Bermudagrass Breeding - Vegetative

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Goals:

- To develop improved, fine textured bermudagrass for golf course putting greens, tees and fairways.
- Develop and refine efficient screening techniques for cold-hardiness and energy reserves.

The 1992-1993 winter was too mild to separate bermudagrass genotypes in the field. The need for a laboratory method to consistently screen for cold tolerance in bermudagrass genotypes is apparent.

We have continued to try various freezing procedures. All involve a grow-out period of frozen plugs planted in sand on the greenhouse bench. Our freezing chamber is thermostatically controlled and can be adjusted to a stable freezing temperature that fluctuates no more than 3°F. An electric fan is placed in the bottom of the cabinet to circulate the air.

Our most recent approach consists of inverting plugs on one shelf in the freezer to try to simulate what happens when cold air hits the top of the dormant or green bermudagrass growing on the golf course. We have found that the soil from which the plugs are cut must have a uniform moisture content. Also, the genotypes must have had uniform management for more than one year.

Winter survival in plants has been associated with energy reserves stored in their roots and underground parts. In 1962 we described "A Method for Measuring Sod Reserves," *Agronomy Journal* 54:53-55. The method involved cutting 6 inch plugs of sod, putting them into large empty cans, letting them develop etiolated stems in the dark, and measuring the dry matter produced. We have modified this method, since used by others, by inverting another can over the one containing the plug. A small black opening is left on the north side for air exchange and water, and the cans are attached to each other with black plastic tape that excludes the light. We have then grown plants out in the greenhouse and separated the cans to measure the etiolated growth.

We also have modified the method by cutting

both ends out of one can and attaching it to an inverted can, leaving an air opening by pushing the bottom can in about 3/8 inches. The two cans are taped together and forced into a cut in the soil made by the plug cutter. The cutter goes deep enough to insure that only rhizomes within the 6 inch plug contribute to the growth under the can. The cans are forced into the soil about 1.5 inches.

With this method we were able to observe significant reserve differences between 16 genotypes that involved the winter hardy Berlin bermuda as one parent. These had been mowed regularly and given low maintenance for 20 years. The number of cans needed to sample a plot will depend on the variation within the plot. We are currently using a total of 10 samples, counting plot replications in another test.