A GREEN SECTION RESEARCH PROJECT

Cool-Season/ Warm-Season Turfgrass Management in The Transition Zone

by **DR. A. R. MAZUR**, Associate Professor,
Clemson University, Clemson, South Carolina

THE MANAGEMENT and culture of turfgrass in transition zone areas of the United States is an extremely delicate task. Temperature and moisture are the climatic factors that influence adaptability of turfgrass species to the greatest extent.

Grasses are classified into broad categories based on season of most active growth. Warm-season turfgrasses are most active during the summer when temperatures are in the 80-95°F. range. These grasses generally have good to excellent drought resistance. The warm-season grasses grow very slowly when night temperatures are in the 60s, and they become dormant after the first killing frost. Excessive cold weather and/or frozen soil often cause injury to perennial stands of most of these turfgrasses. The range where warm-season turfgrasses can be used effectively is defined relatively well by geographical temperature delineations called isotherms. Seldom are these grasses used sucessfully where the daily average January temperature is less than 40°F.

The cool-season grasses grow most actively during the spring and fall when temperatures are in the 60-75°F. range. The cool-season grasses generally have poorer drought resistance than warm-season grasses. These grasses are under stress when temperatures are in the 90-100°F. range. The cool-season grasses are seldom effectively used as permanent turf in regions where the daily average July temperature is greater than 75°F.

In many sections of the country the average daily January temperature is often less than 40°F. while the average daily July temperature frequently is greater than 75°F. These areas are referred to as the transition zones. In these areas we observe repeated injury to cool-season perennial species from complications induced by high temperatures. This situation is magnified in the areas east of the Mississippi River by the high relative humidity. In these areas, night temperatures remain in the 70°F. range, which weakens the turf due to high respirational activity. The weakened turf in the presence of plentiful moisture leads to extensive disease activity. During the winter in these same areas the persistence of cold temperatures with ice and snow can result in extensive injury to the warm-season species. Annuals proliferate in the transition zone because they go through the unfavorable hot, cold and dry periods as seed. It is for this reason that the transition zones have been called the crabgrass belt. Extending turfgrasses to their geographic limits means that management programs become the margin between turf survival and the need for constant annual renovation.

IN THE TRANSITION regions the extended periods of high temperatures with drought, disease and insect pressure have resulted in the extensive use of warm-season grasses, particularly bermudagrass and zoysia. The weather, however, is sufficiently cold during the winter to result in dormancy of warm-season turfgrasses. The standard practice is to overseed high-management turf areas with cool-season grasses to provide aesthetically pleasing green turf and prevent attrition damage to the warm-season turf during its dormant winter period. The length of the overseeding period often may last from seven to nine months, depending on

Method of establishment and timing influence overseeded turf quality.

latitude and elevation. The overseeding period is longest farther north and at higher elevations. Effective overseeding requires 1) rapid germination; 2) good seedling vigor; 3) tolerance to close mowing, traffic and disease; and 4) gradual decline in the hot spring weather.

Ryegrass, red fescue, bentgrass and bluegrass have been evaluated at many locations on greens, fairways and tees with varying results. In the Piedmont region of South Carolina, perennial ryegrasses have shown rapid establishment and high turf quality on putting greens during the overseeding period. The red fescues generally had less seedling vigor and required a longer period to develop the desired quality and are effective principally when blended with the perennial ryegrasses. The bentgrasses and bluegrasses generally show poor seedling vigor and establishment. They can only be used effectively as components of blends where their major need is during the spring period. Despite the rapid germination and excellent seedling vigor, annual ryegrass provides poor overseeding quality on greens because of its susceptibility to disease, its coarse leaf texture and poor color retention.

On fairways, however, annual ryegrass shows results superior to the other species. The more rapid growth of annual ryegrass provides greater effect, while the coarse leaf texture does not detract. The decline of annual ryegrass in the spring provides for better bermudagrass emergence earlier in the spring. The small seeds of perennial cool-season species were totally ineffective for use on fairways.

PROPER TIMING is critical to the success of an overseeding. Seeding times vary with location and are dependent primarily on prevailing temperatures in the area. Overseeding too early can result in poor quality due to the high incidence of *Pythium* and/or bermudagrass competition during warm, humid weather. When seeded too late, germination is slow and the stand remains open due to the lack of adequate growing temperatures. The best indicator of optimum seeding period is when the night temperatures remain in the low 60°F. range.

Studies have consistently shown that the soluble nitrogen source fertilizer materials such as ammonium nitrate provide the highest quality turf during the cool winter months. Comparable quality can be obtained with IBDU only

if all of the nitrogen is applied initially in a single application at three to four pounds N per 1,000 square feet. At one pound N per 1,000 square feet per month, the hydralization rate was not adequate to provide high-quality turf. The reduced microbial activity during the cool winter periods is responsible for poor response to the sewage sludge and urea-formaldehyde materials.

An alternative approach to annual overseeding of dormant bermudagrass in the transition zone areas would be the management of permanent warm- and cool-season turf swards. Compatibility of turfgrasses for use in integrated swards is dependent on physiological as well as morphological characteristics. Compatibility requires the uniform mixing of the two grasses so as to avoid the dense colonization of grasses in isolates within the sward. Segregation of turf stands in isolates results in serious reduction in turf quality in the transition between the successive spring, summer, fall and winter seasons. Common bermudagrass and Kentucky bluegrass have shown the greatest potential for use in the integrated stands of warm- and cool-season grasses. Management is the key to maintaining the delicate balance in these mixed stands.

STUDIES WITH mixed stands of common bermudagrass and Kentucky bluegrass showed that mowing at ¾ inch resulted in an increased bermudagrass population with a general reduction in turf quality when compared with the 1½-inch height. The source and timing of nitrogen fertilizer applications had a distinct influence on grass composition and quality of the turf sward. Acceptable turf quality can be maintained on mixed stands of common bermudagrass and Kentucky bluegrass in the transition zone areas by using readily available nitrogen sources and fertilizing primarily during the cooler portions of the year. The key to success is dependent on maintaining a strong bluegrass population. Fertility programs that increase bermudagrass competition result in reduced turf quality, particularly during the critical winter months. The higher height of cut and the use of periodical vertical mowing to thin bermudagrass in the late summer strengthens bluegrass populations and increases general turfgrass quality.

References

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MAINTENANCE Aids

A TIP FROM

GREG WOJICK, Golf Course Superintendent,
Willimantic Country Club, Willimantic, Connecticut

SUPERINTENDENT Greg Wojick welded a seat and a footrest on the spreader shown. The purpose is twofold: First, it provides additional worker comfort and stability, and secondly, it allows the worker attending the topdressing flow more freedom of movement. This unit, drawn by a truckster, makes several passes and turns during topdressing operations on putting greens. With the seat, the worker has freedom of both hands and a stability not before possible standing on the bar while the unit moves and turns.