



Adaptation of warm and cool season grasses in the United States.

Zoysiagrass in the Transition Zone

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For the superintendent who maintains a golf course located in the transition zone, summer can be a frustrating experience.

The transition zone encompasses an area roughly from Philadelphia, south to Richmond, Va. and west to St. Louis, excluding areas of high elevation. It is a region where the weather is extremely hot and humid in the summer, making it difficult to maintain consistently a quality turf which makes use of the cool season grasses (bentgrass or Kentucky bluegrass). Yet, it is too cold in the winter for the warm season grasses, such as bermudagrass, to escape possible low temperature injury.

For many years superintendents maintaining turf in the transition zone have turned away from recommended varieties of bluegrass and bentgrass because of continual failure of localized or large areas of fairways, tees and approaches. The observation made by many superintendents was that no matter what management procedures were followed, these areas would result in weeds, thin turf and failure. Even with the tremendously improved Kentucky bluegrass varieties available today, none can thrive in the heat and humidity

which is present during July and August in the transition zone.

Because manicured and closely clipped fairways and tees are most desirable in the golf game, the superintendent attempts to keep turf actively growing throughout the season with the aid of his irrigation system, fertilization program and various other techniques. Due to the severe weather conditions, turf managers may run into overpowering turf problems in trying to attain this goal.

When bentgrasses are used in a fairway one must contend with their inherent weakness against summer diseases, namely dollar spot, brown patch and pythium. There are available a limited number of improved varieties which perform better than common types for fairway turf. However, a costly disease control program must be followed with no guarantee against deterioration of fairway turf.

The use of ryegrasses on fairways and tees has increased now that a group of greatly improved varieties has become available. These varieties have been developed over the last ten years through a number of vigorous university and commercial breeding programs. These ryegrasses



Superintendent Hurley (center) supervising plugging operation in the first fairway, Tavistock C.C., New Jersey.

have found a place in many overseeding programs and will continue to perform well in certain locations and for specific purposes. However, as a group, the ryegrasses still have weaknesses. They are susceptible to brown patch, pythium, dollar spot, red thread and snow mold, and have displayed some winter desiccation. These weaknesses limit the use of ryegrasses on fairways and tees in the transition zone.

For many years bermudagrass has been selected for its cold hardiness and there is a limited group that are recommended for use in the transition zone (Midiron and Tufcote). Even with these relatively winter-hardy varieties, one still runs a risk of turf loss from winter kill and spring dead spot. In the early 1960s the transition zone experienced a particularly severe winter. At the time, golf courses were incorporating U-3 bermudagrass in problem areas or whole fairways and were relying on its summer performance for improved turf quality. Through the severe winter most of the bermudagrass was lost through winter kill. Continued breeding of bermudagrass for cold hardiness may provide us with a group of varieties hardy enough to survive the coldest of winters as far north as New York City. At the present, however, bermudagrasses cannot give us the dependability of winter survival in the northern portion of the transition zone.

Do the warm season grasses have a place on golf courses in the transition zone? Most definitely yes! Many of the golf courses in this zone have from small to extremely large areas that have microclimates which are extremely favorable for the

growth of warm season grasses. Turf growing on a south or southwest slope may cause a microclimate or "hot spot" which is unfavorable for the growth of Kentucky bluegrass, bentgrass or ryegrass. One must survey his golf course and pinpoint the microclimates and use warm season grasses accordingly.

What warm season grass should you select? Bermudagrasses have a great appeal in the southern portions of the transition zone and would have more widespread adaptability if new winter hardy strains were developed. To-date, zoysiagrass should be given serious consideration over bermudagrass especially in the northern half of the transition zone. Zoysiagrass, like bermuda, goes into dormancy with the first hard fall frost and resumes growth in the spring when average temperatures rise above 55-60 degrees. Zoysia will thrive at temperatures in excess of 85 degrees. It provides a turf with pleasing light green color and medium texture. The stiffness of the blade provides excellent lies when used as fairway grass if clipped to $\frac{1}{2}$ and a maximum of $\frac{3}{4}$ of an inch. Like bermuda, zoysia will produce a tight knit summer turf which gives maximum competition against summer weed invasion. Zoysia and bermuda grasses also have excellent wear tolerance during the growing season but can be damaged with excessive winter traffic.

Meyer Z-52 zoysia has definite advantages over bermudagrass for use in the transition zone. Some of these are:

- 1—It has shown winter hardiness north to the Boston area. When used in the transition

- zone there should be no threat of winter kill.
- 2—It will not display a spring dead spot as commonly found in bermudagrass.
 - 3—Relative to bermudagrass, zoysia greens up earlier in the spring and retains its color later into the fall.
 - 4—Kentucky bluegrass and the improved varieties of perennial ryegrass can be overseeded into the zoysiagrass which adds color to the turf during the early spring and late fall. A relatively stable population of Kentucky bluegrass and zoysia can be maintained whereas bermudagrass may provide too much summer competition for a cool season companion grass.
 - 5—It is somewhat more shade tolerant than bermudagrass.

In my opinion these advantages far outweigh the disadvantages of slow rate of establishment and recovery from scarring, proneness to thatch buildup and puffiness, and a susceptibility to insect damage (billbug, chinch bug, sod webworm and cutworm).

Once a decision has been made to experiment with zoysiagrass, it should be restricted to fairways, green approaches and possibly par-3 tees. It is not recommended for use on tees where a wood is used for driving; one would have difficulty in properly teeing up the ball because of the characteristic puffiness found in established zoysiagrass. For use on fairways it should be maintained at $\frac{1}{2}$ to $\frac{3}{4}$ inch which will provide an excellent playing surface which will hold the ball up giving a clean lie. As for the straw color of

zoysiagrass during winter dormancy, I feel all that is sacrificed is color. Even in dormancy zoysia provides an excellent, if not green, playing surface. As previously mentioned, Kentucky bluegrass and perennial ryegrass can be overseeded into zoysiagrass providing a stable population that will add fall color to the zoysia stand.

Because there is little zoysiagrass seed available, plugs or stolens of selected varieties are used for establishment. If seed were to be used it would provide variable plants with traits probably unlike the desired turf characteristics of the parental lines. The selections of zoysia which have shown excellent and good winter hardiness are Meyer Z-52 and emerald, respectively. *Zoysia matrella* has a somewhat finer texture when compared to Z-52 and emerald but is slower growing and less winter-hardy. For detailed information on the best adapted variety for your area, fertility requirements, weed and thatch control, watering and soil requirements, consult your local USGA Green Section agronomist or university turf specialist.

In summary, I feel we must look at all alternatives to provide our membership with the best adaptable and least expensive to maintain golf courses. At Tavistock we have started a nursery of Meyer Z-52 zoysiagrass and have purchased additional plugs to fill approximately 15,000 square feet of zoysia into two sections of two fairways.

I am looking to zoysia not as the salvation of my summer turf problems but as a useful alternative to add to my total maintenance program.

Starting a nursery of Zoysia with plugs.

