1982 IOWA TURFGRASS FIELD DAY

AND

EQUIPMENT SHOW

Thursday
July 29, 1982

IOWA STATE UNIVERSITY
HORTICULTURAL RESEARCH
STATION
AMES, IOWA

The first projects in the new field turfgrass research program at Iowa State University were begun in 1979. These areas were expanded in the fall of 1980 and the first field day report was published for last year's field day which was held on June 18, 1981. The following report is the second to be published. It contains information on the projects which were discussed in last years field day in addition to reports on a series of other studies conducted at Iowa State last year.

Those of you who were present at the 1981 field day will notice that the plot area has been expanded by approximately one acre. The new area to the east of the equipment building was established in August of 1981. It includes four investigations which will be included in today's program.

The expansion which has taken place since 1979 was made possible through grants from the Iowa Turfgrass Institute, the Iowa Golf Course Superintendents Association, and through donations made by the companies listed at the end of this report. The profits from activities such as the field day, the Iowa Turfgrass Conference and the upcoming golf tournament are very important in making research projects of this type possible.

On behalf of the Iowa Turfgrass Institute and Iowa State University, I would like to thank you for attending in this years field day.

Nick Christians
July 1982

PROGRAM

Thursday

July 29, 1982

9:30 a.m. to 3:30 p.m.

8:00 - 9:15.....Registration and Coffee with exhibitors

9:15 - 9:30.....Opening remarks and introductions

9:30 - 12:00.....Viewing of research area

12:00 - 1:30.....Lunch

1:30 - 3:30.....Afternoon Educational Program

In case of rain, an indoor morning program is planned at the research station.

MORNING PROGRAM

There are 10 studies on the research area that we will be looking at this morning. Most of the areas in today's program are either new or are different from those which were viewed at last year's field day. There is a number on the back of your lunch ticket which corresponds to 1 of the 10 areas. At 9:30 you will be instructed to go to the study with the same number as that on your ticket (see map). There will be 15 minutes allowed for each stop. Each presentation will last from 7 to 8 minutes and there will be approximately 5 minutes for questions. At the end of 13 minutes a horn will blow and your group will have 2 minutes to move to the next stop. Each group will see all 10 research areas.

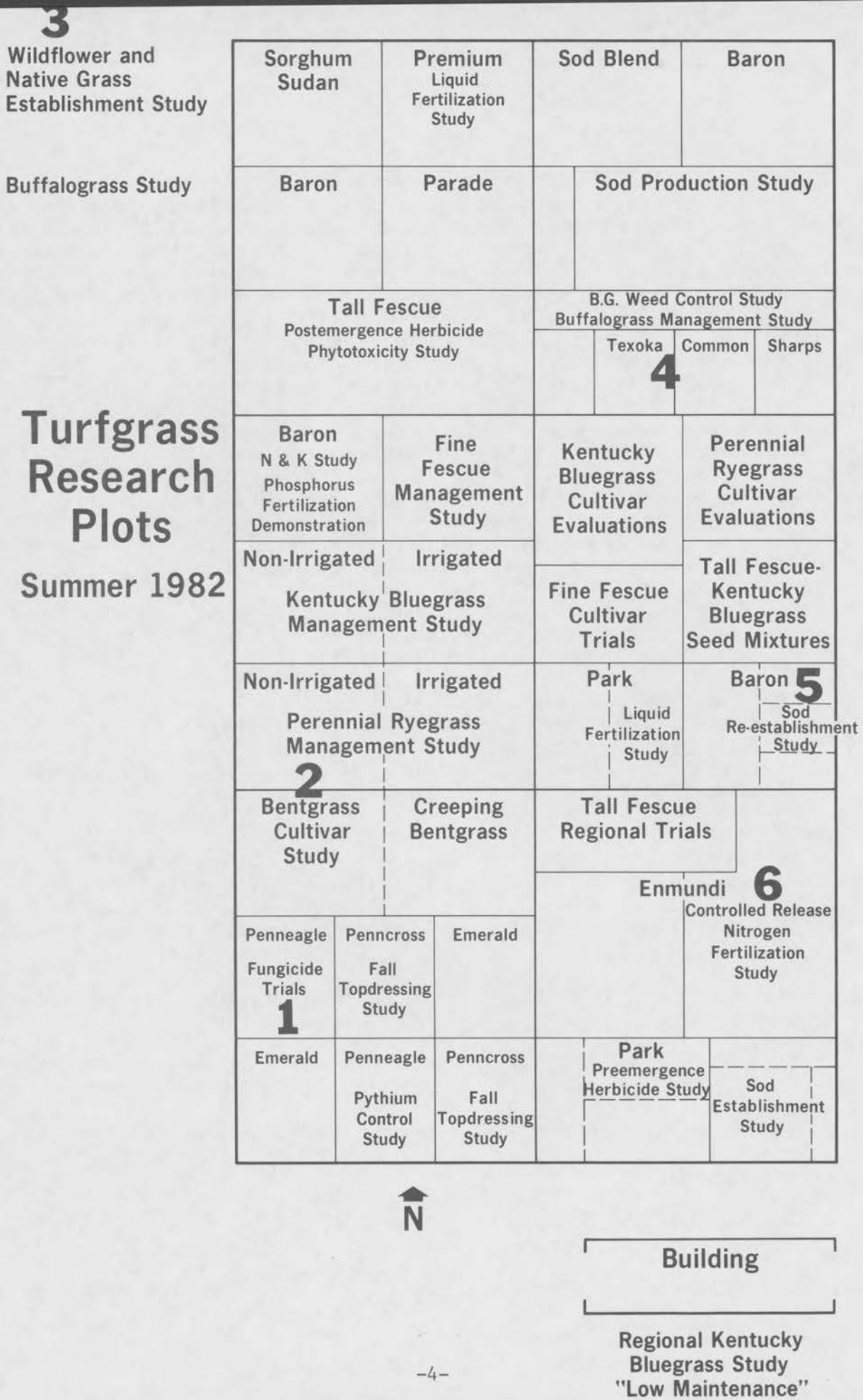
There are more than 10 studies on the research plots. Many of these investigations will have signs on them. Please feel free to visit any of these areas during lunch or after 3:30. The staff involved in presenting the morning program will be available for questions throughout the day.

The research areas that will be discussed this morning and the individuals who will be presenting the information are as follows:

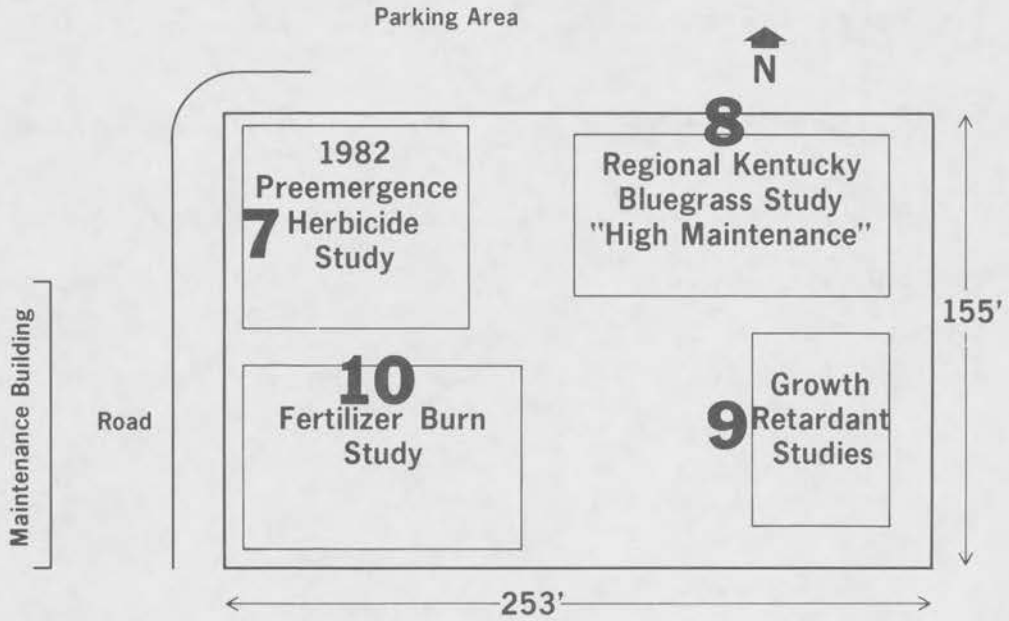
1.	Fungicide Trials	Laura Sweets, Dept. of Plant Pathology Seed and Weed Science, Iowa State University
2.	Bentgrass Cultivar and Management Study	David Wehner, Dept. of Horticulture, University of Illinois
3.	Prairie Grass and Wildflower Establishment	James Midcap, Dept. of Horticulture, Iowa State University
4.	Buffalograss Management Study	David Brahm, Dept. of Horticulture, Iowa State University
5.	Sod Establishment Study	Thomas Robeson, Dept. of Horticulture, Iowa State University
6.	Nitrogen Fertilization Study	Norman Hummel, Dept. of Horticulture, Iowa State University
7.	Preemergence Herbicide Study	Nick Christians, Dept. of Horticulture, Iowa State University
8.	High Maintenance Kentucky Bluegrass Cultivar Evaluations	Terry Riordan, Dept. of Horticulture, University of Nebraska
9.	Growth Retardant Study	Jeff Nus, Dept. of Horticulture, Iowa State University
10.	Fertilizer Burn Studies	Sally Johnson, Dept. of Horticulture, Iowa State University

Turfgrass Research Plots

Summer 1982



Map of New Field Research Area Established in the Fall of 1981



Total Area 39,215 ft^2
0.90 Acres

AFTERNOON PROGRAM

There are six demonstrations set up for our program this afternoon. The demonstrations will begin at 1:30, and each of the six stops will be 20 minutes long. Groups will be divided according to the number on the back of your ticket. At the end of the 20 minute period a horn will blow and your group will proceed to the next area. If all your questions were not answered in the 20 minute period, feel free to return to a station at 3:30.

This afternoon's program should provide you with a lot of practical information, no matter what area of turfgrass management you represent. Here are the topics and the individuals who will present the information:

1.	Weed Identification	Beth Green, Integrated Pest Management Specialist
2.	Pesticide Safety	Don Lewis, Extension Urban Entomologist
3.	Equipment Safety	Dave Williams, Extension Agricultural Engineer
4.	Native Prairie Plants	Jim Midcap, Extension Horticulturist
5.	Sprayer Calibration	Frank Gasperini, E. I. DuPont De Nemours & Co.
6.	Modified Soil Mixes	Norm Hummel, Extension Turfgrass Specialist

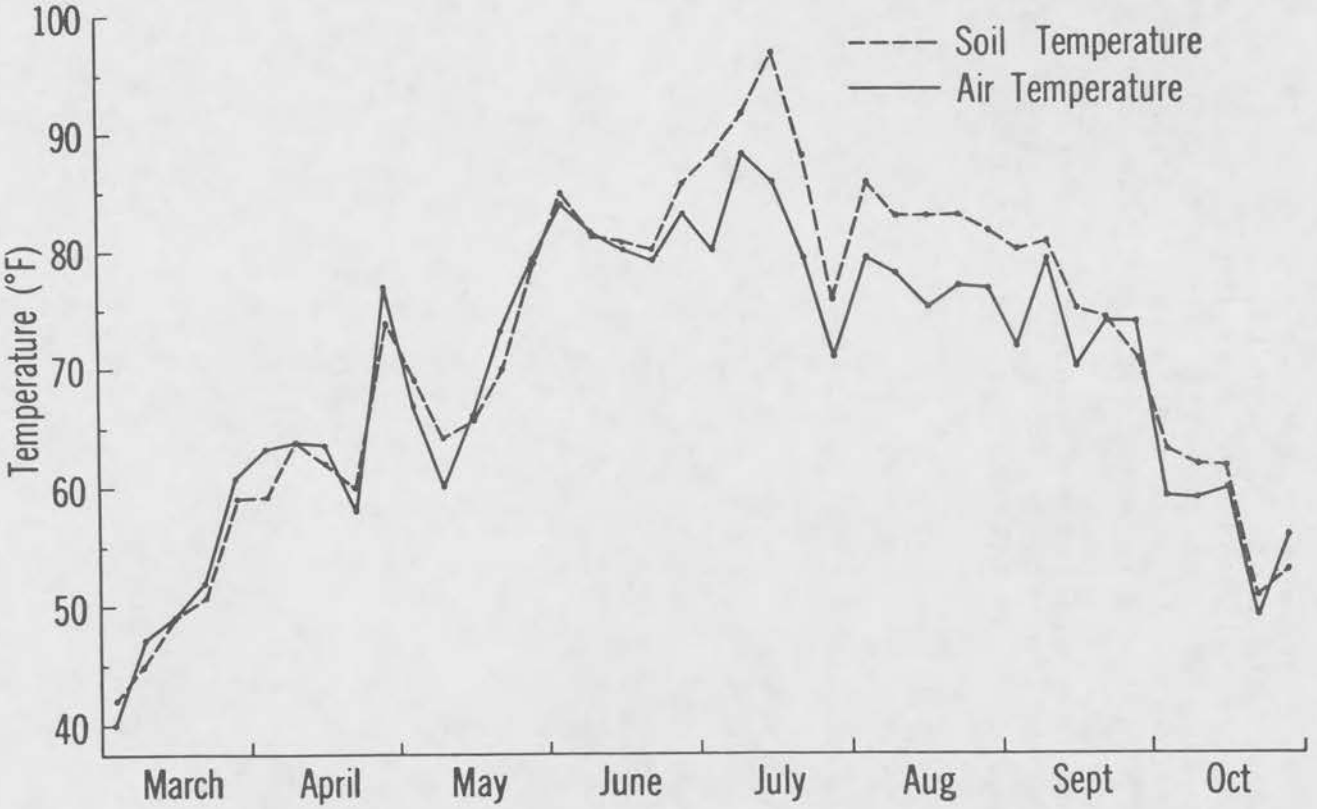
ENVIRONMENTAL INFORMATION 1981 SEASON

The next 2 pages include information on the environmental conditions at the Iowa State University research station in the 1981 season.

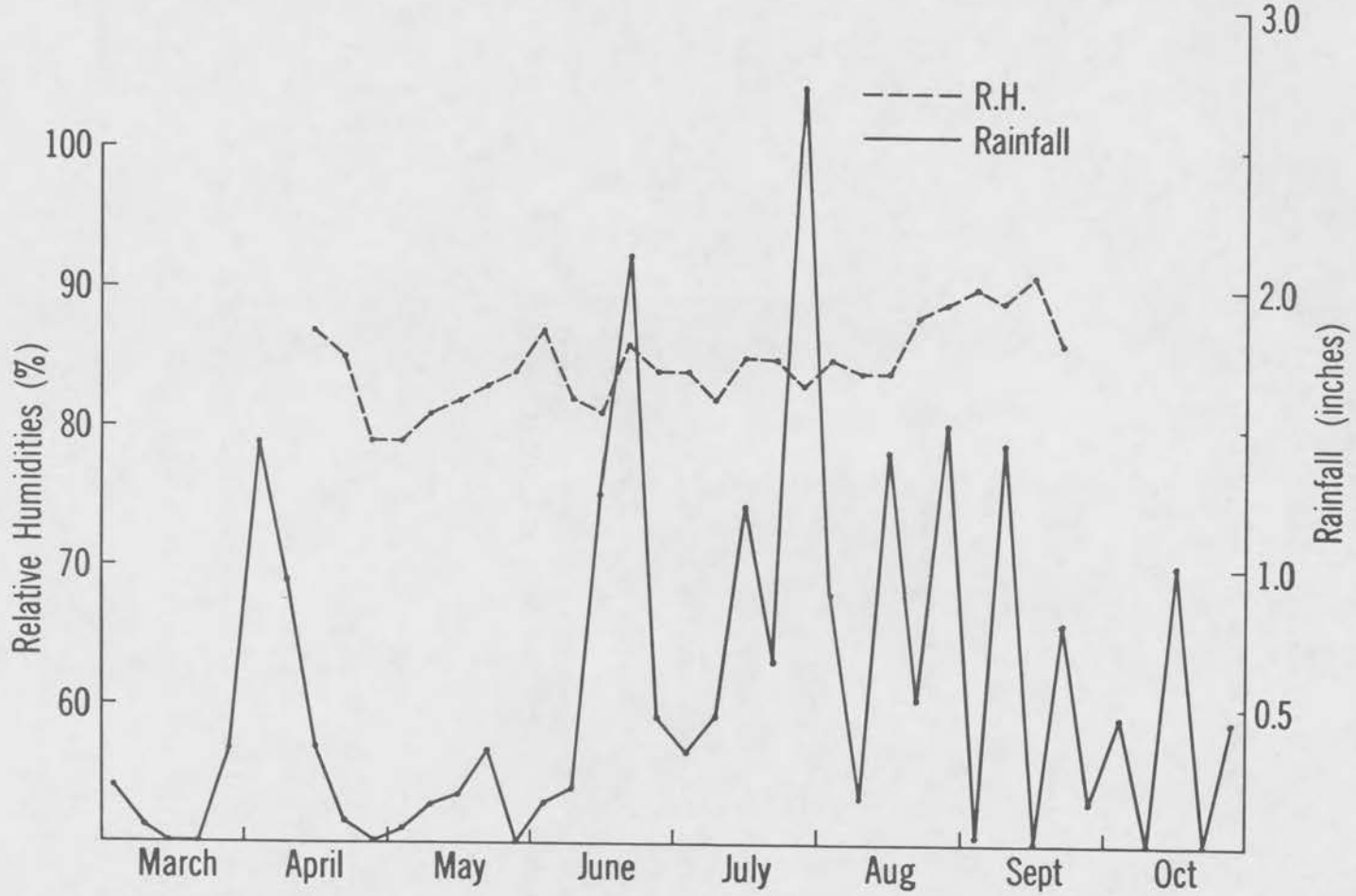
Although the total rainfall for the growing season was approximately 22 inches, the early part of 1981 was extremely dry. This followed a very dry fall and winter in 1980. These unusually dry conditions are reflected in the data collected on non-irrigated studies. Irrigation water was available throughout the season, although some reductions in water use were necessary in June and July.

Average maximum air temperatures and relative humidity were moderate throughout most of the season. Turfgrass diseases were not a serious problem at the research area in 1981.

Average maximum soil and air temperatures at the ISU Horticulture Research Station for each week in the 1981 growing season.



Weekly rainfall and average maximum relative humidity at the ISU Horticulture Research Station in the 1981 growing season.



INDEX

KENTUCKY BLUEGRASS CULTIVAR EVALUATIONS

The 49 Kentucky bluegrass cultivars located in section 2 of the turfgrass research area were seeded in the fall of 1979. These plots were fertilized at a rate of 4 lb N/1000 sq ft (urea) in both the 1980 and 1981 seasons. No insecticides or fungicides have been used on the area. Irrigation was applied as needed to prevent drought. The results of 1981 evaluations are listed in Tables 1 and 2.

The values listed under each month are the averages of ratings made on 3 replicated plots. Yearly means of all the months in which data were taken are listed in the last column. The first cultivar received the highest average rating for the entire 1981 season. The cultivars are listed in descending order. These cultivars have been maintained for 2 full seasons and are beginning to become quite useful for determining which cultivars can be expected to perform well in Iowa. However, it is not unusual for Kentucky bluegrasses which perform well for two seasons to deteriorate in quality in later seasons. More time, along with the results of other Kentucky bluegrass evaluations at the research station, will be required before accurate recommendations can be made.

The yearly averages for the 49 cultivars varied little during 1981 and all of them maintained at least an acceptable quality over the season. Although Sydsport received the highest overall values, the ratings for the first 19 cultivars rounded to 7.5 and there is technically no difference among them.

The cultivar Common, which received the lowest quality rating, had the best early spring color (Table 2). Touchdown and Nugget were the slowest cultivars to greenup.

TABLE 1. THE 1981 QUALITY RATINGS FOR THE KENTUCKY BLUEGRASS STUDY WHICH WAS ESTABLISHED IN THE FALL OF 1979.

CULTIVAR	APRIL	MAY	JUNE	JULY	AUGUST	SEPT	OCT	MEAN
1. SYDSPORT	6.5	7.5	8.0	7.5	8.0	7.0	7.5	7.5
2. SENIC	6.5	6.5	7.5	7.0	8.0	7.5	8.0	7.5
3. MERION	6.5	6.5	8.0	8.0	7.5	7.5	7.0	7.5
4. ASPEN	6.0	7.5	8.0	8.0	8.0	8.0	7.5	7.5
5. TOUCHDOWN	6.0	7.0	8.5	8.5	8.0	7.5	7.5	7.5
6. SVING	6.0	7.0	7.5	7.5	7.5	7.5	7.5	7.5
7. RAM I	6.0	7.5	9.0	8.5	8.0	8.0	7.5	7.5
8. BARBIE	6.5	7.0	8.5	7.5	7.5	7.5	7.0	7.5
9. 1528T	6.0	6.5	8.5	8.0	8.5	8.0	8.0	7.5
10. AMERICA	7.0	7.0	7.5	7.0	8.0	8.0	8.0	7.5
11. ARISTA	6.5	6.5	7.5	8.5	7.0	8.0	7.5	7.5
12. GLADE	6.5	6.5	7.5	7.0	8.0	8.0	7.5	7.5
13. BRISTOL	6.5	6.5	8.0	8.0	7.5	8.0	8.0	7.5
14. ENMUNDI	6.5	7.0	8.0	8.0	7.5	7.5	7.5	7.5
15. (WTN)I-13	7.0	7.5	8.0	8.0	7.5	7.0	6.5	7.5
16. P-164	6.5	8.5	8.5	7.0	7.0	7.5	8.0	7.5
17. ADELPHI	6.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
18. AQUILLA	6.5	7.0	8.0	8.0	8.0	7.5	7.0	7.5
19. ESCORT	6.5	8.0	7.5	8.0	7.5	7.5	7.5	7.5
20. A-20	6.5	7.0	8.0	7.0	6.5	7.5	7.5	7.0
21. PARADE	6.5	7.0	7.5	7.0	7.5	7.5	7.5	7.0
22. K3-160	6.5	6.0	8.0	7.5	7.5	7.5	7.0	7.0
23. (WTN)H-7	6.0	7.5	7.5	7.5	7.0	6.5	6.5	7.0
24. PARK	7.0	7.0	6.5	7.0	7.5	6.5	6.5	7.0
25. KIMONO	6.0	6.5	8.0	8.0	7.0	7.5	7.0	7.0
26. CHERI	6.5	6.5	7.5	7.5	7.0	7.5	7.5	7.0
27. NUGGET	5.5	6.5	7.5	8.0	6.5	7.5	7.0	7.0
28. N-535	6.0	7.0	7.0	7.0	8.0	7.5	7.5	7.0
29. COLUMBIA	6.5	7.5	6.5	6.5	7.5	7.5	7.0	7.0
30. BARON	6.5	6.0	6.5	7.0	7.0	7.5	7.0	7.0
31. PLUSH	6.5	7.5	7.5	7.5	7.5	6.5	7.0	7.0
32. FANFARE	6.5	7.0	7.5	7.5	7.0	7.0	7.0	7.0
33. VICTA	6.5	6.0	7.5	8.0	7.5	7.5	7.5	7.0
34. FYLKING	6.5	7.5	8.0	6.5	7.0	7.0	7.0	7.0
35. BIRKA	6.0	6.5	7.5	7.0	7.0	7.5	7.0	7.0
36. PENNSTAR	6.5	7.0	7.5	7.0	7.5	8.0	7.5	7.0
37. TRENTON	6.0	7.5	7.5	7.0	7.0	7.5	7.5	7.0
38. VANTAGE	6.5	6.5	7.5	7.5	7.5	7.0	7.0	7.0
39. BONNIEBLUE	6.0	6.5	7.5	7.5	7.5	7.5	7.5	7.0
40. RUGBY	6.5	7.0	7.0	7.0	7.0	7.5	7.5	7.0
41. A-20-6	6.5	6.0	7.5	7.5	6.5	7.5	7.5	7.0
42. MERIT	6.0	6.0	7.0	7.5	8.0	7.5	7.0	7.0
43. SV 0 1617	6.0	7.0	7.5	7.0	7.0	7.5	7.0	7.0
44. WABASH	7.0	7.0	7.0	7.0	7.0	6.5	7.0	7.0
45. A-34	7.0	7.5	7.0	7.0	6.5	6.0	6.5	7.0
46. BFB-35	6.0	6.0	6.0	6.5	7.5	7.0	7.0	6.5
47. MAJESTIC	6.0	7.0	6.5	6.5	7.0	7.0	7.0	6.5
48. K76-86-4	7.0	6.5	6.5	7.0	6.5	7.0	6.5	6.5
49. COMMON	6.0	5.5	5.5	6.0	7.0	6.5	6.5	6.0
LSD 0.05	N.S.	N.S.	1.0	1.0	1.0	0.5	1.0	0.5

QUALITY IS RATED AT 9=BEST QUALITY AND 1=DEAD TURF. A RATING OF 6 OR HIGHER CONSTITUTES ACCEPTABLE QUALITY.

TABLE 2. EARLY SPRING GREENUP OF THE KENTUCKY BLUEGRASS CULTIVARS IN THE 1979 KENTUCKY BLUEGRASS STUDY.

CULTIVAR	APRIL COLOR RATING
1. COMMON	7.5
2. BFB-35	7.5
3. WABASH	7.5
4. SYDSPORT	7.5
5. A-34	7.5
6. PARK	7.0
7. CHERI	7.0
8. COLUMBIA	7.0
9. PLUSH	7.0
10. FYLKING	7.0
11. MAJESTIC	7.0
12. (WTN)I-13	7.0
13. RUGBY	7.0
14. P-164	7.0
15. K76-86-4	7.0
16. SENIC	7.0
17. BARBIE	7.0
18. ENMUNDI	7.0
19. ADELPHI	7.0
20. PARADE	6.5
21. K3-160	6.5
22. (WTN)H-7	6.5
23. RAM I	6.5
24. AMERICA	6.5
25. BARON	6.5
26. VANTAGE	6.5
27. GLADE	6.5
28. MERIT	6.5
29. AQUILLA	6.5
30. ESCORT	6.5
31. A-20	6.5
32. N-535	6.5
33. ARISTA	6.5
34. PENNSTAR	6.5
35. TRENTON	6.5
36. BRISTOL	6.5
37. SV O 1617	6.5
38. MERION	6.5
39. ASPEN	6.5
40. 1528T	6.5
41. FANFARE	6.5
42. BIRKA	6.5
43. A-20-6	6.0
44. SVING	6.0
45. BARBIE	6.0
46. KIMONO	6.0
47. BONNIEBLUE	6.0
48. TOUCHDOWN	6.0
49. NUGGET	5.5
LSD 0.01	0.5

COLOR IS RATED AT 9=DARK GREEN AND 1=TOTAL LACK OF GREEN COLOR. A RATING OF 6 OR HIGHER CONSTITUTES ACCEPTABLE COLOR.

LOW MAINTENANCE KENTUCKY BLUEGRASS CULTIVAR EVALUATIONS

Table 3 includes quality information for 84 Kentucky bluegrass cultivars. These cultivars were established in the fall of 1980 and will be maintained under low maintenance conditions for several years. This area will receive no irrigation and will be fertilized once a year with 1 lb of N/1000 sq ft in September. Urea will be used as the nitrogen source. The same 84 cultivars were established on an adjacent site in 1981. This area is to be maintained under high maintenance conditions for comparitive purposes.

This year's data was heavily influenced by rate of establishment. It will be at least one more season before soil nitrogen is depleted to the extent that reliable information on cultivars for low maintenance areas in Iowa will be available.

There were no differences from a statistical standpoint for most of the season. By November, however, a number of cultivars had become fully established and some real differences had begun to appear. Some of the cultivars which performed best for the year as a whole were Glade, Baron, MLM-18011, Touchdown and Majestic. This order is likely to change as soil N is depleted in future years.

TABLE 3. THE 1981 QUALITY RATINGS FOR THE LOW MAINTENANCE, REGIONAL KENTUCKY BLUEGRASS STUDY ESTABLISHED IN THE FALL OF 1980.

CULTIVAR	JUNE	JULY	AUG	SEPT	OCT	NOV	MEAN
1. GLADE	5.0	6.0	6.5	7.0	7.0	6.5	6.5
2. BARON	6.5	5.5	6.5	6.5	8.0	6.0	6.5
3. MLM-18011	5.5	6.0	7.0	6.5	7.0	6.5	6.5
4. TOUCHDOWN	5.5	6.0	7.0	7.5	7.0	5.5	6.5
5. MAJESTIC	5.0	6.0	6.5	7.5	6.5	6.5	6.5
6. MIDNIGHT	5.0	5.5	6.5	7.5	7.5	6.0	6.5
7. SHASTA	5.0	5.5	6.5	7.0	7.0	6.5	6.5
8. VICTA	6.5	6.0	6.5	7.0	7.5	6.5	6.5
9. ENOBLE	5.5	6.0	6.5	6.0	7.0	6.5	6.5
10. NJ 735	5.5	6.0	7.0	7.5	7.0	6.5	6.5
11. BIRKA	5.0	6.0	6.0	5.5	6.5	6.0	6.0
12. RAM-I	5.0	5.5	6.0	7.0	7.0	6.0	6.0
13. FYLKING	5.5	5.5	6.0	6.0	6.0	6.0	6.0
14. CHERI	5.5	5.5	6.0	6.0	6.0	5.5	6.0
15. NASSAU(243)	5.0	5.5	5.5	6.0	7.0	6.5	6.0
16. WABASH	4.5	5.5	6.0	6.5	6.5	6.0	6.0
17. NUGGET	5.0	5.5	6.0	6.5	6.5	6.5	6.0
18. 239	5.5	5.5	6.0	7.0	6.5	6.0	6.0
19. PSU-190	5.5	5.5	6.5	6.5	7.0	5.5	6.0
20. KIMONO	6.5	6.0	6.5	6.0	6.0	6.0	6.0
21. ENMUNDI	6.0	6.0	6.5	6.0	6.0	6.0	6.0
22. TRENTON	5.5	5.5	6.0	6.5	7.0	5.5	6.0
23. GERONIMO	4.5	6.0	6.5	7.0	6.0	5.5	6.0
24. CEB VB 3965	5.5	5.5	6.0	6.5	6.5	6.5	6.0
25. WELCOME	5.0	5.5	5.5	6.5	6.5	6.5	6.0
26. WW AG 463	5.0	6.0	6.5	6.5	6.5	4.5	6.0
27. WW AG 480	5.0	5.5	6.5	6.5	7.0	5.5	6.0
28. AMERICAN	4.5	5.5	6.0	7.5	7.5	5.5	6.0
29. VANESSA	5.0	5.5	6.5	6.5	6.5	5.5	6.0
30. CELLO	4.5	5.0	7.0	7.0	7.0	5.5	6.0
31. PIEDMONT	5.5	5.5	6.0	6.5	6.0	5.5	6.0
32. BONNIEBLUE	5.5	6.0	6.5	6.5	6.5	6.5	6.0
33. MERIT	5.5	5.5	6.0	6.5	6.5	6.0	6.0
34. ARGYLE	5.0	5.5	6.0	6.5	6.0	5.5	6.0
35. CHARLOTTE	5.5	5.5	6.0	6.5	6.5	6.0	6.0
36. N535	5.0	5.0	6.5	7.0	6.0	6.0	6.0
37. COLUMBIA	5.5	5.0	6.0	6.0	6.5	6.0	6.0
38. SYDSPORT	5.5	5.5	6.0	6.5	7.0	6.5	6.0
39. MER PP 300	5.5	6.0	6.0	6.5	6.5	6.0	6.0
40. BRISTOL	4.5	5.5	6.0	6.5	6.5	6.5	6.0
41. SOMERSET(SH-2)	5.5	5.5	6.5	7.0	6.0	6.0	6.0
42. BA-61-91	5.0	5.5	6.5	6.5	6.0	5.5	6.0

TABLE 3. CONTINUED.

43. BAYSIDE	5.5	5.5	6.0	6.5	6.5	6.0	6.0
44. 225	5.5	6.0	6.5	7.0	6.5	5.5	6.0
45. ESCORT	5.0	6.0	7.0	6.5	6.5	6.0	6.0
46. ADELPHI	4.5	5.0	5.0	6.0	5.5	5.0	5.5
47. MONOPOLY	5.0	5.5	5.5	5.5	6.0	5.5	5.5
48. S-21	4.5	6.0	6.0	6.0	6.5	5.0	5.5
49. PSU-150	4.5	6.0	5.5	6.0	6.5	5.5	5.5
50. PSU-173	4.5	5.5	6.0	6.0	6.5	6.0	5.5
51. PLUSH	4.0	6.0	6.0	5.5	6.0	5.5	5.5
52. PARADE	5.5	5.5	6.0	6.0	6.0	5.5	5.5
53. RUGBY	5.5	5.5	5.5	6.0	6.0	5.0	5.5
54. SV-01617	4.5	5.0	5.5	6.0	6.0	5.5	5.5
55. BANFF	5.0	5.5	6.0	6.0	6.0	6.0	5.5
56. DORMIE	5.5	5.5	6.0	5.5	5.0	4.5	5.5
57. HOLIDAY	4.5	6.0	5.5	6.0	6.0	6.0	5.5
58. ASPEN	4.5	5.5	5.5	5.5	5.5	6.0	5.5
59. BONO	4.5	6.0	5.5	5.5	6.0	5.5	5.5
60. HARMONY	5.0	5.5	5.5	5.5	6.0	5.5	5.5
61. MOSA	4.5	5.0	5.5	6.0	5.5	5.5	5.5
62. WW AG 478	4.5	5.5	5.5	6.0	5.5	6.0	5.5
63. VANTAGE	5.0	5.5	6.0	6.5	5.5	4.5	5.5
64. A20-6	4.5	5.0	5.5	6.5	6.0	5.5	5.5
65. A20	5.0	5.5	6.0	6.5	6.5	5.0	5.5
66. H-7	4.5	5.0	5.5	6.0	5.5	5.5	5.5
67. I-13	4.5	5.0	5.5	6.0	6.0	5.5	5.5
68. A20-6A	5.0	5.0	6.0	6.5	6.0	5.0	5.5
69. APART	5.0	5.0	6.0	6.5	6.0	5.0	5.5
70. A-3	4.5	5.0	5.5	5.5	6.0	5.0	5.5
71. MER PP 43	5.5	5.5	5.5	6.0	6.0	6.0	5.5
72. MONA	5.0	5.5	5.5	5.5	6.5	5.5	5.5
73. LOVEGREEN	4.5	5.5	5.5	5.5	6.0	5.0	5.5
74. S.D. COMMON	5.5	5.5	6.0	6.5	6.0	4.5	5.5
75. MERION	5.0	5.5	6.0	6.0	6.0	5.5	5.5
76. P141 (MYSTIC)	5.5	5.5	6.0	6.0	5.5	5.5	5.5
77. ADMIRAL	4.5	5.0	6.0	5.5	6.0	6.0	5.5
78. ECLIPSE	5.0	5.0	6.5	6.0	5.5	6.0	5.5
79. K3-162	4.5	5.0	6.0	6.0	6.0	5.0	5.5
80. K3-179	5.0	5.0	6.0	6.5	5.5	5.5	5.5
81. K3-178	5.0	5.5	6.0	6.5	5.5	4.5	5.5
82. BARBLUE	5.0	5.5	5.5	5.5	5.0	5.5	5.5
83. KENBLUE	4.0	5.5	5.0	5.5	5.5	4.5	5.0
84. K1-152	4.5	5.0	5.0	5.5	5.5	5.0	5.0
LSD 0.05	N.S.	N.S.	N.S.	N.S.	N.S.	1.0	N.S.

QUALITY IS RATED AT 9=BEST QUALITY AND 1=DEAD TURF. A RATING OF 6 OR HIGHER CONSTITUTES ACCEPTABLE QUALITY.

PERENNIAL RYEGRASS CULTIVAR EVALUATIONS

Quality ratings and early spring color evaluations for 22 perennial ryegrass cultivars are listed in Tables 4 and 5. Generally, the cultivars which performed well during the season greened up early. Medalist North and Loretta had good spring color, but received lower quality ratings for the season as a whole.

Regal, Citation and Yorktown were the best cultivars in the 1981 season. Yorktown and Citation were also among the top cultivars in 1980. Regal was ranked 13th in 1980 and demonstrated a considerable increase in quality in the 1981 season. Caravelle, NK-100 and Linn received the lowest ranking in both 1980 and 1981.

These cultivars were established in the fall of 1979. There are plans for the establishment of a larger planting of perennial ryegrass cultivars in the fall of 1982.

TABLE 4. PERENNIAL RYEGRASS QUALITY RATINGS FOR THE 1981 GROWING SEASON.

CULTIVAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	MEAN
1. REGAL	5.5	8.0	8.0	7.5	6.5	7.5	8.0	7.5
2. CITATION	6.0	8.0	7.0	7.5	7.5	8.0	8.0	7.5
3. YORKTOWN	5.5	7.5	7.0	7.5	8.0	7.5	7.5	7.5
4. BLYES	5.5	8.0	7.5	6.5	7.5	7.5	7.5	7.0
5. ELKA	5.5	7.0	7.5	5.5	7.0	8.0	7.0	7.0
6. FIESTA	6.0	7.5	7.0	6.5	6.5	7.5	7.5	7.0
7. DELRAY	6.0	7.5	7.5	7.5	7.5	7.0	7.0	7.0
8. DERBY	5.5	7.5	7.5	7.0	6.5	8.0	6.5	7.0
9. PENNFINE	6.0	7.0	7.5	7.0	7.0	7.0	6.5	7.0
10. DIPLOMAT	5.5	7.0	7.0	6.5	7.5	6.5	7.0	7.0
11. BELLE	6.0	7.0	7.5	8.0	7.5	7.5	7.5	7.0
12. J186 R24 D	5.5	7.5	7.5	5.5	5.0	7.0	7.5	6.5
13. K5-88	6.0	6.0	6.5	6.5	6.5	7.0	7.0	6.5
14. NK-200	5.5	7.5	7.5	6.0	5.0	6.5	7.0	6.5
15. MANHATTAN	5.5	7.0	7.0	5.5	6.5	7.0	7.0	6.5
16. LORETTA	6.0	7.5	8.0	5.5	6.5	6.0	6.5	6.5
17. GOALIE	6.0	7.0	6.5	5.5	7.0	7.0	7.0	6.5
18. MED. NORTH	5.5	7.0	7.0	7.0	6.5	6.5	7.5	6.5
19. K5-94	5.5	7.5	6.0	5.5	7.0	7.5	6.0	6.5
20. CARAVELLE	5.0	6.0	6.0	5.0	5.5	5.5	7.0	5.5
21. NK-100	5.0	5.5	6.0	5.5	5.0	5.0	5.0	5.5
22. LINN	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
LSD .01	0.5	1.5	1.0	1.0	1.0	1.0	1.5	0.5

QUALITY IS RATED AT 9=BEST QUALITY AND 1=DEAD TURF. A RATING OF 6 OR HIGHER CONSTITUTES ACCEPTABLE QUALITY.

TABLE 5. SPRING GREENUP RATINGS FOR PERENNIAL RYEGRASS CULTIVARS IN THE 1981 SEASON.

CULTIVAR	APRIL COLOR RATING
1. CITATION	6.5
2. FIESTA	6.5
3. MEDALIST NORTH	6.5
4. BELLE	6.5
5. K5-88	6.5
6. LORETTA	6.5
7. REGAL	6.5
8. DERBY	6.5
9. J186 R24 D	6.0
10. FIESTA	6.0
11. GOALIE	6.0
12. ELKA	6.0
13. PENNFINE	6.0
14. DIPLOMAT	6.0
15. REGAL	6.0
16. K5-94	6.0
17. YORKTOWN	6.0
18. BLYES	6.0
19. NK-200	6.0
20. LINN	6.0
21. NK-100	6.0
22. CARAVELLE	5.5
LSD 0.01	0.5

COLOR IS RATED ON A SCALE OF 9=DARK GREEN AND 1=DEAD TURF. A RATING OF 6 OR HIGHER CONSTITUTES ACCEPTABLE COLOR.

FINE FESCUE CULTIVAR TRIALS

Tables 6 and 7 contain information on the quality and spring color of 20 Fine Fescue cultivars. These cultivars were seeded on August 29, 1979. The area received 4 lbs of N/1000 sq ft in the 1981 season, and was watered as needed to prevent drought.

The cultivars which received the highest quality ratings in the 1981 season were Canada, Fortress, Ensylva, K4-21, and Checker. Waldina, Fortress, Biljart, K5-29, and K4-21 were found to have the best early spring color.

Many of the cultivars are becoming heavily infested with Kentucky bluegrass. This has resulted in lower quality ratings for some cultivars which normally do quite well in Iowa.

TABLE 6. FINE FESCUE QUALITY RATINGS FOR THE 1981 GROWING SEASON.

CULTIVAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	MEAN
1. CANADA	6.5	7.5	8.0	6.5	6.5	6.5	6.5	7.0
2. FORTRESS	7.0	7.5	7.5	7.0	6.5	6.5	6.5	7.0
3. ENSYLVA	6.5	7.5	8.0	6.5	6.5	7.0	6.5	7.0
4. K4-21	6.5	7.5	8.0	7.0	6.0	6.5	6.0	7.0
5. CHECKER	6.5	6.5	8.0	7.0	6.0	6.5	6.5	7.0
6. SYN W	6.5	7.0	7.5	7.0	6.5	6.5	7.0	7.0
7. K5-29	6.0	6.5	8.0	7.0	5.5	6.5	5.5	6.5
8. RUBY	6.0	7.0	7.5	7.0	6.0	6.5	5.5	6.5
9. RELIANT/FL-16	6.5	7.0	6.5	6.0	5.5	6.0	6.0	6.5
10. JAMESTOWN	6.5	7.0	8.0	7.0	6.0	6.5	6.5	6.5
11. ATLANTA	6.0	7.0	7.5	6.5	5.5	6.5	6.5	6.5
12. ROLAX	6.0	5.5	7.0	7.5	6.5	6.0	6.5	6.5
13. DAWSON	6.0	7.5	8.0	6.5	4.5	6.5	6.5	6.5
14. PENNLAWN	6.0	6.0	6.5	6.5	5.5	6.0	5.5	6.0
15. SCALDIS	6.0	6.5	7.0	6.0	5.0	5.5	5.5	6.0
16. ENGINA	6.0	7.0	7.5	6.5	5.5	5.5	5.5	6.0
17. HIGHLIGHT	6.0	7.0	7.0	6.5	4.5	5.5	6.0	6.0
18. BILJART	6.5	6.5	7.0	6.0	4.0	4.5	6.0	5.5
19. TOURNAMENT	6.0	6.5	6.0	6.5	5.0	5.0	5.5	5.5
20. WALDINA	6.0	6.5	6.0	5.5	3.5	4.5	5.5	5.5
LSD .01	0.5	1.5	1.0	2.0	2.0	1.5	1.5	0.5

QUALITY IS RATED AT 9=BEST QUALITY AND 1=DEAD TURF. A RATING OF 6 OR HIGHER CONSTITUTES ACCEPTABLE QUALITY.

TABLE 7. EARLY SPRING GREENUP OF THE FINE FESCUE CULTIVARS IN THE 1981 SEASON.

CULTIVAR	APRIL COLOR RATING
1. WALDINA	7.0
2. FORTRESS	7.0
3. BILJART	7.0
4. K5-29	7.0
5. K4-21	7.0
6. ROLAX	6.5
7. ENGINA	6.5
8. SYN W	6.5
9. CANADA	6.5
10. ATLANTA	6.5
11. SCALDIS	6.5
12. TOURNAMENT	6.5
13. PENNLAWN	6.5
14. RELIANT(FL-1)	6.5
15. RUBY	6.0
16. DAWSON	6.0
17. ENSYLVA	6.0
18. JAMESTOWN	6.0
19. HIGHLIGHT	6.0
20. CHECKER	6.0
LSD 0.01	0.5

COLOR IS RATED AT 9=DARK GREEN COLOR AND 1=DEAD TURF. A RATING OF 6 OR HIGHER CONSTITUTES ACCEPTABLE COLOR.

TALL FESCUE REGIONAL TRIAL

The tall fescue regional trial is being conducted at a number of state research stations in the central and southern U.S. under the direction of the USDA. This test was established in the fall of 1979. The cultivars are maintained at a 3" mowing height and the area receives 3 lbs of N/1000 sq ft/yr.

Kentucky 31 tall fescue had the best early spring color in 1981 (Table 9), however it ranked number 14 in overall quality for the entire season (Table 8). Some of the newer cultivars, such as Falcon and Rebel, performed the best in 1981. The yearly quality averages for all cultivars were quite uniform and even the cultivar which received the lowest yearly average still maintained a very acceptable quality over the season.

Ames is on the edge of what is normally considered to be the northern range for tall fescue turf and we normally do not recommend this species north of Interstate 80 in Iowa. There have, however, been no problems with winter kill at this location, even during the very severe winter of 1981-1982.

TABLE 8. THE 1981 QUALITY RATINGS FOR THE REGIONAL TALL FESCUE TEST.

CULTIVAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	MEAN
1. FALCON(NJ-78)	5.5	7.5	8.5	7.5	8.0	7.0	7.5	7.5
2. REBEL(T-5)	5.0	7.0	8.5	8.0	7.5	7.0	7.5	7.5
3. BELT TF-11	5.5	6.5	8.5	8.0	8.0	7.0	8.0	7.5
4. BELT TF-25	5.5	7.0	8.0	8.0	8.0	7.0	7.5	7.5
5. T.F. 14801	5.5	7.5	7.5	7.5	8.0	7.0	7.5	7.5
6. T.F. 14803	5.0	8.0	8.0	8.0	8.0	7.0	8.0	7.5
7. KENHY	5.5	7.0	8.0	7.0	7.5	7.0	8.0	7.0
8. PHB-1-5	5.0	6.0	8.0	7.5	7.5	7.0	7.5	7.0
9. CLENFINE *	5.5	7.0	8.0	7.0	7.5	6.5	7.5	7.0
10. OLYMPIC **	5.5	7.0	8.0	8.0	8.0	7.0	7.0	7.0
11. KENWELL	5.0	6.5	7.5	7.0	7.5	6.5	8.0	7.0
12. BL36-1,SOFN	5.5	6.0	8.0	7.5	8.0	7.0	7.0	7.0
13. K5-27	5.0	7.0	8.0	7.0	8.0	7.0	7.5	7.0
14. KENTUCKY-31	5.0	6.5	8.0	7.0	7.5	6.5	7.5	7.0
15. KENMONT	5.0	6.0	8.0	7.0	7.5	6.5	7.0	7.0
16. GOAR	5.5	6.0	7.5	7.5	7.5	6.5	6.5	7.0
17. BELT SYN16-1	5.0	6.5	8.0	8.0	8.0	7.0	7.5	7.0
18. BELT KPH-1	5.0	6.5	7.5	7.0	7.5	7.0	7.5	7.0
19. T.F. 14802	5.0	7.0	8.0	8.0	8.0	7.0	7.5	7.0
LSD .05	N.S.	N.S.	N.S.	0.5	N.S.	0.5	1.0	0.5

QUALITY IS RATED AT 9=BEST QUALITY AND 1=DEAD TURF. A RATING OF 6 OR HIGHER CONSTITUTES ACCEPTABLE QUALITY.

* PREVIOUSLY LISTED AS L-FA-SYN 1

** PREVIOUSLY LISTED AS AG-125

TABLE 9. EARLY SPRING COLOR RATINGS FOR 19 TALL FESCUE CULTIVARS IN THE 1981 SEASON.

CULTIVAR	APRIL COLOR RATING
1. KENTUCKY-31	6.5
2. CLEMFINE(L-FA-SYN 1)	6.0
3. T.F. 14803	6.0
4. PHB-1-5	6.0
5. OLYMPIC(AG-125)	6.0
6. FALCON(NJ-78)	6.0
7. BL36-1, SOFM	6.0
8. K5-27	6.0
9. REBEL(T-5)	6.0
10. GOAR	6.0
11. BELT KPH-1	6.0
12. BELT TF-11	6.0
13. BELT TF-25	6.0
14. T.F. 14801	6.0
15. KENHY	6.0
16. KENWELL	6.0
17. KENMONT	6.0
18. BELT SYN 16-1	6.0
19. T.F. 14803	5.5
LSD 0.01	0.5

COLOR IS RATED ON A SCALE OF 9=DARK GREEN COLOR AND 1=DEAD TURF. RATINGS OF 6 AND ABOVE CONSTITUTE ACCEPTABLE COLOR.

BENTGRASS MANAGEMENT STUDY

The bentgrass management study was begun in the fall of 1980. It includes five creeping bentgrass cultivars: Emerald, Penncross, Penneagle, Prominent, and Seaside, and one velvet bentgrass cultivar, Kingstown. Each cultivar planting is split into 3 fertility levels: 0.5, 0.8, and 1.2 lbs N/1000 sq ft/growing month. This results in a total N application rate of 3.5, 5.6, and 8.4 lbs N/1000 sq ft/yr. The area is maintained as a golf course green with each cultivar replicated 4 times.

Penncross maintained the best overall quality for the 1981 season (Table 10). Penncross, Emerald, Penneagle, and Prominent each were found to have acceptable quality for the year as a whole, whereas Kingstown and Seaside did not.

Penncross and Penneagle retained an acceptable color late into the fall (Table 11). Emerald, Prominent, Seaside, and Kingstown began to go off color prior to the November rating.

Penncross, Emerald, and Penneagle were the only cultivars to maintain an acceptable quality at the lowest fertility level (Table 12). At 0.8 lbs N/1000 sq ft/growing month, Kingstown and Seaside were the only cultivars which did not maintain an acceptable quality. Only Kingstown was found to be unacceptable at the highest fertility level.

TABLE 10. QUALITY RATINGS FOR SIX BENTGRASS CULTIVARS IN THE 1981 SEASON.

CULTIVAR	JUNE	JULY	AUG	SEPT	OCT	MEAN
1. PENNCROSS	5.0*	5.5	7.5	7.5	6.0	6.5
2. EMERALD	5.0	5.0	7.0	7.0	6.5	6.0
3. PENNEAGLE	5.0	4.5	6.5	7.5	7.0	6.0
4. PROMINENT	5.0	5.0	6.5	7.0	6.5	6.0
5. KINGSTOWN	4.0	6.0	6.0	6.0	6.5	5.5
6. SEASIDE	4.5	4.5	5.5	7.0	5.5	5.5
LSD 0.01	0.5	0.5	0.5	0.5	0.5	0.5

QUALITY IS RATED ON A SCALE OF 9 TO 1 WHERE 9=BEST QUALITY AND 1=DEAD TURF. A RATING OF 6 OR GREATER IS CONSIDERED TO BE ACCEPTABLE.

*EACH VALUE IS THE AVERAGE OF THE 3 FERTILITY LEVELS AND 4 REPLICATIONS.

TABLE 11. LATE FALL COLOR EVALUATIONS FOR SIX BENTGRASS CULTIVARS.

CULTIVAR	NOVEMBER COLOR RATING
1. PENNCROSS	6.5
2. PENNEAGLE	6.0
3. EMERALD	5.5
4. PROMINENT	5.5
5. SEASIDE	5.5
6. KINGSTOWN	5.0
LSD 0.01	1.0

COLOR IS RATED ON A SCALE OF 9 TO 1 WHERE 9=DARK GREEN COLOR AND 1=DEAD TURF. A RATING OF 6 OR GREATER IS CONSIDERED ACCEPTABLE.

TABLE 12. THE YEARLY MEAN OF QUALITY RATINGS FOR 6 BENTGRASS CULTIVARS AT 3 FERTILITY LEVELS.

	N FERTILIZATION RATE (LB/1,000 SQ. FT.)		
CULTIVAR	3.5	5.6	8.4
1. PENNCROSS	6.0*A**	6.5 B	6.5 B
2. EMERALD	6.0 A	6.0 A	6.5 B
3. PENNEAGLE	6.0 A	6.0 A	6.0 A
4. PROMINENT	5.5 A	6.0 B	6.0 B
5. KINGSTOWN	5.5 A	5.5 A	5.5 A
6. SEASIDE	5.0 A	5.5 B	6.0 C

QUALITY IS RATED ON A SCALE OF 9 TO 1 WHERE 9=BEST QUALITY AND 1=DEAD TURF. A RATING OF 6 OR GREATER IS CONSIDERED TO BE ACCEPTABLE.

* EACH VALUE IS THE MEAN OF 4 REPLICATIONS AND 5 RATING MONTHS.
** MEANS IN ROWS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.01 LEVEL.

KENTUCKY BLUEGRASS MANAGEMENT STUDY

The Kentucky bluegrass management study was established on August 16, 1979. The study, which includes 10 cultivars of Kentucky bluegrass is divided into irrigated and non-irrigated sections. Each cultivar is maintained at two mowing heights, one and two inches, and is fertilized with IBDU at two rates, one and three lbs N/1000 sq ft/yr.

Touchdown was found to have the best quality under irrigated conditions when averaged over all fertility levels and mowing heights (Table 13). Victa and Sydsport had the lowest ratings for 1981.

Adelphi, Aquila, Glade, Majestic, and Merion maintained the highest quality under non-irrigated conditions (Table 14). The 1981 season was very dry, and none of the cultivars received an acceptable quality rating for the year. In October, when the non-irrigated area was found to have the highest quality of the season, Touchdown was the best cultivar and Park the worst.

Table 13. Quality ratings for the 10 Kentucky bluegrass cultivars in the irrigated section of the management study.

Cultivar	April	May	June	July	Aug.	Sept.	Oct.	Mean
1. Merion	5.0	4.5	6.5	6.5	7.0	6.5	6.0	6.0
2. Park	4.5	4.5	5.5	7.0	6.5	6.0	6.0	6.0
3. Aquila	5.0	5.0	6.0	6.5	6.5	6.0	5.5	6.0
4. Glade	5.0	4.0	5.5	6.5	6.5	6.5	6.5	6.0
5. Baron	5.0	4.5	5.5	6.5	6.5	6.0	6.5	6.0
6. Victa	5.0	4.5	5.5	6.0	6.0	6.0	6.0	5.5
7. Sydsport	4.5	4.5	5.5	6.0	6.0	6.5	6.0	5.5
8. Touchdown	6.0	5.0	6.5	7.0	7.0	6.5	6.5	6.5
9. Majestic	5.0	4.5	5.0	6.5	6.5	6.0	6.5	6.0
10. Adelphi	5.0	4.5	4.5	6.0	7.0	6.0	7.0	6.0
LSD 0.05	0.5	N.S.	0.5	0.5	0.5	N.S.	0.5	0.5

Quality was rated on a scale of 9 - 1 where 9 = best quality and 1 = dead turf. A rating of 6 or greater is considered to be acceptable.

Table 14. Quality ratings for the 10 Kentucky bluegrass cultivars in the non-irrigated section of the management study.

Cultivar	April	May	June	July	Aug.	Sept.	Oct.	Mean
1. Merion	4.0	3.5	3.5	4.0	5.5	5.5	5.5	5.0
2. Park	3.5	3.0	3.0	3.5	5.0	5.0	5.0	4.0
3. Aquila	4.5	4.0	4.0	4.5	5.5	5.5	6.0	5.0
4. Glade	4.5	3.5	4.0	5.0	5.5	5.5	6.5	5.0
5. Baron	4.0	3.5	4.0	4.0	5.5	5.0	6.0	4.5
6. Victa	3.5	3.0	3.5	3.5	5.0	5.0	5.5	4.0
7. Sydsport	4.0	3.5	4.0	4.0	5.0	5.0	6.0	4.5
8. Touchdown	4.5	4.0	3.5	4.0	5.5	5.5	6.5	4.5
9. Majestic	5.0	3.5	4.0	4.5	5.5	5.5	6.0	5.0
10. Adelphi	4.5	3.5	4.0	4.5	6.0	5.5	6.0	5.0
LSD 0.05	0.5	N.S	N.S.	N.S.	0.5	N.S.	0.5	0.5

Quality was rated on a scale of 9 - 1 where 9 = best quality and 1 = dead turf. A rating of 6 or greater is considered to be acceptable.

PERENNIAL RYEGRASS MANAGEMENT STUDY

The perennial ryegrass management study, like the Kentucky bluegrass management study, includes 10 cultivars and is divided into irrigated and non-irrigated sections. Each cultivar is maintained at two mowing heights, one and two inches. Each plot is divided into two fertilizer treatments, one and three lbs N/1000 sq ft, applied as IBDU. The study was established on August 16, 1979.

Manhattan was the best cultivar on the irrigated section of the study, followed by NK-200, and Caravelle. Linn and Loretta received the lowest seasonal quality ratings.

The 1981 season was very dry. There were no real differences among the yearly averages of the quality ratings for the 10 cultivars and none of them maintained an acceptable quality for the season.

In October--when most of the cultivars had recovered from the drought--Caravelle, NK 200, Pennfine, and Yorktown were observed to have the best quality.

TABLE 15. QUALITY RATINGS FOR THE 10 PERENNIAL RYEGRASS CULTIVARS IN THE IRRIGATED SECTION OF THE MANAGEMENT STUDY.

CULTIVAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	MEAN
1. MANHATTAN	7.0	7.0	6.0	6.5	7.0	7.0	7.5	7.0
2. PENNFINE	6.0	6.0	6.0	5.5	6.0	6.0	6.5	6.0
3. NK 200	6.0	6.5	6.0	6.5	6.5	6.5	6.5	6.5
4. DERBY	5.5	6.0	6.5	5.5	6.0	5.5	6.0	6.0
5. CITATION	5.0	6.0	5.5	6.0	6.5	6.0	6.5	6.0
6. DIPLOMAT	5.5	6.0	5.5	6.0	6.5	6.5	7.0	6.0
7. YORKTOWN	5.5	6.0	5.5	5.5	6.5	6.0	6.5	6.0
8. CARAVELLE	6.0	6.5	6.5	6.0	7.0	7.0	7.0	6.5
9. LINN	4.5	5.0	6.0	4.5	5.5	5.5	5.5	5.5
10. LORETTA	5.0	4.5	5.5	4.5	5.0	5.0	5.0	5.0
LSD 0.05	1.5	1.0	N.S.	1.0	1.5	1.5	1.5	1.5

QUALITY WAS RATED ON A SCALE OF 9 TO 1 WHERE 9 = BEST QUALITY AND 1 = DEAD TURF. A RATING OF 6 OR GREATER IS CONSIDERED TO BE ACCEPTABLE.

Table 16. Quality ratings for the 10 perennial ryegrass cultivars in the non-irrigated section of the management study.

Cultivar	April	May	June	July	Aug.	Sept.	Oct.	Mean
1. Manhattan	3.5	3.5	3.0	3.5	5.5	5.5	5.5	4.5
2. Pennfine	3.5	4.0	3.5	4.5	5.0	5.5	6.0	4.5
3. NK 200	3.0	3.5	4.0	4.5	5.0	5.0	6.0	4.5
4. Derby	3.5	4.0	3.0	4.0	5.0	4.5	4.5	4.0
5. Citation	3.0	4.0	3.5	4.5	5.5	5.5	5.5	4.5
6. Diplomat	3.0	4.0	3.0	4.0	5.5	5.0	5.5	4.0
7. Yorktown	3.0	4.0	3.5	4.0	5.5	5.5	6.0	4.5
8. Caravelle	3.0	3.5	3.0	4.0	5.0	5.5	6.0	4.5
9. Linn	3.0	3.5	3.0	3.5	5.0	5.0	5.5	4.5
10. Loretta	3.5	4.0	3.5	4.0	4.5	5.0	4.5	4.0
LSD 0.05	N.S	N.S.	N.S.	0.5	N.S.	N.S.	0.5	N.S.

Quality was rated on a scale of 9 - 1 where 9 = best quality and 1 = dead turf. A rating of 6 or greater is considered to be acceptable.

FINE FESCUE MANAGEMENT STUDY

The Fine Fescue Management study includes the following cultivars:

1. Pennlawn Red Fescue
2. Scaldis Hard Fescue
3. Ruby Red Fescue
4. Atlanta Chewings Fescue
5. K5-29 Red Fescue
6. Dawson Red Fescue
7. Reliant(FL-1) Hard Fescue
8. Ensylva Red Fescue
9. Highlight Chewings Fescue
10. Jamestown Chewings Fescue

Each cultivar is maintained at two mowing heights: one and two inches. Each plot is also divided into two fertilizer treatments: one and three lbs N/1000 sq ft, applied as IBDU. The study was established on September 8, 1979 and is irrigated as needed.

Reliant (FL-1) and Scaldis hard fescue performed the best in 1981 (Table 17). Both cultivars have maintained quite good quality, even at a 1" mowing height. Jamestown and Atlanta chewings fescue, in addition to Dawson and Ensylva red fescue also maintained an acceptable quality through most of the season.

This planting of fine fescue has maintained excellent uniformity and there has been very little encroachment by Kentucky bluegrass.

TABLE 17. QUALITY RATINGS FOR THE 10 CULTIVARS IN THE FINE FESCUE MANAGEMENT STUDY.

CULTIVAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	MEAN
1. PENNLAWN	4.0	5.0	5.0	5.5	5.5	5.0	5.0	5.0
2. SCALDIS	6.0	7.5	6.0	6.0	6.0	6.0	6.5	6.5
3. RUBY	5.0	6.0	5.5	5.5	5.0	5.0	5.5	5.5
4. ATLANTA	6.0	6.0	6.0	6.5	6.0	5.5	6.0	6.0
5. K5-29	5.0	6.0	5.0	5.5	4.5	4.5	5.5	5.0
6. DAWSON	5.5	6.0	6.5	6.5	5.5	5.0	6.0	6.0
7. RELIANT	6.0	7.0	6.0	6.5	7.0	7.0	7.0	6.5
8. ENSYLVA	5.5	5.5	6.0	6.5	5.5	5.5	6.0	6.0
9. HIGHLIGHT	4.5	5.0	5.5	5.5	5.0	5.0	5.5	5.0
10. JAMESTOWN	5.5	6.0	6.0	6.5	6.0	5.5	6.5	6.0
LSD 0.05	1.0	1.0	1.0	1.0	1.0	1.0	1.5	0.5

QUALITY WAS RATED ON A SCALE OF 9 TO 1 WHERE 9 = BEST QUALITY AND 1 = DEAD TURF. A RATING OF 6 IS CONSIDERED TO BE ACCEPTABLE.

GROWTH RETARDANT STUDY

In 1980, a growth retardant study was conducted on common Kentucky bluegrass. The results of that investigation were discussed in last year's field day report.

The same chemicals were used in 1981 on the tall fescue area at the research station. This area was established on August 25, 1980. The site was fertilized at a rate of 1 lb N/1000 sq ft in May of 1981. On June 4, 1981 the study area was mowed at 3" and treatments were applied. Seven days later the area was again mowed at a height of 3". The first data was collected on June 26. Measurements of growth and evaluations of quality were performed weekly until July 25.

MBR 18337 granular(G) had no effect on growth or quality of the tall fescue turf over the duration of the study (Tables 18 and 19). The liquid formulation (2 EC) of MBR 18337 reduced growth only at the 0.5 lb ai/A rate. Quality was also reduced at that rate; however, the quality rating of 7 was still acceptable. The 0.125 and 0.25 rates of MBR 18337 had no effect.

MBR 12325 2S (Embark) had no effect on growth at the 0.125 and 0.25 lb ai/A rate. Growth was reduced by the 0.5 lb rate. Quality was slightly reduced by the 0.25 and 0.5 rates. Again, the quality was acceptable, even at the highest rate.

The BAS 106 00 W was effective at reducing growth at all treatment levels. These treatments also reduced quality, but not to an unacceptable level.

Ethrel reduced growth at the 2 and 6 lb ai/A rate and at the split application rate of 4 + 2 lbs/A. Quality was unaffected by any of the Ethrel treatments.

Of all of the treatments, Ethrel at 6 lb ai/A was the most effective at reducing growth without reducing quality.

TABLE 18. THE MEASURED HEIGHT OF GROWTH OF KENTUCKY-31 TALL FESCUE TREATED WITH GROWTH RETARDING CHEMICALS.

TREATMENT	JUN 26	JUL 2	JUL 10	JUL 17	JUL 25	MEAN
-lb ai/A-			cm			
1. CONTROL	21	22	28	28	31	26
2. MBR 18337 G 0.125	16	18	22	22	25	21
3. MBR 18337 G 0.250	16	16	19	24	26	20
4. MBR 18337 G 0.500	16	18	26	30	33	25
5. MBR 18337 2EC 0.125	19	21	25	34	35	27
6. MBR 18337 2EC 0.250	15	18	21	26	26	21
7. MBR 18337 2EC 0.500	12	15	20	23	25	19
8. MBR 12325 2S 0.125	14	15	23	24	28	21
9. MBR 12325 2S 0.250	11	15	19	24	29	20
10. MBR 12325 2S 0.500	12	13	20	23	29	19
11. BAS 106 (DRY) 3.0	16	16	18	20	24	19
12. BAS 106 (DRY) 4.5	15	15	16	17	17	16
13. BAS 106 (DRY) 3.0 + 1.5*	15	16	16	18	21	17
14. ETHREL 2S 2.0	15	15	19	19	22	18
15. ETHREL 2S 4.0	13	17	21	23	26	20
16. ETHREL 2S 6.0	13	16	19	20	23	18
17. ETHREL 2S 4.0 + 2.0	14	15	19	23	23	19
LSD 0.01	5	6	7	10	9	6

* FOLLOW UP APPLICATIONS OF BAS 106 00 W AND ETHREL WERE MADE FOUR WEEKS AFTER INITIAL APPLICATIONS.

TABLE 19. QUALITY RATINGS FOR KENTUCKY-31 TALL FESCUE TREATED WITH GROWTH RETARDING CHEMICALS.

TREATMENT	JUN 26	JUL 2	JUL 10	JUL 17	JUL 25	MEAN
-lb ai/A-						
1. CONTROL	9.0*	8.5	8.0	8.0	8.0	8.0
2. MBR 18337 G 0.125	9.0	7.5	7.5	7.5	7.5	8.0
3. MBR 18337 G 0.250	8.0	7.5	8.0	7.5	8.0	8.0
4. MBR 18337 G 0.500	8.5	7.5	8.0	8.0	7.5	8.0
5. MBR 18337 2EC 0.125	8.5	8.0	8.0	8.0	7.5	8.0
6. MBR 18337 2EC 0.250	8.5	8.0	8.0	8.0	8.0	8.0
7. MBR 18337 2EC 0.500	6.5	6.5	7.0	7.5	7.5	7.0
8. MBR 12325 2S 0.125	7.5	7.0	8.0	7.5	8.0	7.5
9. MBR 12325 2S 0.250	6.5	6.0	7.5	7.5	8.0	7.0
10. MBR 12325 2S 0.500	6.5	6.0	8.0	7.5	8.0	7.0
11. BAS 106 (DRY) 3.0	8.0	7.0	7.0	7.0	7.0	7.0
12. BAS 106 (DRY) 4.5	7.0	6.0	6.0	6.0	6.5	6.5
13. BAS 106 (DRY) 3.0 + 1.5	8.5	6.5	6.5	6.5	7.0	7.0
14. ETHREL 2S 2.0	8.0	7.5	8.0	8.0	7.5	8.0
15. ETHREL 2S 4.0	8.5	8.0	8.5	8.0	8.0	8.0
16. ETHREL 2S 6.0	8.0	8.0	8.5	8.0	8.0	8.0
17. ETHREL 2S 4.0 + 2.0	8.5	8.0	8.0	8.0	8.0	8.0
LSD 0.01	1.5	1.5	1.0	1.0	1.0	1.0

* BASED ON A SCALE OF 9 = BEST QUALITY AND 1 = DEAD TURF. A RATING OF 6 OR GREATER IS CONSIDERED ACCEPTABLE.

1981 PREEMERGENCE STUDY

The 1981 preemergence study was conducted at two locations. The first site was located at the turfgrass research area north of Ames, Iowa, and the second at the Iowa State University golf course in Ames. The objectives of the studies were to evaluate the efficacy and phytotoxicity of four preemergence herbicides. The study at the research station was conducted in three replications, and the golf course study in four replications. The treatments used in the two studies are listed in Table 20.

Table 20. Treatments used in the two 1981 preemergence studies.

Treatment	Formulation	Rate	Water
		lb ai/A	gal/A
1. Control	75 WP	--	80
2. DCPA (Dacthal)	75 WP	10.5	80
3. DCPA	75 WP	12.0	80
4. DCPA	75 WP	15.0	80
5. DCPA	75 WP	10.5 + 10.5	80
6. DCPA	75 WP	10.5 + 8	80
7. DCPA	75 WP	10.5 + 5.25	80
8. Bensulide (Betamec 4)	4 EC	7.5	80
9. Bensulide (Betamec 4)	4 EC	12.5	80
10. Oxadiazon (Ronstar G)	2 G	2.0	--
11. Oxadiazon (Ronstar G)	2 G	4.0	--
12. Benefin (Pel-Tech)	10%	1.5	80
13. Benefin (Pel-Tech)	10%	2.0	80
14. Benefin (Pel-Tech)	10%	1.5 + 1.5	80

The golf course area was chosen because it has a history of being heavily infested with prostrate spurge (Euphorbia supina) and other annual weeds. The research plot area had no history of annual weed infestation. This area was seeded with the following weed species on 4/17/81.

Goosegrass	340 g/1,000 sq. ft.
Yellow Foxtail	116 g/1,000 sq. ft.
Large Crabgrass	112 g/1,000 sq. ft.
Spotted Spurge	88 g/1,000 sq. ft.

Treatments were applied on 4/7/81 at the golf course and on 4/18/81 at the research station. The second applications which were included in some treatments were applied on 5/27/81 at the research station and 5/29/81 at the golf course.

Results

The results of the study conducted at the University golf course can be found in Table 21. The treatments are listed by increasing numbers of crabgrass plants per plot.

There were no visible phytotoxic effects from any of the treatments at the golf course. All treatments provided good crabgrass control, with the exception of the Benefin material. Although a high degree of variability resulted in a lack of significant differences in the yellow foxtail data, it would appear that yellow foxtail was adequately controlled by Bensulide and DCPA, whereas Oxadiazon and Benefin were less effective in the control of that species. DCPA was the only material which was effective in the preemergent control of prostrate spurge.

There was visible phytotoxic damage from the highest level of Oxadiazon at both the June and July ratings at the horticulture research station location (Table 22). Of the planted weed seeds, only the crabgrass seed germinated satisfactorily. DCPA provided nearly complete control at all rates, with the exception of the 10.5 lb/A rate. Crabgrass plant numbers were significantly lower than the control at the 10.5 lb rate; however, counts were considerably higher at this rate than at ther other rate. The Benefin treatments significantly reduced crabgrass counts from the control, but were not as effective as the other materials. Insufficient numbers of spotted spurge seeds germinated to obtain reliable results for this species.

Table 21. Weed control data from the 1981 preemergence herbicide study conducted at the University Golf Course.

Treatment			Damage Rating	Crabgrass	Yellow Foxtail	Black Medic	Prost. Spurge
		-lb ai/A-		-------Number of Plants-------			
1.	Bensulide	12.5	1	0*	4	13	15
2.	DCPA	10.5 + 5.25	1	0	0	5	0
3.	DCPA	10.5 + 8.0	1	0	0	6	0
4.	DCPA	10.5 + 10.5	1	0	0	12	1
5.	DCPA	15.0	1	0	0	12	1
6.	DCPA	10.5	1	0	0	10	4
7.	Oxadiazon	2.0	1	1	15	6	4
8.	Bensulide	7.5	1	1	1	10	11
9.	DCPA	12.0	1	1	1	8	2
10.	Oxadiazon	4.0	1	2	9	5	6
11.	Benefin	1.5	1	5	4	8	6
12.	Control	---	1	5	7	13	10
13.	Benefin	1.5 + 1.5	1	6	10	6	8
14.	Benefin	2.0	1	17	4	3	7
LSD 0.05			N.S.	10	N.S.	8	5

*Damage ratings were made on June 2, 1981. A rating of 1=no damage and 9=dead turf.

*Counts of weed species were conducted on September 1, 1981.

Table 22. Weed control data from the 1981 preemergence herbicide study conducted at the ISU Horticulture Research Station.

Treatment			Damage Rating	Damage Rating	Crabgrass	Spotted Spurge
		- lb ai/A-		--Number of Plants--		
1.	Bensulide	12.5	1*	1**	0#	1
2.	Bensulide	7.5	1	0	0	0
3.	DCPA	10.5 + 5.25	1	1	0	0
4.	DCPA	10.5 + 10.5	1	1	0	0
5.	DCPA	10.5 + 8.0	1	1	1	0
6.	DCPA	15.0	1	1	1	0
7.	DCPA	12.0	1	1	1	0
8.	Oxadiazon	4.0	3	2	3	0
9.	Benefin	1.5	2	1	6	0
10.	Oxadiazon	2.0	2	2	7	1
11.	DCPA	10.5	1	1	9	0
12.	Benefin	1.5 + 1.5	2	1	10	0
13.	Benefin	2.0	1	1	20	0
14.	Control	---	1	1	39	1
LSD 0.05			1	1	20	N.S.

* Damage ratings made on June 2, 1981. A rating of 1=no damage and 9=dead turf.

** Damage ratings conducted on July 31, 1981. A rating of 1=no damage and 9=dead turf.

\# Counts of weed species were conducted on July 31, 1981.

1981 Broadleaf Weed Control Study

The 1981 Broadleaf Control Study was conducted at a cemetery located on North Dakota Avenue in West Ames. The first treatments were applied on June 11, 1981. Very dry weather following the June treatments resulted in poor weed control from several treatments. A second application of all treatments was made on October 8, 1981 to test fall weed control.

A listing of the treatments used in the test are included in Table 23.

Table 23. The herbicide treatments used in the 1981 Broadleaf Weed Control Study.

	Treatments	Rate
		-lbs a.i./A-
1.	Dacamine 4D (water soluble formulation)	0.750
2.	Dacamine 4D (water soluble formulation)	1.000
3.	Dacamine 3D (oil/water soluble formulation)	0.750
4.	Dacamine 3D (oil/water soluble formulation)	1.125
5.	MCPP + 2,4-D Amine (1.5 : 1.5 oil/water soluble formulation)	1.500
6.	MCPP + 2,4-D Amine (1.5 : 1.5 oil/water soluble formulation)	1.875
7.	MCPP + 2,4-D Amine (1.0 : 2.0 oil/water soluble formulation)	1.500
8.	MCPP + 2,4-D Amine (1.0 : 2.0 oil/water soluble formulation)	1.875
9.	Trimec (3.52 lbs/gallon)	1.760
10.	*Dacamine 3D (oil/water soluble formulation)	1.125
11.	MCPP + 2,4-D Amine (1.5 : 1.5 oil/water soluble formulation)	1.875
12.	MCPP + 2,4-D Amine (1.0 : 2.0 oil/water soluble formulation)	1.875
13.	Control	

* Treatments 10, 11, and 12 were applied with dissolved urea at a rate of 1 lb N/1,000 sq. ft.

Treatments 1-9 were applied at a rate equivalent to 50 gallons of water per acre. Treatments 10, 11, and 12 -- which include the urea -- were applied at a rate equivalent to 175 gallons of water per acre (4 gal/1,000 sq. ft.).

Results

The results of the spring and fall evaluations can be found in Tables 24 and 25. The treatment numbers referred to in the text are those listed in Table 23.

Most of the weeds on the area were dandelions. Among the most effective treatments in both spring and fall were the MCPP + 2,4-D Amine treatments applied with urea at the 4 gal water/1,000 sq. ft. rate. Both the 1.5 : 1.5 oil/water and 1.0 : 2.0 oil/water soluble formulations applied at 1.875 lb ai/A + urea were effective. In the absence of urea, only the 1.0 : 2.0 treatment (Number 8) significantly reduced dandelion populations as compared to the control in the spring. The 1.5 : 1.5 treatment (Number 6) did not provide significant control at that date. In the fall, both of these treatments (6 and 8), provided a statistically significant reduction of dandelions. The MCPP + 2,4-D Amine 1.5 : 1.5 treatment (Number 5) at 1.5 lb active, reduced dandelion population to a greater extent than the 1.875 lb active treatment (Number 6) at both dates. These treatments were not significantly different from one another at either date, however. Trimec provided fairly good control in spring and fall. Better control was observed on plots treated with herbicides + urea. It should be noted that this area has never been fertilized. Future evaluations should include a Trimec + urea treatment for comparison.

The Dacamine 3D and 4D materials did not provide satisfactory control in these tests with the exception of the Dacamine 3D oil/water soluble material (1.125 lb active) + urea (Number 10) and the 4D materials (1 lb active) (Number 2) in the fall. Dacamine 4D (0.75 active) and Dacamine 3D (0.75 active) were not effective treatments.

The control of prostrate spurge is a serious problem in several parts of Iowa. The only treatment which significantly reduced this species in the spring was the MCPP + 2,4-D Amine (1.5 : 1.5 oil/water soluble formulation) at a rate of 1.875 lb active ingredient/acre + urea (Number 12).

Table 24. Results of the 1981 broadleaf weed control study conducted at the North Dakota Cemetery in West Ames; spring application.

Treatments	Rate	Dandelion	Prostrate Spurge	Wild Strawberry
	--lb ai/A--	------Number of Plants-------		
1. MCPP + 2,4-D Amine (1.5 : 1.5 oil/water soluble formulation) + urea	1.875	9	3	0
2. MCPP + 2,4-D Amine (1.0 : 2.0 oil/water soluble formulation) + urea	1.875	13	1	0
3. MCPP + 2,4-D Amine (1.5 : 1.5 oil/water soluble formulation)	1.500	19	4	0
4. Trimec (3.52 lbs/gal.)	1.760	20	3	0
5. MCPP + 2,4-D Amine (1.0 : 2.0 oil/water soluble formulation)	1.875	23	6	0
6. Dacamine 3D (oil/water soluble formulation) + urea	1.125	27	4	1
7. Dacamine 3D (oil/water soluble formulation)	1.125	32	3	0
8. Dacamine 4D (water formulation)	1.000	34	5	1
9. MCPP + 2,4-D Amine (1.0 : 2.0 oil/water soluble formulation)	1.500	38	7	0
10. MCPP + 2,4-D Amine (1.5 : 1.5 oil/water soluble formulation)	1.875	41	3	2
11. Dacamine 4D (water soluble formulation)	0.750	42	5	0
12. Dacamine 3D (oil/water soluble formulation)	0.750	42	6	0
13. Control	---	58	5	0
LSD 0.05		31	4	N.S.

* Herbicide applied June 11, 1981 and data collected on July 29, 1981.

Table 25. Results of the 1981 broadleaf weed control study conducted at the North Dakota Cemetery in West Ames; fall application.

Treatment	Rate	Dandelion
	--lb ai/A--	-Number of Plants-
1. MCPP + 2,4-D Amine (1.5 : 1.5 oil/water soluble formulation) + urea	1.875	6*
2. Dacamine 3D (oil/water soluble formulation) + urea	1.125	8
3. MCPP + 2,4-D Amine (1.0 : 2.0 oil/water soluble formulation) + urea	1.875	8
4. Trimec (3.52 lbs/gallon)	1.760	9
5. MCPP + 2,4-D Amine (1.5 : 1.5 oil/water soluble formulation)	1.500	10
6. MCPP + 2,4-D Amine (1.0 : 2.0 oil/water soluble formulation)	1.875	11
7. Dacamine 4D (water soluble formulation)	1.000	11
8. MCPP + 2,4-D Amine (1.5 : 1.5 oil/water soluble formulation)	1.875	13
9. Dacamine 3D (oil/water soluble formulation)	1.125	14
10. MCPP + 2,4-D Amine (1.0 : 2.0 oil/water soluble formulation)	1.500	14
11. Dacamine 4D (water soluble formulation)	0.750	17
12. Control	---	26
13. Dacamine 3D (water soluble formulation)	0.750	28
LSD 0.05		15

* Herbicides applied on September 8, 1981 and data collected on November 5, 1981

1981 Postemergence Annual Weed Control Study

The 1981 Postemergence Annual Weed Control study was conducted at the Horticulture Research Station and at the cemetery location in West Ames. The research station location was seeded as previously described in the preemergence section.

The treatments used at both locations are listed in Table 26. The treatments include Daconate 6 (2 lb active) with MCPP + 2,4-D Amine (2 lb active) followed by Daconate 6 (2 lb active) applied 10 days later and Daconate 6 (2 lb active) applied alone 10 days after the first application. These treatments were applied with and without granular urea at a rate of 1 lb N/1,000 sq. ft. The delay in application at the cemetery was due to the lack of rainfall in the spring of 1981.

Table 26. The treatments included in the 1981 postemergence annual weed control study.

Treatment	Rate	Date of Application	
		Research Station	Cemetery
	--lb ai/A--		
1. *Daconate 6	2	5/5	5/10
MCPP + 2,4-D Amine	2	5/5	5/10
Daconate 6	2	5/15	5/20
2. Daconate 6	2	5/15	5/20
3. Daconate 6	2	5/5	5/10
MCPP + 2,4-D Amine	2	5/5	5/10
Daconate 6	2	5/15	5/20
Urea at 1 lb N/1,000 sq. ft		5/5	5/10
4. Daconate 6	2	5/15	5/20
Urea at 1 lb N/1,000 sq. ft.		5/15	
5. Control			

* All treatments were made when air temperatures were between 83 and 87 degrees Farenheit.

Results

Crabgrass was the only species to germinate at the research station. This species was reduced, as compared to the control, by all treatments. Total control was achieved only by the Daconate 6 + MCPP + 2,4-D + Daconate 6 with urea treatment (Number 3). No phytotoxicity was observed on any of the treated areas at this location.

There was a very heavy infestation of crabgrass at the cemetery. The treatments were made following a rain, just after the crabgrass had emerged. The best control was achieved by the Daconate 6 + MCPP + 2,4-D + Daconate 6 treatment without urea (Number 1). The reason for the decrease in control when urea was added with Daconate 6 (Number 4) is not known. Again, no phytotoxicity was observed on any of the treated plots.

Table 27. Postemergence weed control data from the 1981 weed control study conducted at the ISU Horticulture Research Station.

Treatment	Rate	Crabgrass
	--lb ai/A--	-Number of Plants-
1. Daconate 6 MCPP + 2,4-D Amine Daconate 6 Urea at 1 lb N/1,000 sq. ft.	2 2 2	0*
2. Daconate 6 MCPP + 2,4-D Amine Daconate 6	2 2 2	1
3. Daconate 6	2	2
4. Daconate 6 Urea at 1 lb N/1,000 sq. ft.	2	9
5. Control	-	59
LSD 0.05		17

* Data collected on July 31, 1981.

Table 28. Postemergence weed control data from the 1981 weed control study conducted at the North Dakota Cemetery in West Ames.

Treatment	Rate	Crabgrass Cover
	lb ai/A	-%-
1. Daconate 6	2	2*
MCPP + 2,4-D	2	
Daconate 6	2	
2. Daconate 6	2	5
3. Daconate 6	2	8
MCPP + 2,4-D Amine	2	
Daconate 6	2	
Urea at 1 lb N/1,000 sq. ft.		
4. Daconate 6	2	40
Urea at 1 lb N/1,000 sq. ft.		
5. Control		60
LSD 0.05		10

* Data collected on July 30, 1981.

EFFECTS OF PREEMERGENCE HERBICIDES ON FOUR CULTIVARS OF KENTUCKY BLUEGRASS (*POA PRATENSIS*)

N.E. CHRISTIANS

The effects of three preemergence herbicides on four cultivars of Kentucky bluegrass ('Baron', 'Enmundi', 'Newport', and 'Park') were studied to evaluate the differential response of these cultivars to the herbicides. The greenhouse study included bensulide (Betemec 4) at 7.5 and 15 lb ai/A, DCPA (Dacthal) at 10.5 and 15 lb ai/A, and oxadiazon (Ronstar G) at 2, 4, and 8 lb ai/A. The rates of bensulide and DCPA are the recommended rates for control of crabgrass [*Digitaria sanguinalis* (L.) Scop.] and annual bluegrass (*Poa annua* L.), respectively. The rates of oxadiazon correspond to the low and high recommended rates, plus the 8 lb/A rate, which is equivalent to a double application of the high rate. Each treatment, plus an untreated control, were replicated three times. The treatments were applied on February 4, 1981. The pots were maintained at a 2" mowing height and were fertilized at a rate of 1/2 lb N/1000 sq ft/mo. with a 20-20-20 analysis fertilizer.

Data collected on a weekly basis included quality ratings and the oven-dry weight of clippings. The subjective quality ratings--based primarily on color, uniformity and density--were visually estimated and rated on a scale of 90-10 where 90 represents highest quality and 10 represents dead turf. At termination of the study on March 25, 1981, data were collected on root weight, on rhizome number per pot, on mean rhizome length and on the oven-dry weight of rhizomes. The weight of the root system was determined by taking the differences between the oven-dry weight of the roots and the weight of the sample after ashing at 500 degrees Centigrade for 14 hrs.

The mean root dry weights of all cultivars were reduced by oxadiazon (4 and 8 lb/A) and by bensulide (7.5 and 15 lb/A) (Table 29). Bensulide reduced root weight to the greatest degree, with bensulide at the highest rate reducing root weight an average of 68%. DCPA and oxadiazon (2 lb/A) had no effect on root weight.

TABLE 29. THE EFFECT OF THREE PREEMERGENCE HERBICIDES ON THE ROOT WEIGHT OF KENTUCKY BLUEGRASS.

TREATMENT	RATE (LB/A)	ROOT WT. (G/POT)
1. CONTROL	----	1.39*
2. DCPA	10.5	1.25
3. DCPA	15.0	1.49
4. OXADIAZON	2.0	1.25
5. OXADIAZON	4.0	0.96
6. OXADIAZON	8.0	0.81
7. BENSULIDE	7.5	0.60
8. BENSULIDE	15.0	0.45
LSD (0.01)		0.34

* VALUES ARE THE MEAN ROOT WEIGHT OF THE CULTIVARS AND 3 REPLICATIONS.

Most of the differences in cultivar response were observed where oxadiazon (Ronstar G) was used. The variation in cultivar response of rhizome weight and rhizome length to oxadiazon were pronounced. In both instances (Fig. 1 and 2), 'Newport' and 'Baron' were affected in a detrimental way, whereas 'Park' and 'Enmundi' were either slightly affected or unaffected by the increasing rates of oxadiazon. Differing responses to oxadiazon were also observed in the effects on clipping weight and quality.

Oxadiazon is considered to be quite damaging to Kentucky bluegrass under some conditions; however, it has certain advantages. Oxadiazon is known to be an excellent control for goosegrass (Eleusine indica L.), whereas the other chemicals are less effective against this species. It also has a fairly long residual when compared to other preemergence herbicides. The phytoxicity of oxadiazon varies with cultivar. The cultivars 'Enmundi' and 'Park' showed little damage under the conditions of this study. The possibility exists that where goosegrass is a serious problem, Kentucky bluegrass cultivars with greater tolerance to oxadiazon could be used.

A much more complete discussion of the methods used in this study and the results have been prepared and submitted for publication.

Figure 1. The effect of oxadiazon on the rhizome length of 4 cultivars of Kentucky bluegrass.

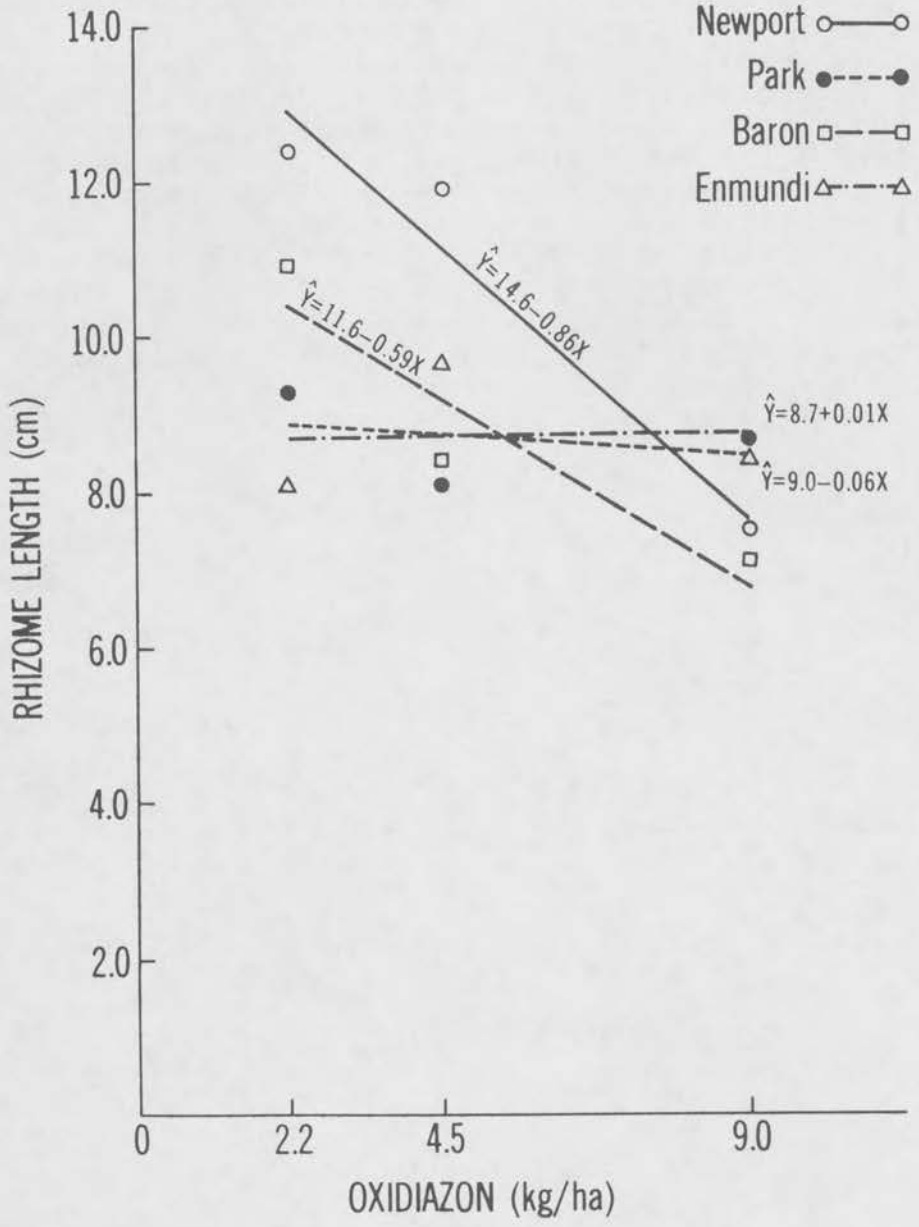
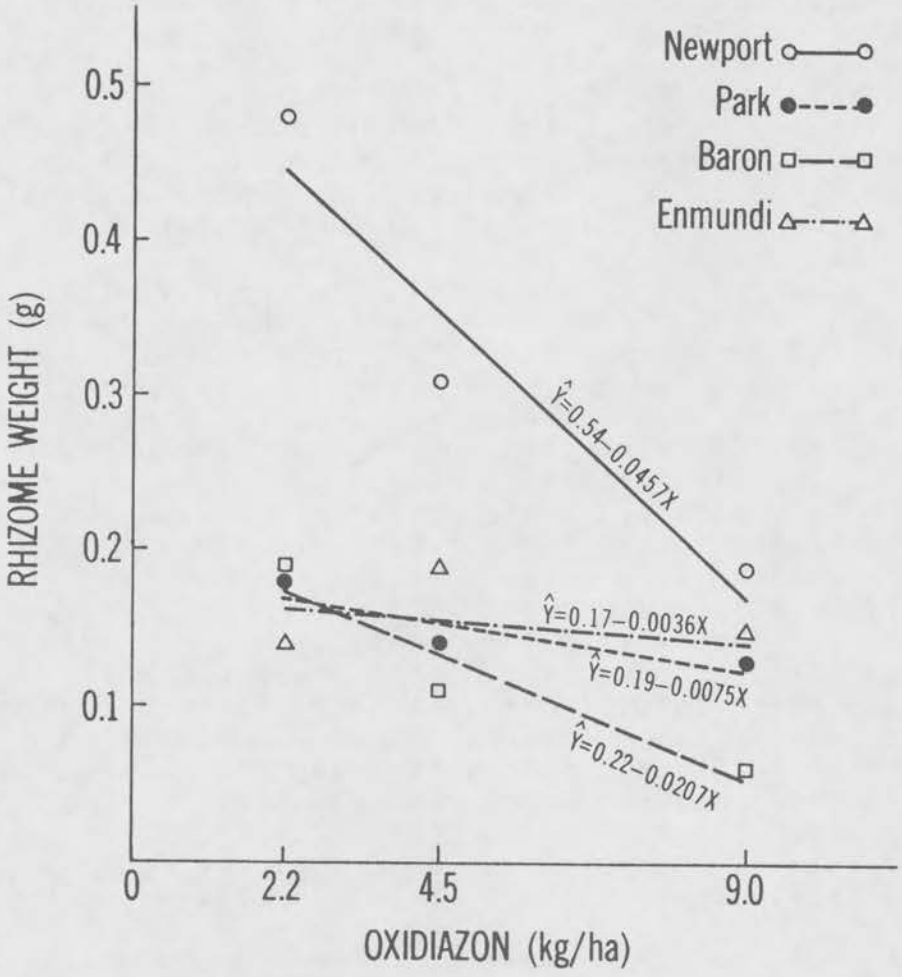


Figure 2. The effect of oxadiazon on the rhizome weight of 4 cultivars of Kentucky bluegrass.



N X K STUDY

J.L. NUS AND N.E. CHRISTIANS

The nitrogen potassium interaction study was initiated to observe the effects of nitrogen and potassium on the growth and development of 'Baron' Kentucky bluegrass and to evaluate the interactions between these two nutrients.

The study is located in Section V, Block 1 of the ISU turf plots on the ISU Horticultural Research Station, located 8 miles north of Ames, Iowa. The area was seeded with 'Baron' Kentucky bluegrass in September, 1979. At the time of establishment, 1.0 lb P205 per 1000 sq ft (as triple super phosphate) and 0.5 lb N per 1000 sq ft (as ammonium nitrate) were applied. The area used for the N X K interaction study has been maintained in lawn condition including two inch mowing, pre- and postemergence weed control, and standard fertilization with urea. No insecticides or fungicides have been applied to the area.

The study is arranged as a complete factorial with four levels of N (0, 1.0, 1.5, and 2.0 Kg are-1 year-1) and four levels of K (0, 1.0, 1.5, and 2.0 Kg are-1 year-1). One Kg are-1 year-1 equals approximately 2 lb per 1000 sq ft per year. A randomized complete design is used for the 16 treatments and 3 reps. Urea is the N source, while KCl is the source of K. Treatments began in April, 1981, and quality ratings were first taken in July. Quality was recorded as a number from 0 - 9.0, with 6.0 representing acceptable turf. Quality ratings were estimated to the nearest decimal place.

Table 30 shows the turf quality rating by month and yearly rating for the N X K interaction study for 1981. From this data, a general trend appears. Turf quality appears to be much more responsive to additional N fertilizer regardless of the level of applied K. Figure 3 shows the data represented in this fashion. The horizontal nature of the response curves for additional K for all levels of N reflects little response in terms of enhanced turf quality to K fertilization. However, the vertical separation of the response curves shows that additional nitrogen fertilizer does improve turf quality up to 1.5 - 2.0 Kg N are-1 year-1. The parallel nature of the response curves implies little statistical interaction between levels of N and levels of K.

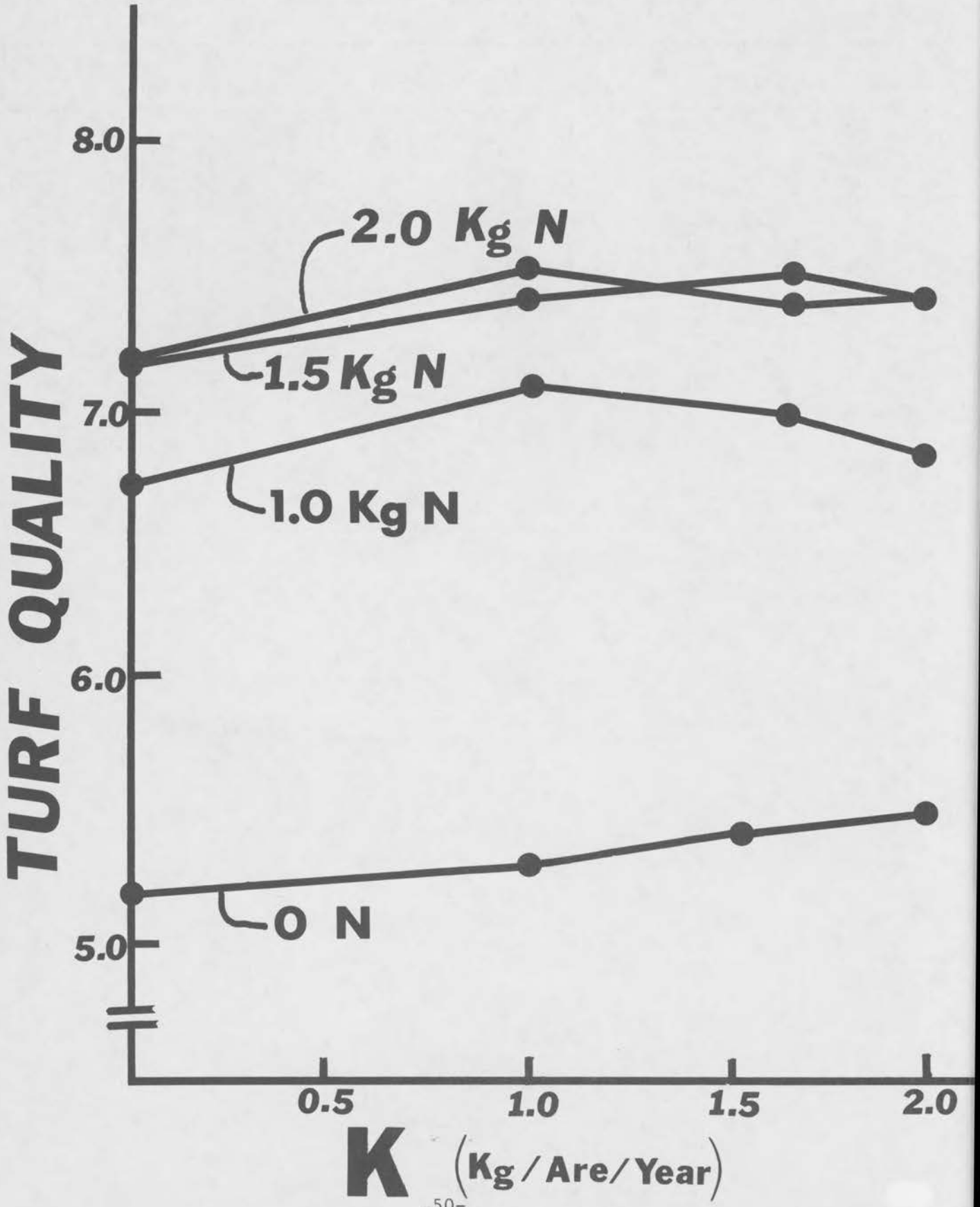
Additional information is needed before sound conclusions can be drawn on the interactive effect of N and K on turf quality. Quality ratings will be continued as well as other parameters including clipping weight, spring green-up, seasonal non-structural carbohydrates, and total N accumulation.

TABLE 30. 1981 MONTHLY AND OVERALL TURF QUALITY OF 'BARON' KENTUCKY BLUEGRASS AS AFFECTED BY TREATMENTS IN N X K INTERACTION STUDY.

N*	K*	JUL Q	AUG Q	SEP Q	OCT Q	NOV Q	DEC Q	OVER-ALL Q
1.5	1.0	7.9	7.4	7.8	8.0	7.2	6.8	7.5
2.0	1.5	7.8	7.5	7.7	7.9	7.4	6.9	7.5
2.0	1.0	7.6	7.5	7.7	7.7	7.3	6.8	7.4
1.5	1.5	7.6	7.5	7.6	7.7	7.1	6.7	7.4
1.5	2.0	7.5	7.5	7.7	7.7	7.3	6.8	7.4
2.0	2.0	7.4	7.5	7.7	7.7	7.4	7.0	7.4
1.5	0	7.4	7.5	7.4	7.5	7.1	6.6	7.2
2.0	0	7.3	7.3	7.4	7.4	7.1	6.5	7.2
1.0	1.0	7.3	7.1	7.3	7.5	7.0	6.5	7.1
1.0	1.5	7.4	7.1	7.2	7.2	7.0	6.3	7.0
1.0	2.0	7.1	7.0	7.3	7.3	6.4	5.9	6.8
1.0	0	7.4	7.1	7.1	7.1	6.1	5.6	6.7
0	2.0	5.6	6.1	5.7	5.3	5.4	4.7	5.5
0	1.5	5.9	6.5	5.8	5.0	5.0	4.4	5.4
0	1.0	5.8	5.9	5.4	5.0	4.9	4.9	5.3
0	0	5.6	6.1	5.5	4.9	5.0	4.3	5.2
LSD (0.05)		0.5	0.4	0.4	0.5	0.6	0.8	0.3

* Kg/are/yr.

Figure 3. 1981 Overall turf quality of 'Baron' Kentucky bluegrass as affected by K when N is held constant.



FOLIAN STUDY

J.L. NUS AND N.E. CHRISTIANS

Folian is a liquid fertilizer manufactured by Allied Chemical containing 12.0% N, 4.0% P205, 4.0% K20, 0.5% S, and 0.1% chelated Fe. It is being marketed for several crops, including turf. The Folian study was initiated to test whether in addition to nitrogen, each of the other nutrients, when added alone to nitrogen, enhanced turf quality on central Iowa soils.

The study is located in Section V, Block 1 of the ISU turf plots on the ISU Horticultural Research Station, located 8 miles north of Ames, Iowa. The area was seeded with 'Baron' Kentucky bluegrass in September, 1979. At the time of establishment, 1.0 lb P205 per 1000 sq ft (as triple super phosphate) and 0.5 lb N per 1000 sq ft (as ammonium nitrate) were applied. The area used for the Folian study has been maintained in lawn condition including two inch mowing, pre- and postemergent weed control, and standard fertilization with urea. No insecticides or fungicides have been applied to the area.

The experimental design was a randomized complete block with seven treatments and three replications. Treatments consisted of Folian (N+P+K+S+Fe), N, N+P, N+K, N+S, N+Fe, and control (no fertilizer). Sources for the nutrients included urea for N, phosphoric acid for P, KC1 for K, sulfuric acid for S, and 10% Sequistrene for Fe. Treatments were applied with a regulated plot sprayer at 6-8 week intervals throughout the growing season. Treatments were calculated to give the same amount of water carrier to each treatment.

Treatments began in May, 1981 and quality ratings began in July. Quality was judged from 0 - 9.0, with 6.0 representing acceptable turf. All quality ratings were estimated to the first decimal place.

As shown in Table 31, overall turf quality was not appreciably increased by applying more than nitrogen alone. Care should be taken to avoid premature conclusions, however, and additional data is needed before solid conclusions can be drawn. Additional turf quality measurements including spring green-up, thatch accumulation, seasonal non-structural carbohydrates, and total nitrogen accumulation will also be taken.

TABLE 31. 1981 MONTHLY AND OVERALL TURF QUALITY OF 'BARON' KENTUCKY BLUEGRASS AS AFFECTED BY THE TREATMENTS OF THE FOLIAN STUDY.

TREATMENT	JUL QUAL	AUG QUAL	SEP QUAL	OCT QUAL	NOV QUAL	DEC QUAL	OVER-ALL QUAL
1. N + K	7.3	7.9	8.0	8.1	7.6	7.2	7.7
2. FOLIAN	7.2	7.1	7.7	8.7	7.5	7.1	7.5
3. N + P	7.3	7.1	7.6	8.1	7.6	7.2	7.5
4. N + Fe	7.4	7.2	7.6	8.0	7.5	7.0	7.5
5. N	7.3	7.4	7.7	7.9	7.3	6.8	7.4
6. N + S	7.2	7.2	7.7	8.0	7.5	7.1	7.4
7. CONTROL	6.1	5.8	5.7	5.6	4.2	3.7	5.2
LSD (0.05)	0.4	0.3	0.4	0.4	0.7	0.7	0.3

LIQUID FERTILIZER STUDY

J.L. NUS AND N.E. CHRISTIANS

The liquid fertilizer study was initiated to evaluate several sources of nitrogen as they affect turf quality when applied as a liquid. Sources of nitrogen include urea, ammonium nitrate, ammonium sulfate, Fluff (10-1-4), Formolene, and Folian. Control plots with no fertilizer were also used. Treatments were applied with a regulated plot sprayer as three 1 lb N per 1000 sq ft applications in May, August, and September.

The study is located in Section III, Block 5 of the ISU turf plots located on the ISU Horticultural Research Station, 8 miles north of Ames, Iowa. The area was seeded with 'Park' Kentucky bluegrass in October, 1979. At the time of establishment, 1.0 lb P205 per 1000 sq ft (as triple super phosphate) and 0.5 lb N per 1000 sq ft (as ammonium nitrate) were applied. The area used for the liquid fertilizer study has been maintained in lawn condition including two inch mowing, pre- and postemergent weed control and standard fertilization with urea. No insecticides or fungicides have been applied to the area.

Fertilizer treatments began in May, 1981, and quality rating began in July. Quality was judged as a number from 0 - 9.0, with 6.0 representing acceptable turf. All quality ratings were estimated to the first decimal place. The experimental design was a randomized complete block with 7 treatments and 4 replications.

As shown in Table 32, results to date show little difference in turf quality rating as affected by nitrogen source. Care should be taken to avoid making any conclusions based on only this first year's data. Other measurements of turf quality will also be taken including spring green-up, thatch accumulation, seasonal non-structural carbohydrates, and total N accumulation.

TABLE 32. 1981 MONTHLY AND OVERALL TURF QUALITY OF 'PARK' KENTUCKY BLUEGRASS AS AFFECTED BY NITROGEN SOURCE.

N SOURCE	JUL Q	AUG Q	SEP Q	OCT Q	NOV Q	DEC Q	OVER-ALL Q
1. NH4NO3	7.5	7.3	7.7	7.8	7.6	7.1	7.5
2. FORMOLENE	7.7	7.4	7.7	7.8	7.4	7.0	7.5
3. UREA	7.6	7.3	7.6	7.8	7.4	6.9	7.4
4. FLUFF (10-1-4)	7.7	7.2	7.6	7.7	7.3	6.8	7.4
5. FOLIAN	7.6	7.4	7.7	7.9	7.3	6.8	7.4
6. (NH4)2 SO4	7.6	7.3	7.0	6.9	7.6	7.1	7.2
7. CONTROL	7.6	7.2	6.5	5.9	6.2	5.7	6.5
LSD (0.05)	0.2	0.3	0.4	0.4	0.4	0.4	0.2

PHOSPHOROUS FERTILIZATION STUDY

J.L. NUS AND N.E. CHRISTIANS

The phosphorous fertilization study was initiated to test whether or not the application of phosphorous fertilizers enhanced the quality of established Kentucky bluegrass turf in central Iowa soils.

The study is located on Section V, Block I of the ISU turf plots on the ISU Horticulture Research Station, 8 miles north of Ames, Iowa. The area was seeded with 'Baron' Kentucky bluegrass in September, 1979. At the time of establishment, 1.0 lb P205 (as triple super phosphate) and 0.5 lb N per 1000 sq ft (as ammonium nitrate) were applied. The area used for the phosphorous fertilization has been maintained in lawn condition including two inch mowing, pre- and postemergent weed control, and standard fertilization with urea. No insecticides or fungicides have been applied to the area. Initial soil test levels of P on this area were 27 lb/A.

The study was designed in a randomized complete block with six treatments and three replications. Treatments included 0, 1, 2, 4, 8, and 12 lb P205 per 1000 sq ft. Phosphorous was applied as triple super phosphate once per season approximately the middle of May.

Quality ratings were taken from 0 - 9.0 with 6.0 representing acceptable turf. All quality ratings were estimated to the first decimal place.

As shown in Table 33, no real benefit in turf quality has been realized with the addition of phosphorous to established 'Baron' Kentucky bluegrass. It should be stressed that these results are preliminary and conclusions cannot be made before additional data is taken. Other turf quality measurements to be taken include spring green-up, thatch accumulation, seasonal non-structural carbohydrates, and total nitrogen accumulation.

TABLE 33. 1981 MONTHLY AND OVERALL TURF QUALITY OF 'BARON' KENTUCKY BLUEGRASS AS AFFECTED BY PHOSPHOROUS FERTILIZATION.

#P205/1000 SQ FT	JUL QUAL	AUG QUAL	SEP QUAL	OCT QUAL	NOV QUAL	DEC QUAL	OVER-ALL QUAL
1	7.2	7.1	7.5	7.7	6.3	5.9	7.0
0	7.1	7.1	7.4	7.8	6.2	5.8	6.9
2	7.1	7.1	7.4	7.7	6.2	5.7	6.9
12	7.3	7.1	7.4	7.8	6.1	5.7	6.9
4	7.0	7.0	7.5	7.8	5.8	5.3	6.8
8	7.0	7.0	7.4	7.8	6.2	5.7	6.8
LSD (0.05)	0.5	0.2	0.2	0.2	0.4	0.5	0.2

RESULTS OF 1981 TURFGRASS DISEASE CONTROL TRIALS

L. E. Sweets
Iowa State University

Selected fungicides were tested in field trials for efficacy of control of Helminthosporium leaf spot (Helminthosporium sorokinianum) and Pythium blight (Pythium aphanidermatum). Trials were conducted on the Turfgrass Research Plots at the Horticulture Research Station.

In both trials, fungicides were applied to Penneagle bentgrass maintained at 1/4" cutting height. Application was made with a modified bicycle sprayer at 30 lbs. p.s.i. and a dilution rate of 5 gallons per 1000 square feet. The experimental design was a randomized block plan with four replicates, plot size 5 x 7 feet. Fungicides were applied on a 7, 14 or 21 day schedule as indicated in either Table 34 or 35. Applications began on June 4, 1981 and continued through September 10, 1981.

1. Helminthosporium Leaf Spot on Penneagle Bentgrass

The purpose of this trial was to compare the relative efficiency of standard and experimental fungicides in the control of Helminthosporium leaf spot. Fungicides included in the trial along with rates of application and spray schedules are given in Table 34. The trial was conducted in an area with a history of leaf spot problems. However, during the 1981 season, Helminthosporium leaf spot was not severe in this plot area. Disease ratings were made on August 5 and August 26. Ratings were made on the basis of the percentage of plot area showing leaf spot symptoms. Results of ratings are also given in Table 34.

Table 34. Rates, spray schedules and efficacy of fungicides tested in Helminthosporium leaf spot trial.

Treatment	Rate of Formulated Product (oz./1000 sq. ft.)	Time Interval Between Sprays (Days)	Disease Rating[1] Aug. 5	Aug. 24
Daconil 2787	3.0	14	12.7	10.5
	6.0	14	8.2	6.3
Tersan 1991	1.0	14	9.7	7.3
Fore	4.0	14	14.2	12.8
	8.0	14	9.1	8.5
Dyrene	4.0	14	14.5	11.6
	6.0	14	7.8	6.9
Acti-dione Thiram	2.0	14	10.5	10.1
CGA 64251	0.5	14	10.6[2]	9.8[2]
	1.0	14	6.4[2]	6.2[2]
Check			20.7	15.6

[1]Average of ratings from four replicated plots. Based on percentage of plot showing leaf spot symptoms.

[2]Plots treated with CGA 64251 showed some "greening" of turf.

1. Pythium Blight on Penneagle Bentgrass

The purpose of this trial was to compare the relative efficiency of standard and experimental fungicides in the control of Pythium blight. Fungicides included in the trial along with rates of application and spray schedules are given in Table 35. Although the trial was located in an area with a history of Pythium blight, no Pythium blight symptoms were visible when the trial was initiated. Environmental conditions were not favorable for disease development during the 1981 season and no disease developed in the plot area. Therefore, no disease ratings were made on these plots in 1981.

Table 35. Rates and spray schedules for fungicides included in Pythium blight trial.

Treatment	Rate of Formulated Product (oz./1000 sq. ft.)	Time Interval Between Sprays (Days)
Tersan SP	4 oz.	7
Koban 30	4 oz.	7
Banol	3 oz.	14
	6 oz.	14
	6 oz.	21
Subdue 2E	1 oz.	14
	2 oz.	14
	2 oz.	21
Control		

Low Volume Foliar Fertilization Study
Sally Johnson, Graduate Research Assistant
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This study was started in June, 1981. The area treated was seeded in the fall of 1980 with Northrup King's Premium sod blend. Data was taken from June through September, and will be continued through the year.

The purpose of this study is to observe the extent of foliar burn on turf fertilized by the low volume method. "Low volume foliar fertilization" is the application of fertilizer to the foliage using no more than one gallon of water per 1000 sq. ft. in the solution. Three nitrogen sources were used, and they were applied at the rate of approximately 0.5 lbs of actual N per 1000 sq. ft. The concentrations of the solutions were varied (i.e. different amounts of water were applied for each treatment). The nitrogen sources used were Urea, Folian (a urea base), and Formolene (a methylol urea product). Treatments were as follows:

Nitrogen Source	Nitrogen rate per 1000 sq. ft.	Fert:Water
1. Control	0.00	---
2. Folian	0.50	1:0
3. Folian	0.41	2:1
4. Folian	0.45	1:1
5. Formolene	0.46	1:1
6. Formolene	0.49	1:2
7. Urea	0.48	1:2
8. Urea	0.50	1:3

Treatments were applied every two weeks. Wind speed, humidity, temperature, and time of day were recorded after each application. Water was withheld for 24 hours following each application. The area was irrigated with 1" of water each week.

Foliar burn ratings were taken at 1 day and 7 days following each application. The area was mowed as needed at a 2" height. Data collected included severity of foliar burn, and appearance of this burn within the turf. A summary of the 1981 data appears in the following table.

Table 36. Extent of Foliar Burn 1 day and 7 days after application.

Treatment	Date Fertilizer Applied													
	June 12		July 1		July 15		July 31		Aug 11		Aug 27		Sept 9	
	D1	D7	D1	D7	D1	D7	D1	D7	D1	D7	D1	D7	D1	D7
1. Control	9.0*	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
2. Folian (1:0)	6.0	8.8	7.2	8.0	6.7	7.3	6.3	6.8	7.2	8.2	9.0	9.0	6.0	6.5
3. Folian (2:1)	7.0	9.0	6.5	8.2	7.0	7.7	6.3	7.2	7.2	8.3	9.0	9.0	5.8	6.2
4. Folian (1:1)	6.3	9.0	6.2	7.8	7.3	7.8	6.3	7.2	7.0	8.2	9.0	9.0	6.0	6.7
5. Formolene (1:1)	8.3	9.0	8.3	8.5	8.3	8.2	8.3	8.0	8.7	8.3	9.0	9.0	7.3	7.0
6. Formolene (1:2)	8.2	9.0	7.7	8.3	8.3	8.7	8.5	8.0	8.8	8.7	9.0	9.0	8.0	7.3
7. Urea (1:2)	6.8	8.8	6.5	7.8	7.7	7.3	7.7	6.7	7.5	7.5	9.0	9.0	6.0	6.2
8. Urea (1:3)	6.8	8.5	6.3	7.7	7.0	7.0	7.7	6.7	7.2	7.3	9.0	9.0	6.0	6.0

*Burn ratings 1=totally dead
5=acceptable
9=no visible burn

Numbers listed are means of 3 replications.

Results:

Treatments were purposely applied during mid-afternoon to coincide with the conditions most likely to produce burn. This time of day is usually the hottest, and the grass is under the greatest amount of stress. There was no significant difference between different concentrations of the same fertilizer. This can best be explained by the fact that the liquid applied evaporates quickly because it is so low volume. Further studies may show that concentrations of fertilizer solutions, applied as low volume sprays, are insignificant, but that the actual rate of N is the factor determining extent of burn.

Of the three materials used, Formolene had the least amount of burn. These preliminary results indicated no difference between Folian and Urea when applied as a low volume concentrate.

None of the materials used caused foliar burn severe enough to kill the turf, at least when applied at the 0.5 lbs. N/1000 sq. ft. rate. As was expected, the most severe burn occurred during the periods of

extremely hot, dry weather. Early August, 1981, was cool and wet and treatments applied at this time showed no burn. This clearly shows that environmental factors have a great influence on the extent of foliar burn. Further testing will be done to screen Nitrogen sources in hopes of determining which ones can be applied with the least chance of foliar burn damage. Other work will be done to determine the rate of nitrogen that can be applied per application with minimal potential for burn.

Buffalograss Management Study

David Brahm

This study was seeded June 16, 1980 as an evaluation of three buffalograss cultivars under various cultural regimes. Management practices include three mowing heights (no mow, 2.5 cm, and 5 cm) and three fertilization rates (0 lb N/yr, 1 lb N/1000 ft^2/yr, and 2 lb N/1000 ft^2/yr). The 2 lb N/1000 ft^2 treatment is split into two applications of 1 lb N/1000 ft^2, with one being applied June 1 and the other July 15. The area is mowed once a week, and is watered as needed to prevent drought stress. Each treatment is replicated three times and data are collected monthly.

The major problem with trying to establish buffalograss in central Iowa is the encroachment of cool-season grasses (e.g. Kentucky Bluegrass). This is especially true with additional fertilization and irrigation.

From the data acquired last season, the addition of nitrogen had a significant effect on the quality of "Common" buffalograss. The quality ratings of the other two cultivars, Texoka and Sharp's, were not significantly different at the three nitrogen levels. See Table 37. According to Table 38, the effect of added nitrogen on the color of the three cultivars proved significant only for "Texoka". Overall, the addition of nitrogen created more problems than benefits, these being, encroachment of both cool-season grasses and annual weeds. From Tables 39 and 40 it is shown that mowing height has a significant effect on both quality and color for all three buffalograss cultivars. In all cases, the 5.0 cm height had a fairly open turf which allowed annual weeds to thrive, while the no mow height had a shaggy appearance.

This study has shown that buffalograss can be grown in central Iowa; and that it can be used wherever a low maintenance area is desired, whether it be your front lawn or along a roadside. Also gathered from this study were ideas for future studies. Due to cool-season grass encroachment, a herbicide study has been started to look at various herbicides which will selectively control the cool-season grasses. A non-irrigated buffalograss management study has been started to observe how it will hold up under dry conditions. From the combination of the studies above, we hope to gather enough information to be able to manage buffalograss both under low- and high-maintainance conditions.

Table 37. The Effects of N Fertilization on the Quality of Three Cultivars of Buffalograss.

N Level (lb/1000 ft^2/yr)	Texoka	Sharp's	Common
0	5.5	5.5	5.5
1	6.0	6.0	6.0
2	6.0	5.5	6.0
LSD (.05) =	N.S.	N.S.	0.5

Table 38. The Effects of N Fertilization on the Color of Three Cultivars of Buffalograss.

N level (lb/1000 ft^2/yr)	Texoka	Sharp's	Common
0	6.0	6.0	6.0
1	6.5	6.0	6.0
2	7.0	6.0	5.0
LSD (.05) =	0.5	N.S.	N.S.

Table 39. The Effects of Mowing height on the Quality of Three Cultivars of Buffalograss.

Mowing height (cm)	Texoka	Sharp's	Common
No mow	5.5	5.5	5.5
2.5	6.0	5.0	5.0
5.0	6.5	6.0	7.0
LSD (.05) =	0.5	1.0	1.0

Table 40. The Effects of Mowing Height on the Color of Three Cultivars of Buffalograss.

Mowing height (cm)	Texoka	Sharp's	Common
No Mow	5.5	5.5	5.0
2.5	6.5	6.5	6.0
5.0	7.0	6.5	6.5
LSD (.05) =	0.5	N.S.	0.5

FALL TOPDRESSING STUDY

The fall topdressing study was begun in November of 1980 and results of the first year were discussed in last year's field day report. This investigation is being conducted on Penncross creeping bentgrass established on both a native soil and a modified soil. Three different treatments were included; a) a 70-10-20 (sand-soil-peat) mix , b) a 1-1-1 topdressing mix and c) a control area where no topdressing was applied. The treatments were applied at a depth of 1/4 inch. Each topdressing treatment was further divided into three fertilizer treatments; a) no nitrogen, b) 0.5 lb N/1000 sq ft, and c) 1 lb N/1000 sq ft. The plots were then further split into two fungicide treatments; a) Chloroneb 9 ounces/1000 sq ft (Tersan SP) and b) Benomyl 2 ounces/1000 sq ft (Tersan 1991). The treatments applied to the native soil area were exactly the same as those applied to the modified soil.

The first winter of the study (1980-1981) was dry and mild. Under these conditions, topdressing proved to be very beneficial. Topdressed areas had a much improved spring greenup rate and there was much less winter damage on topdressed areas.

The 1981-1982 winter season was very cold and there was continuous snow cover from December to March. Under these conditions there was a slight benefit to heavy fall topdressing on the native soil (Table 41). There was also some advantage to topdressing on the modified soil, but it was not nearly as pronounced as in the previous winter when there was no snow cover. No snow mold appeared in 1982 and there was no effect of fungicide application.

Although the application of nitrogen enhanced winter survival and improved spring greenup in the first season, increasing rates of N had no effect in the past season (Table 42). There was very little winter kill in 1982, whereas there was a considerable amount of winter kill in 1981. The Nitrogen response in the first year may have been due to an increase in rate of recovery on the fertilized plots.

This study will be continued, to further evaluate the benefits of heavy full topdressing under varying environmental conditions.

TABLE 41. COLOR RATINGS FOR THE MODIFIED (1-1-1) SOIL GREEN AND THE NATIVE SOIL GREEN IN THE SPRING OF 1982.

	DATE				
TREATMENT	MARCH 30	APRIL 14	APRIL 17	APRIL 21	MEAN
MODIFIED SOIL					
CONTROL	1.0*	3.0	5.0	5.5	4.0
70-10-20	2.0	4.0	6.0	6.5	4.5
1-1-1	2.0	4.0	6.0	6.0	4.5
NATIVE SOIL					
CONTROL	1.0	3.0	5.5	6.0	4.0
70-10-20	2.0	4.5	7.0	7.5	5.0
1-1-1	2.0	4.5	6.5	7.0	5.0

COLOR IS RATED ON A SCALE OF 9 - 1, WHERE 9 = COMPLETE RECOVERY AFTER WINTER DORMANCY AND 1 = DORMANT TURF.

TABLE 42. COLOR RATINGS FOR THE MODIFIED (1-1-1) SOIL GREEN AND THE NATIVE SOIL GREEN AS AFFECTED BY FERTILIZER RATE.

	TOPDRESSING TREATMENT								
	CONTROL			70-10-20			1-1-1		
SOIL	0*	0.5	1.0	0	0.5	1.0	0	0.5	1.0
MODIFIED	4.0**	4.0	4.0	5.0	4.5	5.0	4.5	4.5	4.5
NATIVE	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0

* POUNDS N/1000 SQ FT APPLIED JUST PRIOR TO TOPDRESSING TREATMENTS.

** 9 = TOTAL RECOVERY, 1 = DORMANT TURF, VALUES LISTED ARE THE MEANS OF THE 4 RATING DATES.

SOD PRODUCTION

Tom Robeson

The goal in sod production is to minimize nitrogen fertilizer cost while still producing a quality, early maturing sod crop. One possible way to achieve this goal may be to apply most of the nitrogen needed by the grass plant with a slow release nitrogen fertilizer at the time of establishment. This method has the advantage that fertilizer is incorporated into the root zone for root availability, and that the number of fertilizer applications, and thereby labor costs are reduced.

On September 11, 1982, a sod production study was established at the research station. The treatments and plot design were as follows.

TREATMENTS

1-3 Blue Chip 38-0-0

1. 6 lbs N/1000 ft^2 Incorp. into top 2" at seeding
   4.5 lbs N/1000 ft^2 Applied in spring
2. 3 lbs N/1000 ft^2 Incorp into top 2" at seeding
   4.5 lbs N/1000 ft^2 Applied in spring
3. 1 lb N/1000 ft^2 Incorp into top 2" at seeding
   3 lb N/1000 ft^2 spring

4 - 6 Urea 45-0-0

4. 1 lb N/1000 ft^2 Incorp into top 2" at seeding
   1 lb N/1000 ft^2 April
   1 lb N/1000 ft^2 May
   1 lb N/1000 ft^2 June
5. 1 lb N/1000 ft^2 Incorp into top 2" at seeding
   1/2 lb N/1000 ft^2 April
   1/2 lb N/1000 ft^2 May
6. 1 lb N/1000 ft^2 Incorp into top 2" at seeding
   1 lb N/1000 ft^2 April
   1 lb N/1000 ft^2 May
7. Control

The field plot design is shown on the next page.

Sod Production Study
Field Plot Design

4	3	6	1	7	5	2
5	1	7	3	6	2	3
2	6	7	5	1	3	4
7	4	5	6	2	3	1

North

Data on establishment rate and sod strength will be collected. Establishment rate is determined by evaluating percent cover of the plot area at different dates through the growing season and at harvest. Sod strength will be measured by use of a sod streching machine in September, 1982. Sod strength refers to a sod that produces abundant root and rhizomes with enough length to hold the soil and sod together.

Preliminary results

On June 15th treatment number 1, with 6 lbs. N/1000FT^2 (Blue Chip) at establishment, had the highest percentage of turf cover. Treatments 2, 5, and 6 have the same percentage with treatments 3, 4, and 7 following in order.

TABLE 43 - AVERAGE PERCENT COVER FOR SOD PRODUCTION EXPERIMENT

		Oct	Nov	April	May	June
#1 Bluechip	6 lb N + 4.5 lb N	8	19	39	66	85
#2 Bluechip	3 lb N + 4.5 lb N	8	20	35	65	70
#3 Bluechip	1 lb N + 3 lb N	6	11	33	60	65
#4 Urea	1 lb N + 3 lb N	5	11	23	45	59
#5 Urea	1 lb N + 1 lb N	7	16	35	65	70
#6 Urea	1 lb N + 2 lb N	8	21	39	65	70
#7 Control		5	11	21	38	50

Preliminary data in this study suggest that the 6 lb N/1000 Ft^2 application of blue chip enhanced establishment to a significant degree the other treatments did not improve establishment much above that of the control. The large amount of rain this spring caused much of the nitrogen from the urea to be leached away. These results along with the sod strength measurements will be compiled this fall with more complete results at that time.

COMPANIES AND ORGANIZATIONS WHICH HAVE MADE DONATIONS TO THE RESEARCH PROGRAM *

Special thanks is expressed to Tri State Toro for providing a Greensmaster III, Triplex Greensmower for use on the research green this year and to Big Bear Turf for the donation of a rotary mower for use at the research area.

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* In the rush to prepare this information for the field day report, some companies may have inadvertently been missed. If your company has provided financial or material support for the research program, and is not mentioned above, please contact me so that it can be added in future reports.