease. A common cause for extensive disease in-

jury on golf course turf frequently can be related to improper management practices. Cultural practices that tend to exacerbate diseases include frequent and close mowing, excessive grooming during periods of environmental stress, light and frequent irrigation or excessive irrigation, and applications of inadequate or excessive amounts of nitrogen fertilizer. The development of excessive thatch and/or mat layers, shade, poor air or water drainage, traffic, and soil compaction also contribute significantly to disease problems. **Despite hard work and adherence to sound cultural practices, however, diseases may become a serious problem. This normally occurs when environmental conditions favor disease development, but not plant growth and vigor.** For example, summer patch (*Magnaporthe poae*) and brown patch (*Rhizoctonia solani*) are most damaging when high summer temperatures stress plants and impair their growth and recuperative capacity. In this situation, fungicides may be recommended in conjunction with cultural practices that promote turf vigor.

Fungicides may be applied preventively (i.e., before anticipated disease symptoms appear) or curatively (i.e., when disease symptoms first become evident). **Preventive fungicide treatment is recommended for chronically damaging diseases.** This is particularly true on golf course putting greens in regions where **snow molds, Pythium blight** (*Pythium aphanidermatum*), **brown patch, summer patch,** and **anthracnose** (*Colletotrichum graminicola*) are common. Successful management of **gray leaf spot** (*Pyricularia grisea*) on perennial ryegrass (*Lolium perenne*) fairways in some regions of the United States also is best achieved with preventive sprays. **Curative applications are more economically wise for less severe or chronically damaging diseases** such as **red thread** (*Laetisaria fuciformis*), **Helminthosporium leaf spots** (*Bipolaris* spp. and *Drechslera* spp.), **rusts** (*Puccinia* spp.), and **stripe smut** (*Ustilago striiformis*). The key to a successful curative fungicide program is vigilant scouting.

Contact fungicides are generally less expensive and provide good control. Contact fungicides, however, may only provide 7 to 14 days of control under conditions of high disease pressure. Penetrants applied preventively generally

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