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Glenn W. Burton
University of Georgia
Tifton, Georgia

Another mild winter has failed to eliminate all but the most winterhardy bermudagrass hybrids in North Georgia and North Carolina.

In earlier reports, we expressed the hope that we could cross the Kentucky Quicksand common 9034348 with our best Cynodon transvaalensis clones and obtain a more winterhardy hybrid. After these efforts failed, we tried to cross it with Tifton 68, an excellent pollen producer. Four plants from many pollinations using Quicksand as the female finally produced four plants that were most certainly selfs. These plants were sterile and showed no promise in the first evaluation and no potential as parents for future breeding. Our conclusion is that the winterhardy Kentucky Quicksand bermudagrass can not be used in a breeding program designed to develop more winterhardy hybrids.

This past spring we made several attempts to use a special freezing chamber used by the small grain breeder to chill small grain to make it flower. The chamber is 18" x 18" x 24" with slides for 18" x 18" shelves, 3" apart. The unit is thermostatically controlled and can be adjusted to quite stable freezing temperatures that may fluctuate 2 to 3°C. We developed .5" hail screen shelves and put a small electric fan in the bottom of the cabinet to circulate the air. We tried freezing cup-cutter plugs and rhizomes with a little but no consistent success. Other research caused us to delay this effort until this fall and winter. A dependable laboratory method to screen our hybrids for winter-hardiness is badly needed. We cannot depend on the weather as our experience has shown.

Winter survival in plants has been associated with 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" plugs of sod, putting them in empty No. 10 cans from a cafeteria, letting them develop etiolated stems in the dark and measuring the dry matter so 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 two layers of tape that excludes the light. We have then been able to grow them out in the lighted greenhouse and separate the cans to measure the etiolated growth.

This summer we have modified the method by cutting both ends out of one can and attaching it to an inverted can leaving the air opening by pushing the bottom can in about 3/8" and painting it black. 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" plug contribute to the growth under the can. The cans are forced into the soil about 1.5". With this method we were able to establish 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 reserve cans needed to sample a plot will depend on the variation within the plot. We are using a total of 10 counting plot replications in another test.

We hope our continuation of freezing selected plugs with varying reserves may provide the much needed method for measuring winter hardiness in bermudagrass.