MAJOR CONTRIBUTIONS TO TURFGRASS CULTURE

by the

Michigan State University Turfgrass Research Group

1. Deliniated the major causes of turfgrass winter injury: (a) low temperature, (b) desiccation and (c) snow mold diseases. Showed suffocation or gas toxicities under ice sheets to be of no significance.

2. Developed an effective granular fungicide for Typhula blight control.

3. Shown Demosan to be as effective as the heavy metal fungicides in controlling Typhula blight.

4. Developed and demonstrated the effectiveness of dual-purpose winter protection covers for intensively maintained turfs.

5. Found that direct low temperature injury can be minimized culturally through (a) proper surface and subsurface drainage, (b) a lower, judicious nitrogen fertility level, (c) an N-K nutritional balance of 3 to 1, and (d) low soil arsenic levels.

6. Shade adaptation studies showed disease and a favorable microenvironment for disease development to be the major limiting factors in growing turfgrasses under the shade of trees, rather than competition for light, water or nutrients.

7. Showed the importance of water temperature in influencing the submersion tolerance of turfs.

8. Defined the relative tolerance of the major turfgrass species to (a) low temperature stress and (b) submersion.

9. Developed and released a new red fescue variety - Wintergreen.

10. Conducted a continuing program of turfgrass varietal evaluation for Michigan of the bentgrasses, bluegrasses, fescues and ryegrasses. It has been one of the most comprehensive in existence.

11. Developed improved methods of roadside establishment in Michigan involving proper (a) seed mixture (a minimum of 20% each of Kentucky bluegrass, red fescue and ryegrass), (b) seeding rate (80# per acre), (c) seedbed fertilization (80# each of N, P_2O_5, and K_2O per acre) and (d) mulching (two tons of straw plus 100 gal. of asphalt per acre or Soil Retention Mat).

12. Demonstrated hydroseeding to be quite inferior to shallow soil incorporation and rolling in achieving rapid, uniform turfgrass establishment under droughty Michigan conditions.

13. Developed a method for experimentally evaluating the rooting ability of sodded turfs.

14. Showed that sod rooting was most rapid when (a) placed on moist rather than dry soil, (b) maintained at a relatively low nitrogen level prior to harvest, and (c) harvested at 0.4 to 0.6 inch in depth.

15. Found no difference in the rooting ability of sod grown on organic or on mineral soil.

16. Found high levels of nitrogen fertilization to increase the incidence of fairy ring.

17. Demonstrated that Fusarium blight disease development could be minimized by avoiding turfgrass moisture stress through proper irrigation practices.

18. Developed a method for chemical control of Fusarium blight.

19. Studies of Poa annua strains from 48 states showed that two major extremes existed with all degrees of variation occurring within these extremes. The extremes are (a) the classical annual, bunch type which is a prolific seed producer and (b) a perennial, creeping type which is a low seed producer.

20. Showed seed germination of Poa annua to be highest under alternating day-night temperature in the 55 to 75°F range and to cease at soil temperature of 80°F or higher.

21. Renovation studies on Poa annua dominant fairways showed that bentgrass establishment was best when (a) used in combination with vertical mowing and vegetative kill with sodium arsenite, (b) vegetative plantings were made rather than seeding, and (c) a post-planting Poa annua suppression program is followed.

22. Developed an experimental (inclined plane) method for evaluating the surface quality of greens.

23. Found ball roll distance was increased somewhat by (a) spiking, (b) coring or (c) light topdressing while mowing at 2 or 3-day intervals seriously impaired the distance of ball roll.

24. Developed a rapid, microtechnique for studying the biological decomposition of thatch.

25. Shown that thatch decomposition is favored by a pH between 6.0 and 7.0 and can be stimulated by certain enzymes and enzyme pressures.

26. Shown that plant parts or turfgrass species having a higher lignin content are more prone to thatching.

27. Advanced the basic pool of knowledge regarding the mechanism of high temperature growth stoppage in grasses.

28. Showed that as little as a 4 mph wind can reduce the maximum temperatures of a bentgrass turf by 10 to 15°F.

29. Found the timing of syringing during heat stress can be critical in the degree of turfgrass heating that occurs. Syringing 1 to 2 hours before the 2:00 P.M. maximum is preferred.

30. Shown that mid-September nitrogen fertilization increases the incidence of Typhula blight compared to August or October fertilizations.

31. Found that the application of more than 1 pound of nitrogen per 1,000 square feet in any one application results in the exhaustion of the carbohydrate reserve.

32. Shown that winter color retention of turfs cannot be achieved by late fall nitrogen fertilization under Michigan conditions.

33. Shown placement of phosphorus on the soil surface caused a suppression of turfgrass seed germination compared to soil incorporation.

34. Developed a rapid, reliable experimental method of measuring sod strength.

35. Ascertained the relative sod strengths achieved by various (a) turfgrass varieties, (b) seeding rates, (c) bluegrass blends, (d) bluegrass-red fescue mixtures, (e) mowing heights and (f) nitrogen, phosphorus, and potassium fertilization practices.

36. Studied the mechanism of sod heating during shipment and shown that the degree of heating can be reduced by (a) mowing at a lower height of 0.75 inch, (b) removing clippings, (c) using a low level of nitrogen nutrition, and/or (d) harvesting at a low as soil temperature as possible.

37. Developed a method of pelletizing and utilizing the clippings from mowing turfs.