

Fine Fescues - The Hope of Low Input Turfgrass Management

By Yinjie Qiu, Research Assistant, Plant breeding and Molecular Genetics

Creeping bentgrass and annual bluegrass are the major turfgrass species on golf courses and Kentucky bluegrass dominates home lawns in Minnesota. These grasses all have desired color, traffic tolerance, and good shoot density, however, they are vulnerable to abiotic stresses like drought and biotic stress like diseases such as dollar spot, rust, and snow mold.

Breeding turfgrass species for disease resistance is not easy: most disease resistance mechanisms involve multiple gene interactions and novel gene resources. For this reason, it is hard for current cultivar development when the existing germplasm collection cannot provide sufficient resistance. In addition, different from most major crops, like maize, wheat, and rice, that have whole genomic sequence available, the limitation on the genomic information, further restricts the researcher to apply more modern techniques for the breeding work.

Fine fescues show high potential as low input turfgrasses. Fine fescues have five main subspecies within the family that are used for turf: hard fescues, slender creeping red fescue, chewings fescue, sheep fescue and strong creeping red fescue. Each of these five species has its own unique characteristics. For example, strong creeping red fescue can quickly form a dense turf under low to high fertility; chewings fescue has excellent shade tolerance, slender creeping red fescues tolerate lower mowing heights and have good salt tolerance.

Many fine fescues have exceptional disease resistance. For example, hard fescue is highly resistance to snow mold, a major winter disease in Minnesota, Wisconsin, and the region. Hard fescue also has high resistance to dollar spot and rust. Besides disease resistance, the use of fine fescue can reduce herbicide applications. In field trials, some fine fescues are able to inhibit the development of weeds due to allelopathy, which means that the plants exude chemical compounds that prevent the development of weeds. Fine fescues also have great drought tolerance. The fine fescues planted in Living Laboratory areas at University of Minnesota haven't been watered in years and they are still doing fine. The main drawbacks of the fine fescues are low heat and traffic tolerance.

Our research programs are focusing on understanding:

1. The genetic bases of the snow mold disease resistance in hard fescue,
2. Trying to understand the mechanism behind the weeds inhibition in fine fescue species.
3. What mixes of fescues can produce an acceptable traffic tolerance on fairways.

With our research going on, it is likely we can utilize fine fescues to develop breeding programs to breed fine fescue for better traffic tolerance and heat tolerance. In the meantime, fine fescues could be used as the precious genetic pool to enrich the diversity of our turf community.