MICHIGAN STATE UNIVERSITY

TURFGRASS RESEARCH

SUMMARY

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Michigan State University
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Physiology and Ecology Project

Factors Influencing Competition of Annual Bluegrass Within Established Turfgrass Communities and Seedling Stands - J. E. Bogart and J. B. Beard.

An extensive study of annual bluegrass revealed the following: Penncross creeping bentgrass and Merion Kentucky bluegrass initiated new shoot growth earlier in the spring than annual bluegrass. Penncross and Merion initiated growth between 50° and 55° F while established plants of annual bluegrass did not initiate new spring growth until the soil temperatures exceeded 55° F. Penncross creeping bentgrass is adapted to a wider range of temperatures in terms of producing superior root and shoot dry weights than Merion Kentucky bluegrass and annual bluegrass at the extreme temperatures of 40° and 90° F. A 1.0 inch cutting height produced the highest tiller numbers, shoot dry weights, and shoot density counts for annual bluegrass in both mono-and polystands. Rooting depths were similar for all three species. Annual bluegrass possessed a more extensive, branched root system thereby resulting in greater root dry weights than Merion Kentucky bluegrass. The rooting depths of all three species were reduced by clipping three times weekly at 1.0 inch. Penncross creeping bentgrass was the most severely effected.

Shade Adaptation of Kentucky Bluegrass Cultivars - J. B. Beard and J. M. Vargas

A Kentucky bluegrass cultivar shade adaptation study was initiated in 1971 at Michigan State University. During July and August of 1971 an irrigation system was installed in the woodland shade plot area at the MSU Crop Science Field Laboratory, East Lansing, Michigan. Subsequent to installation of the irrigation system, the tree canopy was selectively pruned to provide a light intensity equivalent to approximately 5 percent of normal sunlight.

A seedbed was prepared and the experimental area sodded on August 25, 1971. The sods were lifted from the MSU Muck Farm experimental plots which were 18 months old at the time of harvest. Three replications of each of the cultivars were transplanted into a uniformly shaded area in a randomized block design. The plot size was 3 x 6 feet. Subsequent to transplanting, the area was irrigated as needed to prevent wilt and mowed weekly at a cutting height of 2.5 inches. In addition, Dr. Vargas is cooperating in the application of a preventative fungicide program over one-half of each of the individual cultivar plots. This is being done with the objective of separating those cultivar responses associated with disease effects from those responses associated with the lack of light and associated shading effects on the turfgrass environment.

Table 1. The relative degree of thinning of twelve Kentucky bluegrass cultivars transplanted into the shade experimental area at East Lansing, Michigan.

Cultivar	Percent thinning*
A-34	20
Nugget	32
Merion	35
Windsor	47
Newport	40
Fylking	42
Galaxy	42
Pennstar	45
Cougar	57
Kenblue	65
Prato	67
Park	69

*Average of three reps and two ratings made in the fall of 1972.

Results to date indicate that A-34 Kentucky bluegrass ranks superior in shade adaptation followed by Nugget, Merion, and Windsor (Table 1). Those cultivars ranking lowest in shade adaptation include Park, Prato, Kenblue, and Cougar. These evaluations during the initial year reflect primarily the effect of leaf spot damage. The influence of powdery mildew was minimal since the incidence of this disease was rare during the 1972 growing season in the shade experimental area. A substantial change in the ranking of some of these cultivars is anticipated during 1973 when the powdery mildew severity will have a greater effect. These data are presented as a preliminary report.

Morphological and Photosynthetic Responses of Poa pratensis and Festuca rubra to Reduced Light Intensities - J. F. Wilkinson and J. B. Beard.

"Merion" Kentucky bluegrass and "Pennlawn" red fescue are being studied under several levels of reduced light intensity. The investigation includes both morphological and photosynthetic responses. The objective of this study is to gain insight into possible shade adaptive mechanisms of red fescue.

The Effect of Temperature on Growth and Intermediary Metabolism of "Merion" Kentucky Bluegrass - K. E. Kaufmann and J. B. Beard.

This investigation was designed to correlate growth stoppage of cool season turfgrasses with intermediary metabolism when subjected to supraoptimal temperatures. Four sources of ^{14}C-labeled carbon skeletons were traced through metabolism at several growth and incubation temperatures. Results to date indicate that glutamine metabolism is altered by supraoptimal temperatures, causing it to be catabolized by a pathway alternate to its synthesis. A relationship between glutamine metabolism and growth inhibition at supraoptimal temperatures is indicated.

The Influence of Temperature, Cultural Factors, and Analytical Techniques on Carbohydrate Levels in Turfgrasses - D. P. Martin and J. B. Beard.

Total nonstructural carbohydrates were determined on three turfgrass species using three extraction (20 C water, 100 C water, and enzyme) and four analysis (anthrone, phenol-sulfuric, arsenomolybdate, and copperiodometric) procedures. The extraction techniques gave similar results for turfgrasses storing fructosans. The analysis procedures also were comparable to each other except for phenol-sulfuric. Heat-drying harvested leaf tissue caused increased carbohydrate losses compared to freeze-drying.

Water soluble carbohydrate (WSC) levels were slightly higher in Merion Kentucky bluegrass grown at a 5-cm cutting height compared to 2.5 cm when grown at 20 C, and higher at 2.5 cm when grown at 35 C. WSC levels in samples harvested from 0 to 14 hours after initiation of the light period increased over three fold when grown at 20 C, but less than two fold when grown at 35 C.

Maximum shoot growth of Merion Kentucky bluegrass occurred at 25 C. Higher WSC levels were measured at a supraoptimal temperature (35 C) than an optimal temperature (20 C) in Merion Kentucky bluegrass leaves harvested within several hours following initiation of the photoperiod. The inverse relationship occurred in samples harvested 10 hours into the photoperiod.

Photosynthetic rates increased from 20 to 25 C and then decreased at higher test temperatures. The decrease was greater in grasses preconditioned at 20 C than those at 35 C. The rate of photosynthesis was higher in Merion Kentucky bluegrass plants grown at 20 C compared to 35 C for all test temperatures except 40 C. Respiration increased as test temperatures increased from 20 to 40 C and was higher at all test temperatures in grasses preconditioned at 20 C.

Low Temperature Tolerance of Perennial Ryegrass Cultivars - J. B. Beard and K. T. Payne.

Good field differentials were obtained in the comparative low temperature hardiness of five perennial ryegrass cultivars. These cultivars were established at Traverse City, Michigan, on a loamy sand site August 19, 1969. Adequate snow cover existed during the winter period for the first two years so that low temperature kill was minimal. However, serious low temperature damage occurred during the winter of 1971-72 to the perennial ryegrass cultivars. A very representative evaluation of the comparative low temperature hardiness among the cultivars was obtained. The plot area involved three replications in a randomized block design.

Table 2. Comparative low temperature kill of ten perennial ryegrass cultivars at Traverse City.

Cultivar	Percent low temperature kill* (5-9-72)
Norlea	20
Bocage	45
Manhattan	50
Pelo	55
Combi	62
Sceempter	82
Linn	90
NK-100	96
Ruanui	100
Ariki	100

* Average of 3 reps.

Earlier studies revealed that Norlea perennial ryegrass was the most low temperature hardy cultivar available for Michigan conditions. The question arose as to whether some of the more recently released cultivars such as Manhattan perennial ryegrass might rank as well or better than Norlea. Results of this test indicate that Norlea still remains the most low temperature hardy perennial ryegrass cultivar (Table 2). Manhattan perennial ryegrass was substantially less low temperature hardy but ranked higher than the other ryegrasses included in this test. Earlier observations at East Lansing had indicated that Pennfine ranked quite poor in low temperature hardiness, being much less hardy than Manhattan. These results indicate that when considering the use of Manhattan for northern climates, one must recognize the potential for serious low temperature injury and thinning of stands periodically during those winters when there is a lack of winter cover in the form of snow.

Water Use Rate Evaluations Among Kentucky Bluegrass Cultivars - R. Yoder and J. B. Beard

The experiments were conducted in a climatically controlled wind tunnel apparatus having a wind velocity of 4 mph, a constant temperature of 90° F, and a relative humidity of 30%. Four inch sod plugs were collected from the field

plots, placed in a growth chamber under controlled conditions for a three week period, and then placed in the wind tunnel for a period of 12 hours. The weights of the plugs were measured before and immediately after removal from the wind tunnel. The plugs were then dried, weighed, and the difference determined as a measurement of water loss.

Table 2a. Comparative Water Use Rates of 17 Kentucky Bluegrass Cultivars.

Very low	Low	Intermediate	High	Very high
Prato	Pennstar	Merion	A-34	Sodco
Cougar	Park	Galaxy	Newport	Sydsport
Delta	Nugget	Monopoly	Fylking	
Kenblue	Windsor	Baron		

The comparative water use rates of 17 Kentucky bluegrass cultivars are compared in Table 2a. Significant differences were found in the water use rate among these bluegrass cultivars. Ranking very low in water use rate were Prato, Cougar, Delta, and Kenblue. In the low category were several of the improved Kentucky bluegrass cultivars including Pennstar and Nugget. In contrast, Sodco and Sydsport ranked very high in their water use rate while A-34, Newport, and Fylking ranked in the high category. The results of these experiments indicate that there are differences in water use rates among the Kentucky bluegrass cultivars and that one might wish to consider this factor when selecting the particular cultivars to be included in the Kentucky bluegrass blend.

Reel Versus Rotary Mower Comparisons - J. B. Beard and J. Eaton.

The effects of reel and rotary mowing at four heights of cut were compared over a period of ten years. The four cutting heights were 0.5, 1.0 and 2.0 inches. The experimental plots were mowed twice per week with clippings returned. Precautions were taken to ensure that the mowers were properly adjusted and sharpened at all times. The turfgrass species utilized was Kentucky bluegrass with a split plot design of three replications in which one-half was composed of Merion Kentucky bluegrass and one-half Delta Kentucky bluegrass. Results of this ten-year study can be summarized as follows.

Mowing with a reel type mower resulted in a better appearance and quality of cut than a rotary mower. The impact action of the rotary mower resulted in a macerated, browned tissue at the upper most tip of the cut leaf that was not evident on the reel type mower which has a truer cutting action. The degree of injury from a rotary type mower was most evident at (a) the lower heights of cut, (b) at times of the year when the turf was growing rapidly, and (c) at higher levels of turfgrass culture, particularly the nitrogen level and irrigation frequency.

The height of cut has a significant effect on the shoot density of turfs as shown in Table 2a. As the cutting height was lowered from 2 to 0.5 inches the shoot density was increased by 36%.

Table 3. Influence of four cutting heights on the shoot density of a Kentucky bluegrass turf.

Cutting height (inches)	Shoot density (per sq. dm)
0.5	348 a
1.0	291 b
1.5	257 c
2.0	224 d

No comparable effect on shoot density was obtained between reel and rotary mowed plots of the same cutting height. There was a tendency however for the turf mowed with the rotary type mower to be more prone to penetration and infection by certain diseases, particularly stripe smut. These results have been confirmed by a duplicate study conducted by the turfgrass researchers at Ohio State University in Columbus, Ohio.

Mowing and Dethatching Practices Influencing Typhula Blight Incidence - J. B. Beard

The experiment was established in 1962 on a Merion Kentucky bluegrass turf. The bojective was to determine the turfgrass cultural system which would minimize the rate of thatch accumulation. The treatments were initiated in a randomized block design of four replications. The various cultural practices were utilized in all possible combinations of 192 treatments.

During the winters of 1969-70 and 1970-71 distinct differences in the incidence of Typhula blight on the Merion Kentucky bluegrass turf were noted among the various mowing and dethatching treatments. These are summarized in Table 4 .

Table 4. Influence of cutting height, clipping removal, and dethatching by vertical mowing on Typhula blight incidence.

Cutting height (inches)	Clippings: R-removed L-left	Thatch: D-dethatched N-not dethatched	Percent of area infected with Typhula blight
1	L	N	0.7
1	L	D	2.3
1	R	N	12.3
2	L	D	13.7
2	L	N	14.3
1	R	D	16.3
2	R	N	35.0
2	R	D	60.0

The two most striking effects observed during both winters resulted from the height of cut and whether the clippings were removed or returned. The one-inch cutting height with clippings returned resulted in a negligible amount of Typhula blight whereas the plots cut at 2 inches with clippings removed had from 35 to 60% of the area infected with Typhula blight. Although the effect was not as consistent, the annual dethatching practice involving vertical mowing did tend to increase the incidence of Typhula blight. Finally, the degree of Typhula blight injury tended to increase with the level of nitrogen fertilization, although this effect was not as striking as the effect of cutting height and clipping removal. These results indicate that the degree of Typhula blight development can be reduced significantly by the proper selection of turfgrass cultural practices.

Chemical Growth Regulator Evaluations - J. B. Beard.

Four of the newer chemical growth regulator treatments plus an untreated check were utilized in this study conducted at Traverse City, Michigan, on a loamy sand site. A mature, infrequently mowed stand of Kentucky bluegrass, red fescue, and annual bluegrass with a scattering of quackgrass was used. The plot area was irrigated as needed to prevent wilt.

The growth inhibitor treatments were applied in three different combinations across three replications. The individual plot size was 6 x 10 feet. One-third of the experimental area received a single application on May 18th. This was just after the first mowing of the turf in the spring. The remainder of the plot area also received the same May 18th application. A second application was applied six weeks later on June 28th. The treatments were also applied over the remaining one-third. Finally, a third application was applied to the last one-third of the plot area on August 9th. Thus, the plot area was split into three sections, one receiving a single spring application, one receiving a spring and early summer application, and a third receiving three applications over the spring and summer period. The experimental plot area was not mowed at any time during the growing season.

Table 5 . Comparative shoot growth inhibition achieved from four chemical growth regulator treatments on a Kentucky bluegrass red fescue turf.

Treatment	Application rate (lb/A)	Degree of shoot growth inhibition* (1-best; 9-least)	
		June 15	June 29
Maintain CF-125 + Maleic hydrazide (MH-30)	1 + 3	1.8	1.3
Sustar (3M0)	4	3.0	1.7**
C-19490 (Geigy)	7.5	5.2	3.8
Maintain CF-125	2	6.7	6.3
Untreated	-	9.0	9.0

* Average of 3 reps.
** Chlorosis and some thinning of stand evident.

The growth inhibition results are summarized in Table 5. Maintain CF-125 at 2 pounds per acre has been the best performing growth regulator in earlier experiments. In this particular series with newer materials it was the poorest of the four treatments. The best treatment in terms of overall performance was a combination of Maintain CF-125 at one pound per acre plus maleic hydrazide at 3 pounds per acre. Sustar also gave quite good growth inhibition although not ranking quite as high as the Maintain CF-125 + maleic hydrazide combination. The Sustar treated plots did how some chlorosis and thinning of stand following the second and third repeat applications on the plot area. Finally, the Geigy C-19490 experimental material proved highly phytotoxic resulting in extensive thinning of the turfgrass stand and at the same time failing to provide adequate shoot growth inhibition of the surviving plants. A certain degree of leaf injury or foliar burn was evident from all four chemical growth regulators following the third application made on August 9.

This chemical growth inhibitor study has been the most effective and successful of the long series that has been conducted by Michigan State University at various locations throughout the state. The key in this case was that the initial application was made at just the right time in the spring. This timing is the most critical and difficult aspect to execute in the use of chemical growth regulators. A similar series of experiments will be repeated during the 1973 growing season at both Traverse City and East Lansing to ascertain if comparable results can be obtained for a second year.

Factors Associated with Thatch Accumulation - J. B. Beard and R. Yoder

This series of experiments is being supported by a grant from the O. J. Noer Research Foundation. The primary objective is to investigate the factors contributing to minimum thatching of turfgrasses. Two aspects of the 1972 research will be reported.

A Merion cultural-thatch study was initiated in 1962 with the objective of evaluating a range of Kentucky bluegrass cultural systems to determine which ones would result in the minimum thatching tendency. The specific cultural treatments included (a) cutting heights of 1 and 2 inches, (b) clippings removed versus return, (c) an annual dethatching versus none, and (d) annual nitrogen fertility levels of 4, 6, 8, 10, 12, and 14 lbs. per 1000 sq ft. These cultural treatments were combined in all possible combinations in a split, split, split plot arrangement of four replications.

Thatch measurements made in the fall of 1972 revealed no significant difference in thatch accumulation from any of the cultural systems included in the study. However, if one steps outside the immediate plot area there is a significant thatch accumulation evident. The only differential between this and the Merion cultural-thatch study is that no pesticides have been applied to the experimental area whereas the adjacent alley received chlordane applications in 1963 and 1966. This observation leads to the conclusion that the activity of earthworms and other small animals in the Merion cultural-thatch study area was sufficient across all cultural system, including cutting heights of 2 inches, clipping returned, no dethatching, and nitrogen fertility levels as high as 14 lbs. per 1000 sq ft., that no thatch formation resulted. These observations suggest that turfgrass areas receiving insecticide applications which control earthworms are much more prone to thatch accumulation.

The second aspect of the thatch investigations involved an anatomical study of the characteristics correlated with thatch accumulation. Sod plugs of four creeping bentgrass cultivars, Cohansey, Evansville, Penncross, and Toronto, were taken from a sod plot that had been maintained under putting green conditions at 0.25 inch for 12 years. At the time of sampling, the Cohansey had a thatch depth of 0.2 inch, Penncross - 0.9 inch, Toronto - 1.1 inches, and Evansville - 2.2 inches. The accumulation was more of a mat than a thatch in that the plot area was topdressed twice per year so that soil was intermixed with the organic matter accumulation. The sod plug mat that had been collected was divided into three categories of (a) green shoots, (b) nongreen lateral shoots, and (c) roots. These groupings were then dried, weighed, ashed, and reweighed to determine the dry weights of these three fractions for each of the four creeping bentgrass cultivars.

Table 6. The comparative dry weights of green shoots, nongreen lateral shoots, and surface roots of four creeping bentgrass cultivars.

Anatomical grouping	Creeping bentgrass cultivars			
	Cohansey	Penncross	Toronto	Evansville
(a) Green shoots	11.4	11.1	10.2	12.7
(b) Nongreen lateral shoots	13.5	13.8	14.2	15.8
(c) A + b	24.9	24.9	24.4	28.5
(d) Roots	54.3	68.4	34.5	91.8
(e) Depth of mat (inches)	0.2	0.9	1.1	2.2

The results of this investigation are summarized in Table 6. The most significant fraction was the quantity of roots associated with Evansville creeping bentgrass which also had the greatest thatch accumulation. Measurements of the lengths of lateral shoots in the sod were also accomplished during this study. These experiments indicated that Cohansey and Evansville creeping bentgrasses possessed the shortest lateral shoots lengths with both Penncross and Toronto possessing lateral shoots that were more than twice as long. Thus, the lateral shoot length probably contributed to the greater thatching tendency of Penncross and Toronto compared to Evansville and Cohansey. However, this anatomical component does not explain the much greater thatch accumulation of Evansville compared to Cohansey. Data in Table suggests that the extensive concentration of surface rooting associated with Evansville may be a major factor associated with thatching of this particular cultivar.

These studies suggest that there is no one anatomical component that is dominant in affecting the thatching tendency of creeping bentgrass cultivars. More than one component may be involved and must be evaluated in a turfgrass breeding program. These studies are containuing with measurements of the lignin content of these individual plant fractions to determine if there is any further relationship with thatching.

The Effect of Nitrogen and Potassium on Turfgrass Wear Tolerance - R. C. Shearman and J. B. Beard.

An investigation of the nitrogen and potassium effects on wear tolerance of Toronto creeping bentgrass turf was initiated in the spring, 1972. The study is part of an extensive investigation of turfgrass characteristics associated with wear tolerance, and the effects of cultural, environmental, and genetic factors on turfgrass wear tolerance. It is supported by a grant from the USGA Green Section.

A portable, mechanical apparatus capable of reliably reproducing and comparing the effects of wear was developed for use in these investigations. Preliminary results indicate that the wear simulator can be effectively utilized to compare relative differences in turfgrass wear tolerance. Potassium fertilization was found to improve turfgrass wear. The greatest increase in wear tolerance was associated with 6 and 8 pounds of actual K per 1000 sq ft. The potassium levels in the tissue (dry weight basis) increased with increasing potassium fertilization rates. Increasing potassium application rates had no effect on shoot density and percent relative turgidity, but did result in increased mat accumulation. Preliminary results indicate that judicious nitrogen fertilization is necessary for improved turfgrass wear tolerance. Excessive application rates can result in a succulent, hydrated turf that is more prone to wear injury.

These results are based on preliminary experiments. Further studies are planned for the 1973 growing season. Emphasis will be placed on (1) finding critical nitrogen and potassium application rates for improved turfgrass wear tolerance, and (2) studying the plant characteristics contributing to wear tolerance that are affected by nitrogen and potassium fertilization.

Comparative Sod Strengths and Transplant Sod Rooting of Kentucky Bluegrass of Kentucky Bluegrass Cultivars and Blends - J. B. Beard

The first three years of a six year program of sod production investigations have now been completed. The basic plan for this work was as follows. Individual cultural practices were to be investigated during the initial three years to determine which ones were best when compared strictly on an individual basis. Studies have now been completed concerning (a) fertilization rates and timing; (b) mowing heights and frequencies; (c) establishment techniques in terms of timing, seeding rate, and wind stabilization; and (d) comparisons of the preferred cultivars, blends, and mixtures for rapid sod strength development.

During the next three years the primary objective will be to combine the best of these cultural practices into various cultural systems to determine which results in the most rapid rate of sod formation. The post-harvest cultural studies involving techniques and methods of transplanting are also continuing. Emphasis will be given during the upcoming year to methods of sod transplanting in shaded sites.

Not all of the work completed during the past year will be summarized in this paper since much of it was included in the Sod Production Field Day Program published and distributed in June of 1971. However, the collection of data on sod strength and sod rooting was continued through the 1971 growing season and has now been completed. This work is summarized in this paper.

COMPARISONS OF SOD STRENGTH AMONG THE KENTUCKY BLUEGRASS CULTIVARS

The Michigan Sod Strength Test was first developed at Michigan State University in 1965. The technique has been refined and improved in subsequent years and has now been adapted for use in experimental work at a number of other universities including New Jersey, Rhode Island, Maryland, Minnesota, and Guelph.

Sod strength measurements among cultivars have been taken on three different plantings made in August of 1968, 1969, and 1970 at the MSU Muck Experimental Farm. The measurements were made at two to three intervals throughout the growing season for each of these plantings. Thus, a very good representative evaluation of the comparative sod strengths has now been obtained. The 1971 data is presented in Table 7.

Table 7. Relative sod strengths of 28 Kentucky bluegrass cultivars

Cultivar	Date Lifted 7-21-71	Date Lifted 9-14-71	Average
Baron	187	131	159
Fylking	188	108	148
Sodco	174	111	142
Nugget	186	87	136
Sydsport	154	119	136
Arista	167	102	134
Pennstar	151	110	130
S-21	132	116	124
Adorno	137	109	123
Primo	138	98	118
Belturf	134	88	111
Palouse	99	114	106
Campus	88	123	105
Prato	106	102	104
Windsor	60	148	104
A-34	141	62	101
Merion	99	102	100
Delft	110	87	99
Geary	104	83	93
Park	81	97	88
Delta	100	77	88
Newport	67	95	81
Cougar	91	67	79
Captan	81	77	79
Monopoly	83	64	74
South Dakota Cert.	67	78	72
Kenblue	39	103	71
Atlas	30	80	55

It can be noted from the data in Table 7 that the sod strengths ranged from a high of 187 pounds to tear the sod to as low as 30 lbs. At least 80 to 85 lbs. is generally desirable for harvesting and transplant handling. The poor sod strength of certain cultivars for August 21, 1971, is caused primarily by greater susceptibility to Helminthosprium leaf spot. Based on these results and earlier data taken since 1968, the relative sod strengths of 22 Kentucky bluegrass cultivars are summarized in Table 7.

Table 8. Relative sod strengths of 22 Kentucky bluegrass cultivars.

Excellent	Good	Intermediate	Poor	Very Poor
Nugget	Belturf	Prato	Cougar	Park
Baron	Primo	Palouse	Delta	Kenblue
Pennstar	Merion	Campus	Monopoly	
Sydsport	A-34	Geary		South
Fylking	S-21	Windsor		Dakota
Sodco				Cert.

Cultivars ranking superior in sod strength include Nugget, Baron, Pennstar, Sydsport, Fylking, and Sodco. Thus, most of the Kentucky blue-grass cultivars that have ranked superior in terms of general turfgrass quality and disease resistance also rank quite well in terms of sod strength. As a group, they are ranked better than Merion Kentucky blue-grass which has been the standard over the years.

COMPARATIVE SOD STRENGTHS RESULTING FROM THE BLENDING OF KENTUCKY BLUE-GRASSES.

As in the previous study, eleven selected blends of Kentucky blue-grass have been evaluated at three different plantings from 1968 through 1970. Results of these studies are summarized in Table .

Table 9. Relative sod strengths of 11 Kentucky bluegrass blends.

Percent Composition						Pounds to Tear
Fylking	Merion	Newport	Park	Prato	Windsor	
33				33	33	116
	50			50		106
		33		33	33	102
33	33		33			100
33		33	33			99
50	50					98
	50				50	98
33	33				33	97
	50	50				88
	33	33	33			87
	50		50			82

In studying the results over the entire test period, no one blend or group of blend has ranked consistently superior. In general, the blends do not rank as high or as low in sod strength in comparison to any one of its individual components. Apparently, the blending of two or more of the Kentucky bluegrass cultivars causes a moderation of the extremes in the overall sod strength of the blend. No great differences have been evident between the blends providing the blend contains one or two cultivars characterized by good leaf spot resistance and sod strength.

The basic concept of blending is more important since it ensures a wider genetic base. Thus, the components of the sod, when transplanted onto the consumer site, will have a wider adaptive ability to environmental, soil, and disease conditions.

COMPARISONS OF THE TRANSPLANT SOD ROOTING ABILITY OF KENTUCKY BLUEGRASS CULTIVARS

The same experimental areas utilized in the Michigan Sod Strength Tests were also used to evaluate the transplant rooting of 20 Kentucky bluegrass cultivars. Three of these tests have been conducted, one time from a 1969

seeding and three times from a 1968 seeding. The sod was produced on an organic soil and subsequently transplanted onto a mineral soil on the MSU turf plots at East Lansing. The actual data for four different lifting times are presented in Table 9.

Table 10 Relative transplant sod rooting of 20 Kentucky bluegrass cultivars (Pounds to lift*)

Cultivar	Date Sod Was Lifted				
	11-6-70	7-2-71	9-9-71	11-2-71**	Average
Belturf	65	98	61	80	77.5
Campus	67	71	71	85	73.5
Captan	61	77	68	55	65.2
NJE-27	54	69	65	61	62.2
Monopoly	49	70	56	71	61.5
A-34	45	80	61	55	60.2
Pp-1	55	64	65	54	59.5
Fylking	48	66	42	51	51.7
Nugget	24	81	60	40	51.5
Newport	51	53	38	63	51.2
Kenblue	65	20	51	68	51.0
Pennstar	38	65	47	51	50.4
Delta	67	23	41	59	47.5
Windsor	61	k0	49	61	45.2
Arboretum	54	27	53	--	44.5
Prato	53	15	53	51	43.0
Merion	48	37	20	55	40.0
Park	60	***	22	63	36.2
Cougar	49	21	15	51	34.0
South Dakota Cert.	58	***	17	61	34.0

* Average of 3 reps.
** Taken from 1969 seeding, all others from the 1968 seeding.
*** Too weak to measure.

The transplant sod rooting strength in these studies ranged from a high of 80 pounds to sods which did not root at all. The inability of certain cultivars to root prior to the July 2, 1971, lifting date was caused by severe thinning of the stand by Helminthosporium leaf spot. Substantial difference was observed in the transplant sod rooting ability among cultivars. The cultivar response varied with the particular time of year. These effects are summarized in Table 10.

Table11. Relative transplant sod rooting of 15 Kentucky bluegrass cultivars expressed on a seasonal basis.

Relative Ranking	Autumn and spring**	Summer	Overall
Excellent (851b.)	Campus Belturf Kenblue	Belturf Nugget A-34	Belturf Campus
Good (58 to 65 lb.)	DElta Park Windsor South Dakota Cert.	Campus Fylking Pennstar	A-34
Intermediate (51 to 57 lb.)	Newport Prato Merion	Newport	Fylking Nugget Newport Kenblue Pennstar
POor (36 to 50 lb.)	Fylking Cougar A-34 Pennstar	Kenblue Delta Merion Windsor	Delta Windsor Prato Merion
Very Poor (35 lb.)	Nugget	Prato Cougar Park South Dakota Cert.	Park Cougar South Dakota Cert.

* Pounds based on the Michigan Sod Rooting Test.
** Non-leaf spot periods.

Note that some of the leaf spot susceptible cultivars such as Kenblue, Delta, and Park have superior transplant sod rooting in both the fall and spring period but rank quite low during midsummer when leafspot thinning is severe. On the other hand, a number of improved Kentucky bluegrass cultivars in terms of disease resistance such as Nugget, Pennstar, Fylking, and Merion, rank much lower than desired. Merion falls in the poor category on a seasonal basis.

These data suggest that it would be desirable to include one of the cultivars with superior transplant sod rooting ability, particularly in the spring and fall period, in a Kentucky bluegrass blend. The most obvious choices among this group are Kenblue, Delta, and Park in terms of seed available on the American market. Thus, even though these cultivars are highly susceptible to leaf spot, they still have certain desirable characteristics that may justify retaining them as a component in a blend of Kentucky bluegrass cultivars.

Table 12.
Effect of nitrogen treatment on sod strengths and rhizome weights of Merion Kentucky Bluegrass sod grown on Houghton muck.

Nitrogen rate, lbs/A			Sod strengths, lbs		Rhizome weight
Seedbed[a]	Monthly		7/22	10/15	mg/plug[c]
0	0		109	146	99
30	30		123	130	120
60	60		105	97	43
120	120		68	67	14
0	15		148	188	89
30	15		155	182	113
60	15		135	180	160
120	15		130	171	190
		Summer[b]			
0	30	0	137	192	272
30	30	30	128	113	94
60	30	60	136	93	144
120	30	120	128	114	97

[a] Seeded and treated in August.

[b] Monthly treatments initiated in July.

[c] Rhizome weights taken July 22.

Table 13.
Sod cultural study sod strengths. Averages of 4 replications, lbs to tear sod.

Nitrogen rate lbs/A/month	Time of application	Blend[b]		Merion		Average
		1.5 in[a]	2.5 in	1.5 in	2.5 in	
15	monthly	42	52	43	50	47
30	monthly	39	53	35	40	42
45	monthly	38	46	28	36	37
30	May, June	47	60	36	56	50
60	May, June	36	56	32	48	43
30	May, June, Aug	39	59	34	46	45
Average		40	54	35	46	

[a] Mowing height.

[b] Blend of Merion, Fylking, Nugget and Baron.

Table 14.
1972 mowing frequency study
(Clipping weights, tons per acre. Averages of 4 replications)

Mowing frequency	Nitrogen rate per month, lbs/A	
	30	60
twice weekly	1.67	2.04
weekly	1.81	2.14
every 2 weeks	1.97	2.69
every 4 weeks	2.64	3.47
every 6 weeks	2.43	3.41

SOIL LOSS WITH SOD REMOVAL. Plots established in 1963 (and discontinued in 1971) had soil levels which indicated the soil had subsided 2.4 inches under permanent grass, 3.4 inches under annual onion cropping, and 5.2 inches after 5 sod crops had been removed. The soil level dropped just over 0.5 inch per crop more than was observed under permanent grass. After 7 onion crops had been harvested, the soil loss was 1 inch more than under permanent grass, or about .15 inch per year under these conditions of very excellent wind erosion control practices.

Table 15.
Averages of monthly visual turfgrass quality ratings for Merion Kentucky Bluegrass under several nitrogen fertility treatments. Averages for 3 replications for 3 years (1 = best; 10 = poorest)

Treatment			Quality rating
Nitrogen rate lbs/1000 sq ft	Time of application	Carrier	
0	--	--	7.8
6	Apr	33-0-0	3.0
6	May	33-0-0	3.2
6	Apr, Aug	33-0-0	3.3
6	Apr, May, Aug	33-0-0	2.8
6	Apr, Aug, Sept	33-0-0	3.6
6	May, Nov	33-0-0	2.9
6	May, Feb	33-0-0	2.9
6	monthly	33-0-0	2.7
12	monthly	33-0-0	1.6
6	Apr	6-3-0 (Milorganite)	3.5
6	Apr, May, Aug	6-3-0	3.5
6	Apr	38-0-0	3.9
6	Apr, May, Aug	38-0-0	4.1
12	Apr, May, Aug	38-0-0	2.4

Table 16.
Effect of nitrogen rate and mowing height on visual turfgrass quality ratings of Wintergreen and Pennlawn Red Fescue. Averages of 3 replications for 1971-72. (1 = best; 10 = poorest)

Nitrogen rate	Wintergreen		Pennlawn	
lbs/1000 sq ft	3/4 in.	1.5 in.	3/4 in.	1.5 in.
0	5.9	5.7	5.7	5.4
1	4.1	4.1	4.4	4.3
1.5	3.9	4.0	4.0	4.1
2	3.5	3.4	3.5	3.5
2.5	3.3	3.0	3.2	3.1
3	3.0	2.7	2.8	2.7
4	2.7	2.6	2.4	2.4
6	2.6	2.5	2.0	2.0
2-Apr	3.9	3.6	3.9	3.8
2-Aug	4.3	4.0	3.8	3.9
2-Apr, Aug	3.7	3.6	3.5	3.4

Table 17.
Effect of 6 years of ammonium nitrate application on soil tests of fine sandy loam, East Lansing. All clippings have been removed. Averages of 3 replications.

N Rate lbs/1000 sq ft	pH Depth of sample, inches			P[a]	K[b]
	0-2	4-6	8-10	lbs/A	lbs/A
0	7.4	7.4	7.4	63	105
2	7.5	7.6	7.4	46	63
4	7.4	7.6	7.5	31	56
6	7.3	7.5	7.6	26	52
8	6.6	7.5	7.5	32	61
10	6.4	7.4	7.5	28	52
12	5.6	7.2	7.3	34	56
14	5.0	7.1	7.3	43	45

[a] Phosphorus extracted with Bray P_1

[b] Potassium extracted with neutral normal ammonium acetate.

Table 18.
Effect of nitrogen rate on stripe smut infestation and quality ratings of Merion Kentucky Bluegrass

N Rate lbs/1000 sq ft	Stripe Smut Free Area[a]	Quality Ratings (1 = best; 10 = poorest)	
3	91	4.4[b]	6.5[c]
6	83	5.3	7.5
12	62	6.5	8.4

[a] Ratings taken 6/72

[b] Averages for 1972 monthly ratings.

[c] Averages for April, 1973 after Fusarium nivale infestation.

Table 19. Effect of nitrogen rate and mowing height on visual turfgrass quality ratings, dandelion encroachment, and percentage of turf area infested with Fusarium nivale on Merion Kentucky Bluegrass. Averages of 3 replications.

Nitrogen rate lbs/1000 sq ft	Mowing height inches	Turfgrass quality[a]		Dandelions/plot[c]		% area diseased[b]	
		Seeded	Sodded	Seeded	Sodded	Seeded	Sodded
0	3/4	7.6	6.5	65	42	1	3
	1 1/2	7.6	6.5	171	99	0	1
2	3/4	5.7	4.9	16	19	9	12
	1 1/2	5.6	4.8	60	27	3	6
4	3/4	4.0	3.3	10	5	46	42
	1 1/2	3.9	3.4	11	7	16	19
6	3/4	3.0	2.7	0	3	48	52
	1 1/2	3.0	2.8	1	2	19	29
8	3/4	2.9	2.7	0	0	15	26
	1 1/2	2.7	2.6	0	0	15	26
10	3/4	2.7	2.6	0	0	63	55
	1 1/2	2.5	2.6	0	0	26	30
12	3/4	3.0	2.9	0	0	58	44
	1 1/2	2.8	2.7	0	0	15	23
14	3/4	3.2	2.9	0	0	625	51
	1 1/2	3.0	2.7	0	0	14	28

[a] Averages of monthly ratings for 1971 and 1972 (1 = best; 10 = poor)

[b] Averages of ratings taken in March, 1972 and 1973.

[c] Counts taken in May, 1972.

Table 20. Effect of soil mix on turfgrass visual quality ratings and relative drouth tolerance of Cohansey Creeping Bentgrass and on infiltration rate.

Soil mix			Quality ratings[a]	Relative drouth tolerance[b]	Infiltration rate[c]
Coarse sand	Sandy loam	Peat	(1 = best; 10 = poor)	(1 = best; 10 = poor)	in/hr
0	1	0	1.6	1.0	0.7
X[d]	1	1	6.1	5.2	14.3
X	2	1	3.4	4.3	11.4
X	1	2	3.2	3.9	12.6
1	X	X	2.2	1.3	3.8
2	X	X	2.4	2.0	8.3
3	X	X	3.0	3.3	12.4
4	X	X	3.7	4.8	17.4
6	X	X	4.5	7.2	17.9
8	X	X	5.7	8.2	16.8
3	0	1	6.9	8.0	20.3
3	1	0	5.3	8.5	21.3
3	1	1	2.9	4.5	14.9

[a] Averages for 1969-70 seasons.

[b] Taken 5/2/73 after severe moisture stress conditions.

[c] Using double ring infiltrometer.

[d] X indicates variable amounts of soil mix component. Coarse sand varied from 1 to 8 parts in the mix; sandy loam and peat varied from 1 to 2 parts.

SYSTEMIC FUNGICIDE CONTROL OF SCLEROTINIA DOLLAR SPOT

J. M. Vargas Jr. and R. Detweiler

A. Spray interval:

The purpose of this study was to determine how long spray intervals could be extended with systemic fungicides over the normal 10-14 days required with a surface or contact type fungicide. The study was conducted on toronto creeping bentgrass, replicated 3 times in a random block design. The plots were 4 x 4 ft and surrounded by a six inch untreated border so as to have inoculum adjacent to all plots throughout the study. The name of the contact fungicide which was not applied in accordance with the 10-14 day interval recommended on the label is ommitted. The fungicides were applied with a John Bean Spartan sprayer and a 3 nozzle boom on wheels which covered a 4 foot swath. The first spray application was made on June 23 after the dollar spot was first observed. The results are given in table 21. They show that 4 weeks and 6 weeks after application (7/20 and 8/2) all the systemic fungicide effectively controlled dollar spot while the contact fungicide check and the untreated check failed to do so. Seven weeks (8/10) after the fungicides were applied, the dollar spot began to increase in most of the systemic fungicide plots and in the control contact fungicide check, while the untreated check had a decrease in the number of spots. The disease was allowed to increase for an additional week (8/18), at which time all the fungicides were applied a second time. The first reading 3 weeks later (9/8) showed a decrease in the number of dollar spots in all plots receiving the systemic fungicides while the number of spots increased in the contact check and the untreated check. One month later the disease began to increase in most treatments.

Conclusion:

All the systemic fungicides tested appeared capable of controlling dollar spot for a period of 3 to 6 weeks depending on the disease pressure. This means they will give more residual control of dollar spot than the contact fungicides and will therefore require fewer applications during the growing season. However, because of the possible development of resistant strains of S. homeocarpa to the systemic fungicides, they should not be used exclusively but combined or alternated with some of the contact or surface fungicides in a total spray program.

B. Bi-weekly application of the systemic fungicides:

The systemic fungicides were applied in the same manner as described in part A, the only difference being that they were applied every two weeks instead of as needed. The fungicides were applied on the following dates: 6/23, 7/7, 7/21, 8/3, 8/18, 8/30, and 9/18. The results can be seen in table 22. They show good control throughout the season with some disease showing up on 8/10 under severe disease pressure.

Table 21.

Sclerotinia dollar spot control

(fungicides applied as needed) 1972

Chemical	Rate/1000 ft^2	Total number of spots in 3 replications						
		6/23*	7/20	8/2	8/10	8/18*	9/8	9/15
Benomyl	1 oz.	3	0	0	32	77	0	4
Benomyl	2 oz.	0	0	0	21	55	7	12
70% Throphanate-methyl	1/2 ox.	3	1	6	16	44	0	43
70% Throphanate-methyl	1 oz.	3	0	1	9	54	0	41
Triarimol	1 oz.	1	3	4	30	82	30	93
Triarimol	2 oz.	24	13	8	24	69	0	9
U-32-104	1 oz.	6	0	0	24	29	0	1
U-32-104	2 oz.	28	0	0	10	26	0	0
Bay Dam 18654	1 oz.	22	0	2	24	26	0	0
Bay Dam 18654	1 oz.	2	0	0	0	19	0	0
50% Throphanate methyl	1 oz.	28	3	0	10	39	0	10
50% Throphanate methyl	2 oz.	16	0	3	28	41	0	2
Contact Fungicide Check	4 oz.	13	75	49	81	245	376	523
Untreated Check		79	130	118	145	125	300	300

* Dates sprayed

Table 22. Sclerotinia dollar spot control

(fungicides applied every two weeks)

Chemical	Rate/1000 ft^2	Total number of spots in 3 replications								
		6/23	7/10	8/2	8/10	8/18	9/1	9/15	9/26	10/6
Tersan 1991	1 oz.	33	0	0	6	1	0	0	0	12
"	2 oz.	41	0	0	3	1	0	0	0	0
Topsin M	1/2 oz.	11	0	1	4	3	0	0	1	0
"	1 oz.	15	0	0	9	0	0	0	0	0
El 273	1 oz.	48	1	0	0	0	0	0	0	0
"	2 oz.	64	1	0	10	0	0	0	0	0
U-32-104	1 oz.	5	0	0	20	0	0	3	0	0
"	2 oz.	63	0	0	6	0	0	0	0	0
Bay Dam 18654	1 oz.	14	0	2	4	0	0	0	1	6
"	2 oz.	19	0	0	5	0	0	0	0	0
Fungo	1 oz.	37	0	1	1	0	0	0	0	5
"	2 oz.	17	0	0	1	0	0	0	0	0
Check		36	86	68	108	142	351	351	266	319

STRIP SMUT CONTROL

J. M. Vargas and R. Detweiler

Strip smut has become a serious problem in Michigan the last couple of years. Obtaining a satisfactory means of controlling this disease has become imperative. The following study was set up at East Lansing to evaluate systemic fungicides Theophanete, Throphanate-methyl, benomyl and triarimol on strip smut control. The plots were 5 x 10 ft and replicated 3 times. The first application was made on May 26 for Throphanate, benomyl and triarimol. A second application of these materials was made to 1/2 the plots on June 14. Throphanate-methyl was applied in a similar manner on 7/16 and 7/30. All materials were drenched into the root zone with an inch of water immediately after application. The plots were read on October 7. The percent infected plants per plot were estimated and the results are given in Table 22a. The readings show that two applications of 4 and 8 oz. of benomyl, triarimol and throphanate-methyl give excellent control.

In general, the 2 applications of these materials was superior to 1 application of the same total amount of material. (For example, two 4 oz applications of benomyl was superior to one 8 oz. application.) The one exception is the October 7 reading of triaromol.

Table 22a. The effectiveness of various systemic fungicides for the control of stripe smut in East Lansing study on October 7.

Treatment	Rate/100 sq ft	% plants infected with strip smut[4]	
		application[1,2]	2 applications[1,3]
Triarimol	8 oz.	13 a	4 a
Benomyl	8 oz.	18 a	8 a
Thiophanate-methyl	8 oz.	23 a b	8 a
Benomyl	4 oz.	18 a	8 a
Triarimol	4 oz.	18 a	13 a b
Throphanate-methyl	4 oz.	33 b c	17 a b
Throphanate	8 oz.	38 c	31 b
Benomyl	2 oz.	25 a b	35 b c
Throphanate	4 oz.	43 c	38 b c
Untreated Control	--	42 c	50 c

[1] each figure is the average number of plants infected with stripe smut in 3 replications

[2] received treatments on 5/26 except Throphanate-methyl which was treated on 7/16

[3] received treatments on 5/26 except throphanate-methyl which received treatments on 7/16 and 7/30

[4] treatments followed by same letter are not significant at 5% level

Read 10/7

Breeding Project

Summary of Turfgrass Variety Trials

K. T. Payne, J. B. Beard, J. M. Vargas

Turfgrass evaluation at Michigan State University is conducted at four locations. At East Lansing, the soil is Conover silt loam and plots are irrigated as needed. A shade nursery, with irrigation, was established in 1971. The sod evaluation is done at the MSU Muck Farm, about 10 miles east of East Lansing. The soil is organic. Northern Michigan variety evaluation is done on sandy soil at Traverse City in northwest lower Michigan. Plots are fertilized at 3 and 6 lbs. N per 1000 sq. ft. per season.

Field notes are generally taken with 1 being what is most desirable or best from the appearance quality standpoint

1 = best

9 = poorest

All plots are three replications. Parentheses at the tops of columns indicate the number of observations in the mean. Thus, (9) = the plots were read at three dates with three replications per date.

Disease readings are either

(a) % infection

(b) 1 = no infection, 5 = complete infection

or

(c) 1 = no infection, 9 = complete infection

Table 23

Bentgrass Cultivar Evaluation
East Lansing
1968-1973
Area B-2

Greens management mowed at 1/4"

Cultivar	Seedling Appearance Fall 1968 (3)*	Percent Cover 4/24/69 (3)	Spring Green up 1969 (3)	Appearance 1969 (15)	1970 (18)	1971 (12)	1972 (3)	1973 (3)	Weighted Average (51)
MSU-28-AP	3.3	92%	1.7	1.5	2.3	1.6	1.0	2.3	1.8
Emerald	3.3	23	3.7	2.9	2.3	1.6	1.7	1.0	2.2
NR-42-23	4.0	34	3.5	2.7	2.3	1.9	1.7	1.3	2.2
MSU-38-AP	2.6	93	3.0	2.1	2.7	2.0	1.0	2.7	2.3
Penncross	2.6	34	4.0	2.8	2.2	2.3	1.0	1.0	2.3
Pennpar	2.3	90	1.3	2.7	2.6	1.3	1.7	1.7	2.3
Cohansey	3.7	67	2.3	2.7	2.7	1.5	2.0	1.7	2.3
MSU-18-AP	3.0	97	1.3	2.6	2.6	2.1	1.0	2.0	2.3
Toronto	3.6	87	3.0	2.0	2.1	2.9	2.3	3.7	2.4
Kingston[1]	3.0	47	4.0	2.8	2.4	3.4	5.3	5.3	3.1
Seaside	3.0	34	4.0	3.6	3.3	2.3	2.7	2.3	3.1
Exeter	4.0	7	3.5	4.1	3.6	3.6	4.0	3.3	3.8
Astoria	3.0	23	4.0	3.8	3.7	4.4	4.0	5.0	4.0
Holfior	2.6	28	4.0	3.9	3.8	4.4	5.0	3.3	4.0
Brabantia	5.6	10	3.5	4.2	3.7	3.9	5.7	4.3	4.1
Bt-806-Browntop	6.6	22	4.0	3.6	4.0	4.2	6.0	6.3	4.2
Boral	2.6	43	4.0	3.8	4.0	4.2	6.0	6.3	4.2
Highland	5.3	7	4.0	4.2	3.9	4.6	6.0	4.3	4.3
Bardot	-	8	3.5	3.9	4.9	4.5	6.3	6.3	4.7
Sport	2.0	87	4.0	4.0	5.3	5.3	-	-	4.9

* no. in parenthesis ( ) refers to the no. of observations in mean value, e.g. (3) = 1 date x 3 replications; (12) = four dates x 3 replications each.

[1] only 5% Kingston

Table 24. Bentgrass Cultivar Evaluation
East Lansing, Michigan
1968-1973
Area D-1

Tee and Fairway Management Mowed at 1/2"

Cultivar	Seedling Appearance Fall 1968 (3)*	Percent Cover 4/24/69 (3)	Spring Green up 1969 (3)	Appearance					Weighted Average (48)
				1969 (12)	1970 (15)	1971 (12)	1972 (6)	1973 (3)	
Pennparr	1.0	98%	1.7	2.3	2.8	1.7	1.0	1.0	2.1
Nr 42-23	6.7	15	4.0	2.1	2.4	2.1	1.5	1.3	2.1
Toronto	1.7	95	2.7	1.4	2.3	2.9	1.8	2.3	2.2
MSU-38-AP	2.0	93	2.7	1.9	2.6	1.8	2.7	1.7	2.2
Emerald	6.0	12	4.0	2.0	2.3	2.4	1.7	2.0	2.2
MSU-28-AP	2.3	92	1.7	1.8	3.1	2.1	3.0	3.3	2.5
Penncross	5.0	12	3.7	2.9	2.9	2.0	1.9	2.0	2.5
MSU-18-AP	3.0	95	1.3	2.2	2.9	3.0	2.5	1.7	2.7
Cohansey	2.0	97	4.3	2.8	2.7	2.5	3.3	3.3	2.8
Seaside	5.3	12	4.0	3.4	3.4	2.5	1.7	2.3	2.9
Kingston	-	20	4.0	2.9	2.7	3.9	3.5	3.0	3.2
Holfior	2.3	20	4.0	3.8	3.3	3.3	2.9	2.7	3.4
Prominent[1]	-	-	-	-	-	-	3.4	2.7	3.4
Brabantia	6.3	4	4.0	3.7	3.6	3.4	3.2	2.7	3.5
Exeter	4.7	13	3.7	3.9	3.8	3.7	3.2	2.3	3.7
Boral	2.3	22	4.0	3.9	3.6	4.1	4.0	2.7	3.9
Astoria	3.0	18	3.7	4.1	3.5	4.3	3.7	3.7	3.9
Bt-806-Browntop	7.7	43	3.5	3.4	3.7	5.0	4.2	4.3	4.0
Bardot	4.0	2	4.0	3.0	4.3	4.6	3.9	-	4.0
Highland	6.3	13	4.0	4.5	4.3	4.4	2.7	3.0	4.2
Sport[1]	2.7	77	4.0	5.1	5.0	4.1	-	-	4.8

[1] Sport reps replaced by Prominent in 1972

* No. in parentheses ( ) refers to the no. of observations in mean value.

Table 25.
Fine Leaved Fescue Cultivar Evaluations-III (NRT)
Michigan State University
East Lansing
1973
Area E-3
Seeded 1972

Cultivar	Appearance 1973 Avg. (3)
Jamestown	1.0
Waldorf	1.3
Oregon D	1.3
Ru 45-C	1.3
Wintergreen	1.7
Harritine	1.7
Scaldis	1.7
MLM 15001	1.7
ERb 11	1.7
Scarlet (HF-9)	1.7
Dawson	2.3
Minuet (Fallox)	2.3
Polar	2.3
C-26	2.3
Highlight	2.7
Oregon K	2.7
Koket	3.0
Barfalla	3.0
Flavo	3.0
Encota	3.3
Boreal	3.3
Duraturf	3.7
Pennlawn	5.0
MLM 1512	5.0
S-59	5.3
Roda	5.3
Arctared	-
Pollux	-
Ruben	-
Echo	-
Rapid	-
Burgere	-

Table 26. Kentucky Bluegrsss Blends Evaluation IV
Michigan State University
East Lansing
1972-1973
Area E-2

Blend Percentage Composition	Appearance 4/26/73 Avg. (3)[2]
Merion Nuggett Sydsport @ 33%	1.7
Fylking Merion Nuggett @ 33%	2.0
Fylking Nuggett Merion Pennstar @ 25%	2.0
Baron Pennstar Sodco @ 33%	2.3
Merion Sodco Sydsport @ 33%	2.7
Baron Sodco Merion Sydsport @ 25%	2.7
Merion Nuggett Sodco @ 33%	3.0
Baron Sodco Sydsport @ 33%	3.0
Baron Sodco Pennstar Sydsport @ 25%	3.0
Pennstar Sodco Sydsport @ 33%	3.3
Baron Fylking Sodco @ 33%	3.3
Fylking Park Nuggett Sydsport @ 25%	3.3
Fylking Nuggett Park @ 33%	3.7
Fylking Nuggett Merion Park @ 25%	4.0
Merion Nuggett Park @ 33%	4.3
Baron Nuggett Park @ 33%	4.3
Baron Pennstar Park Sodco @ 25%	4.3
Fylking Park Pennstar @ 33%	6.0

[2] Average of 3 replications

Fine Leafed Fescue Cultivar Evaluation-I (NRT)
Michigan State University
East Lansing
1968-1972
Area E-3

Cultivar	Fall Seedling Vigor (inches) 9/25/68	Seedling Appearance Fall 1968 (12)[1]	Spring Green up 1969 (3)	Leafspot Rating 1969 (3)	Appearance[2] 1969 (24)	1970 (24)	1971 (12)	1972 (6)	Wtd. Average (66)
C-26 Hard Fescue (NRT)	1.6	4.9	4.7	1.0	1.9	2.6	2.4	2.2	2.3
Erika (NRT)	1.6	3.6	4.0	1.0	2.2	3.3	2.0	2.1	2.5
Golfrood	1.6	3.7	4.7	3.0	2.5	2.7	2.7	1.5	2.5
Highlight (NRT)	2.1	3.0	3.7	2.7	2.3	3.1	2.6	1.8	2.6
Jamestown (NRT)	1.7	4.1	2.3	1.0	2.1	3.2	3.1	4.2	2.8
Arctared	1.8	3.1	4.7	2.0	3.3	3.1	2.2	1.5	2.9
Barfella Chewings	1.7	3.3	3.3	2.7	2.9	3.0	3.6	2.6	3.1
S-59	1.3	5.0	3.3	3.0	3.8	3.4	3.3	-	3.5
BL-127 Chewings	1.7	3.2	2.3	2.0	3.2	3.8	4.3	4.7	3.8
Tjelvar (NRT)	2.5	3.5	3.0	3.7	4.4	3.6	3.4	3.1	3.8
Pennlawn (NRT)	1.8	2.9	3.7	2.7	3.6	3.5	4.8	5.3	3.9
Cascade Chewings	2.2	3.2	3.0	2.3	3.9	3.9	4.4	5.4	4.1
Oasis (NRT)	1.7	4.5	3.3	2.7	4.0	3.8	4.6	4.8	4.0
Wintergreen (NRT)	1.7	4.3	4.7	2.0	3.8	4.0	4.5	5.2	4.1
Sceempter Chewings (NRT)	1.8	4.5	3.3	3.3	4.6	4.1	3.3	-	4.1
Ruby	2.3	3.2	4.0	3.0	4.2	4.2	4.4	3.2	4.2
Illahee	1.5	3.8	3.7	2.3	4.0	4.2	4.6	6.0	4.3
Common Chewings (NRT)	1.7	3.4	3.3	2.7	3.9	4.3	4.8	5.8	4.3
Boreal	2.3	3.6	2.3	2.7	4.8	4.3	4.3	3.8	4.4
Olds	2.1	2.8	3.3	3.0	5.4	4.7	5.0	4.8	5.0
Duraturf	1.3	5.5	-	-	6.5*	4.0*	-	-	6.0

1 No. in parenthesis are numbers of observations in the mean.

2 1 = excellent, 9 = poorest

Table 28.
Fine Leafed Fescue Cultivar Evaluations-II
Michigan State University
East Lansing
1968-1973
Area E-4

Cultivar	Fall Seedling Vigor (inches) 9/25/68	10/9/68	Seedling Appearance Fall 1968 (12)	Spring Green up 1969 (3)	Leafspot Rating 1969 (3)	Appearance 1969 (25)	1970 (24)	1971 (16)	1972 (6)	1973 (3)	Weighted Average (70)	Total Observations If Different From (70)
Dawson	1.1	1.7	5.2	4.3	1.3	1.9	2.9	2.3	1.5	2.3	2.3	
Oregon K	1.7	2.2	3.7	4.3	2.3	2.5	2.8	2.2	1.8	2.3	2.5	
MSU-63-FR	1.9	2.3	5.3	2.0	2.3	3.0	2.8	2.1	2.0	3.7	2.7	
Wintergreen (1964)	1.3	2.3	4.4	4.3	2.3	-	2.8	2.7	3.3	-	2.8	(34)
Brabantia	1.3	2.0	5.0	4.7	2.3	2.5	3.0	3.0	2.5	3.3	2.8	
Polar	1.3	1.7	7.5	2.7	2.3	2.6	3.7	2.6	2.3	1.7[1]	2.9	
Syn 1-64	1.7	2.7	4.3	3.3	2.0	3.1	3.1	3.2	1.3	-	3.0	(67)
Oregon D	1.9	2.7	3.3	5.0	2.0	3.1	3.3	3.1	3.8	2.7	3.2	
MSU-2-Fp	-	-	-	-	-	-	3.6	3.6	4.0	3.5	3.6	(49)
N2-65	2.0	2.7	4.1	4.0	2.3	3.6	3.6	3.7	3.5	4.0	3.6	
Reptans	2.3	3.7	3.0	2.3	3.3	4.5	3.5	3.3	2.2	4.0	3.6	
Bergere	2.0	2.3	4.0	4.0	4.0	5.6	2.8	2.5	-	-	3.9	(49)
MSU-13-Fe	2.3	3.3	3.3	2.3	4.0	3.9	4.1	3.8	3.3	2.7	3.9	
MSU-64-Fr	2.0	2.3	6.5	3.0	3.0	3.6	-	4.5	4.0	-	4.0	(39)
Sceempter	2.2	3.2	4.1	3.3	3.3	4.4	3.4	-	-	-	4.0	(33)
Rubin	1.8	2.8	4.6	2.7	3.7	4.8	4.1	3.8	3.7	4.7	4.3	
Bargena	1.0	2.0	7.0	2.0	3.0	4.6	4.4	4.0	4.5	5.0	4.5	(68)
MSU-1-Fp	-	-	-	-	-	-	4.4	4.4	5.5	2.0	4.5	(48)
Elco	2.5	2.5	4.0	2.5	3.5	4.3	4.6	-	-	1.5	4.5	(47)
MSU-65-Fr	1.8	2.0	7.0	3.0	2.0	4.6	-	-	-	-	4.6	
Rainier	2.0	2.2	3.6	2.5	4.0	4.7	4.7	4.4	4.5	6.5	4.7	
Steinacher	2.4	3.5	2.9	3.0	4.0	4.9	4.2	-	-	-	4.6	(33)
Cottage	1.6	2.2	3.9	5.7	4.8	4.5	5.1	-	-	2.0	4.7	(48)
Echo	2.7	3.8	2.3	3.3	4.7	5.2	5.0	5.5	4.0	3.7	5.0	

[1] 95% Bluegrass

Fine Leafed Fescue
Cultivar Evaluation III
Michigan State University
East Lansing

Area E5-b
1968-1973

Cultivar	Seedling Appearance Fall 1968 (6)*	Percent Cover 5/12/69 (3)	Leafspot Rating 1969 (3)	Appearance					Weighted Average (60)
				1969 (21)	1970 (21)	1971 (9)	1972 (6)	1973 (3)	
K8-149	2.7	78%	2.0	1.6	1.9	1.9	1.5	1.0	1.7
K8-151	2.4	87	2.7	1.7	2.5	2.3	1.8	3.0	2.1
K8-148	3.5	60	1.7	2.0	2.0	2.2	4.4	2.0	2.3
Pennlawn	2.2	75	3.0	2.8	4.2	4.1	3.8	3.7	3.6
K8-152	4.5	62	3.3	4.2	4.0	3.5	2.3	4.0	4.0
K8-147	6.0	7	4.0	3.3	5.0	4.3	4.3	2.7	4.3
Elco	4.0	60	2.7	4.8	5.8	5.2	5.2	4.3	5.3
Bargena	5.5	35	2.3	4.8	6.1	6.6	7.0	5.7	5.6
NFG	3.4	78	3.7	5.5	5.9	6.0	6.3	4.3	5.7
Bergere	4.0	57	3.7	5.5	6.1	6.3	5.2	5.7	5.9
Turf	5.0	29	3.7	5.1	6.7	6.7	6.0	5.0	6.0

*( ) = no. of observations in each average figure

Table 30. Kentucky Bluegrass Evaluations
Michigan State University
East Lansing
1972-1973
Area F3a

% Blend	% Snowmold 4/8/73 Avg.	Leafspot[2] 4/26/73 Avg.	Appearance[1] 4/26/73 Avg.
50 Merion 50 Newport	18%	2.0	2.3
50 Merion 50 Windsor	8	2.0	2.7
50 Merion 50 Park	28	2.7	3.3
33 Merion 33 Newport 33 Park	28	3.0	3.3
33 Merion 33 Park 33 Fylking	53	3.3	3.7
50 Merion 50 Fylking	41	3.0	4.0
33 Merion 33 Fylking 33 Windsor	47	4.7	4.0
50 Merion 50 Prato	84	6.3	5.3
33 Newport 33 Park 33 Fylking	91	7.3	6.0
33 Fylking 33 Windsor 33 Prato	98	8.3	7.3
33 Newport 33 Windsor 33 Prato	98	9.0	7.7

1 1 = best, 9 = poorest

2 1 = resistant, 9 = susceptible

Table 31. Bluegrass Cultivar Evaluations I
Michigan State University
East Lansing
1968-1973
Area F-4

Cultivar	Fall Seedling Vigor (Ins.) 1968	Seedling Appearance (6)[1]	Percent Cover 4/24/69 (3)	Spring Green up 1969 (3)	Spring Green up 1972 (3)	Spring Green up Avg. (6)	Leafspot Rating 1969 (3)	Leafspot Rating 1971 (3)	Leafspot Rating 1972 (3)	Leafspot Rating Avg. (9)	Snowmold % Infected 4/8/73 (9)	Appearance 1969 (21)	Appearance 1970 (24)	Appearance 1971 (15)	Appearance 1972 (6)	Appearance 1973 (3)	Weighted Average (69)
NJE P-56	.5	6.2	73%	1.2	3.3	2.3	1.0	1.0	1.0	1.0	7%	1.3	1.8	1.2	1.2	3.0	1.4
Nuggett	.7	3.7	92	2.4	5.3	3.9	1.0	3.0	1.0	1.7	5	1.9	1.9	2.5	1.4	1.3	2.0
NJE P-114	.7	5.9	88	1.2	3.0	2.1	1.7	1.7	3.0	3.2	5	1.8	2.4	1.8	2.1	2.3	2.0
Sodco	.5	5.2	82	1.2	4.3	2.7	1.0	3.0	3.3	2.4	15	1.9	2.8	2.1	1.2	4.0	2.2
Belturf	.7	3.7	92	1.0	4.3	2.7	1.0	3.0	6.7	3.6	95	1.9	2.7	2.4	2.2	5.3	2.3
A-34 (Warren 13)	.8	3.9	97	3.0	4.0	3.5	1.0	2.0	5.0	2.7	53	2.2	2.7	2.0	2.7	5.0	2.4
Merion	.5	5.0	73	3.0	2.0	2.5	2.3	1.7	3.7	2.6	15	2.3	2.5	2.8	2.4	3.0	2.5
WK-412 (Weibull's)	.7	3.5	98	1.5	2.7	2.1	1.0	2.0	4.3	2.4	23	2.3	2.8	2.5	1.3	7.3	2.6
Sydsport	.7	6.3	50	2.7	2.7	2.7	2.0	1.7	4.7	2.8	78	2.8	2.7	2.4	2.0	6.0	2.7
Ba 6124 (Scott's)	1.0	6.0	80	3.2	1.3	2.3	2.7	2.3	7.0	4.0	42	2.1	3.4	2.3	4.2	4.7	2.9
WK-411 (Weibull's)	.7	4.7	92	1.5	2.3	1.9	1.0	1.7	3.3	2.0	45	2.5	3.3	2.8	2.8	7.0	3.0
Pennstar	1.0	3.2	97	2.2	3.7	3.0	1.7	1.7	4.7	2.7	90	2.7	3.1	2.9	4.4	7.0	3.1
Fylking	1.0	3.0	97	2.3	3.7	3.0	1.3	2.7	6.0	3.3	75	2.9	3.1	3.3	4.3	7.3	3.4
Newport	1.3	3.9	93	3.7	4.3	4.0	2.3	3.3	5.7	3.8	62	2.3	3.8	3.9	3.5	5.3	3.4
K-107 (PSU)	.7	5.0	90	2.7	4.3	3.5	2.0	2.0	3.3	2.4	75	3.0	3.3	3.5	4.4	6.7	3.4
PPI (R. I.)	1.0	3.0	92	2.4	2.0	2.2	1.3	1.0	3.7	2.0	10	2.9	3.4	3.3	5.5	3.0	3.4
Primo	1.0	5.7	77	3.0	5.3	4.2	2.7	2.3	6.0	3.7	88	2.4	4.3	3.7	2.5	5.7	3.5
K-162 (PSU)	1.3	3.8	92	4.0	3.0	3.5	4.0	2.7	3.3	3.7	43	3.9	3.8	2.9	3.5	4.7	3.6
Cougar	.5	3.4	97	2.4	7.7	5.1	1.3	3.7	7.0	4.0	87	2.6	4.6	4.0	3.2	6.3	3.8
Campus	1.3	3.0	97	2.2	8.0	5.1	1.7	2.7	6.7	3.7	100	2.2	4.5	4.6	4.0	9.0	4.0
Prato	.8	3.4	88	2.4	8.7	5.6	2.0	3.0	6.0	3.7	97	3.3	4.2	4.1	3.0	8.3	4.0
Zwartberg	1.0	3.0	97	2.2	4.0	3.1	1.3	3.0	4.7	3.0	50	2.7	4.4	4.5	4.8	7.0	4.1
Arista	1.3	3.5	98	1.5	8.0	4.8	1.0	3.7	5.7	3.5	100	2.3	4.8	5.3	3.3	8.7	4.2
Windsor	1.2	3.0	95	3.9	3.0	3.5	4.0	3.3	6.3	4.4	40	3.9	4.5	4.1	3.7	5.7	4.2
Kenblue	1.2	2.7	92	4.0	4.3	4.2	3.0	3.7	8.7	5.1	83	3.4	5.3	4.3	4.4	7.0	4.5
Geary	1.7	2.5	100	4.7	4.3	4.5	4.0	4.0	9.0	5.7	87	3.7	5.2	4.2	5.0	7.0	4.6
Park	.5	6.0	67	4.9	6.0	5.5	4.0	4.0	9.0	5.7	63	4.0	4.8	4.8	5.7	7.3	4.7
S-21 (Jacklin)	1.7	3.4	97	5.2	6.3	5.8	4.0	4.0	9.0	5.7	72	3.9	5.3	5.1	4.5	7.0	4.8
WK-408 (Weibull's)	1.3	3.0	100	4.5	6.3	5.4	4.0	3.7	8.3	5.3	77	3.6	5.7	5.1	5.5	7.7	5.0
Minn-6	1.3	3.0	100	4.4	5.0	4.7	4.0	4.0	7.3	5.1	82	3.9	5.7	5.5	5.0	7.3	5.1
Delta	1.5	3.2	93	4.3	5.7	5.0	4.0	4.0	8.0	5.3	27	3.8	5.8	5.9	5.7	5.7	5.2
Palouse	1.7	2.2	98	4.7	5.7	5.2	4.3	4.0	8.7	5.6	52	4.3	5.9	5.0	6.5	6.0	5.2
South Dakota Cert.	1.2	3.0	90	4.5	5.0	4.8	4.0	4.3	9.0	5.8	47	4.9	7.0	6.6	6.2	6.0	6.2

[1] ( ) = no. of observations in average

Table 32.
Experimental Kentucky Bluegrass Evaluations
Michigan State University
East Lansing
1971-1973
Area F5-a

Cultivar	Percent Snowmold Infected 4/8/73 (3)	Appearance		Weighted Average (6)
		1972 (3)	1973 (3)	
EVB 307	18%	1.7	2.0	1.8
EVB 391	67	1.7	4.0	2.8
EVB 305	37	2.3	3.3	2.8
EVB 195	95	3.0	4.0	3.5
EVB 202	5	2.7	4.3	3.5
EVB 154	90	2.0	5.3	3.7
KO 173	95	2.3	5.3	3.8
EVB 118	98	2.3	7.0	4.7
KO 172	100	4.0	8.7	6.3

Table 33.
Experimental Fine Leafed Fescue Evaluation
Michigan State University
East Lansing
1973
Area F5b

Selection	Appearance 1973 Avg. (3)
Jamestown	1.7
Veddome	1.7
C-26	2.3
Wintergreen	3.3
E 5-5	3.3
E 8-2	3.7
Pennlawn	3.3
Ambaise	4.0
E 1-5	4.3
E 7-3	4.3
E 2-1	4.7
E 7-5	4.7
West 5F	5.0
E 1-3	5.0
West 7F	5.7
Blare @ 17 g.	6.3
Minuet (Fallox)	-
Chombard @ 16 g.	-

Table 34.
Shade-Bluegrass Cultivar Sod Evaluation[1]
Michigan State University
East Lansing

Cultivar	Appearance 4/26/73 Avg.
Merion	1.3*
	2.3**
Nugget	3.0
	3.3
Fylking	4.7
	5.0
Pennstar	5.0
	6.3
Windsor	4.0
	4.7
A-34	1.7
	1.3
Belturf	3.0
	4.3
Prato	6.3
	8.3
Newport	5.7
	7.0
Delta	5.3
	6.7
Park	5.7
	7.3
Kenblue	6.0
	6.3
Cougar	6.3
	6.0
Campus	7.3
	8.0
Captan	4.3
	6.7
Monopoly	2.0
	3.3
NJE-P27	3.3
	4.7
76 G22-986	2.3
	4.0
P_p-1	1.0
	1.3

* Upper reading is for treated area.
** Lower reading is for untreated area.

1 Sod of each variety transplanted from organic soil to Shade Research Area, September 1971. One half of each plot sprayed regularly for disease control through 1972.

Miscellaneous Cultivar Evaluations
Michigan State University
East Lansing, Michigan
1969-1972
Area F5-b

Cultivar	Fall Seedling Vigor (ht. in inches) 9/25/68	10/9/68	Seedling Appearance (9)*	Percent Cover 4/24/69 (3)	Spring Green up 1969 (3)	Leafspot Rating 1969 (3)	Appearance 1969 (21) **	1970 (18)	1971 (9)	1972 (3)	Wtd. Average
Crested Dogtail	1.0	2.0	3.0	100%	4.3	1.3	2.3	3.3	3.9	3.7	3.0
Evergreen Timothy	1.7	3.2	1.7	100%	6.3	3.0	3.5	3.2	3.5	2.3	3.4
Heidemij Timothy	1.5	2.3	1.7	100%	6.3	3.0	3.5	3.2	3.4	2.3	3.4
Career Sheep Fescue	1.0	1.2	6.3	83%	3.7	2.3	3.5	4.4	4.1	-	4.0
Redtop	.9	2.5	3.0	100%	2.7	2.3	3.8	4.3	4.7	5.3	4.2
Reton Redtop	-	-	-	95%	6.0	2.5	4.1	4.5	5.2	-	4.5
Barenza Sheep Fescue	1.1	1.7	2.8	100%	3.3	4.0	4.3	4.7	5.2	-	4.6
Nordan Crested Wheatgrass	3.0	4.0	2.0	97%	3.0	5.0	5.9	4.5	4.0	-	5.0
Common Canada Bluegrass	.9	1.3	4.8	97%	2.7	4.7	5.7	5.3	3.2	4.3	5.1
Draylor Upland Bluegrass	.9	1.5	3.9	85%	3.3	3.7	6.7	5.0	4.7	4.3	5.7
Fairway Std. Wheatgrass	2.2	4.0	1.7	90%	5.0	5.0	6.3	6.2	7.7	-	6.5
Cannon Canada Bluegrass	.9	1.5	3.7	100%	2.5	4.0	6.4	5.6	5.8	5.0	6.0
Durar Hard Fescue	2.2	2.8	2.5	100%	2.0	5.0	7.2	6.2	6.7	-	6.7

* ( ) = no. of observations in average
** 1 = best, 9 = poorest

Table 36. Bluegrass Cultivar Evaluations III
Michigan State University
East Lansing
1968-1973
Area G 3b

Cultivar	Fall Seedling Vigor (ht. in inches) 10/21/68	Seedling Appearance Oct. 1968 (6)	Percent Cover 4/24/69 (3)	Spring Green up 1969 (3)	Spring Green up 1972 (3)	Leafspot Rating (3)	% Snowmold infected 4/8/73	Appearance 1969 (21)	Appearance 1970 (18)	Appearance 1971 (12)	Appearance 1972 (6)	Appearance 1973 (3)	Wtd. Avg. (60)
NJE P-108 FS 170	1.2	2.8	95%	2.0	3.0	1.0	27%	1.6	2.7	2.4	2.1	1.0	2.1
NJE P-84 FS 191	1.3	3.7	90	1.0	3.0	1.0	20	2.3	2.6	1.9	2.5	3.7	2.4
NJE P-106 FS 293	1.5	4.3	87	2.3	3.3	1.0	5	2.2	2.9	2.2	2.4	2.7	2.5
NJE P-74 FS 313	1.0	5.4	77	1.3	1.7	2.0	7	2.2	2.8	2.5	2.1	4.7	2.5
NJE P-111 FG 480	1.0	5.0	90	1.3	3.0	1.0	30	2.0	3.1	2.5	2.3	3.3	2.5
NJE P-101 FS 301	1.5	3.4	98	1.0	2.0	1.0	5	2.4	2.5	2.6	2.4	2.0	2.5
NJE P-57 FS 48	1.3	4.7	92	3.0	5.0	2.0	90	2.7	3.3	1.8	2.3	3.3	2.7
FC-39071 (B 117-26-6)	.7	4.9	83	3.7	5.7	1.7	40	2.2	3.4	3.3	2.8	4.3	2.9
NJE P-72 FS 303	.8	5.7	73	1.3	3.0	1.0	5	2.4	3.6	2.8	3.0	2.7	2.9
NJE P-107-135	1.5	3.7	95	3.0	1.3	2.0	8	2.8	3.8	2.2	3.2	3.0	3.0
NJE P-44	1.0	4.8	83	1.3	3.7	1.7	20	2.5	3.4	3.6	2.3	5.0	3.1

Table 37. Kentucky Bluegrass Cultivar Evaluations, II
Michigan State University
East Lansing
1968-1973
Area G-4

Cultivar	Seedling vigor (ht. inches) 10/21/68	Seedling appearance[1] Fall 1968 (6)[2]	Percent cover 4/24/69	Spring color[1] 1969 (3)	Spring color[1] 1972 (3)	Spring color[1] Ave. (6)	Leafspot rating 1969 (3)	Leafspot rating 1971 (3)	Leafspot rating 1972 (3)	Snowmold % infected 4/8/73	Visual appearance rating[1] 1969 (21)	Visual appearance rating[1] 1970 (24)	Visual appearance rating[1] 1971 (15)	Visual appearance rating[1] 1972 (16)	Visual appearance rating[1] 1973 (3)	Weighted Average (79)
NJE P-69 (NRT)	1.3	4.3	88	1.5	3.3	2.4	1.0	1.0	2.7	5	1.8	2.4	1.9	2.0	3.3	2.1
Baron	1.0	3.4	98	1.7	3.0	2.4	1.7	1.3	4.0	67	2.1	2.3	1.9	2.3	6.0	2.2
NJE P-35 (NRT)	-	-	63	1.0	2.3	1.7	1.7	1.3	4.7	13	2.2	2.4	2.0	1.7	3.3	2.2
NJE P-5 (NRT)	-	-	60	1.4	2.7	2.1	1.0	1.0	1.7	10	1.8	2.7	2.1	2.5	2.7	2.2
NJE P-27	0.8	5.0	83	1.4	1.7	1.6	1.7	1.0	2.7	5	2.0	2.6	1.7	2.2	2.7	2.2
WK 412	1.3	3.8	93	2.4	4.3	3.4	1.7	1.0	1.0	5	2.3	2.9	2.5	2.0	1.0	2.5
Golf	1.0	3.5	97	2.7	2.7	2.7	2.3	2.0	5.3	58	2.0	2.8	2.9	2.0	5.3	2.6
A-20	-	-	-	-	3.7	3.7	-	1.3	2.0	10	-	2.9	2.0	1.5	2.0	2.6
K-103	1.5	2.7	100	2.7	2.0	2.4	2.0	1.3	4.0	5	2.6	2.8	2.2	3.3	3.3	2.6
NG-129	1.2	3.7	100	2.0	3.3	2.7	1.7	1.0	3.0	43	2.1	2.9	2.3	1.8	7.3	2.7
NJE P-115 (NRT)	1.2	4.7	83	2.7	2.7	2.7	2.7	1.0	4.0	7	2.5	3.0	2.1	2.5	5.0	2.7
K-106	0.8	4.2	97	2.9	4.3	3.6	2.0	1.7	5.3	92	2.6	3.0	2.6	2.3	4.3	2.9
NG-101	1.0	4.0	98	2.2	8.0	5.1	1.7	2.7	8.0	100	1.9	3.3	3.6	3.1	7.0	3.1
Spaths	-	-	92	2.7	7.0	4.9	2.7	3.0	6.7	97	2.3	3.6	3.9	5.3	8.7	3.4
A-10	-	-	-	-	3.7	3.7	-	3.0	8.3	87	-	3.2	3.1	3.6	6.3	3.4
Monopoly (59)	-	-	87	2.5	2.7	2.6	1.7	1.3	3.7	8	2.9	3.4	3.1	3.2	5.0	3.3
Sydsport	-	-	85	2.7	-	2.7	2.0	-	-	-	2.3	2.9	5.4	-	-	3.3
K-109	1.2	2.5	98	4.0	5.3	4.7	3.3	3.3	9.0	93	3.1	4.3	2.9	4.8	7.7	3.7
Silverblu	1.0	4.7	93	2.2	6.7	4.5	2.3	3.7	7.3	73	1.9	4.5	4.5	2.3	6.7	3.7
Captan	1.3	3.2	93	2.8	3.7	3.3	3.0	3.3	7.0	83	3.2	3.8	4.1	4.5	7.3	3.8
Delft	0.8	4.7	90	3.4	3.7	3.6	3.0	1.7	6.7	57	2.8	4.2	4.1	4.8	7.0	3.8
76 G22-986	1.3	3.0	100	3.4	4.0	3.7	3.3	4.0	8.7	88	3.0	4.7	3.5	4.3	8.0	4.0
Bar 643	1.8	3.3	97	3.3	7.3	5.3	2.7	3.0	7.7	85	2.6	4.6	5.4	5.2	7.3	4.2
Atlas	1.7	3.2	98	3.5	4.7	4.1	3.0	3.3	7.0	88	3.6	4.6	4.4	4.8	6.0	4.3
Hunsballe Soma	1.2	2.2	97	4.0	5.0	4.5	3.3	4.0	9.0	85	3.2	5.5	4.3	5.5	7.0	4.5
66 G22-982	1.7	2.0	100	4.5	6.3	5.4	4.3	4.0	9.0	93	3.2	5.2	5.0	5.5	7.0	4.6
Troy	1.8	3.5	97	3.7	5.3	4.5	4.3	4.0	8.3	80	4.1	5.3	4.4	4.5	6.0	4.7
Skandia II	2.0	2.1	100	4.7	5.3	5.0	4.7	3.7	7.0	87	3.5	6.1	4.8	5.3	4.7	4.9
Nike	1.8	2.9	100	4.0	-	4.0	4.3	-	-	-	3.7	6.0	5.7	-		5.1
Arboretum	1.3	3.3	93	4.0	-	4.0	4.6	-	-	-	3.7	5.7	6.4	-		5.2
Fusa	0.8	4.9	95	3.5	-	3.5	3.0	-	-	-	3.3	6.0	7.3	-		5.4
SK-46	1.5	3.8	93	4.7	-	4.7	4.7	-	-	-	3.7	6.0	7.3	-		5.5

[1] [2] 1 = best, 9 = poorest
( ) = no. of individual readings in average

[3] 1969 1971 1= no infection, 5=100% infection

[4] 1972 1 = no infection, 9 = 100% infection

Table 38. Ryegrass Cultivar Evaluations
Michigan State University
East Lansing
1968-1971
Area H-5

Variety or Selector	Fall Seedling Vigor (ht. in inches) 9/26/68	10/9/68	Seedling Appearance (9)	Spring Green up 1969 (3)	Leafspot[4] Rating 1969 (3)	Winter[2] Survival 4/22/71 (3)	Appearance[1] 1969 (18)	1970 (15)	1971 (12)	1972 (6)	1973 (3)	Weighted Average (54)
Manhattan	2.0	3.3	2.8	1.7	1.0	4.3	2.4	2.2	1.8	2.8	3.0	2.3
Syn O.	1.8	2.7	3.8	2.0	1.7	3.0	2.5	2.9	1.6	1.3	2.3	2.3
Norlea	2.0	2.8	3.2	3.3	1.7	3.0	2.7	3.5	2.8	5.0	4.3	3.2
Pelo	1.9	3.7	3.3	3.7	2.3	5.0	3.2	3.3	3.5	3.3	3.0	3.3
Combi	2.2	4.2	3.0	3.7	2.7	4.3	3.8	3.6	3.9	3.8	5.3	3.9
Brabantia	2.0	3.8	3.0	3.0	2.7	7.0	3.2	3.5	4.4	5.3	7.7	4.0
S-23	1.8	3.2	2.7	5.0	2.3	8.3	3.3	3.5	5.2	4.8	7.3	4.2
MSU (diploid)	2.3	4.0	2.2	4.0	3.3	4.3	4.3	4.0	3.7	4.5	4.3	4.2
Viris	2.3	4.2	3.2	3.7	3.0	6.7	3.7	4.1	5.2	5.0	6.0	4.4
Nr 42-34	2.0	4.2	3.1	4.0	3.3	6.0	4.1	4.1	4.8	4.7	5.7	4.4
Bocage	1.4	3.5	3.6	4.3	3.0	7.3	4.0	3.9	4.8	4.7	8.3	4.5
Sceempter	2.2	3.8	3.8	4.0	3.7	6.0	4.1	4.3	4.7	5.2	6.0	4.5
NK-100	1.9	3.7	3.1	2.7	2.3	8.0	4.0	4.3	5.5	5.8	8.3	4.9
Linn	2.0	3.5	3.0	3.0	3.0	8.7	4.3	4.4	7.7	5.3	8.7	5.4[3]
Ruania	1.7	3.3	3.4	4.0	2.0	9.0	3.6	4.9	8.6	-	-	5.4[3]
Ariki	2.3	4.2	3.4	4.3	4.0	9.0	4.7	5.2	9.0	-	-	6.0[3]
MSU (allotetraploid)	3.3	5.2	3.3	3.0	4.0	9.0	5.8	5.5	8.5	-	-	6.4[3]

Plant September 17, 1968

[1] 1 = best, 9 = poorest

[2] 1 = complete survival, 9 = complete kill

[3] tests concluded 1972 with 45 observations.

[4] 1 = resistant, 5 = susceptible

Tall Fescue Cultivar Evaluations
Michigan State University
East Lansing
1968-1970 and 1971-1972
Area H-5

Selection or Variety	Fall seedling vigor (hgt. in inches) 9/26	10/9	Seedling appearance Fall 1968 (9)	Spring Green up 1969	Percent cover 4/24/69 (3)	Appearance 1969 (18)	1970 (15)	Wtd. Average (33)
Kenwell	1.4	3.3	3.0	5.0	93	2.3	3.5	2.8
Kentucky 31	1.0	3.2	4.9	3.7	77	2.4	3.9	3.1
Fawn	1.7	3.5	3.2	3.7	95	2.5	3.9	3.1
Alta	1.6	3.5	4.1	3.7	77	2.5	4.2	3.3
Backafall	1.3	3.2	5.0	4.3	72	3.6	4.3	3.9
Syn A	1.9	2.0	6.3	3.7	40	3.9	4.5	4.2
MSU-5-FE	-	-	9.0	-	--	-	4.2	4.2
S 170*	-	2.0	7.3	-	--	-	4.8	4.8
Oregon B	.8	2.5	5.1	3.7	43	4.1	5.8	4.9
MSU-4-FE	.5	1.8	7.2	-	--	-	5.0	5.0

1971-1973

MSU Meadow Fescue						2.0	3.7	2.8
Mom. FA-2						4.0	3.0	3.5
Kentucky 31						4.7	4.0	4.3

Table 40. Sod Cultivar Study
Michigan State University
East Lansing
1971-1972
Organic Soil

Cultivar	Establishment Rating Percent Cover (3)[1]	Percent Snowmold Infected (3)	Appearance[2] 1971 (12)	Appearance[2] 1972 (9)	Wtd. Average (21)
NJE P-27 KB	94%	13%	2.4	2.4	2.4
Merion KB	93	23	2.6	2.3	2.5
Baron KB	95	10	2.7	2.8	2.7
Belturf KB	97	72	2.4	3.1	2.7
Sydsport KB	95	73	2.2	3.3	2.7
NJE P-84 KB	96	4	2.8	3.1	2.9
NJE P-135 KB	93	37	3.1	3.1	3.1
WW 412 KB	94	35	3.3	2.9	3.1
A-34 KB	97	28	3.0	3.4	3.2
EVB-154 KB	95	42	3.1	3.3	3.2
Newport KB	95	47	3.3	3.0	3.2
Nuggett KB	96	7	3.2	3.3	3.2
Fylking KB	95	48	3.2	3.4	3.3
EVB-118 KB	96	10	3.1	3.7	3.4
Pennstar KB	96	33	3.3	3.6	3.4
EVB-281 KB	94	27	4.0	2.9	3.5
K-107 KB	96	33	3.6	3.3	3.5
Kenblue KB	94	95	3.9	3.0	3.5
Monopoly-59 KB	97	7	3.6	3.3	3.5
NJE P-111 KB	95	23	3.8	3.2	3.5
Prato KB	95	100	2.8	4.5	3.5
Windsor KB	98	38	3.3	3.7	3.5
Primo KB	98	53	3.2	4.2	3.6
Cougar KB	97	82	3.2	4.3	3.7
EVB 202 KB	96	88	3.9	3.7	3.8
K-162 KB	93	83	4.5	3.1	3.9
86-G22 986 KB	97	62	3.3	4.9	4.0
Delta KB	95	23	4.1	4.2	4.1
Palouse KB	96	73	3.9	4.4	4.1
Park KB	98	75	3.6	4.9	4.2
96 G22-982 KB	91	30	4.5	4.4	4.5
Geary KB	96	82	4.3	4.9	4.6
S-21 KB	96	73	4.2	5.2	4.6
South Dakota Cert. KB	94	97	4.5	5.1	4.8
Atlas KB	96	83	5.3	4.7	5.0
Nike KB			4.7	6.2	5.3
Wintergreen RF	97	0	4.2	3.4	3.9
C-26 HF	97	3	5.4	2.8	4.3
Pennlawn RF	98	0	5.4	3.9	4.8
S-59 RF	97	5	4.6	5.4	3.9
Highlight RF	96	0	5.5	4.5	5.1

[1] ( ) = no. of observations in average

[2] 1 = best, 9 = poorest

Sod Cultivar Study
Michigan State University
East Lansing
1968-1971
Organic Soil

Cultivar	Fall Seedling Vigor (ht. in inches) 9/11/68 (3)	Establishment Rating Fall 1968 (6)	Visual Density Rating Fall 1968 (6)	Spring Green up 1969 (3)	Fall Color Rating 1969 (3)	Appearance			Wtd. Average (24)
						1969 (15)	1970 (6)	1971 (3)	
Nugget KB	.4	4.1	3.5	4.7	1.7	1.3	2.4	1.0	1.5
NJE P-27 KB	.5	4.4	5.4	2.7	1.3	1.8	1.9	2.0	1.8
Merion KB	.2	3.0	4.4	2.7	1.3	1.7	2.3	4.0	2.1
Fylking KB	.5	2.8	3.1	3.3	2.7	2.2	2.8	2.7	2.4
Pennstar KB	.5	3.8	4.0	3.3	2.0	2.3	2.8	2.7	2.5
Belturf KB	.4	4.0	4.5	3.0	1.0	1.9	2.6	5.3	2.5
A-34 KB	.3	3.4	4.2	4.0	3.3	2.4	2.2	4.7	2.6
PSU K107 KB	.5	3.8	3.3	3.3	2.3	2.8	-	3.0	2.8
Captan KB	.5	2.9	2.1	1.3	2.0	2.6	3.3	3.3	2.9
PP-1 KB	.5	2.0	2.9	3.3	2.0	2.7	3.7	3.3	3.0
Monopoly KB	.5	3.5	3.7	4.0	4.7	3.4	-	3.3	3.4
Newport KB	.5	3.0	3.5	5.0	4.3	3.2	3.0	6.0	3.5
Prato KB	-	7.4	8.5	2.0	2.7	2.9	3.7	7.3	3.6
Campus KB	-	5.9	6.2	4.3	2.3	3.5	4.2	4.3	3.8
Windsor KB	.5	2.6	3.1	3.0	3.3	3.4	4.0	6.3	3.9
Cougar KB	.3	3.6	3.9	4.3	2.7	3.1	5.4	8.7	4.4
76 G22-986 KB	.5	3.4	3.7	3.7	3.0	4.0	4.9	8.7	4.8
Delta KB	.6	1.9	2.9	4.3	4.3	5.1	4.5	7.3	5.2
Park KB	.7	1.9	2.5	3.7	4.3	5.1	6.0	7.7	5.6
Arboretum KB	.5	2.9	3.2	4.0	4.7	4.8	7.0	8.3	5.8
Kenblue KB	.6	3.0	2.8	4.0	4.0	6.1	5.6	7.0	6.1
South Dak. Cert. KB	.5	2.5	3.4	3.3	3.3	5.7	7.7	8.0	6.5
Jamestown RF	.8	2.2	1.4	1.3	2.3	2.4	-	3.3	2.6
S-59 RF	.8	3.4	3.3	7.0	4.7	2.5	-	7.3	3.3
Pennlawn	1.2	1.3	1.0	3.3	4.0	4.0	-	3.7	3.9

Table 42. Sod Cultivar Study
Michigan State University
East Lansing
1969-1972
Organic Soil

Cultivar	Appearance[1] 1970 (6)[2]	1971 (12)	1972 (9)	Weighted Average (27)
Nugget KB	2.0	1.2	1.7	1.5
Merion KB	1.7	1.7	1.7	1.7
NJE P-84 KB	1.4	1.7	2.0	1.7
NJE P-27 KB	1.8	1.9	2.1	1.9
Sodco KB	2.8	2.0	2.8	2.4
A-34 KB	2.3	2.8	2.2	2.5
Baron KB	2.2	1.9	3.5	2.5
Sydsport KB	1.7	2.8	2.6	2.5
PP-1 KB	2.5	2.5	3.2	2.7
Pennstar KB	2.7	2.6	3.3	2.9
K-107 KB	3.0	3.0	3.7	3.2
Monopoly (59) KB	3.4	3.5	2.9	3.3
Belturf KB	1.9	3.7	3.9	3.4
Captan KB	2.9	3.6	3.8	3.5
Windsor KB	3.4	3.6	3.9	3.7
Adorno KB	4.9	3.3	3.8	3.8
Campus KB	2.7	3.4	5.0	3.8
Fylking KB	3.0	3.9	4.6	3.9
Primo KB	3.2	3.4	5.0	3.9
Delft KB	2.5	4.1	5.2	4.1
Park KB	3.4	3.4	5.5	4.1
Aristo KB	2.5	4.3	5.8	4.4
Newport KB	3.0	4.9	5.0	4.5
Cougar KB	2.7	4.8	6.0	4.7
Delta KB	4.5	3.9	6.4	4.9
Kenblue KB	3.2	5.6	5.2	4.9
Prato KB	2.5	4.7	6.7	4.9
Palouse KB	3.8	4.3	6.7	5.0
76 G222-986 KB	3.8	5.7	5.2	5.1
Atlas KB	6.4	4.7	4.8	5.1
Nike KB	4.0	4.3	7.0	5.1
Geary KB	4.2	4.5	6.9	5.2
S-21 KB	4.0	4.2	7.2	5.2
South Dakota Cert. KB	4.8	4.5	6.5	5.2
Skandia II KB	4.2	5.1	7.0	5.5
S-59 RF	2.9	3.6	3.7	3.5
Wintergreen RF	3.7	4.0	2.9	3.6
Pennlawn RF	3.2	4.4	3.6	3.9
Highlight RF	5.2	4.3	3.8	4.3
C-26 HF	7.7	4.2	5.1	5.3

[1] 1 = best, 9 = poorest

[2] ( ) = no. of observations in the average

Table 43. Northern Miscellaneous Cultivar Evaluations
Michigan State University
Traverse City
1970-1972

Cultivar (Perennial ryegrass)	Percent Winter Survival 5/9/72	Appearance[1] 1970 (6)[2]	1971 (3)	1972 (2)	Wtd. Average (11)
Manhattan PR	50%	2.0	2.5	2.0	2.1
Norlea PR	80	3.3	2.0	2.5	2.8
Combi PR	38	3.3	2.5	3.0	3.0
S-23 PR	12	3.5	2.0	3.8	3.1
Bocage PR	55	3.3	2.5	3.8	3.2
Brabantia PR	12	3.7	2.5	3.0	3.2
Pelo PR	45	3.5	3.0	3.0	3.3
Persistenta PR	12	3.0	3.0	4.7	3.3
Ruanui PR	0	3.3	2.0	6.5	3.5
Viris PR	18	3.8	2.5	4.3	3.5
NK-100 PR	4	3.5	3.0	5.5	3.7
MSU (diploid) PR	35	4.5	2.5	3.5	3.8
Linn PR	10	4.0	3.0	4.8	3.9
Sceempter PR	18	4.0	4.0	3.8	4.0
Ariki PR	0	4.5	2.5	6.5	4.3
(Miscellaneous Cultivars) Not Measured					
Kentucky 31 tall fescue	"	3.8	1.5	2.0	2.4
Kenwell tall fescue	"	3.8	1.5	2.3	2.6
Alta tall fescue	"	3.5	2.5	2.3	2.9
Backafall tall fescue	"	3.3	2.0	3.3	3.0
Oregon B tall fescue	"	5.8	4.0	3.7	4.9
Crested dogtail	"	3.0	2.0	5.3	3.1
Evergreen timothy	"	5.8	3.0	2.3	4.4
Heidemj timothy	"	5.5	3.5	2.3	4.4
Redtop	"	6.0	2.0	3.3	4.4
Barenza sheep fescue	"	4.5	5.5	5.8	5.0
Common Canada Bluegrass	"	5.8	5.0	3.8	5.2
Draylor Upland Bluegrass	"	6.8	3.5	3.0	5.2
Canon Canada Bluegrass Durar hard fescue	"	5.5	5.5	6.5	5.7

[1] 1 = best, 9 = poorest

[2] ( ) = no. of observations in average

Table 44. Northern Bluegrass Cultivar Evaluations
Michigan State University
Traverse City
1969-1973

Cultivar	Percentage Snowmold Infected		Appearance[1]			Wtd. Average
	1971 (3)[2]	1972 (3)	1970 (6)	1971 (3)	1972 (6)	(15)
Adorno	13%	15%	1.0	2.0	1.5	1.4
A-20	55	33	1.2	1.0	1.8	1.4
NJE P-27	42	17	2.3	1.7	1.6	1.9
A-34 (Warren)	83	63	2.0	2.0	2.0	2.0
A-10 (Warren)	70	50	1.0	2.7	2.8	2.1
PP-I	68	27	2.7	1.7	2.0	2.2
Southport	83	68	2.2	1.3	3.2	2.4
Campus	88	73	2.2	1.3	3.4	2.5
Baron	52	23	2.5	2.3	2.5	2.5
Merion	70	23	2.3	3.3	2.2	2.5
Fylking	87	50	2.5	1.7	2.8	2.5
Monopoly (59)	23	5	3.2	2.7	2.2	2.7
NJE P-111	52	22	3.2	2.0	2.5	2.7
Belturf	80	70	3.0	2.3	2.6	2.7
NJE P-57	62	40	2.9	1.3	3.2	2.7
WK-411	75	27	2.9	1.7	3.2	2.8
NJE P-106	40	22	3.7	2.7	2.0	2.8
Nuggett	72	42	2.5	1.0	4.2	2.9
Sodco	60	15	4.0	2.0	2.6	3.0
Adelphi (NJE P-69)	47	25	3.2	3.0	2.7	3.0
NJE P-35	62	13	3.7	3.0	2.5	3.1
K-107	87	60	3.3	2.3	3.2	3.1
Arista	85	57	3.2	1.0	4.0	3.1
Pennstar	88	30	2.5	2.3	4.4	3.2
NJE P-56	62	8	3.9	2.3	3.0	3.2
NJE P-114	38	5	3.9	2.3	2.8	3.2
66-G22-982	77	60	3.4	2.3	3.8	3.3
Cougar	65	83	3.2	2.3	4.0	3.3
Captan	70	40	2.7	3.0	4.0	3.3
Prato	93	92	2.9	1.7	4.6	3.4
Primo	55	32	2.7	3.3	4.5	3.5
76 G22-986	57	55	2.9	3.0	4.5	3.6
Zwartberg	63	18	3.2	3.7	4.0	3.6
Newport	77	57	3.2	3.0	4.6	3.7
NJE P-5	30	12	4.7	3.0	3.3	3.8
K-162	85	60	3.5	4.7	3.8	3.9
SK-46	72	93	3.0	3.0	5.2	3.9
Windsor	82	40	3.5	4.7	4.2	4.0
Troy	83	87	4.0	3.3	4.4	4.0
Palouse	80	83	3.5	3.7	4.7	4.0
Kenblue	83	83	3.0	3.0	5.4	4.0
Delta	63	55	3.2	4.0	5.0	4.1
Minn 6	87	93	2.8	3.3	5.8	4.1
Ba 6124	60	23	3.7	4.7	4.5	4.2
S-21	85	92	3.3	3.7	5.3	4.2

continued

continued
Table 44.

Arboretum	85	92	3.2	3.0	5.9	4.3
Nike	80	85	3.7	4.0	5.4	4.4
Park	70	77	3.5	4.0	5.4	4.4
WK-408	80	92	3.5	4.0	5.5	4.4
Bar 643	93	77	4.0	2.3	6.0	4.5
Atlas	65	90	3.9	5.0	5.4	4.7
Hunsballe Soma	80	72	4.7	3.3	5.5	4.7
Geary	78	93	3.5	4.3	6.0	4.7
Delft	65	57	4.0	4.3	5.7	4.8
Skandia II	85	97	3.9	4.3	6.0	4.8
South Dakota Cert.	90	98	4.2	5.3	7.4	5.7

[1] 1 = best, 9 = poorest

[2] ( ) = no. of observations in average

Table 45. Northern Red Fescue Cultivar Evaluations
Michigan State University
Traverse City
1970-1972

Cultivar	Appearance[1] 1970 (6)	1971 (3)	1972 (9)	Wtd. Average (18)
Menuet (Fallax)	1.5	1.0	1.7	1.3
Oregon K	1.4	1.0	3.0	2.1
Arctared	2.7	2.0	2.2	2.3
C-26 (Biljart)	2.0	1.3	3.0	2.4
Dawson	2.7	1.0	3.0	2.6
Pennlawn	3.0	1.3	2.8	2.6
BL-127 Chewings	2.5	-	2.8	2.7
Sceempter	2.9	2.3	2.7	2.7
Golfrood	2.2	3.3	3.0	2.8
Barfella Chewings	3.7	2.0	2.7	2.9
Illahee	2.5	2.3	3.3	2.9
Sceempter Chewings	2.9	2.3	3.1	2.9
Boreal	3.5	2.0	3.0	3.0
Brabantia	3.2	1.3	3.5	3.0
Tjelvar	3.2	1.7	3.2	3.0
Jamestown	2.7	2.0	3.8	3.1
N_2-65 (Ruby)	3.3	2.7	3.2	3.1
Duraturf	4.0	2.7	3.0	3.3
Oregon D	4.2	2.0	3.2	3.3
Ranier	4.0	2.3	3.2	3.3
Oasis	3.4	3.3	3.4	3.4
Reptans	3.3	2.7	3.6	3.4
S-59	3.7	3.0	3.4	3.4
Steinacher*	3.5	3.0	3.4	3.4
Erika	4.4	4.0	2.7	3.5
Wintergreen	3.2	2.0	4.3	3.5
Highlight	3.8	2.7	3.6	3.5
Bargena	3.7	2.7	3.8	3.6
Ruby	3.7	3.3	3.7	3.6
Rubin	3.2	3.0	4.3	3.7
Cascade Chewings	4.2	3.3	3.9	3.9
Echo	4.2	3.0	3.9	3.9
Common Chewings	4.9	3.7	3.8	4.2
Rapid (Nr 42-8)	5.2	3.7	4.2	4.4
Olds	4.2	3.7	4.9	4.5
Cottage	4.2	5.3	7.6	6.0

[1] 1 = best, 9 = poorest

[2] ( ) = no. of observations in average

* 95% Poa trivialis