EFFECTS OF CULTURAL PRACTICES ON THE INCIDENCE OF TURFGRASS DISEASE

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Diseases of turf result from the combination of a susceptible host and environmental conditions conducive to the pathogenic activity of specific disease-causing organisms. For example, leaf spot (Helminthosporium vagans) disease typically occurs in susceptible varieties of Kentucky bluegrass under the cool, moist conditions occurring in mid-spring while brown patch (Rhizoctonia solani) develops on closely clipped turfs during the hot, humid weather of mid-summer. However, the extent of turfgrass deterioration from pathogenic organisms is frequently associated with factors in addition to varietal susceptibility and climatic conditions. The cultural program of fertilization, mowing and irrigation may substantially affect the severity of disease incidence in a turf during certain periods in the growing season. Field research and practical experience in managing turfs have resulted in the evolution of certain principles of turf-grass culture that are based, in part, on the association of mowing height and frequency, fertilization rate and timing, etc., with the incidence and severity of diseases. Most of these observations have been on Kenblue-type (common) or Merion Kentucky bluegrasses and traditionally used cultivars of other turfgrass species. Today, increasing numbers of superior cultivars are being planted for many different uses and cultural intensities. Questions arise regarding the application of established principles of culture to the newer varieties. Apparent differences in turfgrass density, vigor, disease susceptibility and other parameters suggest that the principles of culture may change somewhat from cultivar to cultivar.

A study was initiated at the University of Illinois in which five Kentucky bluegrass cultivars (Nugget, Merion, Fylking, Pennstar, and Kenblue) were maintained under two mowing heights (3/4 vs 1 1/2 in) and four fertilization regimes (2, 4, 6, and 8 lbs N/1000 sq ft/yr) beginning April, 1973. By early August, with half of the fertilizer applications made, differential development of Fusarium blight disease was observed in the plots. Generally, higher spring fertilization rates were associated with substantially higher incidence of the disease in summer. This was evident in all cultivars except Kenblue which was severely affected regardless of fertility level. Pennstar was essentially unaffected at the lowest (2 lb) level of nitrogen fertilization while slight to moderate blighting occurred in plots receiving the 4 lb level of nitrogen. The 6 and 8 lb nitrogen levels were associated with a severe incidence of Fusarium blight. Fylking was slightly to moderately blighted at the 2 and 4 lb nitrogen levels and severely diseased at higher levels. Merion responded in much the same manner as Pennstar while Nugget was largely unaffected except at the highest nitrogen level. The incidence of Fusarium blight in Nugget, Merion and Fylking was slightly higher in plots maintained at the higher (1 1/2 in) mowing height. No such difference was apparent in the Pennstar and Kenblue plots.

Sclerotinia dollar spot incidence in October was very severe in Nugget maintained under close mowing (3/4 in) and low fertility (2 lbs N/1000 sq ft/yer). The severity of the disease was considerably less at higher mowing and higher fertility levels. Very little dollar spot developed in the other cultivars and only in plots maintained at the lowest fertility level and close mowing.

Results through 1974 and 1975 were essentially the same except that annual bluegrass invasion occurred in diseased turfs during fall. This was expecially evident in the heavily fertilized turfs maintained under close mowing. Loss of turf during these years was associated with both Fusarium blight and the differential death of annual bluegrass due to midsummer stress.

Several conclusions can be drawn from this experiment. First, high rates of nitrogen fertilization in spring were conducive to the development of Fusarium blight in four out of five Kentucky bluegrass cultivars. The severity of the disease varies with cultivar, fertility level and mowing height. Second, low fertility and close mowing were conducive to the severe incidence of Sclerotinia dollar spot in Nugget Kentucky bluegrass in fall. This may preclude the successful use of Nugget for football fields and other turfs where fall quality is important unless appropriate measures are taken to control this disease. Third, disease incidence in summer was followed by annual bluegrass invasion as soon as climatic conditions favored its germination. Thus, the differential development of two important diseases and a major weed problem were directly or indirectly related to the cultural practices performed on specific varieties of Kentucky bluegrass.

New turfgrass varieties will continue to enter the market with claims of greater disease resistance and superior quality. The turfgrass manager must learn to select varieties adapted to his conditions and to manage them according to their specific cultural requirements.