RESEARCH SUMMARY

Options for Potential Enhancement of Zoysiagrass Establishment

Zoysiagrass (*Zoysia* species) is well known for its very slow establishment from either sprigs or seed. Even the best of the cultivars, which is El Toro, does not establish at a desirable rate. Researchers at the University of Maryland have investigated various methods that might have potential for enhancing the rate of vegetative establishment of Meyer Japanese zoysiagrass (*Zoysia japonica*). The treatments included (a) urea nitrogen fertilization, (b) a biostimulator combination of auxin, cytokinin and iron, and (c) three preemergent herbicides, including oxadiazon and dithiopyr.

The results of the investigation revealed that monthly applications of nitrogen at 1 lb per 1,000 ft^2 (0.5 kg/100 m^2) during the growing season had no influence on the sprig establishment rate of zoysiagrass. **Treatments with a biostimulator containing an auxin, cytokinin, and iron combination applied either by soaking the sprigs prior to planting or by weekly sprays after broadcast sprigging had no effect on zoysiagrass establishment or on rooting.** In contrast, use of a postemergence herbicide generally enhanced zoysiagrass establishment under conditions of significant competition from smooth crabgrass (*Digitaria ischaemum*). **Both oxidiazon and dithiopyr provided similar levels of crabgrass control and enhanced the rate of zoysiagrass coverage.** However, the dithiopyr did reduce midsummer root growth of Meyer Japanese zoysiagrass.

Editor Comments. Gibberellin and certain other growth regulators are used for enhancing the vegetative establishment of woody ornamental cuttings. However, similar effectiveness of growth regulators for enhancing the vegetative sprig propagation of zoysiagrass has not yet been documented through research, including the previously described research. Other than maintaining adequate available soil moisture, the key practice that this editor has found effective in the enhancement of zoysiagrass establishment is frequent mowing at a cutting height of less than 25 mm (1 inch). **Source: Zoysiagrass establishment from sprigs following application of herbicides, nitrogen, and biostimulator. 1996. by M.J. Carroll, P.H. Dernoeden, and M.J. Krouse.** *HortScience.* 31(6):972-975.

JB COMMENTS

High- and Low-Density Cultivar Trade-Offs

Introduction of the new high density bentgrass (*Agrostis stolonifera*) and bermudagrass (hybrid *Cynodon*) cultivars for closely mowed putting greens is evolving similar to previous innovations involving key plant morphological changes. For example, in the 1960s a number of golf course superintendents presented talks at turf conferences and articles in publications stating that the new cultivar was a failure, while others expounded on its success. The main difference between these two views was that the former **failed to adjust to the cultural needs of the new cultivar morphology,** but rather chose to maintain it as it had traditionally been done. In contrast, the latter learned how to adjust the cultural program to meet the morphological needs of the new

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JB Comments

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cultivar. Similar diverse statements are now being made about the new high-density cultivars for putting greens mowed closely at under 5/32 inch (4 mm).

One negative statement currently being made is that the high-density cultivars have increased cultural requirements in terms of vertical cutting and high-density minitine use for canopy biomass management. The extent to which this is true depends on the intensity of nitrogen fertilization. With the lower-density cultivars there was a tendency to use higher nitrogen fertilization rates to produce more lateral shoots in an attempt to improve the shoot density at close cutting heights. The **new cultivars that have the genetic capability for a high shoot density do not necessarily require high nitrogen fertilization.** In fact, the high nitrogen fertilization may increase the need for more frequent vertical cutting.

A dimension being overlooked concerning the increased cultural inputs for the new cultivars is the trade-offs, in that the high shoot density—even under very close mowing—restricts sunlight penetration to the soil surface. This results in a substantial reduction in moss, algae, *Poa annua*, and other weed problems. These problems require significant labor, pesticide, and cultural inputs to correct when many of the lower-density cultivars are in use. As golf course superintendents rise higher on the cultural learning curve for those morphologically different cultivars, it may actually result in reduced labor, cultural, and chemical inputs than for the lower-density cultivars under very close mowing heights. Overriding all of these agronomic dimensions is the golfer response and preference in terms of superior uniformity of ball roll with a great diversity of higher speeds that can be produced relatively easily on putting greens.

ASK DR. BEARD

Q. I need to fertilize the turf in early spring. What is the appropriate timing?

A. As a general strategy, nitrogen fertilization should be moderate or avoided in early spring, as temperatures are particularly favorable for growth, especially for cool-season grasses. However, this question relates to a situation where the turf either has a nutrient deficiency that requires significant spring fertilization or else there is a key event or competition scheduled that dictates an early spring fertilization. The spring fertilization strategy typically applies to nitrogen. In contrast, phosphorus and potassium can be applied at any time in the spring, provided the soil is thawed so the nutrients enter the soil with minimum potential for lateral movement.

A typical scenario where problems arise involves an individual who applies the initial spring nitrogen fertilization on a calendar date. When no turf response occurs at the normal time interval, the individual then applies a second nitrogen fertilization, and even this one may fail to give the desired turf response. What the individual has failed to understand is that **spring shoot growth initiation is controlled by soil temperature and that the timing of nitrogen fertilization should be based on monitoring of soil temperatures rather than a calendar date.** Consequently, in the situation just described, when the soil temperature finally warms to the threshold level for shoot growth there is an explosion in leaf production associated with the excessive nitrogen fertilization. This can create serious problems in terms of poor rooting, increased diseases, and subsequent proneness to heat stress as the turfgrass nears the summer season.

The key in interpreting early spring nitrogen fertilization is to monitor the soil temperature, as it basically controls new shoot growth in the spring. **For C_3 cool-season turfgrasses significant shoot growth usually does not occur until soil temperatures rise above 50°F (10°C), with substantial shoot growth rates occurring above 55°F (13°C).** Spring nitrogen fertilization may stimulate a somewhat earlier spring green-up, but will have minimal effect on vertical shoot growth and on tillering, which provides shoot density. **In the case of C_4 warm-season turfgrasses, spring green-up occurs when soil temperatures at a 4-inch (100 mm) depth reach 64°F (18°C). Subsequent substantial shoot growth does not occur until soil temperatures are above 72°F (22°C).**

Finally, it is important to recognize that there are other factors which affect the rate of soil warming other than the seasonal climatic pattern. For example, closely mowed turfs warm up more rapidly than high-cut turfs, due to greater shoot biomass insulation. Also, poorly drained, wet soils warm up much more slowly than well-drained, drier soils due to the high specific heat of the water. Finally, dark-colored surfaces warm up more quickly than light-colored areas.

Ask Dr. Beard: TURFAX, c/o Ann Arbor Press
121 S. Main St., P.O. Box 310
Chelsea, MI 48118
Email: turfax@aol.com
Fax: 734-858-5299