

MISCELLANEOUS REPORT 24
REVISED DECEMBER 1968



*Varietal
Trials*
OF FARM CROPS

Agricultural Experiment Station
University of Minnesota

VARIETAL TRIALS OF FARM CROPS

Successful crop production depends to a considerable extent on selecting the best varieties for a particular farm.

To provide a basis for the selection of varieties, the Minnesota Agricultural Experiment Station compares varieties in trial plots. These trials are conducted on the Agricultural Experiment Stations at St. Paul, Rosemount, Waseca, Lamberton, Morris, Crookston, and Grand Rapids, and on farmers' fields.

Recommended varieties, important old varieties, and new varieties are grown in replicated plots at each location. These plots are handled so that the factors affecting yield and other characteristics are as nearly the same for all varieties at each location as is possible.

On the basis of results from these comparative trials, the list of varieties recommended for use in Minnesota is revised each year by the Experiment Station Crop Variety Review Committee.

Data for varieties not included in all trials averaged within a table have been adjusted so that averages of varieties tested for different numbers of years can be compared directly.

For most crops, varieties are arranged in order of "recommended varieties," "varieties not adequately tested," and "other varieties;" and in alphabetical order within each group.

Recommended varieties have performed better than other varieties in important characteristics in comparative tests. A variety usually is not eligible for recommendation until it has been tested in Minnesota for at least 3 years. New varieties developed in other states or countries but not sufficiently evaluated here are listed as "not adequately tested." Information now available regarding these varieties is presented but no conclusions are drawn regarding their suitability under Minnesota conditions.

Varieties listed in the "other varieties" category are usually inferior in one or more characteristics, as demonstrated in comparative tests.

The use of certified seed of recommended varieties is recommended. Varieties eligible for certification by the Minnesota Crop Improvement Association include varieties recommended by the Minnesota Agricultural Experiment Station, certain new varieties not adequately tested in Minnesota, and certain nonrecommended varieties. Certification does not imply recommendation of a variety.

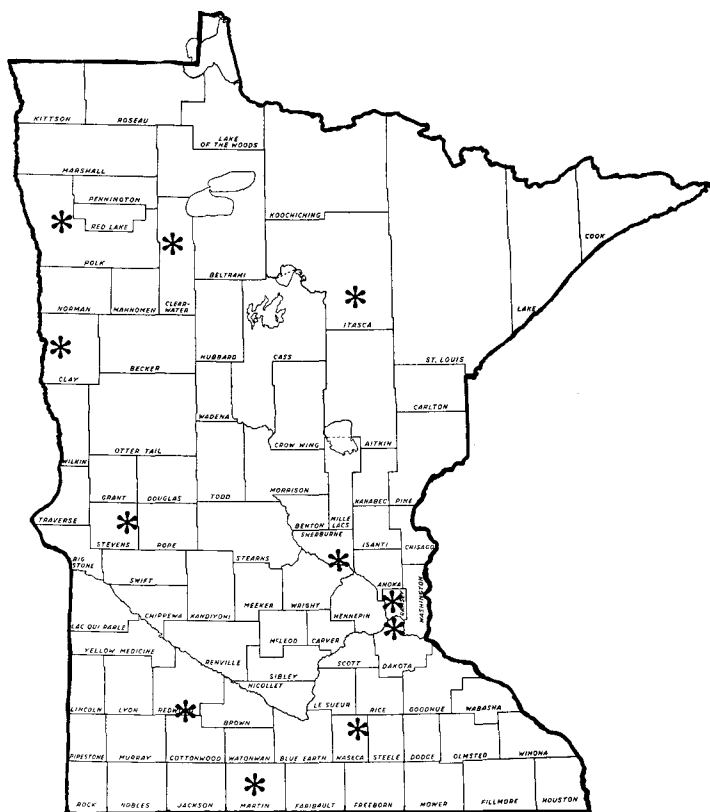
Registered and certified seed of most varieties described in this report can be purchased from seed dealers or from growers listed in the Minnesota Registered and Certified Seed Directory for 1969 Planting. This annual publication can be obtained without charge from the Minnesota Crop Improvement Association, St. Paul, Minnesota 55101, or from county agricultural agents' offices.

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Field work of the variety trials at Waseca, Lamberton, Morris, Crookston, and Grand Rapids was supervised by W. E. Lueschen, W. W. Nelson, S. D. Evans, J. R. Lofgren, and R. H. Anderson, respectively.

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30M — 12-68

1968 varietal trials were conducted at these locations.

BARLEY

RECOMMENDED VARIETIES

Conquest — Six-rowed, smooth-awned, blue aleurone variety. Long rachilla hairs. High yield, good standing ability. Highly resistant to loose smut and stem rust. A malting variety. Developed at Brandon, Manitoba, Canada.

Dickson — Six-rowed, rough-awned, colorless aleurone variety. Short rachilla hairs. High yield, good standing ability. Has resistance to prevalent leaf spotting diseases and stem rust. Kernel plumpness inferior to Larker. Yields more than Larker when planted late. A malting variety. Developed at North Dakota State University from a cross involving Traill, Kindred, and CI 7117-77.

Larker — Six-rowed, semi-smooth awned, colorless aleurone variety. Long rachilla hairs. High yield, good standing ability, and excellent kernel plumpness. A malting variety. Originated at North Dakota State University from the cross Traill x a selection from U. M. 570.

VARIETIES NOT ADEQUATELY TESTED

Primus — Six-rowed, smooth-awned, colorless aleurone variety. Long rachilla hairs. Good kernel plumpness. Resistant to stem rust, but susceptible to leaf spotting diseases. Early maturing. Malting quality status undetermined. Developed at the South Dakota Agricultural Experiment Station from the cross Brandon 3902 x Liberty 2x Swan.

OTHER VARIETIES

Kindred — Six-rowed, rough-awned, colorless aleurone variety. Short rachilla hairs. Low yield and highly susceptible to lodging. A malting variety. Selected by a farmer, S. T. Lykken of Kindred, North Dakota.

Parkland — Six-rowed, smooth-awned, blue aleurone variety. Long rachilla hairs. Inferior to Conquest in yield and standing ability. A malting variety. Originated in Canada from a cross of (Ollie x Montcalm) x Brandon 1136.

Traill — Six-rowed, rough-awned, colorless aleurone variety. Short rachilla hairs. Has good standing ability and high yield. Tends to produce low percentage of plump kernels. A malting variety. Developed at North Dakota State University from a cross of Kindred x Titan.

Trophy — Six-rowed, rough-awned, colorless aleurone variety. Long rachilla hairs. Good kernel plumpness. Stands well and is medium in yield. A malting variety. Developed at North Dakota State University from the cross Traill x a selection from U. M. 570.



Conquest — The newest addition to the list of recommended barley varieties.

Table 1. Yield in bushels per acre of Dickson and Larker when planted early and late at Crookston

Variety	Early planting			Late planting		
	1965	1966	Average	1965	1966	Average
Larker	76	46	61	38	22	30
Dickson	79	47	63	56	31	43

Table 2. Yield of barley varieties in bushels per acre, 1963-68

Variety	No. of trials:	Morris	Crookston	St. Paul	Rosemount	Lamberton	Average of 31 trials
		9	8	7	4	3	
Dickson		58	62	49	59	68	58
Larker		58	60	50	59	61	57
Conquest		61	55	54	60	66	58
Parkland		58	54	47	49	58	53
LSD (5%)		4	5	4	4	6	2

Table 3. Yield of barley varieties in bushels per acre, 1966-68

Variety	No. of trials:	Morris	Crookston	St. Paul	Rosemount	Average of 14 trials
		5	4	3	2	
Dickson		53	63	72	67	62
Larker		54	64	59	66	60
Primus		52	62	82	62	63
LSD (5%)		5	6	8	7	3

Table 4. Characteristics of barley varieties

Variety	Date of heading (June)	Height (inches)	Lodging score*	Plump kernels† (percent)	Disease Reaction‡		
					Stem rust	Leaf spotting	Loose smut
Dickson	26	32	3.5	48	R	R	S
Larker	24	33	4.6	72	R	S	S
Primus	20	34	4.5	71	R	S	S
Conquest	26	39	3.5	59	R	S	R
Parkland	27	37	4.0	58	R	S	S

* 1 erect, 9 flat.

‡ R = resistant, S = susceptible.

† Held on 6/64" x 3/4" screen.



Foundation seed field being inspected by agronomist D. D. Stuthman and Minnesota Crop Improvement Association manager, W. H. Marshall.

OATS

RECOMMENDED VARIETIES

Garland — Midseason, good yield, short, fair straw strength, good test weight. Susceptible to crown rust. Selected at the Wisconsin Agricultural Experiment Station from the cross Clintland 3x Garry 2x Hawkeye x Victoria.

Lodi — Late, tall, excellent standing ability and yield, good test weight. Some resistance to crown rust. Developed in Wisconsin from Richland x Bond 3x Garry 2x Hawkeye x Victoria.

Portal — Midseason to late, excellent yield, moderately tall, fair straw strength, good test weight. Some resistance to crown rust. Selected from the cross P. I. 174544 x Garland at the Wisconsin Agricultural Experiment Station.

VARIETIES NOT ADEQUATELY TESTED

E 68 — Early, good yield, short, good straw strength and test weight. Heterogeneous crown rust reaction. Multi-line variety, the recurrent parent is a selection from the Iowa Agricultural Experiment Station.

Kelsey — Late, good yield, moderately tall, fair straw strength, poor test weight. Some crown rust resistance. Selected in Canada from the cross Victoria 2x Hajira x Banner 3x Roxton 4x Beacon 5x Rodney.

M 68 — Midseason, excellent yield, medium height, good straw strength and test weight. Heterogeneous crown rust reaction. The recurrent parent of this multi-line variety is Clintland 64. The variety was developed by the Iowa Agricultural Experiment Station.

Table 5. Yields of oat varieties in bushels per acre; varieties arranged in order of maturity from early to late

Variety	Years grown	Rose mount	Waseca	Morris	Crookston*	Grand Rapids	Average†	Lamberton‡
Dawn	1966-7-8	78	91	74	58	73	75	99
Jaycee	1966-7-8	75	81	76	59	72	72	91
Minhafer	1967-8	88	89	65	53	66	72	77
Tippecanoe	1966-7-8	72	74	74	46	66	66	71
Wyndmere	1966-7-8	82	85	87	72	75	80	85
Andrew	1966-7-8	80	77	72	60	71	72	83
E 68	1967-8	75	100	76§	—	—	—	89
Garland	1966-7-8	76	80	83	75	71	77	82
M 68	1967-8	91	101	86	47	75	80	101
O'Brien	1966-7-8	77	82	79	55	71	73	73
Holden	1966-7-8	77	88	87	78	77	81	83
Orbit	1966-7-8	88	99	94	90	76	89	102
Portal	1966-7-8	88	91	87	77	78	84	94
Stormont	1966-7-8	77	89	79	69	77	78	92
Sioux	1967-8	82	97	105	96	88	94	93
Kelsey	1967-8	83	93	102	97	72	90	98
Lodi	1966-7-8	82	90	96	82	81	86	95
Harmon	1967-8	71	73	88	96	76	81	74
LSD (5%)		6	8	8	8	6	3	9

* 1966 and 1968.

† State average does not include Lamberton.

‡ 1967.

§ 1968.

Sioux — Late, excellent yield, medium height, poor straw strength and test weight. Susceptible to crown rust. Selected in Canada from the cross Garry x Rex.

OTHER VARIETIES

Clintland 64 — Midseason, good yield, medium height, good test weight and straw strength. Some resistance to crown rust. A Clintland derivative released from the Purdue Agricultural Experiment Station.

Dawn — Early, good yield, tall, good test weight, poor straw strength. Susceptible to crown rust. Developed and released by the North Dakota Agricultural Experiment Station from a cross involving several lines.

Garry — Late, good yield, tall, good test weight, fair straw strength. Susceptible to crown rust. Developed in Canada from a cross of Victory 2x² Hajira x Banner.

Harmon — Late, fair yield, tall, poor straw strength, poor test weight. Susceptible to crown rust. Selected in Canada from the cross Victoria 2x Hajira x Banner 3x Roxton 4x Beacon 5x Rodney.

Holden — Midseason, good yield and test weight, medium height, good straw strength. Susceptible to crown rust. Developed in Wisconsin from the same cross as Garland to which it is similar.

Jaycee — Early, good yield, short, good test weight, poor straw strength. Susceptible to crown rust. Released by the Illinois Agricultural Experiment Station from the cross Clintland 3x Garry 2x Hawkeye x Victoria 4x Putman.

Minhafer — Early, good yield, test weight and straw strength. Only variety with some resistance to the most prevalent race (6AF) of oat stem rust. Some resistance to crown rust. Developed at the

Minnesota Agricultural Experiment Station from a cross of Landhafer 3x Bond x Rainbow 2x Hajira x Joannette.

O'Brien — Early, poor yield and straw strength, medium height, good test weight. Susceptible to crown rust. Selected at the Iowa Experiment Station from the cross Victoria 2x Hajira x Banner 3x Victory x Hajira 4x Roxton 5x Clintland.

Orbit — Midseason to late, excellent yield, good straw strength, poor test weight. Small resistance to crown rust. Developed by the New York Agricultural Experiment Station from the cross Alamo 4x Garry (Sel. 5) 3x Goodwin 2x Victoria x Rainbow.

Portage — Midseason to late, high yield, tall, good test weight, fair straw strength. Some resistance to crown rust. Developed at the Wisconsin Agricultural Experiment Station from a cross of Ajax 2x Hawkeye x Victoria.

Rodney — Late, good yield, tall, fair straw strength and test weight. Developed in Canada from a cross Victoria 2x Hajira x Banner 3x Victory x Hajira 4x Roxton.

Stormont — Midseason to late, fair yield, poor test weight, excellent straw strength. Susceptible to crown rust. Developed from the cross Shield 2x Garry x Klein by the Canada Department of Agriculture.

Tippecanoe — Early, poor yield, short, good straw strength. Susceptible to crown rust. Released from Purdue Agricultural Experiment Station from a cross of Clintland 60 x Mo. 0-205 2x Clintland 60.

Wyndmere — Early, excellent yield, good test weight, poor straw strength. Susceptible to crown rust. Developed by the North Dakota Agricultural Experiment Station from a cross of Ajax x Ransom.

Table 6. Characteristics of oat varieties, 1966-68 and reactions to disease, 1968

Variety	Heading date	Lodging* score	Height (inches)	Test weight (pounds)	Groats† (percent)	Reactions to diseases‡			
						Stem Rust§	Crown Rust	Smut	Red Leaf Virus
Dawn	6-23	5.9	41	32	73	S	S	MR-S	MS
Jaycee	6-23	6.0	32	32	69	S	S	R	R
Minhafer	6-23	3.9	38	32	71	MS	MS	R	MR
Tippecanoe	6-23	4.6	35	30	70	S	S	R-S	S
Wyndmere	6-23	5.6	39	32	74	S	S	MR	MS
Andrew	6-24	6.1	38	31	75	S	S	R	R
E 68**	6-24	2.7	35	35	74	S	S-R	R-S	S
Garland	6-25	5.7	35	32	74	S	S	R	MS
M 68***	6-25	3.8	38	33	76	S	S-R	R-S	R
O'Brien	6-25	6.1	39	32	76	S	S	R	MS
Holden	6-27	4.3	36	32	71	S	S	R	S
Orbit	6-27	4.6	36	29	69	S	S-MS	R-MS	MS
Portal	6-27	4.6	40	32	74	S	MS	R	S
Stormont	6-27	2.6	37	29	68	S	S	R	MS
Sioux***	6-30	6.1	38	29	71	S	S	R	MR
Kelsey***	7-1	4.6	40	29	70	S	MS	R	R
Lodi	7-2	3.7	43	32	73	S	MS	R-MS	S
Harmon ***	7-2	5.6	43	28	69	S	S	R	MR

* 1 = standing, 9 = flat.

† Groats percentage data for 1968 only. This may be more important than test weight; however, the two characters are positively correlated.

‡ R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

§ Race 6AF has been the most prevalent stem rust race in Minnesota the past 4 years. Nearly all oat varieties grown in Minnesota are susceptible to 6AF. The variety Minhafer, has been moderately resistant to 6AF in tests at St. Paul.

** Rosemount, 1967-68; Waseca, 1967; and Morris, 1968.

*** 1967, 1968.

WINTER RYE

Spring rye varieties are not recommended because they yield much less than recommended winter ryes.

RECOMMENDED VARIETIES

Frontier — High yield, very winterhardy, medium maturity, tall. Poor resistance to lodging. Small seed, predominantly blue-gray in color, high bushel weight. Developed by the Swift Current, Saskatchewan, Experimental Farm from a cross of Dakold 23 x Petkus. Seed distributed by Canada Department of Agriculture in 1965.

Pearl — High yield, fair winterhardiness, late maturity, tall. Medium-size seed of brown and green color and medium bushel weight. Obtained from Canada Department of Agriculture Experi-

mental Farm, Swift Current, Saskatchewan, under the name Pearl, and thought to originate from seed imported from Denmark about 1952.

Von Lochow — High yield, fair to poor winterhardiness, late maturity, medium height. Very good resistance to lodging. Large seed, predominantly green in color, and high in bushel weight. Obtained from F. von Lochow-Petkus Ltd. of Germany.

VARIETIES NOT ADEQUATELY TESTED

Cougar — High yield, winterhardy, late maturity, medium height. Very good resistance to lodging. Small seed of green and tan color, low bushel weight. Originated by the University of Manitoba from an open-pollinated selection in a composite cross

of European and Canadian varieties. Named and released in Canada in the fall of 1967.

OTHER VARIETIES

Antelope — Appears identical to Caribou, its sister selection, except it has yielded less in Minnesota. Released by the University of Saskatchewan in 1952.

Caribou — Medium yield, very winterhardy, medium maturity, tall. Small seed, somewhat mixed in color, medium bushel weight.

A Crown rye selection obtained from the University of Saskatchewan in 1949. Named and released by the University of Minnesota in 1953.

Elk — High yield, fair winterhardness, late maturity, tall. Medium-size seed, predominantly green in color, medium bushel weight. Originated from a small lot of seed obtained in 1953 from the Cereal Crops Division, Canada Department of Agriculture. Named and released by the University of Minnesota in 1959.



Field day visitors at Waseca view winter rye plots.

Table 7. Yields of winter rye varieties in bushels per acre

Variety	Rosemount 1965-68	Waseca 1966-68	Lamberton 1966-67	Morris 1966-68	Grand Rapids 1966-68	Average of 5 locations
Frontier	41	58	44	56	72	54
Pearl	39	63	35	55	77	54
Von Lochow	36	63	36	54	80	54
Caribou	36	52	38	47	61	47
Elk	36	60	33	51	75	51
LSD (5%)	3	6	13	5	6	3
Cougar*	43	66	—	58	75	57

* 1967-68 at Rosemount; 1968 at other locations.

Table 8. Characteristics of winter rye varieties, 1965-68

Variety	Winterkill	Date of heading	Date mature	Plant height	Lodging*	Weight of 100 seeds	Bushel weight
	percent	June	July	inches		grams	pounds
Frontier	4	2	23	51	4.0	2.5	56.6
Pearl	12	4	25	50	2.6	2.6	55.6
Von Lochow	22	4	25	47	1.6	2.9	56.4
Caribou	4	1	22	51	2.7	2.4	55.8
Elk	18	5	25	50	3.0	2.7	55.7
Cougar	7	3	25	47	1.7	2.4	55.3

* 1 erect, 9 flat.

HARD RED SPRING WHEAT

RECOMMENDED VARIETIES

Chris — Awnless variety of medium height, straw strength, and maturity. Resistant to leaf and stem rust. High yielding with very good test weight. Milling and baking characteristics are satisfactory. Selected from a cross of Frontana-Thatcher³ x (Kenya 58-Newthatch x Thatcher²) at the Minnesota Agricultural Experiment Station.

Manitou — Awnless variety of medium height, straw strength, and maturity. Resistant to stem and leaf rust. High yielding with good test weight. Milling and baking characteristics are satisfactory. Selected from a cross of (Thatcher²-Frontana x Canthatch) x Thatcher²-P.I. 170925 by the Canada Department of Agriculture Research Station, Winnipeg, Manitoba.

Polk — Bearded, bronze chaff variety of medium height, straw strength, and maturity. Resistant to stem and leaf rust. High yielding with excellent test weight. Milling and baking characteristics are satisfactory. Selected from a cross of Thatcher-Supreza x [Frontana x (Kenya 58-Newthatch)] at the Minnesota Agricultural Experiment Station.



Two 3-row plots of Minnesota's experimental semi-dwarf spring wheat surrounded by normal height wheat varieties.

VARIETIES NOT ADEQUATELY TESTED

Red River 68 — A semi-dwarf variety with good straw strength and maturity. Resistant to stem rust. High yielding with good test weight. Milling and baking characteristics are unsatisfactory (based on one year's data). Released in 1967 by World Seeds Incorporated, Salinas, California.

OTHER VARIETIES

Crim — Bearded variety of medium height, straw strength, and maturity. Susceptible to loose smut and leaf rust but resistant to stem rust. Good yield and test weight. Milling and baking characteristics are satisfactory. Selected from a cross of Klein Titan-Thatcher³ x (Kenya 58-Newthatch x Thatcher²) at the Minnesota Agricultural Experiment Station.

Fortuna — Beardless sawfly resistant variety of medium height, straw strength, and maturity. Resistant to leaf and stem rust but very susceptible to black chaff. High yielding with good test weight. Milling and baking characteristics are satisfactory. Selected from a cross of Rescue-Chinook x (Frontana-K58 x Newthatch) at the North Dakota Agricultural Experiment Station.

Justin — Awnless, stiff-strawed, late maturing variety. Susceptible to leaf rust but resistant to stem rust. Good yield and test weight. Milling and baking characteristics are satisfactory. Selected from a cross of Conley x (Thatcher-Kenya Farmer x Mida-Lee) at the North Dakota Agricultural Experiment Station.

Lathrop — Bearded variety of medium height and maturity with good straw strength. Moderately resistant to leaf rust and stem rust. High yielding with good test weight but poor quality. Selected from a backcross of Henry² x P.I. 94587 made at the Wisconsin Agricultural Experiment Station.

Pembina — Awnless variety of medium height, maturity, and straw strength. Good yield with medium test weight. Milling and baking characteristics are satisfactory. Selected from a cross of Thatcher x (McMurachy-Exchange x Redman³) by the Canada Department of Agriculture Research Station, Winnipeg, Manitoba.

Selkirk — Awnless variety of medium height and maturity with good straw strength. Susceptible to leaf rust but resistant to stem rust. Good yield with medium test weight. Milling and baking characteristics are satisfactory. Selected from a cross of McMurachy-Exchange x Redman³ by the Canada Department of Agriculture Research Station, Winnipeg, Manitoba.

Sheridan — Bearded variety of medium height, maturity, and straw strength. Resistant to leaf and stem rust and loose smut. High yielding with good test weight. Baking characteristics are satisfactory but milling characteristics are not. Selected from a cross of (Frontana-K58 x Newthatch) x Pilot at the Montana Agricultural Experiment Station.

Spinkcota — Bearded, susceptible to leaf rust, stem rust, and bunt; inferior milling and baking qualities. A selection of Velvet Chaff or Preston developed by a South Dakota farmer.

Thatcher — Beardless and strong-strawed. Susceptible to leaf rust, stem rust, and scab, but has high milling and baking qualities. Developed at the Minnesota Agricultural Experiment Station.

Table 9. Yields and other characteristics of spring wheat varieties, 1966-68

Class and variety	Date of heading	Plant height, inches	Lodging score*	Leaf rust reaction†	Stem rust reaction†	Test weight	Yield, bushels per acre				
							St. Paul	Waseca	Morris	Crookston	Average
Hard Red Spring											
Chris	June 28	38	4.0	R	R	61.5	37	35	34	40	37
Manitou	June 28	37	3.8	R-MS	R	60.4	37	36	34	40	37
Polk	June 29	38	4.0	R	R	62.0	37	34	35	37	36
Justin	June 29	37	3.7	S	R	60.0	30	29	28	33	30
Thatcher	June 28	38	4.2	S	S-R	58.6	30	25	28	35	29
LSD 5%							4	5	4	5	3
Durum											
Wells	June 30	39	3.8	R	R	61.3	34		37	39	37
Lakota	June 30	39	3.5	MR	R	59.7	37		40	37	38
Leeds	June 29	38	3.0	R	R	62.3	32		36	37	35
Mindum	July 1	48	5.5	R-MR	S-R	61.8	29		32	34	32
LSD 5%							4		5	6	3

* 1 erect, 9 flat.

† Reaction to prevalent races: R = resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible.

DURUM WHEAT

Durum production for the semolina market should be confined to the west-central and northwestern sections.

RECOMMENDED VARIETIES

Lakota — Early, bearded, short variety with medium straw strength. Resistant to stem and leaf rust, bunt, and loose smut. High yielding with medium test weight; quality is satisfactory for semolina products. Selected from a cross of Sentry x (Ld. 379 x Ld. 357) at the North Dakota Agricultural Experiment Station.

Leeds — Bearded, early, short variety with good straw strength. Resistant to leaf and stem rust and loose smut. Very good test weight with large kernels. Quality is satisfactory for semolina products. Selected from a cross of Brandon 180 x Wells at the North Dakota Agricultural Experiment Station.

Wells — Early, bearded, short, stiff-strawed variety. Resistant to stem and leaf rust, bunt, and loose smut. High yielding with good test weight; quality is satisfactory for semolina products. Selected from a cross of Sentry x (Ld. 379 x Ld. 357) at the North Dakota Agricultural Experiment Station.

OTHER VARIETIES

Langdon — Early, bearded variety of medium height and straw strength. Moderately resistant to leaf rust, susceptible to stem rust, and resistant to bunt and loose smut. Medium yield and test weight; is satisfactory for use in making semolina products. Selected from a cross of (Carleton x Ld. 194-Khapli x Ld. 308) x Stewart made at the North Dakota Agricultural Experiment Station.

Mindum — Bearded and amber-kerneled. Resistant to bunt, leaf rust, and loose smut; susceptible to scab and stem rust. Weak strawed; excellent in quality for semolina products. Resulted from a durum type selected from a common bread wheat field at the Minnesota Agricultural Experiment Station.

Stewart 63 — Bearded, tall, late-maturing variety with weak straw. Resistant to leaf and stem rust. Good yield and test weight. Quality is satisfactory for semolina products. Developed by a back-cross of Stewart x St 464 by the University of Saskatchewan.

WINTER WHEAT

RECOMMENDED VARIETIES

Minter — Tall, bearded, winterhardy variety of medium straw strength. Susceptible to leaf rust and to some prevalent races of stem rust. High yielding with good test weight. Quality characteristics are satisfactory. Selected from a backcross of Hope x Minterki² at the Minnesota Agricultural Experiment Station.

OTHER VARIETIES

Gaines — A semidwarf white wheat developed at the Washington Agricultural Experiment Station. Completely winterkilled in Minnesota trials.

Hume — Bearded variety of medium height and straw strength. Susceptible to leaf rust and some prevalent races of stem rust. Test weight and quality characteristics are satisfactory. Not sufficiently winterhardy. Selected from a cross of unknown parentage at the South Dakota Agricultural Experiment Station.

Lancer — Bearded variety of medium maturity and height with good straw strength. Susceptible to leaf rust and loose smut, but resistant to some prevalent races of stem rust. Not sufficiently winterhardy. Selected from a cross of Turkey-Cheyenne x Hope-Cheyenne² at the Nebraska Agricultural Experiment Station.

Warrior — Early, bearded, mid-tall variety with good straw strength. Winterhardiness is not satisfactory. Susceptible to leaf rust and stem rust. Low yield with medium test weight. Quality is satisfactory. Selected from a cross of Pawnee x Cheyenne at the Nebraska Agricultural Experiment Station.

Winalta — Bearded variety of medium height and straw strength. Susceptible to leaf and stem rust. Test weight and quality characteristics are satisfactory. Not sufficiently winterhardy. Selected from a cross of Minter x Wichita at the Canada Department of Agriculture Research Station, Lethbridge, Alberta.



Several methods of planting are used for variety trials. This four-row planter is sowing wheat in rows 1 foot apart and 10 feet long.

Table 10. Yields and other characteristics of winter wheat varieties, 1965-67

Variety	Date of heading	Plant height, inches	Winter injury percent	Lodging score*	Leaf rust reaction†	Stem Rust reaction†	Test weight, pounds	Yield, bushels per acre		
								St. Paul	Waseca	Average
Minter	June 17	43	25	3.0	S	R-S	59.5	28	34	31
Lancer	June 16	38	30	2.7	S	R-S	59.7	23	29	26
Warrior	June 15	38	32	3.5	S	S	54.2	23	29	26
Winalta	June 16	40	33	3.3	S	S	57.9	22	34	28
LSD 5%								5	7	4

* 1 erect, 9 flat

† Reaction to prevalent races: R = resistant, S = susceptible.

MILLET

Three types of millet are adapted in Minnesota: proso, foxtail, and barnyard (Japanese). Proso varieties are grown for grain for bird or livestock feed. Foxtail varieties and Japanese are grown for silage or hay. See Extension Bulletin 302 for more information.

RECOMMENDED VARIETIES

Turghai — Proso. Very early maturity. Fair lodging resistance. Large, orange seed. Introduced from Russia by the U.S. Department of Agriculture in 1903. Grow for grain.

Empire — Foxtail. Medium maturity. Poor lodging resistance.

Very small, plump, yellow seed. Originated by Canada Department of Agriculture. Grow for hay or silage.

White Wonder — Foxtail. Late maturity. Fair lodging resistance. Small white or yellow seed. Too late for good seed production some years. Grow for hay or silage.

VARIETIES NOT ADEQUATELY TESTED

Panhandle — Proso. Early maturity. Poor lodging resistance. Large white seed. Selected from white proso by the Nebraska Agricultural Experiment Station and released in 1967.

**** Wray** — Foxtail. Medium maturity. Poor lodging resistance. Small yellow seed. Selected from German foxtail millet by Mr. Deschamps of Wray, Colorado. Much earlier than German and very uniform. Named by the Colorado Agricultural Experiment Station in 1967.

OTHER VARIETIES

Barnyard or Japanese — Highest yielding forage millet but very coarse. Good seed producer. Excellent lodging resistance. Medium-size gray seed of low bushel weight.

Broomcorn or Yellow Hog — Proso. Seedlots tested were later maturing and lower yielding than Turghai. Medium-size yellow seed.

Crown — Proso. Excellent variety but its grey-colored seed is usually not marketable. Originated by Canada Department of Agriculture.

Early Fortune — Proso. Seedlots tested appeared to be uncertified Turghai.

German, German R, and German No. 8 — Foxtail. Very late maturity. High forage yield but too late for good seed production. Good lodging resistance. Very small yellow seed. Poor seedling vigor.

Hungarian — Foxtail. Early maturity. Short. Poor lodging resistance. Low yield. Small yellow, black, and brown seeds.

Manta — Foxtail. Early maturity. Short. Poor lodging resistance. Small orange seed. A selection of Manchurian released by South Dakota Agricultural Experiment Station in 1958.

Siberian — Foxtail. Similar to Manta except lower in yield.

White Proso — Seedlots tested were later maturing and lower yielding than Turghai. Large white seed frequently brings a premium price for parakeet feed.

Table 11. Yields and other characteristics of millet varieties sown in late June at Rosemount, 1967-68

Variety	Yield per acre		Forage protein* percent	Date heading	Plant height inches	Lodging†	Weight of 100 seeds grams	Bushel weight pounds
	Seed	Forage*						
	pounds							
Proso								
Turghai	2047	3231	12.6	August 11	35	2.2	.59	54.0
Panhandle‡	1293	2079	14.5	August 15	34	2.3	.60	47.4
White	1837	2557	12.8	August 15	34	2.2	.73	51.2
Foxtail								
Empire	1496	6131	9.3	August 27	47	2.5	.17	47.3
White Wonder	629	7112	9.3	September 6	52	1.4	.23	42.4
** Wray	1425	6542	9.4	August 30	44	3.0	.24	46.6
LSD (5%)	377	1149						

* 15% moisture basis.

† 1 erect, 9 flat.

‡ 1968 adjusted data.

** Renamed Golden German by Colorado Experiment Station, December 1968.

GRAIN SORGHUM

Many hybrids are available. Most are too late for Minnesota. Even the earliest hybrids generally require drying after combine-harvest. The medium- and early-maturing hybrids shown in the table are of acceptable maturity for southern Minnesota if planted during the recommended period of May 25 to June 10. The earlier hybrids are also satisfactory for some parts of central Minnesota.

Hybrids not tested in 1968, but which were of acceptable maturity for southern Minnesota in previous tests, include Nebraska

505, South Dakota 441, South Dakota 502, Northrup King 115, Northrup King 120, Northrup King 125, and Pawnee.

These trials were planted about June 1 in rows 30 or 40 inches apart for cultivation and also in noncultivated rows 12 inches apart. Sowing rate was 157,000 seeds per acre in cultivated plots and 150,000 in noncultivated plots. Herbicides were used in all trials.

Table 12. Yield and other characteristics of grain sorghum hybrids at Lamberton, 1967-68

Hybrid and originator	Number of trials	Grain yield* per acre	Head moisture percent	Bushel weight pounds	Date heading	Height inches
1, Minnesota	4	93	17	56.9	2	59
133, Northrup King	4	97	23	57.8	11	50
Mini-Milo 50, Northrup King	4	75	18	56.6	1	49
A25, DeKalb	4	93	24	53.6	9	48
LSD (5%)		10	2			
R94, Acco	3	75	27	56.2	11	50
R920, Acco	3	84	26	56.6	10	52
BL-101, Acco	2	87	26	57.1	10	57
123, Northrup King	2	83	25	56.1	11	55
127, Northrup King	2	65	30	53.1	15	47
889, Pioneer	2	66	35	56.5	16	43
894, Pioneer	2	71	30	56.1	14	42
GS30, Weathermaster	2	85	25	55.8	9	59
GS30B, Weathermaster	2	77	27	57.7	12	52

* 13% moisture and 56 pound per bushel basis.

FLAX

RECOMMENDED VARIETIES

Bolley — Developed at North Dakota Agricultural Experiment Station from cross of Birio x C.I. 1134. Immunity to rust conditioned by N¹ gene. Moderately susceptible to pasmo. Excellent oil content of excellent drying quality. Some evidence of greater susceptibility to aster yellow virus than other recommended varieties. Susceptible to damage by chlorosis, do not grow where chlorosis is likely to occur. Brown-seeded, blue-flowered, medium-early maturing. Superior to B-5128 or Redwood for late sowing.

B-5128 — From a cross of Golden x Rio made at North Dakota Agricultural Experiment Station. Immunity to rust conditioned by N¹ gene; moderately susceptible to both wilt and pasmo. Good oil content of only fair drying quality. Contains a mixture of types, including a small percentage of both yellow-seeded plants and rust-susceptible plants. Brown-seeded, blue-flowered, late maturing. Not recommended for late sowing.

Nored — Released in 1968 by the Minnesota Experiment Station. Progeny of a plant line selected from an irradiated population of B-5128 x Redson. Good resistance to pasmo, wilt, and rust (N¹ gene); good resistance to lodging and more tolerant of the herbicides MCPA and dalapon than other commercial varieties; high oil content; late maturity; high seed yields especially when sown early.

Summit — Released in 1964 by South Dakota Agricultural Experiment Station as selection from B-5128 x Zenith. Immunity to rust conditioned by N¹ gene. Resistant to wilt and moderately susceptible to pasmo. Fair oil content of good drying quality. Brown-seeded, blue-flowered, early in maturity. Excellent seed yields.

Windom — Released in 1962 from Minnesota Agricultural Experiment Station from cross [(Renew x Bison) (Koto x Redwing) (Redwood)]. Immunity to rust conditioned by N¹ gene. Resistant

to wilt and moderately susceptible to pasmo. Fair oil content of high drying quality. Brown-seeded, blue-flowered, early in maturity. Good seed yield, whether sown early or late.

VARIETIES NOT ADEQUATELY TESTED

Linott — Released in 1967 in Canada. Selection F.P. 364 of a cross (770B x Arg. C) x (Arrow x C.I. 974) from Ottawa. Grown in Minnesota trials for the first time in 1967. High in yield, early maturing, good in oil content and iodine value. Resistant to race 300 of rust, moderately susceptible to wilt and pasmo.

OTHER VARIETIES

Army — From a cross of Crystal x Redson made at Minnesota Agricultural Experiment Station. Highly resistant to wilt and moderately resistant to pasmo. Rust reaction conditioned by L gene, thus susceptible to race 300. Resistant to lodging. Fair oil content of good drying quality. Brown-seeded, blue-flowered, late-maturing.

Bison — Developed at North Dakota Agricultural Experiment Station by mass selection. Susceptible to rust, moderately susceptible to pasmo. Tends to lodge. Resistant to wilt. Low oil drying quality but good oil content. Brown seeds and blue flowers.

Marine 62 — Selection of Marine made at Minnesota Agricultural Experiment Station. Released in 1962. Moderately resistant to wilt and pasmo. Rust reaction conditioned by L gene, thus susceptible to race 300. High oil content of high drying quality. Brown-seeded, blue-flowered, early maturity. Yields are inferior to those of late-maturing varieties when sown early but superior in yield when sowings are made in late May or June.

Noralta — Selection from a cross of Rocket x Redwing made at Ft. Vermillion, Canada (F.V. 387) released in 1964. Moderately susceptible to wilt and pasmo. Resistant to race 300 of rust. Good in seed yield, very low in oil content, and fair in iodine value. Blue-flowered, brown-seeded, mid-late in maturity.

Norland — Selection from Victory made at North Dakota Agricultural Experiment Station; similar to Victory. Resistant to rust. Moderately susceptible to wilt. Susceptible to pasmo. Flowers are white with blue anthers, brown seeds. Late maturity.

Raja — Selection from a cross of experimental varieties at Ottawa, Canada (Can. No. 39010). Moderately susceptible to wilt. Susceptible to pasmo. Resistant to rust, including race 300. Moderately short when sown early but relatively tall when sown late. While earlier than Windom it has not been as dependable in producing good yields. Large brown seeds, blue flowers. Low in both oil content and oil quality.

Redwood — Originated from a cross of B-5128 x Redson at Minnesota Agricultural Experiment Station. Has N¹ gene which conditions immunity to rust. Moderately wilt resistant and moderately susceptible to pasmo. Good oil content of good drying quality. Straw of excellent fiber quality. Brown-seeded, blue-flowered, mid-late in maturity.

Redwood-65 — Irradiated selection of Redwood developed in Canada (F.P. 342) and released in 1964. Similar to Redwood in maturity and appearance, superior to Redwood in seed yield and oil content. This selection is more susceptible to pasmo than Redwood.



Nored — Minnesota's newest flax variety being examined by agronomist E. A. Oelke.

Table 13. Yields of flax varieties in pounds per acre, 1963-68

Variety	Early-sown				Late-sown				Average
	Lamberton	Morris	Crookston	Average	Lamberton	Morris	Crookston	Average	
No. trials	4	6	6	16	4	5	6	15	31
Bolley	1140	1135	648	953	700	1048	657	799	879
B-5128	1160	1226	808	1052	646	974	764	802	931
Nored	1187	1233	925	1106	610	1140	764	846	980
Summit	1084	1259	862	1067	758	1102	861	914	993
Windom	1224	1243	804	1074	778	1112	792	895	987
Linott*	-	1201	868	-	683	1024	730	816	-
Redwood	1018	1204	788	1002	705	1052	776	849	928

*1967-68, adjusted data.

Table 14. Characteristics of flax varieties, 1963-68

Variety	Days from sowing to			Plant height inches	Seed weight gm. 1000	Lodging*	Pasm*	Wilt*	Rust†	Oil‡ content %	Iodine value no.
	First bloom	Full bloom	Maturity								
No. trials	36	37	20	36	11	8	9	6		41	41
Bolley	49	55	95	22	5.6	3	5	4	R	41.2	186
B-5128	52	59	98	23	5.9	5	5	6	R	39.3	176
Nored	53	60	97	23	5.5	3	4	2	R	40.4	183
Summit	50	56	95	21	5.4	3	5	4	R	38.7	180
Windom	50	56	94	22	5.1	4	6	2	R	39.2	185
Linott§	49	55	94	22	4.8	5	-	7	R	40.4	180
Redwood	52	58	96	22	5.7	5	6	3	R	39.7	179

* 1 = best, 9 = poorest.

† R = resistant.

‡ Ovendry basis.

§ 1967-68, adjusted data.

SOYBEANS

RECOMMENDED VARIETIES

A-100—Developed by Anderson Brothers, St. Peter, Minnesota. Recommended for the southern zone only.

Chippewa 64—Developed at the USDA Regional Soybean Laboratory from Chippewa by backcrossing. Similar in all respects, except Phytophthora resistance, to Chippewa which was selected from Lincoln x (Lincoln x Richland) at the Regional Laboratory. Recommended for south central and southern zones and southern one-third of central zone.

Clay—Developed at the Minnesota Agricultural Experiment Station from Renville x Capital. Recommended for the north-central, central, and northern zones.

Corsoy—Developed at the Iowa Agricultural Experiment Station from Harosoy x Capital. Recommended for southern zone only.

Grant—Developed at the Wisconsin Agricultural Experiment Station from Lincoln x Seneca. Recommended for central, south-central, southern, and north-central zones.

Hark—Developed at the Iowa Agricultural Experiment Station from Hawkeye x Harosoy. Recommended for southern zone

Merit—Developed at the Central Experimental Farm, Ottawa, Canada, from Blackhawk x Capital. Recommended for central and north-central zones.

Portage—Developed at the University of Manitoba from Acme x Comet. Recommended for the northern zone.

Traverse—Developed at the Minnesota Agricultural Experiment Station from Lincoln x Ottawa Mandarin. Recommended for south-central, central, and southern zones.

VARIETIES NOT ADEQUATELY TESTED

Altona—Early variety developed from PI 194654 x Flambeau at the University of Manitoba has yielded well, but seed tends to have a dark, "smoky" appearance.

OTHER VARIETIES

Acme—A very early selection from the variety Pagoda, developed in Canada. Similar in most respects to Portage but somewhat inferior to it in yield.

Amsoy—Selected at the Iowa Agricultural Experiment Station from a cross of Adams x Harosoy. Too late except in perhaps the southern half of the southern zone.

Blackhawk—Selected at the Iowa Agricultural Experiment Station from a cross of Mukden x Richland. Medium tall. About 5 to 6 days later in maturity than Chippewa yet averages somewhat lower in yield and has less resistance to lodging.

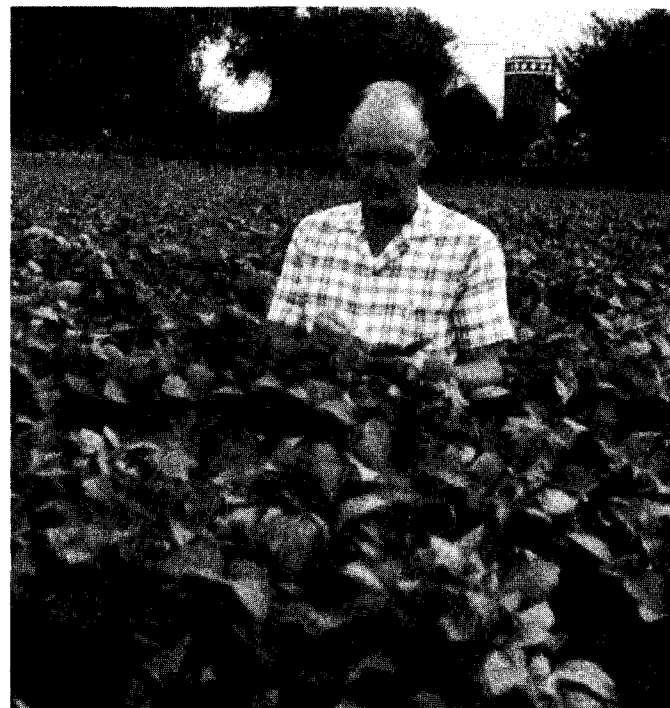
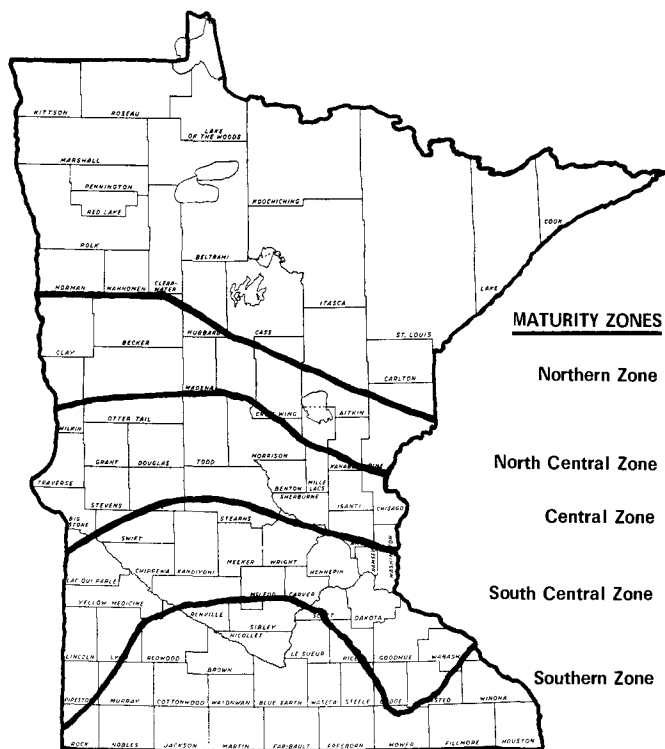
Bombay—Selected by Illinois farmer. Similar to Hark in maturity but yields less and lodges much more. Highly susceptible to chlorosis on high lime soils.

Table 15. Average yield of soybean varieties in bushels per acre

Variety*	Crookston 1967-68	Grand Rapids 1967- 68	Moor- head 1967- 68	Morris		Big Lake 1964- 67	Rose- mount 1966- 68	Waseca 1964- 68	Southern Minn.† 1964- 68	Lamberton		
				1967- 68	1966- 68					Early May planting 1967-68	Late May planting 1967-68	Late May planting 1964-68
Early maturing group												
Portage	13	28	22	18								
Altona	18	29	22	22								
Flambeau	22	22	23	23								
Clay	22	25	27	25								
Merit	18	16	25	25								
Medium maturing group												
Clay				28			34					
Merit				27	23		35	35	29			25
Traverse				27	25		33	36	31			26
Grant				27	24		32	39	33			26
Chippewa 64				29	22		35	38	32			28
Late maturing group												
Chippewa 64							38	32	27	27		25
Hark							40	39	29	28		27
A-100							38	33	26	23		25
Corsoy								42	36	31	30	30
Amsoy								39	36	30	30	29
Disoy										19		
Magna Prize										22		22

* Ranked according to maturity adaptation from north to south.

† Faribault Co. 1964-1967, Martin Co. 1968.



Individual plants in a soybean seed increase field being examined by agronomist J. W. Lambert.

Capital — Selected at the Central Experimental Farm, Ottawa, Canada, from a cross of 171 x A.K. (Harrow). Similar to Grant in maturity and yield, but lodges more and has lower oil content.

Chippewa — Similar in all respects to Chippewa 64 except that it is susceptible to Phytophthora root rot.

Comet — A selection made at the Central Experimental Farm, Ottawa, Canada, from a cross of Pagoda x Mandarin. Similar to Merit in maturity, but lower in yield. Highly susceptible to chlorosis injury on high-lime soils.

Disoy — A variety with very large yellow seeds well suited for edible uses either as a garden vegetable or in the specialized

Oriental food market. Yields less than recommended varieties of this maturity and presents special problems in planting and harvesting. Developed at the Iowa Agricultural Experiment Station from crosses involving Ottawa Mandarin, Kanro, Richland, and Jogun. Five or six days later than Chippewa 64.

Flambeau — An early variety selected at the Wisconsin Agricultural Station from an introduction from Russia. Yields less and lodges more than Clay.

Ford — Selected at Iowa Agricultural Experiment Station from a cross of Lincoln x (Lincoln x Richland). Two or three weeks

Table 16. Characteristics of soybean varieties

Variety	Date mature	Stand-ability*	Plant height inches	Seed size gms/100 beans	Seed quality score	Phytophthora reaction†	Chlorosis score*	Flower color	Pubescence color‡	Hilum color‡
Early maturing group (average of Crookston and Morris, 1967-1968)										
Portage	9-7	1.0	19	14.7	3.0	S	3	P	G	Y
Altona	9-10	1.0	22	16.4	3.1	R	4	P	T	B1
Flambeau	9-14	1.0	24	14.0	2.8	S	3	P	T	B1
Clay	9-16	1.2	22	14.1	2.8	S	3	P	G	Y
Merit	9-22	1.0	25	12.3	3.0	R	3	W	G	Bf
Medium maturing group (average of Rosemount and Morris, 1966-1968)										
Clay	9-12	1.6	26	16.4	2.8	S	3	P	G	Y
Merit	9-18	2.0	31	14.2	2.8	R	3	W	G	Bf
Traverse	9-20	1.8	30	17.0	2.8	S	4	W	G	Y
Grant	9-22	2.2	30	16.1	2.8	S	3	W	T	B1
Chippewa 64	9-24	2.4	34	15.1	2.6	R	2	P	T	B1
Late maturing group (average of Waseca and Lamberton, 1964-1968)										
Chippewa 64	9-21	1.4	30	15.0	2.3	R	2	P	T	B1
Hark	9-28	1.7	34	16.8	2.5	S	5	P	G	Y
A-100	9-28	1.6	30	17.8	2.7	S	3	W	G	Bf
Corsoy	9-28	2.0	34	15.5	2.6	S	4	P	G	Y
Amsoy	10-2	2.2	36	17.1	2.7	S	3	P	G	Y
Disoy	9-30	2.2	33	28.0	3.3	S	3	P	G	Y
Magna	10-3	2.0	32	27.0	3.3	S	4	P	G	Y
Prize	10-5	2.0	32	27.0	3.3	S	4	P	G	Y

* 1 excellent, 5 very poor.

† R = resistant, S = susceptible.

‡ Flower color: P = purple, W = white; pubescence color: T = tawny, G = gray; hilum color: B1 black, Bf = buff, Y = yellow.

later than Chippewa. Too late for most of Minnesota. Earlier varieties yield as well or better.

Harosoy — Selected at the Dominion Experimental Farm, Harrow, Ontario from a cross of Mandarin x (Manadrin x A.K.). Similar to Corsoy in maturity, height, and standing ability but yields appreciably less.

Harosoy 63 — Similar to Harosoy except that it is resistant to Phytophthora root rot.

Hawkeye — Selected at Iowa Agricultural Experiment Station from a cross of Mukden x Richland. Ten days to 2 weeks later than Chippewa. Very late for Minnesota. Earlier varieties yield as well or better.

Hawkeye 63 — Similar to Hawkeye in all respects except for

the addition of Phytophthora root rot resistance.

Lindarin — Selected at the Indiana Agricultural Experiment Station from a cross of Ottawa Mandarin x Lincoln. Similar to Corsoy in maturity and has yielded significantly less.

Lindarin 63 — Similar to Lindarin except for resistance to Phytophthora root rot.

Magna and Prize — Large seeded varieties developed at the Iowa Agricultural Experiment Station from the same parentage as Disoy. Several days later in maturity than Disoy.

Ottawa Mandarin — Selected at the Central Experimental Farm, Ottawa, Canada, from the variety Mandarin. Medium early and fairly short. Highly resistant to lodging. Large, solid-yellow seeds.

SUNFLOWERS

The commercial crop is used for birdfeed, nutmeats, salted whole seed, and oil. See Extension Bulletin 299 for more information.

RECOMMENDED VARIETIES

Arrowhead — Medium to high yield. Early maturity and medium height. Stands well for combining but tends to shatter when dry. Seed is medium in size, medium in hull, low in oil, high in protein, and high in bushel weight. Good seedling vigor. Excellent for birdfeed production. An open-pollinated variety released in 1954 by the Minnesota Agricultural Experiment Station.

Mingren — Medium to high yield. Medium maturity and height. Seed is very large, high in hull, and low in oil and bushel weight. More resistant to bird feeding loss than other recommended varieties. Large seed used for dehulled and whole seed food uses and the smaller seed for birdfeed. An open-pollinated variety selected from Menmonite by the Minnesota Agricultural Experiment Station. Released in 1964.

Peredovik — Medium to high yield. Late maturity and tall. Small black seed of high bushel weight, low hull percentage, and very high oil content. Excellent for the oilseed market but not for the birdfeed or whole seed food markets. An open-pollinated variety developed in Russia.

VNIIMK 89.31 — Medium to high yield. Late maturity and tall. Small black seed of high bushel weight, low hull percentage, and very high oil content. Excellent for the oilseed market but not for the birdfeed or whole seed food markets. An open-pollinated variety developed in Russia.

VARIETIES NOT ADEQUATELY TESTED

Armavirec — Medium to low yield. Very early maturing and short. Small black seed of high bushel weight, low hull percentage, and high oil content. An open-pollinated variety developed in Russia.

Krasnodarets — Medium to low yield. Very early maturing and short. Small black seed of high bushel weight, low hull percentage, and high oil content. An open-pollinated variety developed in Russia.

Smyrna — Medium yield. Late maturity and tall. Small black seed of high bushel weight, low hull percentage and high oil content. Seed came from Bulgaria.

TAM-CRD P-21 ms x TAM-CRD HA60 — High yield. Late

maturity and tall. Small striped seed of high bushel weight, low hull percentage, and high oil content. Rust-resistant hybrid whose parental lines were released by the Texas Agricultural Experiment Station-USDA in 1968. Produced by alternating the parents in blocks of various numbers of rows each. About 50% of the P-21 ms plants are male fertile, and these must be killed at the onset of pollination. The remaining P-21 ms plants are harvested for hybrid seed.

Valley — High yield. Late maturity and tall. Small striped seed of high bushel weight, low hull percentage, and high oil content. Lodging medium. Rust-resistant topcross hybrid licensed in 1968 by Canada Department of Agriculture. Produced by alternating two rows of CM90RR inbred with four rows of Peredovik. Seed harvested from the CM90RR rows is used for Valley seed.

OTHER VARIETIES

Commander — Medium yield. Similar to Mingren in maturity, height, and use. Slightly smaller and darker seed than Mingren. An open pollinated variety selected from Menmonite by the Morden Experimental Farm, Canada Department of Agriculture. Released in 1964.

Greystripe and Manchurian Varieties — Very tall and too late maturing for commercial production.

HO 1 — Medium yield. Late maturity and tall. Small black seed of high bushel weight, low hull percentage, and high oil content. An open-pollinated variety developed by Northrup King and Company.

Menmonite — Medium yield. Similar to Mingren in maturity, height, and use. Smaller and less uniform seed than Mingren. Originated in Russia.

Smena — Medium yield. Late maturity and medium height. Small black seed of high bushel weight, low hull percentage, and very high oil content. An open-pollinated variety developed in Russia.

Disease Reaction of Presently-Grown Varieties

All varieties except Valley and P-21 ms x HA 60 are susceptible to rust. Peredovik, VNIIMK 89.31, and some other high-oil Russian varieties have some tolerance to rust and considerable tolerance to leaf mottle (caused by *Verticillium*). All varieties are susceptible to downy mildew and to stem rot (caused by *Sclerotinia*).

Table 17. Yields of sunflower varieties at Rosemount and Crookston 1965-68, Gonvick 1966-67, and Grand Rapids 1967-68

Variety	Yield per acre, pounds				
	Rosemount	Crookston	Gonvick	Grand Rapids	Average 12 trials
Arrowhead	1747	1657	1401	1962	1695
Mingren	1783	1928	1373	1782	1763
Peredovik	1696	1767	1128	1762	1636
VNIIMK 89.31	1753	1877	1077	1889	1704
Armavirec	1598	1257	1427	1339	1413
Smena	1601	1581	907	1518	1465
LSD (5%)	208	276	410	331	198
HO 1*	1669	1890	989	1651	1626
Krasnodarets†	1412	1335	—	1416	1304
P-21ms x HA 60‡	2254	2015	1176	1909	1937
Valley§	2091	2729	—	1958	2241

* No 1965 data.

† Rosemount, Grand Rapids 1967-68; Crookston 1968.

‡ 1967-68.

§ 1968.

Table 18. Characteristics of sunflower varieties

Variety	Date of flowering	Plant height	Lodging*	Seed			
				Weight of 100	Large seed†	Bushel weight	Oil content‡
		inches		grams	percent	pounds	percent
Arrowhead	July 29	60	2.5	8.5	3	29.1	30.7
Mingren	August 2	62	2.8	11.6	67	23.1	28.0
Peredovik	August 4	66	3.0	5.9	0	27.9	45.2
VNIIMK 89.31	August 4	68	3.1	5.9	0	28.3	45.0
Armavirec	July 26	53	2.4	7.1	0	29.8	43.0
Smena	August 4	62	2.9	6.0	0	28.7	45.7
HO 1	August 6	67	2.9	5.4	0	28.5	42.3
Krasnodarets	July 27	54	2.7	6.6	0	29.3	42.6
P-21ms x HA 60	August 4	65	3.3	6.1	0	29.8	40.4
Smyrna	August 4	66	2.3	5.8	0	28.7	43.8
Valley	August 5	67	3.0	7.4	1	30.5	40.0

* 1 erect, 9 flat.

† Held on 20 round-hole screen.
64

‡ Dry matter basis.

DRY EDIBLE PEAS AND FIELD PEAS

Dry edible peas are sold to processors for use in soup and pigeon feed or fed on the farm to sheep, hogs, or cattle. When used for a forage or feed grain crop they are usually sown in a mixture with oats. See Minnesota Extension Bulletin 300 for more information.

RECOMMENDED VARIETIES

Century—Medium to early maturity. Long vined. Large, cream-colored seed of high bushel weight. Good cooking quality. Licensed in 1960 by Canada Department of Agriculture from a cross of (Chancellor x Early Raymond) x Stirling. Grow for soup market.

Chancellor—Medium maturity. Long vined. Small, cream-colored seed of high bushel weight. Selected at the Experimental

Station, Ottawa, Canada, in 1906 from an English variety also called Chancellor. Grow for forage, feed grain, and pigeon feed market.

OTHER VARIETIES

Maple—Late maturity. Long vined. Large, olive-colored seed with brown mottle and indistinct hilum. An excellent variety for pigeon feed use. Grow under contract when buyers offer a higher price than for recommended varieties.

Strål—Medium maturity. Long vined. Cream-colored seed, medium in size, and high in bushel weight. Good cooking quality. Originated at the Weibullsholm Plant Breeding Institute, Landskrona, Sweden, as an X-ray mutation from Kloster.

Table 19. Yields and other characteristics of pea varieties at Crookston, 1965-68

Variety	Seed yield	Weight of	Seed	Date	Vine	Sowing rate
	per acre	100 seeds	protein*	first bloom	length	per acre
	pounds	grams	percent	June	inches	pounds
Century	1907	21.4	25.5	26	53	225
Chancellor	1483	13.2	26.5	28	42	122
Strål	1520	15.4	27.8	26	45	143
LSD (5%)	465					

* Dry matter basis.

ALFALFA

Present alfalfa varieties, released by both private and public plant breeders, represent a continuous range in winterhardiness, fall dormancy, recovery after harvest, bacterial wilt resistance, and yield. Therefore, realistic classifications of "satisfactory" and "unsatisfactory" varieties can not be made. Variety descriptions and performance data are given to provide a basis for alfalfa growers to select varieties which suit their needs. When selecting a variety, study the data available and consider the factors indicated in light of your needs.

The following characteristics are important:

WINTERHARDINESS—Severe winters in Minnesota make winterhardiness a primary consideration in variety selection. Under favorable conditions, less hardy varieties will survive. But under more severe conditions, less hardy varieties will yield less than winterhardy varieties, even the first year after seeding.

BACTERIAL WILT RESISTANCE—This disease is prevalent in most areas of the state. Wilt-susceptible varieties generally show economic losses in stand by the end of the second year after seeding. In some cases where infection is severe, stand losses are often observed by the end

of the first year after seeding. Infected plants are more susceptible to winterkilling. Stand reductions after winter are often due to a combination of wilt damage and winter injury.

OTHER DISEASES—Common leafspot, blackstem, and *Pseudoplea* leafspot are other diseases of some importance in Minnesota. Losses from these diseases are more difficult to observe and do not normally destroy stands as does bacterial wilt. Resistance to these diseases is a consideration in selecting varieties, but is secondary to bacterial wilt resistance and winterhardiness.

FORAGE YIELD—The ultimate value of a variety depends upon total forage yield. Most varieties will yield well, but some are consistently high yielders. All varieties have an inherent yield potential which is largely influenced by inherited characteristics; for example, winterhardiness, disease resistance, and insect resistance. Environment (including soil fertility, climate, and management) also influences yield. Top yields are only obtained when all these factors are favorably combined.



Researchers are shown taking notes on an alfalfa variety trial at Rosemount. Variety in right foreground is winterhardy.

The Minnesota Agricultural Experiment Station recommends the use of certified seed. Purchase of certified seed provides the best assurance of obtaining varietal purity. Numerous tests have shown that uncertified seed generally performs less consistently than certified seed. For consistent performance from year to year, insist on certified seed. A "blend" is not necessarily composed of the same sources each year. Therefore, the performance of a blend may vary from year to year. Some seed is sold on basis of area where grown (i.e., Kansas common). Seed of this type is not a variety and varies from lot to lot.

CLASSIFICATION OF ALFALFA VARIETIES

Alfalfa varieties are grouped according to winterhardiness and bacterial wilt reaction. In some cases very limited data are available and classifications may be revised when more complete information is obtained.

Very winterhardy, wilt-resistant varieties

Varieties in this group are characterized by exceptional winterhardiness, slower recovery after cutting, early dormancy in late August, and little growth after a second harvest. First-crop yields are normally competitive with other varieties, but slow recovery makes second cuttings later than normal. The third crop is usually small due to early dormancy.

The varieties are Beaver, Norseman, Teton, and Travois.

Winterhardy, wilt-resistant varieties

This group exhibits good hardiness even under severe winter conditions. Average recovery after cutting with normal fall regrowth and average dormancy. Bacterial wilt resistance ranges from moderately resistant varieties to high resistance in Vernal.

Forage yields vary between varieties but are adequate for economic production.

Varieties in this group are Cayuga, Culver, Dawson, DeKalb 123, Iroquois, Ladak, Ladak 65, Progress, Ranger, Rambler, Scout, Titan, Uinta, Vernal, WL202, 522, and 525.

Winterhardy, wilt-susceptible varieties

These varieties are sufficiently hardy to survive severe winters. They maintain adequate stands when wilt is not a factor, but stands and yields will be poor when plants are infected with the wilt organism.

Varieties in this group are Altfranken-Schmidt, Atlantic, Franck's Langmeiler, Grimm, and Narragansett.

Moderately hardy, wilt-resistant varieties

Varieties in this group are resistant to bacterial wilt but are less hardy than those in the hardy, resistant group above. Following a mild winter they will respond like the winterhardy, wilt-

Table 20. Forage yields of very hardy varieties expressed as percent of Ranger and Vernal at Rosemount

Variety	Forage yield
Beaver	94
Norseman	95
Teton	91
Travois	85
Ranger	96
Vernal	104
LSD (5%)	8
Average of Ranger and Vernal in tons per acre	4.55

Table 21. Forage yields of moderately hardy, bacterial wilt susceptible alfalfa varieties at Rosemount expressed as percent of Ranger and Vernal

	Seeded in 1965			Seeded in 1966	
	1966	1967	1968	1967	1968
Alfa	121	100	3	107	87
Cardinal	105	98	3	103	82
DuPuits	112	95	4	100	90
Europa	114	100	3	104	85
F D 100	113	98	8	103	84
Flandria	104	97	2	95	86
Glacier	109	100	10	102	100
Orchies	111	104	3	102	75
Ranger	96	98	82	99	102
S C 118	109	99	3		
Vernal	104	101	118	101	98
W L 302	110	100	14	103	93
Average yield of Ranger and Vernal (tons/acre)	5.05	5.06	3.33	5.01	4.41

resistant group, but severe winter conditions will reduce stands and yields. Varieties in this group are: Buffalo, Cody, Haymore, Lahontan, Saranac, Warrior, and W.L.303.

Moderately hardy, wilt-susceptible varieties

This group is generally characterized by rapid recovery after harvest, late dormancy, less winterhardiness, and more fall growth than the winterhardy wilt-resistant group. Most varieties in this group are Flemish varieties introduced from Europe and are completely susceptible to bacterial wilt. When winter injury and wilt are not factors, they perform quite well. After a severe winter or when plants are infected with wilt, yields will be considerably lower. Yields the first year after seeding are normally good, but

usually decline in succeeding years. Even the first year after seeding, yields can be low following a severe winter. Minnesota trials have seldom shown any advantage for this group, even when winter injury and wilt were not factors.

The data in table 21 demonstrate the usual performance of the moderately hardy, bacterial wilt susceptible varieties in Minnesota. The data were collected in 1965 and 1966 seedings at Rosemount. There was little winter injury during the winters of 1965-66 and 1966-67, but rather severe killing during the winter of 1967-68.

Varieties in this group are: Alfa, Apex, Amim, Cardinal, Cherokee, DeKalb 153, DuPuits, Europa, F.D. 100, Flandria, Glacier,

Table 22. Forage yields expressed as percent of the average of Vernal and Ranger and bacterial wilt reaction of alfalfa varieties

	Crookston	Grand Rapids	Lamberton	Morris	Rosemount	Waseca	Average	Bacterial wilt*
Moderately hardy varieties†								
Alfa	92	109	97	84	88	98	95	S
Apex†	104	111	97	93	107	104	103	S
Cardinal	93	100	99	93	75	97	93	S
DuPuits	95	104	93	98	76	99	94	S
Europa	96	106	95	96	80	99	95	S
FD 100	105	102	97	102	79	101	97	S
Flandria §	99	102	91	99	73	98	94	S
Glacier	112	107	103	95	80	103	100	S
Haymore	91	109	106	95	93	102	99	MR
Orchies	101	97	99	94	79	97	94	S
PAT 30†	98	109	90	98	90	91	96	S
Ranger	98	98	95	97	93	96	96	R
Saranac	99	108	108	100	105	105	104	VR
SC 118	92	101	101	90	78	103	95	S
Socheville†	99	111	87	94	96	103	98	S
Stride†	107	109	87	87	97	91	96	S
Vernal	103	103	105	102	107	104	104	VR
Warrior	99	104	99	96	94	98	98	MR
WL 302	92	102	97	98	83	95	94	S
WL 303†	103	112	97	99	96	100	101	MR
Average of checks in tons per acre	3.94	3.97	4.09	4.28	4.15	4.23	4.11	
Hardy varieties‡								
A-59†	98	104	108	—	102	107	104	R
Altfranken-Schmidt	117	94	107	—	94	94	101	S
Arnim	102	103	107	107	95	99	102	S
Beaver	104	97	110	104	102	99	103	R
Cayuga	108	113	110	104	101	102	106	R
Culver	97	106	110	—	84	99	99	R
Dawson	—	—	106	—	96	99	100	R
Franck's Langmeiler	105	102	109	—	96	99	102	S
Iroquois†	98	109	114	—	103	110	107	VR
Mark II†	102	104	108	114	98	99	104	R
Narragansett	107	100	105	102	100	105	103	S
Norseman	111	99	110	97	—	95	100	R
Progress	98	103	102	99	100	102	101	R
Ranger	97	94	99	95	95	100	97	R
Saranac	109†	119†	107†	90†	101	114†	107†	VR
Scout	97†	103†	105†	92	97	104†	100	MR
Titan	—	—	—	—	107	—	107	VR
Vernal	102	106	101	105	105	100	103	VR
WL 202	103	104	101	107	104	100	103	R
522	106	99	109	93	100	96	100	R
525	106	104	106	108	99	99	104	R
Average of checks in tons per acre	3.28	3.91	3.88	3.14	4.75	4.06	3.83	

* VR = very resistant, R = resistant, MR = moderately resistant, S = susceptible.

† One year data only. Should be recognized as less reliable than longer term data.

‡ Varieties were classified into trials according to available information. The same check varieties were used in each trial. Therefore, check yields are not necessarily the same for each group.

§ Land races of Flemish type used as variety designation in this country.

Milfeuil, Orchies, PAT-30, S.C. 118, Socheville, Stride, and W.L. 302.

Nonhardy varieties

These varieties are not sufficiently winterhardy to be grown in Minnesota except for plowdown in the seeding year.

Varieties in this group are: African, Hairy Peruvian, Moapa, and Sonora.

BIRDSFOOT TREFOIL

RECOMMENDED VARIETIES

Empire — Selected at the New York Agricultural Experiment Station. Winterhardy, prostrate growth, good yield.

VARIETIES NOT ADEQUATELY TESTED

Leo — Bred at MacDonald College, Quebec, Canada. Outstanding seedling vigor and high forage yield.

Viking — Selected at the New York Agricultural Experiment Station. A little less winterhardy than Empire. Relatively upright growth. Good yield.

Table 23. Average yield of birdsfoot trefoil in tons per acre

	Rosemount 1966-68	Crookston 1966-68	Average
Empire	2.93	2.62	2.77
Viking	2.25	2.23	2.24
Leo	3.25	2.82	3.02

RED CLOVER

RECOMMENDED VARIETIES

Dollard — Selected at MacDonald College, Quebec, Canada. Resistant to several strains of northern anthracnose and viruses. Good forage and seed yield and better stand persistence into second crop year than varieties not recommended. Susceptible to powdery mildew.

Lakeland — Bred by the Wisconsin Agricultural Experiment Station in cooperation with the U.S. Department of Agriculture. Released in 1959. Resistant to several strains of northern anthracnose and virus. Highly resistant to powdery mildew. Good forage and seed yield and relatively good persistence into second crop year. When northern anthracnose and virus are severe the superiority of the recommended varieties is evident.

OTHER VARIETIES

Kenland — Developed by the Kentucky Agricultural Experiment Station and the U.S. Department of Agriculture. Very susceptible to northern anthracnose and virus.

Pennscott — A naturalized variety from the farm of Frank Scott, Lancaster, Pennsylvania. Very susceptible to northern anthracnose and virus.

SWEETCLOVER

RECOMMENDED VARIETIES

Evergreen — A white-blossomed, biennial sweetclover introduction from Ohio. It produces a larger growth than common types. It has a longer grazing season because of later maturity.

Goldtop — A yellow-blossomed biennial type bred at the Wisconsin Agricultural Experiment Station in cooperation with the U.S. Department of Agriculture. Outstanding for seedling vigor. Resistant to leaf and stem diseases. Good forage yield both seedling year and second year. A few days earlier than Evergreen, but much later than Madrid.

Madrid — A yellow-blossomed, biennial type introduced into United States from Madrid, Spain, in 1910. The first-year growth of Madrid is superior to common types and the forage and seed production the second year are satisfactory. Time of flowering is similar to common types.

VARIETIES NOT ADEQUATELY TESTED

Cumino — A white-blossomed biennial bred at Saskatoon and licensed in Canada in 1957. The result of 10 years of breeding work involving interspecific crosses with particular attention paid



Varieties differ in chemical composition. The laboratory technician is analyzing the varieties in the six Kjeldahl flasks for nitrogen content. Protein percent is then calculated from the nitrogen content.

to low coumarin content. Gave consistently poor stands at five stations in 1961.

Denta — A white flowered, low-coumarin synthetic bred by the Wisconsin Agricultural Experiment Station in cooperation with the U.S. Department of Agriculture. Has looked promising in 2 years of tests, but not as vigorous as Goldtop.

BROMEGRASS

RECOMMENDED VARIETIES

Achenbach — A naturalized southern strain from the farm of Achenbach brothers in Washington County, Kansas. Improved by mass selection and introduced by the Kansas Agricultural Experiment Station. In regional tests the highest forage yielder in the northern part of the north central region.

Fischer — Seed collection from old brome field on the E. A. Fischer farm, Shenandoah, Iowa. Increased and tested by the Agricultural Experiment Station in cooperation with the Soil Conservation Service at Ames, Iowa. Vigorous southern type.

Fox — A new variety bred at the Minnesota Experiment Station. Equal to other recommended varieties in yield and superior for seedling vigor and leaf spot resistance. Southern type.

Lincoln — Increased at the Nebraska Agricultural Experiment Station from collections from old brome fields. Good forage yield. Southern type. Seed plentiful in Minnesota.

VARIETIES NOT ADEQUATELY TESTED

Blair and Baylor — Southern type varieties introduced by W. R. Grace & Company.

Sac — Selected at the Wisconsin Agricultural Experiment Station in cooperation with the Agricultural Research Service. A southern type brome, it possesses superior tolerance to leaf spot.

Saratoga — Selected at the New York Agricultural Experiment Station from a wide collection of seedlots obtained from plant breeders in the United States. Synthetic variety of five clones. Equal to Lincoln in yield in New York.

Table 24. Average yields of bromegrass varieties in tons per acre, 1965-68

	Rosemount	Lamberton	Crookston	Grand Rapids	State Average
Fox	3.99	4.17	2.91	4.37	3.86
Sac	4.11	4.20	2.92	4.18	3.85
Saratoga	3.76	4.25	2.87	4.46	3.83
Achenbach	4.18	4.38	2.92	4.28	3.94
Lincoln	3.94	3.72	2.78	4.24	3.67
Common	3.62	3.58	2.74	3.99	3.48

TIMOTHY

RECOMMENDED VARIETIES

Climax — Selected by Experimental Farms Service, Ottawa, Canada, from a wide collection of seedlots by combining several progeny tested clones. Described as tall, fine stemmed, and leafy. Superior forage yield under Minnesota conditions.

Itasca — A composite of seven inbred lines selected at the Minnesota Agricultural Experiment Station. Good forage and seed yielder. Time of maturity the same as commercial sorts. Highest forage yielder in regional tests.

Lorain — Selected from collections from old meadows and roadsides by the Ohio Agricultural Experiment Station. Good forage and seed yielder. Approximately a week later in maturity than Itasca and commercial.

OTHER VARIETIES

Clair — Extremely early strain increased by the Kentucky Experiment Station at Lexington. A naturalized strain from the farm of Clair Andrew, VeVay, Indiana.

Drummond — Selected at MacDonald College, Quebec. Winterhardy with an appreciable amount of rust resistance.

Engmo — The best adapted forage variety for Alaska conditions. May be useful for future seed production in Minnesota.

Essex — Bred at the New York Agricultural Station, Ithaca. It is a very late maturing leafy type.

Milton — Selected at MacDonald College, Quebec. It is winterhardy and early maturing.

Verdant — A late variety bred at the Wisconsin Agricultural Experiment Station, Madison.

Table 25. Yields and time of bloom of timothy varieties

	Forage yields, tons/acre						
	Rosemount 1962-67, 68	Waseca 1962, 63, 67	Lamberton 1963-65	Morris 1963, 65, 68	Crookston 1962, 65-67, 68	Grand Rapids 1963, 65, 68	7-year state average
Climax	2.62	2.38	3.36	2.82	2.59	4.16	2.99
Itasca	2.71	2.47	2.95	2.85	2.95	4.19	3.02
Essex	2.43	1.76	2.44	2.69	2.40	3.31	2.50
	Seed yields, pounds/acre				Maturity		
	Rosemount 1964	Grand Rapids 1964	Grand Rapids 1966	State average	Rosemount, % bloom July 1, 1964		
Climax	427	242	324	331	8*		
Itasca	334	194	252	260	27		
Essex	273	224	212	236	10		

* In other observations Climax was closer to Itasca in time of bloom.

SUDANGRASS, SORGHUM-SUDAN AND SWEET SORGHUMS

Sudangrass and sorghum-sudan hybrids were solid-seeded at 30 pounds per acre with ample P and K fertilizer plus the equivalent of 100 pounds N per acre. They were evaluated at the green chop stage (about 4 feet tall at first cut). Sweet sorghums were grown in 30-inch rows with similar fertilization and harvested at the silage stage.

Two cuttings were obtained at each location each year except in 1967 at Morris where drought prevented a second cut. Prussic

acid (HCN) contents, as measured at Rosemount, were generally lower for the sudans than for the sorghum-sudans with a few exceptions.

In the sweet sorghum trials harvested at the silage stage, wide differences in maturity were observed, as shown by the maturity notes and percent heads. Corn produced a higher percent of its weight in ears than did sorghum in heads. The percent of digestible dry matter of corn was also higher than sorghums.

Table 26. Yields and other characteristics of sudan, sorghum-sudan hybrids and a pearl millet at a stage to simulate green feeding (first cut about 4 ft. tall)

Variety or hybrid and company	Tons dry matter per acre						Mg. HCN per 100 gm. D.M.		Recovery after cut†	
	4-station* average 1966	2-station average 1967	1968			3-station average	Rosemount 1967	1968	1967	1968
			Rose- mount	Waseca	Morris					
Sudans										
Piper	3.20	2.27	2.74	2.69	1.75	2.39	21	17	78	82
Trudan II, Northrup King	3.56	2.10	2.80	2.52	1.97	2.43	25	25	53	62
Monarch, Caladino	—	3.06	3.66	2.98	2.36	3.00	17	28	65	85
9-45G, Caladino	—	—	3.12	2.25	2.02	2.46	—	40	—	82
HS-33, Paymaster	—	—	3.36	3.06	2.04	2.82	—	22	—	90
Sorghum-sudan hybrids										
Sx-5, DeKalb	3.91	2.71	3.14	3.14	2.37	2.88	43	36	—	50
Sx-6, DeKalb	4.03	2.78	3.57	3.71	2.39	3.22	29	47	—	55
Astro, Asgrow	—	—	3.13	2.88	2.11	2.71	—	30	—	55
Grazer N, Asgrow	—	—	3.20	2.85	2.49	2.85	—	59	—	62
FS550, M.R.A.	—	—	2.99	3.11	1.95	2.68	—	42	—	72
FS551, M.R.A.	—	—	2.94	2.66	2.48	2.69	—	51	—	60
Sordan 67, Northrup King	—	—	2.88	3.11	2.21	2.73	—	48	—	57
FFR-66, Land O'Lakes	3.74	2.50	3.17	2.84	2.19	2.73	42	53	48	57
985, Pioneer	3.41	2.43	3.16	2.61	2.29	2.69	34	41	39	52
FS555, Barzen	3.35	2.38	3.09	2.69	1.74	2.51	39	44	43	52
FS556, Barzen	—	—	3.00	2.40	2.29	2.56	—	55	—	55
Sweet Sioux, Paymaster	3.73	2.82	3.32	3.55	2.13	3.00	35	48	48	60
Nebr. 280	3.74	2.81	3.24	2.79	2.44	2.82	20	39	53	52
Pearl Millet										
Milllex 22 Northrup King	—	—	2.27	2.47	1.83	2.19	—	31	—	40

* Four stations in 1966 were Rosemount, Waseca, Morris and Grand Rapids. Two stations in 1967 were Rosemount and Morris.

† Percent ground cover 10 days after cut.

Table 27. Yields and other characteristics of sweet sorghums (corn check) grown in 30-inch rows and harvested at the silage stage

Company and sorghum or corn	Tons dry matter per acre		Digestible dry matter (in vitro) at		Height, inches		Percent heads or ears, Rosemount	Maturity†		
	1968		Rosemount		Rose- mount	Lamb- erton		Rose- mount	Lamb- erton	
	Lamb- erton	Rose- mount	percent	tons/acre						
Sorghum										
DeKalb FS-4	6.35	5.50	66	3.60	112	115	12	EM	LM	
DeKalb FS-1a	5.17	4.96	62	3.09	88	87	12	PP	LM	
Asgrow Duet	5.25	4.80	66	3.16	83	92	21	SD	SD	
Asgrow Dairy D	6.76	5.39	65	3.51	100	109	8	PP	M	
Asgrow Robusto	4.68	4.63	66	3.05	52	66	23	LM	M	
M.R.A. FS 500	7.80	5.67	64	3.65	114	115	8	PP	PP	
Northrup King 318S	7.26	5.29	62	3.25	104	102	9	EM	EM	
Grace & Co. Sumax	9.35	6.94	70	4.84	103	103	9	EM	M	
Pioneer 931	6.55	6.62	56	3.67	127	142	9	H	PP	
Barzen FS 446	6.62	5.98	65	3.88	118	118	8	PP	EM	
Acco FS 300R	6.25	5.14	65	3.35	109	109	9	PP	EM	
Acco FB 44	5.19	4.51	68	3.05	81-106	105	11	M	EM	
Acco FS 401R	6.06	5.91	64	3.76	99	98	12	PP	EM	
Corn										
High sugar, HS50 (early planted)	—	6.39	71	4.56	109	—	10	30% Dent*	—	
Dent (late planted)	7.06	5.69	71	4.74	107	104	39	50% Dent	Dent	
Dent (early planted)	—	6.50	70	4.41	106	—	45	Dent	—	

* Determined on the border rows. The variety is male sterile and so center rows were bagged.

† Maturity — Headed (H), post pollen (PP), early milk (EM), milk (M), soft dough (SD).

RATE AND DATE OF SOWING

Rates are based on average seedbed and on use of good quality seed of high germination. Use high rate for large-seeded and low rate for small-seeded recommended varieties. Increase rate for seed of low germination.

Crop	Bushel weight* in pounds	Rate per acre in pounds	Date
Barley †	48	72-96	Early spring
Corn †	56	8-14	Early May
Flax †	56	42-56	April 15 to May 15
Forage Grasses (perennial)			
Bromegrass (with legumes)	14	5-8	Early spring or fall
Kentucky bluegrass (with timothy)	14	8-10	Early spring or fall
Meadow fescue (in mixture with brome and legume)	14-24	3-4	Early spring or fall
Timothy (with legumes)	45	4-6	Early spring or fall
In mixture with brome and legume or reed canary or bluegrass		2-4	
Reed canary	44-48		Early spring or fall:
Alone or with timothy		6-8	after freezeup
Forage Legumes (biennial or perennial)			
Alfalfa	60		With companion grain
Alone		8-12	or flax, early spring;
With grasses		5-8	or alone before Aug. 10
Birdsfoot trefoil	60	3-6	Early spring
Clover	60		Early spring
Red (in mixture)		4-8	
Alsike (in mixture)		2-4	
Ladino (in mixture)		1/2-1	
Sweet Clover	60		Early spring
Alone		10-12	
In mixture		2-4	
Oats †	32	64-80	Early spring
Rye	56	56-84	Aug. 1 to Sept. 10 for pasture. Aug. 25 to Sept. 30 for seed
Sorghum †	50 (sweet)		In warm soil, May 25
Corn planter rows	56 (grain)	5-10	to June 15
"Solid" drilled		7-20	
With 1 1/2 bushel soybeans		10	
Sudangrass	40		In warm soil, May 20
Rows		10-20	to June 10
Broadcast		25-30	
With 1 1/2 bushels of soybeans		10	
Soybeans †	60		In warm soil after May 1
"Solid" drilled		120 (4 seeds/ft.)	
20-inch rows		90 (10 seeds/ft.)	
30-inch rows		75 (11 seeds/ft.)	
40-inch rows		60 (12 seeds/ft.)	
Wheat †	60		Early spring
Hard Red Spring		75-90	Early spring
Durum		90	Early spring
Winter		75-90	Aug. 20 to Sept. 20
Miscellaneous Crops			
Field peas †	60		Early spring
Alone		120-225	
With 1 1/2 to 2 bushels of oats		45-90	
Sunflowers	24	4-8	May 1-25
Millet	48-56	20-40	June 15 to July 15
Mustard and oilseed rape	50-58	10	May 1 - June 15
Navy beans †	60	40	May 20 to June 15
Pinto beans †	60	60-80	May 20 to June 15
Rape for forage	50	4-6	Early spring with oats
Buckwheat	48-50	40-48	June 15 to July 15

* U. S. legal if established. If not established, weight given is that most widely accepted in the United States.

† Use fungicide seed treatment.