have been well established at the USDA Research Station, Beltsville, Maryland and observed for winter performance over a 5-year period. Dr. Burton and Dr. Gerald Powell, of the U.S. Department of Agriculture at Beltsville, Maryland, have closely cooperated over the last 5 years in observation of winterhardiness of the major bermudagrass cultivars. Dr. Powell's report on winterhardiness is as follows: "Our bermudagrass mutants established for 5 years here were selectively killed. Not all of Tifgreen was killed, but rated 4.75 on a scale of 0-9 for complete kill to little damage. Midiron ranked 8.50 and is our most winter hardy variety. Mutant 951 ranked 7.50 and Mutant 260 ranked 6.25. Tufcote in this test ranked 6.00. A total of 18 mutants ranked higher than Tifgreen. Tifdwarf was far down the list in 156 clones which were evaluated."

At Tifton, 9 of the most promising bermudagrass mutants and their parent clones of Tifgreen, Tifdwarf and Tifway have been moved into the greenhouse for expansion tests in Tifton field plots next year. At this time Dr. Burton judges that the 9 mutants are superior to the parent clones in winterhardiness, although most of them are not greatly different.

UNIVERSITY OF MISSOURI - Dr. John H. Dunn, Project Leader

Funds Granted - $1,000 —— Management of Zoysia and Bermudagrass in a Transition Zone.

Various management practices alone and in combination are being tried on zoysia and bermudagrass. Mowing frequency decidedly affects thatch with closer mowing (3/4 inch) showing a beneficial reduction. Mowing frequency and height had a greater effect on thatch reduction than mechanical thatching. Lower rates of nitrogen also exhibited less thatch than high rates.

Lower rates of nitrogen continue to give good quality zoysia and bermudagrass turf providing proper attention is given to other management procedures. A combination of 2 pounds nitrogen per year, 3/4 inch mowing, and annual dethatching has been the most favorable treatment for quality zoysia. However, casual observation based upon "sponginess" of turf suggests that even 2 pounds of nitrogen may be above optimum except where recovery from injury or replacement of leached nitrogen is needed. An annual application of 3 pounds of nitrogen seems to be sufficient for good quality of the three bermudagrass varieties used in this study. Increased nitrogen may also be needed for bermudagrass where leaching of nitrogen or injury occurs.

NORTH CAROLINA STATE UNIVERSITY - Dr. W. M. Lewis, Project Leader

Funds Granted - $1,200 —— The Influence of Soil and Air Temperatures on Goosegrass (*Eleusine indica* (L.) Gaertin) Germination with Reference to Timely Herbicide Application for Preemergence Control of Goosegrass.

Objectives: To determine the optimum time to apply preemergence herbicides for goosegrass control by correlating soil and air temperatures with goosegrass germination. To compare three widely used herbicides for preemergence crabgrass control on their effective control of goosegrass.

Tests in 1976 and 1977 showed benefin and DCPA were more effective in controlling goosegrass than bensulide. The target date for applying preemergence herbicide for goosegrass could be set when soil and atmospheric temperatures reach $55^{\circ}$ to $68^{\circ}$ F. Goosegrass emerged on May 9th when the average soil temperature was $68^{\circ}$ F. Results of this test questions the effectiveness of the preemergence herbicides for goosegrass control and the proper timing of applications.

Postemergence tests with several herbicides indicate promise for acceptable controls. Metribuzin and asulam were the most promising postemergence treatments.

NORTH CAROLINA STATE UNIVERSITY - Dr. Leon T. Lucas, Project Leader

Funds Granted - $1,000 —— Spring Dead Spot Study

Several fungicides and nitrogen sources and rates were tested. Tests in previous years had shown that spring dead spot was more severe the spring following late summer ammonium nitrate applications. Some degree of control was obtained from very heavy applications of fungicides with Tersan 1991 at 1 ounce per 100 square feet. However, the high cost of such treatments make this approach impractical except for use as a drench directly applied to the afflicted area.

Results of rates and time of applications of fungicides - 1977

| | Treatment | | Turf Quality | % SDS |
|---|---|---|---|---|
| 1. | Tersan 1991 (1 oz/100 $ft^2$) | Oct., Nov., Dec. | 8.00 | .5 |
| 2. | " | Oct. | 7.75 | .3 |
| 3. | " | Nov. | 7.75 | 1.8 |
| 4. | " | Dec. | 3.50 | 13.8 |
| 5. | Terraclor 75 (1.3 oz/100 $ft^2$) | Oct., Nov., Dec. | 5.00 | 14.0 |
| 6. | " | Oct. | 6.00 | 7.5 |
| 7. | " | Nov. | 5.00 | 9.8 |
| 8. | " | Dec. | 5.75 | 5.3 |
| 9. | Vitavax | Oct., Nov., Dec. | 5.25 | 8.3 |
| 10. | " | Nov. | 5.25 | 8.0 |
| 11. | Mertect | Oct., Nov., Dec. | 6.75 | 5.8 |
| 12. | " | Nov. | 6.50 | 6.8 |
| 13. | Tersan 1991 (.5 oz/100 $ft^2$) | Oct., Nov., Dec. | 8.00 | .5 |
| 14. | " (.25 oz/100 $ft^2$) | " | 6.75 | 4.5 |
| 15. | Terraclor (.66 oz/100 $ft^2$) | Oct., Nov., Dec. | 6.00 | 9.5 |
| 16. | " (.33 oz/100 $ft^2$) | " | 5.00 | 9.3 |
| 17. | Check | | 4.50 | 11.3 |
| 18. | Tersan 1991 (1 oz/100 $ft^2$) spray | Oct., Nov., Dec. | 8.75 | 0 |