TURFGRASS TRENDS

LOW-MAINTENANCE TURF

There's a New Native Low-Input Turfgrass Option in Town

Danthonia promises lower inputs

By Scott Warnke

When it comes to low-maintenance, cool-season turfgrasses, golf course superintendents don't have many choices. Tall fescue is often thought of as a low-maintenance turfgrass. However, the fertility and fungicide applications needed to maintain acceptable quality can be higher than would be desired in a low-maintenance turf.

The only other option would be fine-leaf fescues and, while they typically require very few inputs, their appearance is objectionable to some. This shortage of options led scientists working for the U.S. Department of Agriculture's Agriculture Research Service (USDA-ARS) to look into the development of new low-maintenance turfgrasses. Exploration of turf areas that receive very few inputs, such as battlefields, graveyards and public gardens in the Maryland, Virginia, Washington, D.C. area, identified species in the genus Danthonia as potential native low-input turfgrasses.

The genus Danthonia is comprised of more than 100 species that are primarily native to temperate regions of the Southern hemisphere, where they are important forage grasses.

About six species of Danthonia are native to the United States, with *Danthonia spicata* (poverty oatgrass) being the most widespread. The common name, "poverty oatgrass," resulted from the fact that its presence in an area is considered an indicator of impoverished or low-fertility soils. *D. spicata* is widespread throughout the continental U.S. and Canada. However, the species has not been widely collected or studied. Previous research has focused on its reproductive biology because it has the unusual ability to form two types of seed heads.

The development of this unique seed production characteristic may have originated from the interaction of *D. spicata* with a choke-forming fungal species (Atkinsonella hypoxylon). Choke occurs when the fungus forms a fruiting body around the tiller and chokes off the production of the terminal seed-head. However, D. spicata can still form seed at the nodes of the tiller.

Our research efforts with Danthonia have involved the collection of plant material and seed from native stands throughout the Maryland, Virginia and Washing-

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***Danthonia spicata* produces two different seed heads. The seed head on the right is a typical terminal seed head and the seed head on the left is produced at the nodes of the flowering tiller.**

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ton, D.C area. We're using this material to study the amount of genetic diversity present and to determine how that diversity is partitioned. If the genetic variation is primarily between locations with very few differences between plants at a specific location, this is an indication that the plants are primarily self-fertile and that only limited amounts of outcrossing occurs. Initial results have indicated high levels of self-fertility. Therefore, we're designing breeding strategies that involve crossing plants collected from different locations in order to see if material with unique characteristics can be developed.

The focus of our initial improvement efforts is on seed characteristics such as resistance to shattering that occurs when seed falls from the seedhead prior to harvest. Shattering is a common characteristic of wild weedy grass species and will need to be improved before commercialization.

Seed dormancy is also a concern and various seed treatments are being evaluated in an effort to improve the speed and uniformity of germination.

Leaf spot diseases are common in some material. However, there appears to be some variation for resistance so it will be necessary to incorporate this resistance into newly developed material. The leaf spot problem is not widespread, and I don't expect it to be a difficult problem to solve.

Our first seed established turf trials focused on determining an appropriate seeding rate and the results indicated that an acceptable turf could be established with seeding rates at or below 1 pound per 1,000 square feet.

In addition, we have looked at mixtures with hard fescues because D. spicata is often found associated with hard fescues in nature. Both D. spicata and hard fescues are extremely shade tolerant and the mixture seems to enhance the overall appearance of both species. However, we don't have enough data from plots of this mixture to make any recommendations.

Future research efforts will involve comparisons of the overall level of inputs required to maintain an acceptable turf of D. spicata and other common cool-season turfgrass species such as ryegrass, tall fescue and fine fescues.

The focus of the USDA-ARS breeding efforts with turfgrasses is to do the difficult, time-consuming work required to make a new species useful for commercial turfgrass breeding companies. Breeding companies will then do the work that's required to create products for golf courses and other consumers.

Germplasm collection and the improvement of seed characteristics are projects that may pay off in a useful product, but are considered too risky and time consuming for commercial turf breeding companies. The long-term goal of this work is to create new native, low-maintenance turfgrass options for consumers that enhance the beauty and sustainability of our landscapes.

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