

## REPORT OF GRASS AND LEGUME INVESTIGATIONS 1959 CROP SEASON

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1951 Grass Plots. The 1951 grass plots were not cut this year. Work with these plots has been terminated. Most of the plots have become badly mixed with crested wheatgrass. The Russian wildrye and the green stipagrace plots are an exception to this. Stands of these two grasses are still as good as the stands of crested wheatgrass. Lincoln bromegrass stands also remain in fairly good shape, although crested wheatgrass has infiltrated these stands to some extent.

The usefulness of the plots for comparative purposes is now largely over, and the work with them was terminated at the end of the 1958 season. The results of the studies with these plots are being summarized for publication.

Intermediate - pubescent wheatgrass plots. The 1959 hay yields from the intermediate and pubescent wheatgrass plots seeded in 1954 are given in [Table 2](#). [Table 3](#) gives the average yields of the varieties in this trial over the 5-year period, 1955-59. The 1959 yields given in [Table 1](#) show the composition of the yield in terms of the seeded grass, other grass which invaded the plots, and weeds. These data indicate that there has been some deterioration in stand since 1958, with appreciable invasion of other grass, mainly crested wheatgrass, as well as broadleaved weeds. Up to the time of the 1958 clippings there had been no appreciable stand deterioration in these plots.

The data of [Table 1](#) show that in the dry 1959 season pubescent wheatgrass, Ree wheatgrass (intermediate), and Nebraska 50 (intermediate) actually produced the highest grass yields, although North Dakota pubescent and North Dakota intermediate produced high plot yields. Weeds averaged from one-tenth to one-half the plot yields in the 1959 season.

The average plot production for all varieties in 1959 ([Table 2](#)) was 1439 lbs. per acre dry-weight. This is the lowest average yield since 1956. All varieties produced over half a ton, with most varieties producing approximately 3/4 ton per acre. Part of this plot yield was made up of weeds. In general the intermediate wheatgrass strains seem to be more productive than the pubescent wheatgrass strains, as shown by the average yields for the 5-year period. However, in the 1959 season pubescent wheatgrass had the highest yield of seeded grass of any of the strains ([Table 1](#)) additional data obtained over the next few years may change the picture in regard to pubescent wheatgrass in this trial. The results from the 1959 clippings show that North Dakota intermediate, M-2-10820 intermediate, and A-12496 intermediate have begun to show considerable stand deterioration.

Uniform Bromegrass Nursery. The hay yields from the 14 strains of bromegrass in the uniform bromegrass nursery are given in [Table 3](#).

The period of the trial covers from 1954-59. The plots were accidentally cut in 1956 before yield plots were harvested, so no data are available for that year.

The average yield for all varieties was 1252 lbs. per acre. This is slightly better than the average yield for all varieties of intermediate wheatgrass in the new variety trial of this species ([Table 4](#)). The range in yield was from 1452 lbs. per acre for commercial crested to 789 lbs. per acre for Turkish Fairway. Commercial crested, Nordan crested, and commercial Fairway produced about the same yield, the range here being only from 1425 to 1452 lbs. per acre.

The only variety which seemed to show low vigor and general lack of adaptation was Turkish Fairway. As previously indicated, part of the low vigor of the stands of this variety may have been due to poor seed.

New Station Grass and Mixture Trial. [Table 6](#) gives the 1959 yields from the new Station trial seeded in the spring of 1958. A similar trial is being carried on at several of the branch stations and at the main station at Fargo. This trial was seeded on ground which had been in corn for one year followed by a year of fallow. Despite the relatively favorable type of seedbed the stands obtained have not been uniform, and some of the plots are not yet fully established. The generally high yields from this seeding as compared the results obtained from the other new seedings are a reflection of the year of row crop followed by a year of fallow which preceded the seeding.

While the results of the first year's yield harvest do not justify any conclusions, they do not seem to indicate the high vigor of young stands of intermediate wheatgrass. The mixtures of intermediate and alfalfa and intermediate wheatgrass alone are the high-yielding plots in the trial. The data of [Table 6](#) show that alfalfa did not make much direct contribution to the yield of the intermediate-alfalfa plots, and the yield of these mixtures was about the same as the yield of the grass by itself. The production of about 1 ½ tons of hay per acre by the intermediate-alfalfa mixtures and intermediate alone is the highest production obtained from any of the plots in any of the trials during the dry 1959 season.

The average production of all grass and alfalfa mixtures was 2297 lbs. per acre. The average production of all straight grass plots was 2215 lbs. per acre. Thus the overall contribution of alfalfa to increased yields of the mixtures was relatively small in the 1959 season. However, the data do show that alfalfa did make up an appreciable portion of the yields from the mixtures with the various bromes and Russian wildrye.

Alfalfa Yield Plots. The alfalfa plots, including both the series seeded in 1952 and in 1954, winterkilled almost completely during the 1958-59 winter. The only variety which showed substantial survival was Medicago falcata. All plots of this yellow-flowered species showed almost complete survival. It is doubtful whether the cold had much actual effect on the killing of the alfalfa varieties, but the combination of dry soil, scanty snow cover, and deep freezing apparently was too severe even for such well-adapted varieties as Ladak and Cossack.

The alfalfa plots were plowed up in the summer of 1959, and a new trial will be seeded this coming year.

## INFLUENCE OF NITROGEN FERTILIZER ON FORAGE PRODUCTION

## OF OLD CRESTED WHEATGRASS STANDS

Plots Fertilized Every Year. Hay yields from plots fertilized every year with ammonium nitrate are given in [Table 7](#). This trial was begun in 1955, and five years' data are available. The treatments include check, 25 lbs. nitrogen per acre, 50 lbs., and 100 lbs. In these trials the nitrogen fertilizer has been applied early in the spring.

In the 1959 season additional forage was produced on the fertilized plots, but apparently the 50 lbs. and the 100 lbs. rate were injurious because yields from these plots were lower than from the 25 lb. plots. The dry 1959 season was extremely unfavorable for grass response to fertilizer, and growth on the fertilized plots was very irregular. It should be pointed out that in each of the 5 years of the trial the spring period has been dry, and conditions have not been favorable for securing maximum utilization by the grass of the applied fertilizer nitrogen.

The results to date with these trials indicate that fertilization with 25 lbs. of nitrogen per acre annually would be profitable based on the extra yield of hay and prices of 10¢ per pound for nitrogen and 1¢ per pound for hay. The additional increments of nitrogen have been unprofitable, the average production of hay with 50 lbs. of nitrogen actually being less than the production with 25 lbs. the production with 100 lbs. of nitrogen has been only slightly better than production with 25 lbs.

The crude protein content (Nx6.25) of the crested wheatgrass hay samples from the check and fertilized plots is given in [Table 8](#). In [Table 9](#) the production of crude protein from the plots is given in pounds per acre. This evaluation involves both the protein content, as given in [Table 8](#), and the plot production as given in [Table 7](#). The data of [Table 8](#) and [Table 9](#) show that the applications of nitrogen fertilizer produced substantial increases in the protein content of the forage and in protein production per acre. Again the increase in protein obtained with the first 25 lbs. of nitrogen per acre is the most economical response and has resulted in an average increase from 100 lbs. crude protein per acre for the check, to 184 lbs. per acre for the plots receiving 25 lbs. of nitrogen.

Plots Fertilized Every Other Year. The hay yields from the plots fertilized every other year are given in Table 10. Those plots are fertilized in the spring, and the rates of application are the same as for the plots fertilized annually. Fertilizer was applied in the 1957 and in the 1959 seasons. The data obtained so far in this study indicate that there is very little carry-over from the 25 and the 50 lb. rates of fertilization, and only relatively little carry-over from the 100 lb. rate. Additional data will be needed before legitimate comparisons can be made between the practices of fertilizing annually and every other year. The indications so far are that results obtained from fertilizing every other year are not quite as good as the results obtained from fertilizing every year on the basis of the use of equal amounts of nitrogen over a 2-year period.

## NITROGEN FERTILIZER ON TAME GRASS COMPARED WITH GRASS ALONE AND GRASS ALFALFA MIXTURES

Hay clippings were made for the second consecutive year in the new trial to determine the value of three rates of nitrogen fertilization as contrasted to the value of using alfalfa as a source of nitrogen for tame grasses. Pasture-type clippings were made with a rotary lawn mower in this trial for the first time this year. The yields from the hay clippings are given in [Table 11](#) and [Table 12](#), and the pasture clipping

yields in [Table 13](#).

In this trial four grasses, Nordan crested wheatgrass, intermediate wheatgrass, Lincoln brome, and Russian wildrye, are grown alone, mixed with Ladak alfalfa, and in plots fertilized with 33 lbs. of nitrogen, 67 lbs., and 100 lbs. of nitrogen per acre. Fertilizer applications were made in the fall of 1958. Fertilizer was not applied in the fall of 1959, but will be applied early in the spring in 1960.

The hay yields from this trial, given in [Table 11](#) show that alfalfa in the mixture resulted in increased yields of all four grasses this year, despite the dry season. With intermediate wheatgrass and Lincoln brome increases in yield obtained with the use of alfalfa in the grass mixture. In the case of Nordan crested and Russian wildrye production with the fertilizer was somewhat better than production with alfalfa. However, even here the 67 lb. rate on Nordan crested produced less than did the grass-alfalfa mixture.

In most cases amounts of nitrogen over 33 lbs. per acre did not produce additional increases in hay yields. Fertilizer applications in excess of 33 lbs. per acre were definitely uneconomical on the basis of increased returns, and it is questionable whether the 33 lb. rate was economical in the 1959 season.

The data on the pasture clippings given in [Table 13](#) are interesting, although, they represent only one year's results. It is apparent that only small increases in yield were obtained with nitrogen fertilizer over the increases obtained with the use of alfalfa in the mixture. All rates of nitrogen fertilizer did increase yields over the check yields, but as in the case of the hay yields the increases were not economical on the basis of yield alone.

The data of [Table 11](#) and [Table 13](#) show that with the exception of Russian wildrye the hay yields of the grasses are substantially greater than are the yields from pasture clippings. With Russian wildrye hay yields are only slightly greater than pasture yields. A larger proportion of the total yield was obtained from the second clipping with Russian wildrye than was the case with the other grasses. With this grass the influence of the fertilizer was to increase the proportion of the yield produced in the first clipping.

## **SWEETCLOVER YIELD PLOTS**

### **North Central Sweetclover Nursery**

Data on the conditions of the sweetclover varieties and the yields from the plots are given in [Table 14](#). In [Table 15](#) the average yields for the period 1954-59 are given. It should be noted that in this latter summary table no data are given for 1956. The 1956 stands (seeded in 1955) were lost, and no yield data are available for that season. The 1959 nursery was seeded on summer fallow in the spring of 1958. Stands were rather thin and development slow. Part of the plots were in unsatisfactory condition in 1959 and were not harvested.

Cutting of the plots in the 1959 season was delayed somewhat in the hope that rain would be received to promote additional growth. Consequently bloom was well advanced for most varieties at the time of cutting. Evergreen, however, was only about 1/4-bloom when cut on July 20 ([Table 14](#)). It was necessary to cut this variety at that time in order to prevent excessive leaf loss. Madrid and common yellow

were in full bloom when cut on July 1 and averaged about 24" in height. Goldtop was cut on July 9 at 3/4-bloom and averaged 38" in height, which is a height comparable to the heights attained by the white varieties.

As in the past the white varieties in general were higher producing than the yellow varieties. Spanish was the highest yielder, producing 2.06 tons per acre, with Evergreen next at 1.99 tons. The average yield of all varieties, 1.77 tons per acre, was very good considering the dryness of the season. This was the second highest average yield in the period 1954-59 ([Table 15](#)).

### SUDANGRASS YIELD TRIAL

A small sudangrass yield trial was seeded on June 29, 1959 from seed supplied by Dr. Paul Sandal. The 13 varieties included in the trial were seeded in 20 foot rows spaced 3 ½ feet apart. Three replicates were seeded. The trial was seeded on summer fallow, and the rows were kept clean-cultivated until harvest. The height of the varieties at the time of cutting and the average yield for the three replicates is given in [Table 16](#).

All varieties except sweet sudangrass were cut on August 29, at which time they were mainly fully headed, with many in late anthesis. Sweet sudangrass was not fully headed on August 29, so it was not cut until later. Sweet sudangrass was cut on September 15 when it was in mid-anthesis.

The varieties made an excellent growth during the season, but the late moisture was inadequate to promote maximum production. The average yield of all varieties was 1314 lbs. per acre (oven-dry weight). Piper seemed to be definitely better in over-all production than the other varieties, averaging 1825 lbs. per acre, as against 1493 lbs. for ND 77-11, the next highest producer.

### SPRING GRAZING TRIAL

The pastures in the spring grazing trial were grazed for the fifth season this year. Yearling steers were on the pastures from May 8 to June 29, a period of 52 days. This year, as last year, the crested wheatgrass pastures were stocked with 6 steers each, while the crested-alfalfa pastures were stocked with 8 steers each.

[Table 17](#) summarizes the pasture yields and forage utilization on the pastures in the 1959 season. This year Pasture 1 was fertilized with 50 lbs. of nitrogen (150 lbs. 33-0-3) on April 16. The fertilization resulted in increased yield on Pasture 1 as shown in [Table 17](#). On the basis of past yields Pasture 1 would not be likely to yield more than Pasture 3, so that the increase in yield was at least 212 lbs. per acre. Additional animals were not available for use on the pasture, so the additional yield is reflected in the larger amount of forage left on the ground at the end of the grazing period.

The average production of the two crested wheatgrass pastures was 1046 lbs. per acre (dry-weight), and the grazing animals consumed an average of 713 lbs. of forage per acre, leaving on the ground at the end of the grazing period 206 lbs. of material per acre. This consumption represents an average utilization of 68.2 percent. Utilization was noticeably less heavy on Pasture 1 than on Pasture 3.

The production on the crested-alfalfa pastures averaged 1110 lbs. per acre. The animals consumed 870 lbs. of material per acre and left on the ground at the end of the grazing period 240 lbs. per acre. Utilization on these pastures was thus 78.4 percent. The two crested-alfalfa pastures were uniformly heavily grazed.

Considering the averages of both sets of pastures the crested alfalfa pastures produced 6 percent more forage than the crested wheatgrass pastures and carried a 33 percent heavier grazing load. If pasture 3 is considered alone in comparison with the two crested alfalfa pastures, the difference in production is 18 percent. The percentage of alfalfa in the crested-alfalfa pastures is now very low, but the influence of the alfalfa on yield is still apparent.

[Table 18](#) summarizes the yield and forage consumption data for the 5-year period of the study. On the basis of the 5-year averages the crested-alfalfa pastures have produced 29.2 percent more forage than the straight crested wheatgrass pastures, and the yearling steers have consumed 29.6 percent more forage on the crested-alfalfa pastures than on straight crested pastures.

[Table 19](#) summarizes the animal data obtained during the 1959 season in the spring grazing trial. This year the steers on the crested wheatgrass pastures gained an average of 138 lbs. per head during the 52 days on pasture, with an average daily gain per head of 2.64 lbs. The steers on the crested-alfalfa pastures gained an average of 113 lbs. in the 52-day period, with an average daily gain of 2.17 lbs. per head.

The average gains per acre this year were 103.2 lbs. for the crested pastures and 1125 lbs. for the crested-alfalfa pastures. The data given in Table 20 summarizing the results of the 5-year trial show that on the crested wheatgrass pastures the per acre gains were the best next to those of 1957 during the period. However the per acre gains on the crested-alfalfa pastures were the lowest in the past 3 years. The average results for the 5-year period clearly show the superiority of the crested-alfalfa pastures over the straight crested pastures in the production of lbs. of beef per acre. Over the 5-year-period of the trial the crested alfalfa pastures have produced 37.1 percent more beef per acre than the crested pastures.

## PERSONAL ACTIVITIES

### Correspondence

- Twenty-eight (28) letters were written in the conduct of business relating to the Dickinson Station.

### Radio programs and TV shows

- Radio programs participated in since last January 1, are as follows:

January 8, 1959	Hay yields (recording)
March 19, 1959	Grass seeding (recording)
April 16, 1959	Nitrogen of grass
June 25, 1959	Intermediate wheatgrass
July 23, 1959	Range yields
August 20, 1959	Nitrogen on crested
November 9, 1959	Fertilizing grass
December 10, 1959	Spring grazing trial

- TV programs since last January 1

March 16, 1959	KDIX with County Agent
July 20, 1959	KDIX with County Agent

- Public Meetings

Date	Meeting	Attendance	Participation
2/6/59	Veterinarian Short Course	27	1 hr. on Poisonous plants
3/21/59	Sandhills Grazing Ass'n.	75	30 min. on range improvements
6/24/59	Dickinson Crops Field Day	250	Half day of tours
7/7/59	DSTC Conservation Class	40	1 hr. on grassland agriculture
7/10/59	Am. Society of Range Management	45	Results of field studies
7/10/59	N.S.F. Summer Institute Tour	75	1 hr. on grass in N. Dak.
10/30/59	Fertilizer Dealers Conference	130	20 min of grass fertilization
9/12/59	Livestock Research Roundup	1100	15 min. on grasses & fertilizers

- Scientific conferences

Date	Meeting	Attendance	Participation
1/27-30/59	American Society of Range Manage. Tulsa, Oklahoma	530	Attended sessions
2/3-4/59	Soil & Water Cons. seminars, Mandan & Minot	150	30 min. on fertilizing grass
3/3/59	Plant Science Seminar	31	1 hr. on poisonous plants
5/1/59	N. D. Acad. Of Science, Minot	60	15 min. paper on native grass yields
7/30-31/59	American Society of Range Management, Gunnison, Colorado	115	Attended sessions
11/19-20/59	GP-6 Range Research Committee, Denver, Colorado	13	Prepare range research project

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**Table 1.** Composition of 1959 yields from intermediate-pubescent wheatgrass plots seeded in 1954.

Variety	Composition of Yield			Total Plot production - lbs./acre
	Grass	Other grass	Weeds	
Pubescent wheatgrass	1194	144	143	1481
Ree wheatgrass	1178		333	1511
Nebraska 50	1119	118	111	1348
N. Dak. Pubescent	1004	303	273	1580
N. Dak. intermediate	952	145	393	1490
M-2-10820	945	16	474	1435
A-12496	865	166	200	1231
Average	1037	127	275	1439

**Table 2.** Hay yields from intermediate - pubescent wheatgrass yield plots seeded in 1954.

Variety	Oven-dry weight - lbs./acre					5-year average yield
	1955	1956	1957	1958	1959	
Ree wheatgrass	3419	1484	2332	1815	1511	2112
Nebraska 50	3299	1296	2200	1879	1348	2004
M-2-10820	2724	1329	2290	2006	1435	1957
N. Dak. intermediate	2839	1385	2214	1735	1490	1933
Pubescent whtgr.	3131	1355	1979	1494	1481	1888
N. Dak. Pubescent	2580	1308	1905	1794	1580	1833
A - 12496	2647	1409	2017	1449	1231	1751
Average	2948	1367	2134	1739	1439	1925

**Table 3.** Hay yields from uniform bromegrass nursery seeded in 1953.

Variety	Oven - dry weight - lbs. per acre						5-year average
	1954	1955	1956	1957	1958	1959	
Lincoln	1606	1498		1459	1260	906	1346
Fischer	1637	1414		1408	1239	849	1308
Elsberry	1190	1548		1537	1184	952	1282
Okla. Synthetic	1363	1426		1614	1190	789	1276
Achenbach	1702	1463		1318	1159	734	1275
Bin 12	1289	1326		1380	1206	1007	1242
Lancaster	1275	1476		1397	1142	864	1231
Lyon	1380	1511		1417	1140	707	1231
Kuhl	1334	1352		1486	1107	704	1197
Martin	1247	1335		1160	1179	951	1174
Mandan 404	1261	1359		1226	1069	865	1156
Homesteader	1214	1433		1319	1099	677	1148
Manchar	1241	1478		1132	1126	746	1145
Canadian com.	1122	1287		1095	920	774	1040
Average	1347	1421		1353	1144	823	1218

**Table 4.** Hay yields from intermediate wheatgrass variety plots seeded in 1958.

Variety	Dry weight - lbs./acre		Total plot yield - lbs. per acre
	Seeded grass	Weeds	
South Dakota 20	1273	9	1282
Ree wheatgrass	1268		1268
Idaho #3	1200	7	1207
Greenar	1165	22	1187
Nebraska 50	1129	22	1151
N. Dak. intermediate	1139	5	1144
Amur A-13046	1138	4	1142
Idaho #4	1041	3	1044
A-12496	831	29	860
Average	1132	11	1143

**Table 6.** Hay yields from station grass and mixture trial seeded in 1958.

Mixtures and varieties	Dry weight yield - lbs. per acre				Total plot yield lbs./acre
	Grass	Alfalfa	Volunteer clover	Weeds	
Intermediate whtgr. Teton alfalfa	3118	22		4	3144
Intermediate whtgr. Ladak alfalfa	2710	46		62	2818
Nordan crested-Teton alfalfa	1946	577		13	2536
Lincoln brome - Nordan crested-Ladak alfalfa	1873	509	16	49	2447
Lincoln brome-Teton alfalfa	872	1341		116	2329
Manchar brome-Ladak alfalfa	1857	252	3	15	2127
Lincoln brome-Ladak alfalfa	744	919	32	476	2171
Russian wildrye 2355-Teton alfalfa	915	499		35	1449
Russian wildrye 2355- Ladak alfalfa	827	500	184	142	1653
Intermediate Whtgr. (N.50)	2853			12	2865
Summit crested	2622		10	21	2653
Lincoln brome grass	2410			149	2559
Nordan crested	2346		8	10	2364
Southland brome	2327		4	13	2344
Northern brome	2317		3	4	2324
Manchar brome	2272			60	2332
Slender wheatgrass	1857		39	41	1937
Russian wildrye (com.)	1617		8	79	1404
Russian wildrye (2355)	1268		5	95	1368

**Table 7.** Forage production from old crested wheatgrass plots fertilized annually with ammonium nitrate (33-0-0).

Year	Dry weight yield - lbs./acre				Percentage increase over check		
	Check	25# N	50# N	100# N	25# N	50# N	100# N
1955	1276	2096	2121	2494	64.3	66.2	95.4
1956	612	751	763	670	22.7	24.7	9.5
1957	1356	2117	2064	2174	56.1	52.2	60.3
1958	1224	1679	1839	1993	37.0	50.2	62.8
1959	1116	1451	1284	1206	30.0	15.1	8.1
5 - yr. average	1117	1619	1614	1707	44.9	44.5	52.8

**Table 8.** Crude protein content of crested wheatgrass hay from plots fertilized annually with ammonium nitrate (33-0-0).

Treatment	Crude protein - percent				
	1955	1956	1957	1958	4-year average
Check (No N)	7.7	10.5	9.1	9.3	9.2
Very light (25# N)	8.3	15.4	12.5	10.8	11.8
Light (50# N)	8.3	17.2	14.2	11.4	12.1
Medium (100# N)	9.8	17.8	14.5	13.1	13.8

**Table 9.** Per acre production of crude protein from crested wheatgrass plots fertilized annually with ammonium nitrate (33-0-0).

Treatment	Crude protein - lbs. per acre				4-year average
	1955	1956	1957	1958	
Check (No N)	98	64	123	114	100
Very light (25# N)	174	116	265	181	184
Light (50# N)	176	131	293	210	203
Medium (100# N)	244	119	315	261	235



**Table 11.** Hay yields from grasses in pure stands, in mixture with alfalfa, and in pure stands fertilized at three different rates 1958-1959.

Grass Variety	Year	Dry weight - lbs./acre				
		Grass alone	With alfalfa	33# N	67# N	100# N
Nordan crested	1958	1809	1647	1832	2491	2724
Intermediate Whtgr.	1958	1729	1706	1992	2466	2714
Lincoln brome	1958	1461	1818	2205	2459	2342
Russian wildrye	1958	941	1111	1224	1613	1984
Nordan crested	1959	1416	1827	2120	1737	2011
Intermediate Whtgr.	1959	1033	1372	1244	1468	1325
Lincoln brome	1959	936	1465	1630	1421	1279
Russian wildrye	1959	778	841	975	971	1086

**Table 12.** Two-year (1958-59) average hay yields from grasses in pure stands, in mixture with alfalfa, and in pure stands fertilized with nitrogen at three different rates.

Grass Variety	Dry weight yield - lbs./acre				
	Grass alone	With alfalfa	33# N	67# N	100# N
Nordan crested	1613	1737	1976	2114	2368
Intermediate whtgr.	1381	1539	1618	1967	2020
Lincoln brome	1199	1642	1918	1940	1811
Russian wildrye	860	976	1100	1292	1535

**Table 13.** Dry weight yields (lbs. per acre) from pasture-type clippings of grasses grown alone, with alfalfa, and with three rates of nitrogen fertilizer - 1959 season.

Variety	Grass alone			With alfalfa			33# N			67# N			100# N		
	1st clip	2nd clip	Total	1st clip	2nd clip	Total	1st clip	2nd clip	Total	1st clip	2nd clip	Total	1st clip	2nd clip	Total
Nordan crested	530	261	791	865	276	1141	831	208	1039	936	323	1259	851	289	1140
Intermediate whtgr.	497	328	825	499	402	901	581	353	934	537	428	965	551	529	1080
Russian wildrye	284	406	690	273	428	701	433	415	848	453	463	916	444	462	906
Lincoln brome	401	273	674	513	285	798	462	251	713	445	270	715	573	437	1010

**Table 14.** Condition at time of cutting and yield of sweetclover varieties in the North Central Sweetclover Nursery Trial - 1959.

Variety	Date of cutting	Height at cutting inches	Estimated stage of bloom*	Yield tons per acre
Spanish	7/9/59	39"	50%	2.06
Evergreen	7/20/59	36"	25%	1.99
Common white	7/9/59	34"	60%	1.91
Goldtop	7/9/59	38"	75%	1.90
Madrid	7/1/59	24"	100%	1.50
Common yellow	7/1/56	23"	100%	1.24
Average		32"		1.77

\*100% = full bloom.

**Table 15.** Average forage yields from North Central Sweetclover Nursery. (Seed supplied by Dr. Paul Sandal, Dept. of Agronomy, N.D.A.C.)

Variety	Dry weight yield - tons per acre					
	1954	1955	1957	1958	1959	Average
Evergreen	1.77	1.78	1.94	1.86	1.99	1.87
A - 46	1.93	1.82				1.87
S - 65	1.96	1.65				1.80
Goldtop (A-46/S-65)	1.94*	1.73*	1.76	1.25	1.90	1.72
Spanish	1.64	1.42		1.77	2.06	1.72
Common white		1.46	1.44	1.77	1.91	1.65
Madrid	1.86	1.47	1.43	1.35	1.50	1.52
Common yellow		1.77	1.32	1.11	1.24	1.36
Williamette			1.31			1.31
	1.85	1.64	1.53	1.52	1.77	

\*Average of A-46 and S-65.

**Table 16.** Height and yield of sudangrass varieties grown in 42" cultivated rows - 1959 season.

Variety	Average Height inches	Dry weight* lbs. per acre
Piper	42	1825
ND 77-11	42	1493
ND 77-7	43	1410
ND 520-10	36	1410
ND 85-1	44	1410
ND 26-8	44	1327
Sweet	38	1327
ND 77-4	39	1327
ND 5-3	41	1327
ND 90-7	41	1161
ND 4-7	42	1078
ND 56-4	40	1078
ND 26-2	39	912
Average	41	1314

\*Field samples consisting of 5' rows were weighed to the nearest 0.1 lb.

**Table 17.** Forage produced on pastures and forage utilized by yearling steers in the spring grazing trial in the 1959 season.

<b>Pasture No.</b>	<b>Pasture vegetation</b>	<b>Forage produced lbs./acre</b>	<b>Forage utilized lbs./acre</b>	<b>Forage left on ground lbs./acre</b>
1	Crested wheatgrass*	1152	667	485
3	Crested wheatgrass	940	759	181
	Average-pastures 1 &3	1046	713	333
2	Crested wheatgrass and alfalfa	1041	919	122
4	Crested wheatgrass and alfalfa	1179	822	357
	Average-pastures 2 & 4	1110	870	240

\*50 lbs. of nitrogen per acre applied to pasture 1 on April 16, 1959.

**Table 18.** Five-year summary of forage produced and utilized on spring grazing trial pastures at Dickinson Experiment Station.

<b>Pasture Nos.</b>	<b>Pasture type</b>	<b>Year</b>	<b>Forage produced lbs./acre</b>	<b>Forage utilized lbs./acre</b>	<b>Forage left on ground lbs./acre</b>
1 & 3	Crested wheatgrass	1955	962	817	145
1 & 3	Crested wheatgrass	1956	743	556	187
1 & 3	Crested wheatgrass	1957	1046	827	219
1 & 3	Crested wheatgrass	1958	902	756	146
1 & 3	Crested wheatgrass	1959	1046	713	333
	5 - year average		940	734	206
2 & 4	Crested-alfalfa	1955	1429	969	460
2 & 4	Crested-alfalfa	1956	1020	756	264
2 & 4	Crested-alfalfa	1957	1415	1231	184
2 & 4	Crested-alfalfa	1958	1102	930	172
2 & 4	Crested-alfalfa	1959	1110	870	240
	5 - year average		1215	951	264



**Table 19.** Spring grazing trial: Performance of yearling steers on crested wheatgrass and crested wheatgrass-alfalfa pastures during spring grazing period from May 8 to June 29, 1959.

Pasture No.	Type of pasture	No. of steers	Acres per pasture	Days on pasture	Average initial weight per steer	Average final weight per steer	Average seasonal gain per head	Average daily gain per head	Gain per acre
1	Crested whtgr.	6	8	52	528	661	133	2.56	99.8
3	Crested whtgr.	6	8	52	529	671	142	2.73	106.5
	Average 1 & 3	6	8	52	528	666	138	2.64	103.2
2	Crested-alfalfa	6	8	52	524	641	117	2.25	117.0
4	Crested-alfalfa	6	8	52	523	631	108	2.08	108.0
	Average 2 & 4	6	8	52	523	636	113	2.17	112.5