

# Varietal Trials of Farm Crops



# 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 promising 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.

Varities 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 that Minnesota seed growers wish to produce for export to other states. 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 1968 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.

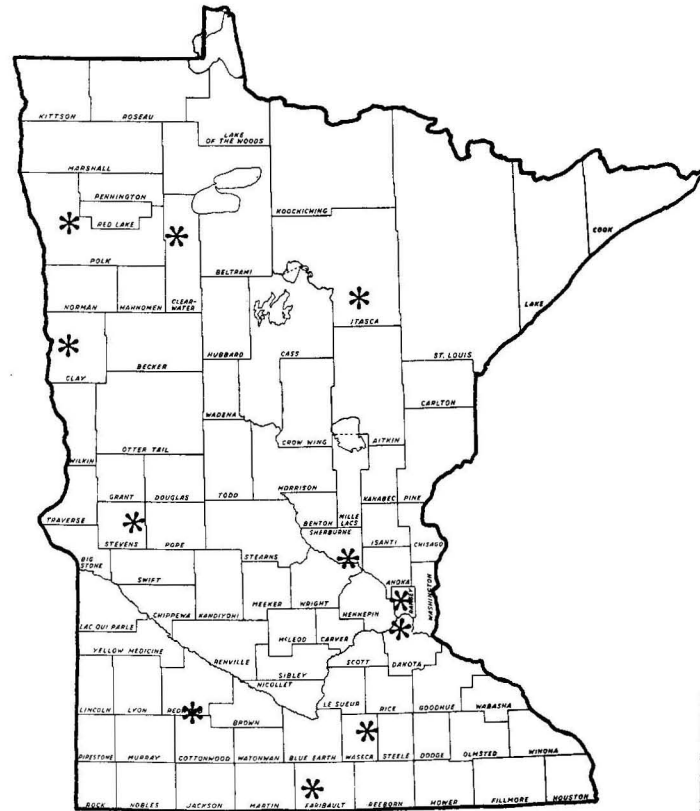
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Field work of the variety trials at Waseca, Lamberton, Morris, Crookston, and Grand Rapids was supervised by J. R. Thompson, W. W. Nelson, S. D. Evans, J. R. Lofgren, and R. H. Anderson, respectively.

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Cover photo—Birdseye view of research plots at the Southwest Experiment Station near Lamberton. The grass waterways in the foreground are on sloping Clarion soil whereas the plots are on gently sloping Nicollet and level Webster soils.



1967 varietal trials were conducted at these locations.

## BARLEY

### RECOMMENDED VARIETIES

**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.

**Parkland**—Six-rowed, smooth-awned, blue aleurone variety. Long rachilla hairs. Relatively tall, but good resistance to lodging. Med. yielding. Careful threshing necessary to avoid excessive skinning and breaking. Acceptable for malting when grown in northwestern Minnesota. Originated at Brandon, Manitoba, from a cross of (Ollie x Montcalm) x Brandon 1136.

### VARIETIES NOT ADEQUATELY TESTED

**Conquest**—Six-rowed, smooth-awned, blue aleurone variety. Long rachilla hairs. Two or three days earlier than Parkland. High yield, good standing ability. Highly resistant to loose smut and stem rust. Malting quality status undetermined. Developed at Brandon, Manitoba, Canada.

**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

**Forrest**—Six-rowed, smooth-awned, colorless aleurone variety. Long rachilla hairs; medium straw strength and yielding ability. Good kernel plumpness. Not acceptable for malting. A single plant selection made at the University of Minnesota from Brandon 1136, which came from (Peatland x Newal) x O.A.C. 21.

**Keystone**—Six-rowed, smooth-awned, colorless aleurone variety. Long rachilla hairs; high yield; good standing ability. Resistant to loose smut and stem rust. Not suitable for malting. Developed at Brandon, Manitoba, from the cross Jet x Vantage 2 x Vantmore.<sup>2</sup>

**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.

**Liberty**—Six-rowed, smooth-awned, colorless aleurone variety. High yielding with good straw strength. Not suitable for malting. Developed at the South Dakota Agricultural Experiment Station. Parentage involves Lion, Manchuria, Peatland, and Titan.



Removal of the male flowers (anthers) with tweezers is the first step in making a barley cross. Lines developed from this cross will be tested and an improved variety may result.

**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.

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, 1963-67

Variety	No. of trials:	Morris	Crook-Ston	St. Paul	Rose-mount	Lamber-ton	Grand Rapids	Average of 29 trials
		7	7	6	3	3	3	
Larker		60	59	48	57	61	40	55
Trophy		59	55	50	53	62	43	53
Dickson		58	60	42	55	68	47	55
Parkland		61	53	46	49	58	45	53
Conquest		63	53	51	57	66	45	56
LSD (5%)		4	5	4	5	6	7	2

Table 3. Characteristics of barley varieties

Variety	Date of heading	Height	Lodging score*	Plump kernels†	Disease reaction‡		
					Stem rust	Leaf spotting	Loose smut
	June	inches		percent			
Larker	25	32	4.4	65	R	S	S
Trophy	26	32	3.7	50	R	S	S
Dickson	27	31	3.8	42	R	R	S
Parkland	28	34	4.0	54	R	S	S
Conquest	26	36	3.1	55	R	S	R

\* 1 erect, 9 flat.

† Held on 6/64" x 3/4" screen.

‡ R = resistant, S = susceptible.



Agronomists Roger Kleese and Olin Smith examine a plot of Garland oats during field day at the West Central Experiment Station (Morris).

### OATS RECOMMENDED VARIETIES

**Garland**—Medium maturing, high yield, average straw strength. Susceptible to crown and oat stem rust. Selected at the Wisconsin Agricultural Experiment Station from the cross Clintland x (Garry x Hawkeye-Victoria).

**Lodi**—Late, tall, excellent standing ability and yield. Only moderately susceptible to crown rust. Developed in Wisconsin from (Richland-Bond) x (Garry x Hawkeye-Victoria).

**Minhafer**—Early, average yield, good test weight and straw strength. Only recommended variety with some resistance to the most prevalent race of oat stem rust (6AF). Moderately susceptible to crown rust. Developed at the Minnesota Agricultural Experiment Station from a cross of Landhafer x (Bond-Rainbow x Hajira-Joanette).

**Tippecanoe**—Similar to Minhafer but shorter and slightly stiffer straw. Susceptible to crown and stem-rust. Probably the best of the recommended varieties for use as a companion crop for forage crop establishment. Released from Purdue Agricultural Experiment Station from a cross of (Clintland 60 x Mo. 0-205) x Clintland 60.

### VARIETIES NOT ADEQUATELY TESTED

**Dawn**—Tall, early, good yield and bushel weight but very weak straw. Some resistance to crown rust. Some smut resistance. Susceptible to yellow dwarf and moderately susceptible to Septoria. Susceptible to race 6AF of oat stem rust. Developed and released by the North Dakota Agricultural Experiment Station from a cross of Ajax-Ransom x [Roxton x (Victory x Hajira-Banner)]-Ajax x (Victoria x Hajira-Banner).

**Harmon**—Late, below average in yield, tall, average straw strength, low test weight. Susceptible to oat stem rust and only slight resistance to crown rust. Selected in Canada from the cross Victoria 2x Hajira x Banner 3x Roxton 4x Beacon 5x Rodney (coefficients indicate sequence of crosses).

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

**Jaycee**—Short, early, good yield, good bushel weight, and acceptable straw strength. Susceptible to race 6AF of oat stem

Table 4. Yields of oat varieties in bushels per acre; varieties are arranged in order of maturity from early to late

Variety	Years of trial	Rose-mount	Waseca	Lamber-ton*	Morris	Crook-Ston†	Grand Rapids	Average
Tippecanoe	1965-6-7	66	69	77	89	65	66	72
Minhafer	1965-7	78	84	77	78	66	63	74
Jaycee	1966-7	68	82	93	89	85	70	81
Dawn	1966-7	76	88	100	92	84	78	86
Wyndmere	1966-7	80	85	87	109	87	77	88
Andrew	1965-6-7	66	74	86	83	69	63	74
O'Brien	1966-7	71	79	76	98	75	73	79
Garland	1965-6-7	75	86	88	97	75	74	82
Stormont	1966-7	75	86	94	92	85	77	85
Holden	1966-7	79	92	86	106	90	77	88
Orbit	1966-7	82	102	98	109	94	85	95
Portal	1966-7	84	90	95	103	90	81	90
Sioux	1967	75	83	95	130	—	88	94
Kelsey	1967	84	103	99	124	—	69	96
Lodi	1965-6-7	81	91	90	110	89	91	92
Harmon	1967	76	82	77	106	—	79	84
LSD (5%)		5	7	9	9	8	6	3

\* No 1966 data

† No 1967 data

Table 5. Characteristics of oat varieties, 1965, 66, 67, and reactions to disease, 1967

Variety	Heading date	Lodging* score	Height (inches)	Bushel weight (pounds)	Reactions to diseases †			
					Stem rust ‡	Crown rust	Smut	Red leaf virus
Tippecanoe	6-25	2.2	35	30	S	S	R-S	S
Minhafer	6-25	2.5	37	32	MR-MS	MS	R	MR
Jaycee	6-25	3.5	32	33	S	S	R	R
Dawn	6-25	3.7	40	32	S	MS	MR-S	MS
Wyndmere	6-26	3.1	39	32	S	S	MR	MS
Andrew	6-26	3.4	37	30	S	S	R	R
O'Brien	6-27	3.4	38	32	S	S	R	MS
Garland	6-27	3.1	34	32	S	S	R	MS
Stormont	6-29	1.7	37	29	S	S-MS	R	MS
Holden	6-29	2.6	35	32	S	S	R-MS	S
Orbit	6-30	2.5	35	29	S	MS	R-MS	MR
Portal	6-30	2.7	39	32	S	MS	R	MS
Sioux	7-2	3.4	38	28	S	S	R	MR
Kelsey	7-3	2.7	40	28	S	MR-MS	R	R
Lodi	7-3	2.5	43	32	S	MS	R-MS	MS
Harmon	7-5	2.8	43	27	S	S-MS	R	MR

\* Scale from 1 to 5. 1 = lodging resistant, 5 = lodging susceptible.

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

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

rust. Good resistance to smut and yellow dwarf. Susceptible to crown rust. Released by the Illinois Agricultural Experiment Station from the cross Clintland 3x Garry 2x Hawkeye x Victoria 4x Putman.

**Kelsey**—Late, good yield, moderately tall, average straw strength, below average in test weight, considerable crown rust resistance, susceptible to stem rust. Selected in Canada from the cross Victoria 2x Hajira x Banner 3x Roxton 4x Beacon 5x Rodney.

**O'Brien**—Early, below average yield and straw strength, medium in test weight and height. Susceptible to stem rust and some of the prevalent races of 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, good yield and straw strength. Bushel weights have been poor in Minnesota variety tests. Susceptible to race 6AF of oat stem rust. Susceptible to crown rust. Developed and released by the New York Agricultural Experiment Station from the cross Alamo 4x Garry (Sel. 5) 3x Goodwin 2x Victoria x Rainbow.

**Portal**—Midseason, good yield, medium in height and straw strength, good test weight, moderately tall. Some crown rust resistance susceptible to stem rust. Selected from the cross P.I. 174544 x Garland at the Wisconsin Agricultural Experiment Station.

**Sioux**—Late, good yield, medium height, below average in straw strength and test weight, susceptible to crown and stem rust. Selected in Canada from the cross Garry x Rex.

**Stormont**—Midseason to late with excellent straw strength. Moderate yield and bushel weights in Minnesota variety tests. Susceptible to oat stem rust and crown rust. Developed by the Ontario Project Group from the cross Shield x Garry-Klein and released by the Canada Department of Agriculture.

**Wyndmere**—Early, good yield and good bushel weight, but moderately weak straw. Susceptible to oat stem rust and to crown rust. Developed and released by the North Dakota Agricultural Experiment Station from a cross of Ajax x Ransom.

#### OTHER VARIETIES

**Andrew**—Yellow grain, medium in height, early maturing, average yielding oat with excellent adaptation throughout the Corn Belt. Good weight per bushel; undesirable straw strength; high groat percentage. Selected at the Minnesota Agricultural Experiment Station from a cross of Bond x Rainbow.

**Burnett**—Medium-early maturing, yellowish-white oat; large, plump grain of high test weight. Medium in height; good in yield and straw strength. Developed at the Iowa Agricultural Experiment Station from a cross of Victoria-Hajira-Banner x Colo.

**Clintford**—Early, midseason, good yield; high bushel weight and excellent straw strength. Susceptible to crown rust and prevalent races of stem rust. Moderately resistant to smut. Developed at the Purdue Agricultural Experiment Station from a cross of Milford to a selection from Clinton 59 x Landhafer.

**Clintland 64**—Midseason, good yield, average in bushel weight and straw strength. Good resistance to crown rust. A Clintland derivative released from the Purdue Agricultural Experiment Station.

**Garry**—Tall, late, above average in yield, has large yellowish-white seed of good test weight. Developed in Canada from a cross of Victory x (Victoria x Hajira-Banner) and reselected for purity of agronomic characters and disease resistance.

**Nodaway**—White, short, plump grain of excellent test weight. Early maturing, medium in height and yield, good straw strength. Developed at the Missouri Agricultural Experiment Station from the cross Columbia-Marion x [(Victoria x Hajira-Banner) x Victory-Hajira] x Roxton].

**Portage**—Tall, late midseason, high-yielding, yellowish-white oat with high bushel weight, weak straw, and good resistance to crown rust. Developed at the Wisconsin Agricultural Experiment Station from a cross of Ajax x Hawkeye-Victoria.

**Rodney**—Tall, very late, high in yield. Large, plump, yellowish-white seed of good test weight. Developed in Canada from a cross [(Victoria x Hajira-Banner) x Victory x Hajira] x Roxton.

**Tyler**—Midseason, average yield and bushel weight, and very stiff straw. Susceptible to crown rust and prevalent races of stem rust. Moderately resistant to smut. Released by the Purdue Agricultural Experiment Station from a cross of Clintland 60 type x Mo. 0-205.

#### WINTER RYE

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

#### RECOMMENDED VARIETIES

**Caribou**—High yield, very winterhardy, medium maturity, tall. Small seed, somewhat mixed in color, and high 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 winterhardiness, late maturity, tall. Medium-size seed, predominantly green in color, high 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.

Table 6. Yields of winter rye varieties in bushels per acre, 1966-67 (1965-67 at Rosemount)

Variety	Rosemount	Waseca	Lamberton	Morris	Grand Rapids	Average of 5 locations
Caribou	33	61	38	47	61	48
Elk	32	68	33	45	75	51
Frontier	39	64	44	53	73	55
Pearl	33	70	35	50	79	53
Von Lochow	34	71	36	46	84	54
LSD (5%)	4	7	13	6	7	4

Table 7. Characteristics of winter rye varieties, 1966-67 (1965-67 at Rosemount)

Variety	Winterkill	Date of heading	Date mature	Plant height	Lodging*	Weight of 100 seeds	Bushel weight
	percent	June	July	inches		grams	pounds
Caribou	5	2	23	52	2.5	2.3	55.9
Elk	20	5	25	50	3.0	2.7	55.9
Frontier	4	3	24	51	3.9	2.5	56.7
Pearl	14	5	25	50	2.6	2.5	55.7
Von Lochow	23	4	25	47	1.5	2.9	56.8

\* 1 erect, 9 flat.

**Frontier**—High yield, very winterhardy, medium maturity, tall. Small seed, predominantly blue-gray in color, high bushel weight, poor lodging resistance. 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 Experimental 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. In 1967 at Rosemount, Cougar was the most lodging resistant variety and yielded more than Caribou or Frontier but less than Pearl or Von Lochow. 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

**Adams**—Medium yield, winterhardy, medium maturity, tall. Medium-size seed, light brown in color, high in bushel weight. A combination of lines from Imperial which were selected for high fertility. Released by the University of Wisconsin in 1953.

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

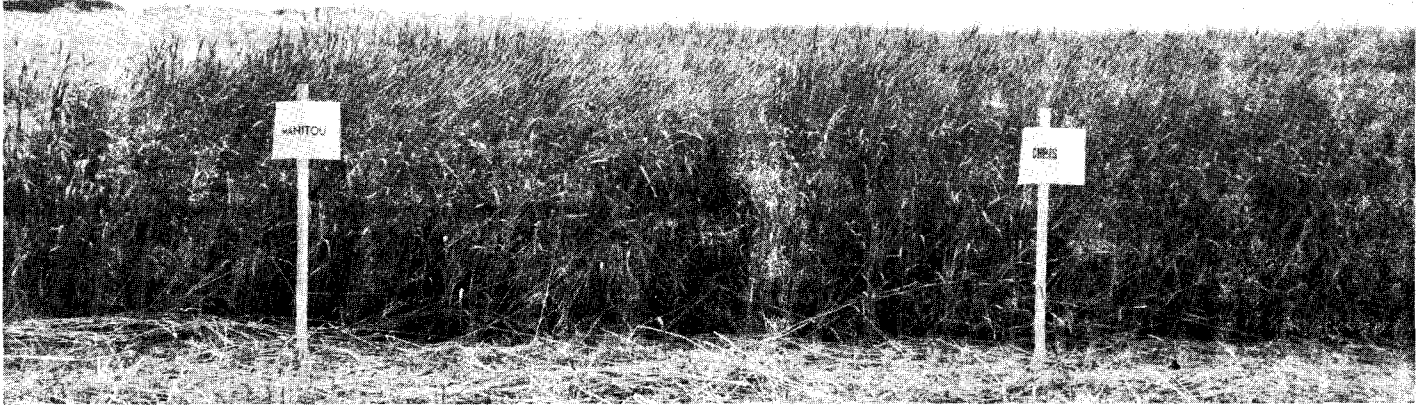


Orris Shulstad, Minnesota Crop Improvement Association, studies a plot of Von Lochow rye at the Southern Experiment Station (Waseca) to prepare for inspection of seed growers fields.

## 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-Thatcher<sup>3</sup> x (Kenya 58-Newthatch x Thatcher<sup>2</sup>) 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 Thatcher<sup>2</sup>-Frontana x Canthatch) x Thatcher<sup>2</sup>-P.I. 170925 by the Canada Department of Agriculture Research Station, Winnipeg, Manitoba.



Chris and Manitou, recommended hard red spring wheat varieties in Lake of the Woods County demonstration plots.

### 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-Thatcher<sup>3</sup> x (Kenya 58-Newthatch x Thatcher<sup>2</sup>) 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 Henry<sup>7</sup> 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 Redman<sup>8</sup>) 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 Redman<sup>8</sup> 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 8. Yields and other characteristics of spring wheat varieties, 1965-67

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	Morris	Crookston	Average‡
<b>Hard Red Spring</b>										
Chris	June 30	37	3.5	R	R	61.2	33	37	39	36
Manitou	June 30	36	3.1	R-MS	R	60.1	31	37	38	35
Selkirk	June 30	36	3.0	S	R	57.9	27	34	34	31
Justin	July 1	38	2.7	S	R	59.6	27	30	31	29
Thatcher	June 30	37	3.6	S	S-R	58.2	25	27	30	26
LSD 5%							4	4	5	3
<b>Durum</b>										
Wells	July 2	38	3.4	R	R	61.8	33	41	36	37
Lakota	July 2	38	3.1	MR	R	60.1	31	41	34	35
Leeds	July 1	37	2.7	R	R	62.6	31	35	32	33
Mindum	July 3	47	5.1	R-MR	S-R	62.0	24	30	30	28
Stewart 63	July 4	48	5.6	R	R	62.9	30	37	38	35
LSD 5%							4	5	6	3

\* 1 erect, 9 flat.

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

‡ Hard red spring average includes Waseca, 1966-67.

## 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.

**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. Se-

lected from a cross of (Carleton x Ld. 194-Khapli x Ld. 308) x Stewart made 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.

**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 Minter<sup>2</sup> 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-Cheyenne<sup>2</sup> 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.

Table 9. 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

**Golden German**—Foxtail. Medium maturity and much earlier than German. Small yellow seed. Grown near Wray, Colorado, for many years.

### 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-sized 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 10. Yields and other characteristics of millet varieties sown in late June at Rosemount, 1965-67

Variety	Yield per acre		Forage protein* percent	Date heading	Plant height inches	Lodging†	Weight of 100 seeds grams	Bushel weight pounds
	Seed pounds	Forage* pounds						
Turghai	1604	4401	12.2	August 9	38	4.6	.59	54.6
White proso‡	1594	4023	12.2	August 11	41	4.2	.71	51.9
Empire	772	7452	9.4	August 25	44	4.9	.16	45.3
White Wonder	181	8230	8.8	September 3	51	3.9	.20	41.0
Golden German‡	743	7997	9.5	August 29	42	3.8	.18	41.0
LSD (5%)	234	852						

\* 15 percent moisture basis.

† 1 erect, 9 flat.

‡ 1967 adjusted data.

## GRAIN SORGHUM

Many hybrids are available. Most are too late for Minnesota. Even the earliest hybrids generally require drying after combine-harvest. The 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.

These trials were planted about June 1 in rows 40 inches apart at a rate of 157,000 seeds of at least 90% germination per acre. Herbicides and cultivation were used for weed control.

Table 11. Yield and other characteristics of grain sorghum hybrids at Lamberton

Hybrid and originator	Years of trial	Grain yield**† per acre	Head moisture† percent	Bushel weight pounds	Date heading	Height inches
1, Minnesota	1964-67	67 (97)	25 (15)	56.8	7-31	58
115, Northrup King	1964-67	64 (101)	32 (16)	54.9	8-3	46
133, Northrup King	1964-67	86 (126)	31 (16)	58.2	8-3	49
LSD (5%)		4 (9)	2 (1)			
Mini-Milo 50, Northrup King	1966-67	49 (83)	28 (16)	56.8	8-2	48
110A, Northrup King	1967	59 (95)	- (16)	54.9	7-31	48
A25, DeKalb	1967	73 (109)	- (17)	54.1	8-6	43
R94, Acco	1967	77 (112)	- (16)	56.9	8-3	47
R920, Acco	1967	70 (105)	- (17)	56.3	8-5	46
B32, DeKalb	1964-66	77 -	40 -	56.1	8-6	51
Pawnee, Acco	1964-66	75 -	38 -	56.1	8-6	56
441, South Dakota	1964-66	67 -	29 -	55.1	8-1	60

\* 13% moisture and 56 pound per bushel basis.

† 1967 data are shown in parenthesis.

### RECOMMENDED VARIETIES

**Bolley**—Developed at North Dakota Agricultural Experiment Station from cross of Birio x C.I. 1134. Immunity to rust conditioned by N<sup>1</sup> 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 N<sup>1</sup> 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.

**Summit**—Released in 1964 by South Dakota Agricultural Experiment Station as selection from B-5128 x Zenith. Immunity to rust conditioned by N<sup>1</sup> 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.

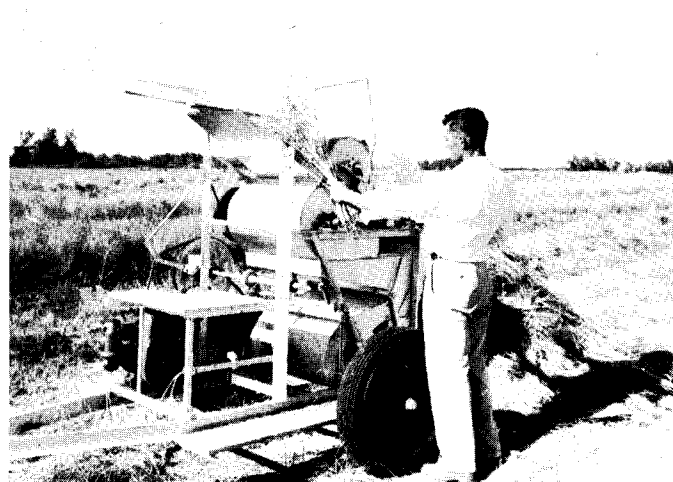
**Windom**—Released in 1962 from Minnesota Agricultural Experiment Station from cross [(Renew x Bison) (Koto x Redwing) (Redwood)]. Immunity to rust conditioned by N<sup>1</sup> gene. Resistant to wilt and moderately susceptible to pasmo. Fair oil content of high drying quality. Brown-seeded, blue-flowered, 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

## FLAX

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.



Special equipment, such as this roller thresher for flax, is needed for small plot work.

## 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; sow early for best yields.

**Bison**—Developed at North Dakota Agricultural Experiment Station by mass selection. Susceptible to rust, moderately resistant 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 it is 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 N<sup>1</sup> 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.

Table 12. Yields of flax varieties in pounds per acre 1963-67

Variety	Early-sown				Late-sown			
	Lamberton	Morris	Crookston	Average	Lamberton	Morris	Crookston	Average
No. trials	4	5	5	14	4	4	5	13
Bolley	1,140	1,126	607	945	700	1,062	707	814
B-5128	1,160	1,212	731	1,025	646	985	844	826
Summit	1,084	1,254	766	1,031	758	1,128	890	923
Windom	1,224	1,226	732	1,049	778	1,160	813	909
Bison	1,235	1,196	723	1,038	788	970	759	833
Linott*	-	1,173	789	-	683	1,048	735	815
Redwood	1,018	1,172	710	963	705	1,032	794	840

\* 1967 adjusted data

Table 13. Characteristics of flax varieties 1963-67

Variety	Days from sowing to-			Plant height inches	Seed weight gm/1000	Lodging*	Pasmo*	Wilt*	Rust†	Oil‡ content %	Iodine value
	First bloom	Full bloom	Maturity								
No. trials	33	32	13	33	10	7	8	4		35	35
Bolley	50	55	94	22	5.7	4	5	5	R	41.4	186
B-5128	52	59	95	23	6.1	5	6	7	R	39.8	178
Summit	50	56	93	21	5.5	5	6	5	R	38.9	181
Windom	50	55	92	21	5.3	4	7	2	R	39.6	185
Bison	51	57	94	23	5.9	6	5	3	S	39.9	173
Linott§	49	53	90	22	5.0	6	-	8	R	41.1	180
Redwood	52	57	94	22	5.9	5	6	2	R	40.1	180

\* Rated on scale of 1 = best, 9 = poorest.

+ R = resistant, S = susceptible.

‡ Oven-dry basis.

§ 1967 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.

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

**Flambeau**—Developed at the Wisconsin Agricultural Experiment Station from an introduction from Russia. Recommended for central, north-central, and northern zones.

**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 only.

**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.

### 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.

**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 Jognun. Five or six days later than Chippewa 64.

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

Table 14. Average yield of soybean varieties in bushels per acre

Variety*	Crookston	Grand Rapids	Moor-head	Morris		Big Lake	Rose-mount	Waseca		Late May	Lamberton		Blue Earth
	1964-67	1964	1966-	1963-	1964-	1964-	1963-	1963-	1964-	planting	Late May	Early May	Earth
		1966-	1966-	1963-	1964-	1964-	1963-	1963-	1964-	1963-67	1964-67	1966-67	1964-
		67	67	67	67	67	67	67	67				67
<b>Early maturing group</b>													
Portage	14	23	26		23								
Flambeau	18	19	31		25								
Merit	19	16	33		28	23							
<b>Medium maturing group</b>													
Merit			34	29		23	31	36		24			29
Traverse			33	30		25	32	38		26			31
Grant			33	31		24	32	40		26			32
Chippewa 64				32		22	32	39		28			31
<b>Late maturing group</b>													
Chippewa 64						22		39		24		26	31
Hark								41		26		27	37
A-100						24		38		26		28	32
Harosoy								37		25		26	33
Lindarin 63								36		24		26	31
Corsoy								42		29		30	34
Amsoy								38		28		31	33
Ford													29

\* Ranked according to maturity adaptation from north to south.

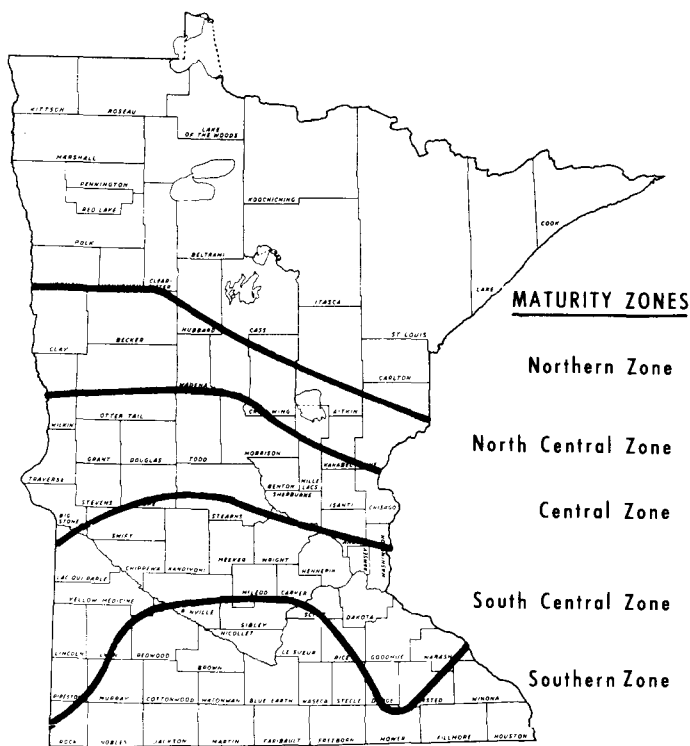
Table 15. Characteristics of soybean varieties

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‡
<b>Early maturing group (average of Crookston and Morris 1964-1967)</b>										
Portage	9-6	1.0	21	15.4	3.0	S	3	P	G	Y
Flambeau	9-13	2.2	25	15.3	2.8	S	3	P	T	Bl
Merit	9-21	1.5	27	13.3	3.1	R	3	W	G	Bf
<b>Medium maturing group (average of Rosemount and Morris 1963-1967)</b>										
Merit	9-17	2.4	32	14.6	2.7	R	3	W	G	Bf
Traverse	9-22	2.2	32	18.0	2.5	S	4	W	G	Y
Grant	9-22	2.6	30	17.1	2.6	S	3	W	T	Bl
Chippewa 64	9-26	2.3	34	15.7	2.5	R	2	P	T	Bl
<b>Late maturing group (average of Waseca and Lamberton 1964-1967)</b>										
Chippewa 64	9-20	1.5	30	15.0	2.3	R	2	P	T	Bl
Hark	9-27	1.5	34	16.9	2.6	S	5	P	G	Y
A-100	9-28	1.6	30	17.9	2.7	S	3	W	G	Bf
Harosoy 63	9-28	2.3	36	17.6	2.7	R	3	P	G	Y
Lindarin 63	9-29	1.6	31	15.9	2.8	R	4	P	G	Y
Corsoy	9-29	1.9	33	15.4	2.7	S	4	P	G	Y
Amsoy	10-2	2.1	36	17.1	2.7	S	2	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: Bl=black, Bf=buff, Y=yellow.



**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 Arrowhead. Large seed used for dehulled and whole seed food uses and the smaller seed for birdfeed. An open-pollinated variety selected from Mennonite by the Minnesota Agricultural Experiment Station. Released in 1964.

**Peredovik**—Medium yield. Late maturity and tall. Small black seed of high bushel weight, low hull percentage, and very high oil content. Lodging medium. 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

Table 16. Yields of sunflower varieties at Rosemount and Crookston 1964-67, Gonvick 1966-67, and Grand Rapids 1967

Variety	Yield per acre, pounds				
	Rosemount	Crookston	Gonvick	Grand Rapids	Average 11 trials
Arrowhead	1535	1452	1401	2253	1546
Mingren	1574	1605	1373	2122	1599
Peredovik	1396	1406	1128	2160	1420
Commander	1460	1412	1100	2034	1429
Smena	1267	1397	907	1750	1293
VNIIMK 89.31	1391	1532	1077	2148	1454
LSD (5%)	197	279	410	524	152
Armavirec*	1201	1096	1427	1193	1203
Krasnodarets†	1052	1460	-	1444	1226
Kubanek‡	1259	1330	1219	1610	1309
HO 1‡	1390	1550	989	1845	1417
Vostok‡	1294	1435	1109	1312	1313

\* No 1964 data.

† 1967 data. Not grown at Gonvick.

‡ No 1964-65 data.



Sunflower breeding nursery with heads bagged to control pollination. Recommended varieties are usually over five feet tall in contrast to the short lines in the foreground.

short. Small black seed of high bushel weight and very high oil content. An open-pollinated variety developed in Russia.

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

**Krasnodarets**—Medium yield. Early 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.

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

**VNIMK 89.31**—Medium yield. Late maturity and tall. Small black seed of high bushel weight, low hull percentage, and very high oil content. An open-pollinated variety developed in Russia.

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

#### OTHER VARIETIES

**Admiral**—Medium yield, maturity, and height. Small seed of low oil content and high bushel weight. Rust-resistant three-way cross licensed in 1960 by Canada Department of Agriculture. Produced by crossing the inbred S-37-388RR with the single

cross CM5 x CM27. Seed harvested from the S-37-388RR rows in the crossing field is used for seed.

**Advent**—Medium yield, maturity, and height. Small seed of low oil content and high bushel weight. Rust-resistant topcross hybrid licensed in 1959 by Canada Department of Agriculture. Produced by crossing the inbred S-37-388RR with the variety Sunrise. Seed harvested from the S-37-388RR rows in the crossing field is used for seed.

**Note: Commercial or second generation Admiral or Advent should not be planted. Use only first generation hybrid sunflower seed.**

**Commander**—Medium yield. Similar to Mingren in maturity, height, and use. Slightly smaller and darker seed than Mingren. An open pollinated variety selected from Mennonite 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.

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

#### Disease Reaction of Presently-Grown Varieties

All varieties except Admiral and Advent are susceptible to rust. However recommended varieties have more tolerance to rust than certain varieties used for rust experiments. Peredovik and some other high-oil Russian varieties have considerable tolerance to leaf mottle (caused by Verticillium). All varieties are susceptible to downy mildew and to stem rot (caused by Sclerotinia).

Table 17. Characteristics of sunflower varieties

Variety	Date of flowering	Plant height inches	Lodging*	Seed			
				Weight of 100 seeds grams	Large seed† percent	Bushel weight pounds	Oil content‡ percent
Arrowhead	July 27	60	2.9	8.3	2	29.6	30.2
Mingren	July 31	62	3.5	11.4	49	23.9	28.8
Peredovik	August 2	65	4.0	6.0	0	28.7	44.4
Commander	August 1	62	3.2	10.9	33	24.9	28.2
Smena	August 2	61	3.7	5.9	0	29.2	45.1
VNIMK 89.31	August 2	66	3.5	5.8	0	29.0	44.4
Arnavirec	July 24	52	2.7	6.9	0	30.3	42.5
Krasnodarets	July 29	59	2.7	6.2	0	29.0	44.1
Kubanek	July 30	59	3.2	6.4	0	29.8	38.4
HO 1	August 3	67	3.6	5.3	0	29.6	41.9
Vostok	July 30	57	4.2	6.7	0	29.0	41.6

\*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.

**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. Grow for soup 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.

Table 18. Yields and other characteristics of pea varieties at Crookston, 1960-63, 1965-67

Variety	Seed yield per acre	Weight of 100 seeds	Seed protein*	Date first bloom	Sowing rate per acre
	pounds	grams	percent	June	pounds
Century	1820	21.7	25.3	26	224
Chancellor	1573	13.4	26.4	28	124
Strål	1730	16.1	27.7	26	149
LSD (5%)	154				

\*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.

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, DeKalb 123, Ladak, Progress, Ranger, Rambler, Scout, 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 Atlantic, 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-resistant group, but severe winter conditions will reduce stands and yields. Varieties in this group are: Buffalo, Cody, Haymore, Lahontan, Saranac, and Warrior.

#### 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 they tend to 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.

Varieties in this group are: Alfa, Altfranken-Schmidt, Apex, Arnim, Cardinal, Cherokee, DeKalb 153, DuPuits, Europa, F.D. 100, Flandria, Glacier, Milfeuil, Orchies, PAT-30, S.C. 118, Socheville, Stride, W.L. 302, and W.L. 303.

#### Nonhardy varieties

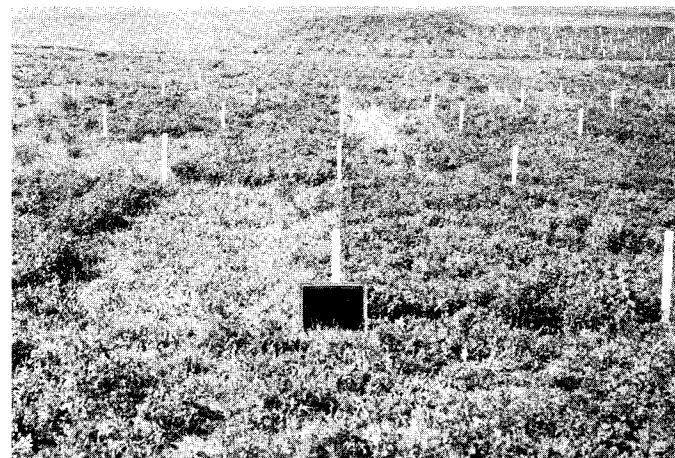
These varieties are not sufficiently winterhardy to be grown in Minnesota except for plowdown in the seeding year.

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

#### Varieties not classified

The following varieties have not been tested sufficiently to place them into a specific group above. As more information becomes available they will be classified.

Included are: Aphidor, Franck's Langmeiler, Resistador, and Triesdorfer.



Alfalfa variety test—right, winterhardy variety is resistant to bacterial wilt; left, less winterhardy variety is susceptible to bacterial wilt.

Table 19. Forage yields expressed as percent of the average of two check varieties (Vernal and Ranger), and bacterial wilt reaction of alfalfa varieties (1966 and 1967 data from 1965 seedings except at Morris which are one year data)

	Crookston	Grand Rapids	Lamberton	Morris	Rosemount	Waseca	Average	Bacterial wilt*
<u>Moderately hardy varieties †</u>								
Alfa	96	101	99	80	111	98	98	S
Cardinal	92	95	100	89	102	100	96	S
DuPuits	100	99	93	101	104	101	100	S
Europa	91	100	99	95	107	102	99	S
F.D. 100	100	93	102	100	106	105	101	S
Flandria ‡	93	96	95	97	101	101	97	S
Glacier	116	102	106	94	105	105	105	S
Haymore	85	107	109	96	103	103	101	MR
Orchies	103	94	103	89	108	99	99	S
Saranac	94	102	110	95	110	107	103	VR
S.C. 118	87	96	107	89	104	107	98	S
Socheville ‡	—	—	—	—	—	—	—	S
Warrior	102	105	102	92	107	99	101	MR
W.L. 302	92	101	98	99	105	96	99	S
Ranger π	102	97	94	99	97	97	98	R
Vernal π	99	104	106	100	103	103	103	VR
LSD (5%)	20	13	16	11	7	13		
Average of checks in tons per acre	4.13	3.68	3.69	4.05	5.06	4.40	4.17	
<u>Hardy varieties †</u>								
Altfranken-Schmidt	123	94	107	—	101	94	104	S
Arnim	104	102	110	111	104	94	103	S
Beaver	108	97	110	100	101	99	103	R
Cayuga	104	113	110	108	99	102	106	R
Culver	97	106	110	—	103	99	103	R
Franck's Langmeiler	106	99	111	—	107	96	102	S
Narragansett	116	99	105	101	99	105	104	S
Norseman	113	97	100	95	—	95	102	R
Progress	94	106	101	94	101	100	99	R
Ranger π	95	95	101	95	97	95	96	R
Scout	—	—	—	90	—	—	—	MR
Vernal π	105	106	99	105	103	105	104	VR
W.L. 202	106	103	98	103	107	97	102	R
522	109	98	110	94	103	99	102	R
525	109	106	104	100	104	96	103	R
LSD (5%)	20	14	18	13	8	12	14	
Average of checks in tons per acre	3.18	3.60	3.42	4.11	4.98	4.43	3.95	
<u>Very hardy varieties †§</u>								
Beaver					96			R
Norseman					99			R
Teton					91			R
Travois					87			R
Ranger π					96			R
Vernal π					105			VR
LSD (5%)					9			
Average of checks in tons per acre					4.11			

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

† Varieties were classified into (3) 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.

§ Only two cuttings from these varieties.

π Check varieties.

## 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 MacDonal College, Quebec, Canada. Outstanding seedling vigor and high forage yield.

**Tana**—Developed at the Montana Agricultural Experiment Station.

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

Table 20. Average yield of birdsfoot trefoil in tons per acre

	Rosemount seeded 1965 cut 1967	Crookston seeded 1965 av. 1966-67	Rosemount seeded spring 1967 cut August 1967	Average
Empire	4.23	2.36	.59	2.39
Viking	4.18	2.26	.88	2.44
Leo	4.42	2.68	1.31*	2.80

\* Shows remarkable seedling vigor.

## RED CLOVER

### RECOMMENDED VARIETIES

**Dollard**—Selected at MacDonal 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 yielder 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 the fall of the first year, is a heavy forage producer the second year, and comes to full bloom 2 or 3 weeks later than common types. Therefore, it has a longer grazing season.

**Goldtop**—A yellow-blossom 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 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.

**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 21. Average yields of bromegrass varieties in tons per acre

	Rosemount 1963, 1965-67	Waseca 1963, 1966-67	Lamberton 1963-67	Morris 1963-64, 1966	Grand Rapids 1963-66-67	Crookston 1965-67	5-Year state average
Sac	4.05	2.76	4.21	2.62	3.34	2.30	3.21
Saratoga	3.96	2.66	4.06	2.72	3.51	2.25	3.19
Achenbach	3.97	2.85	4.23	2.52	3.40	2.30	3.21
Lincoln	3.98	2.89	3.54	2.53	3.34	2.30	3.09
Common	3.90	2.58	3.91	2.69	2.58	2.29	2.99



## 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.

**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. Winter-hardy 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 winter-hardy and early maturing.

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

Table 22. Yields and time of bloom of timothy varieties

	Forage yields, tons/acre						6-year state average
	Rosemount 1962-67	Waseca 1962, 63, 67	Lamberton 1963-65	Morris 1963, 65	Crookston 1962, 65-67	Grand Rapids 1963, 65	
Climax	2.24	2.38	3.36	2.73	2.17	3.70	2.76
Itasca	2.35	2.47	2.95	2.91	2.01	3.73	2.74
Drummond	1.99	2.16	2.63	2.33	1.73	3.08	2.32
Essex	2.12	1.76	2.44	2.60	2.12	2.63	2.28

	Seed yields, pounds/acre				Maturity Rosemount, % bloom July 1, 1964
	Rosemount 1964	Grand Rapids 1964	Grand Rapids 1966	State average	
Climax	427	242	324	331	8*
Itasca	334	194	252	260	27
Drummond	395	265	245	301	0
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 in 1966 and 1967 at 30 lbs. per acre with ample P & K fertilizer plus the equivalent of 100 pounds N per acre. They were evaluated at the green chop stages. Sweet sorghums were grown in 40-inch rows with similar fertilization and harvested at the silage stage.

The green-chop yields of the sudans and sorghum-sudans were somewhat lower in 1967 than in 1966 because of the cool June and the dry conditions later in the summer of 1967. Two cuttings were obtained in 1966 and 1967 except at the Morris Station in 1967 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 again in 1967, except for one sorghum-sudan which exhibited lower HCN content than the sudans.

In the sweet-sorghum trials harvested at the silage stage, wide differences in maturity were observed, as shown by the percent composition and maturity. Since the heads and leaves are considered to be more nutritious than the stems, the percentages of these are an indication of the nutritive value. Corn produced a higher yield of ears plus leaves than did the sorghums (heads plus leaves).



Field day at Lake of the Woods County demonstration plots finds farmers studying small grain varieties. Sunflower plots are in the background.

Table 23. Yields and other characteristics of sudan and sorghum-sudan hybrids at a stage to simulate green feeding (first cut about 4 ft. tall)

Variety or cross and company	Tons dry matter per acre				Mg. HCN per 100 gm. D.M.		% protein 1st cut		Recovery after cut†	
	4-station* average 1966	1967			Rosemount		Rosemount		Rosemount	
		Rose- mount	Morris	2-station average	1966	1967	1965	1966	1966	1967
<b>Sudans</b>										
Piper	3.20	2.85	1.72	2.29	10	21	10.5	17.4	74	78
Trudan II, Northrup King	3.56	2.23	1.97	2.10	12	25	10.8	17.4	70	53
Trudan IV, Northrup King	3.54	2.51	1.92	2.22	18	24	-	17.2	75	65
7-49G, Caladino	-	3.12	2.99	3.06	-	17	-	-	-	65
<b>Sorghum-sudan hybrids</b>										
Sordan, Northrup King	3.46	3.04	2.36	2.70	26	48	10.8	18.3	59	39
985, Pioneer	3.41	2.81	2.05	2.43	19	34	10.7	18.6	59	39
990, Pioneer	-	2.59	2.20	2.40	-	32	-	-	-	43
X1733, DeKalb	3.77	2.93	2.53	2.73	24	28	-	17.2	68	50
SX6, DeKalb	4.03	3.23	2.32	2.78	30	29	-	16.8	66	49
SX5, DeKalb	3.91	2.79	2.62	2.71	21	43	-	18.7	66	48
L77F, Lindsey Funk	3.36	2.76	2.03	2.40	25	32	10.2	17.1	61	40
L8029F, Lindsey Funk	-	2.68	2.52	2.60	-	50	-	-	-	40
Chowmaker, Excel	3.71	2.72	2.17	2.45	25	43	10.5	16.9	63	48
Greenlan, Caladino	3.66	3.18	2.61	2.90	31	32	12.3	17.1	69	48
Rancher 555, Midw. Res. Assoc.	3.35	2.77	1.98	2.38	25	39	-	18.6	66	43
FFR66, Land O'Lakes	3.74	2.63	2.36	2.50	27	42	-	18.4	69	48
Grazemaster, Taylor Evans	3.37	2.87	1.98	2.43	32	49	10.7	17.9	60	48
Haygrazer, Taylor Evans	3.85	2.77	1.87	2.32	32	41	10.7	17.7	66	40
RP Mor Su, W.R. Grace & Co.	3.53	3.59	2.60	3.10	26	44	-	17.2	66	50
Thunderbird, Paymaster	3.02	2.77	1.85	2.31	19	29	11.5	18.1	61	38
Sweet Sioux, Paymaster	3.73	3.26	2.38	2.82	23	35	9.9	18.0	65	48
Hidan 39A, Frontier	-	3.06	2.32	2.69	-	29	-	-	-	40
Nebr. 280, Nebraska	3.74	3.04	2.58	2.81	15	20	11.6	18.0	63	53

\* Four stations are Rosemount, Waseca, Morris and Grand Rapids.

† Percent ground cover 10 days after cut.

Table 24. Yields and other characteristics of sweet sorghums (corn check) grown in 40-inch rows and harvested at the silage stage

Company and sorghum	Tons dry matter per acre*				% composition, Rosemount 1967			Maturity 1967†		Height inches 1967	
	1966		1967		Heads or ears	Leaves	Stems	Rose- mount	Lamb- erton	Rose- mount	Lamb- erton
	Rose- mount	Lamb- erton	Rose- mount	Lamb- erton							
<b>Sorghum</b>											
DeKalb FS 15	-	-	5.34	5.85	17	29	54	LM	SD	87	76
Northrup King 315	5.25	7.51	5.22	5.54	21	29	50	SD	HD	87	70
Taylor Evans Yieldmaker	5.56	7.70	5.39	5.98	19	30	51	SD	SD	91	81
Taylor Evans Yieldmaker A	5.78	6.93	5.61	4.77	11	34	55	M	D	83	72
Taylor Evans Silomaker	5.82	5.88	5.78	6.48	22	31	47	SD	HD	85	77
Taylor Evans Goldmaker	5.45	6.43	6.53	5.66	9	26	65	PP	M	96	70
W.R. Grace & Co. 30F	4.89	7.27	5.84	5.48	7	27	66	PP	M	99	71
W.R. Grace & Co. Sumax	-	-	6.05	6.03	10	25	65	M	HD	99	65
Paymaster Cropguard	5.64	5.07	5.86	5.75	7	31	62	PP	EM	109	80
Paymaster FS 401R	-	-	5.67	6.06	27	27	46	M	HD	85	70
Paymaster 3 Little Indians R	3.85	6.29	4.70	5.37	25	25	50	LM	D	80-107	89
Frontier S214	-	-	5.51	6.44	12	30	58	P	EM	99	82
Pioneer 931	6.41	9.16	6.49	7.09	11	29	60	H	H	120	115
<b>Corr.</b>											
High Sugar, HS 50 (early planted)	-	-	6.30	-	49	29	22	Dent	-	97	-
Dent (late planted)	5.46	6.16	6.27	5.16	47	29	24	¾ dent	Dent	105	92
Dent (early planted)	5.43	6.34	7.05	-	54	25	21	Dent	-	97	-

\* All harvested prior to last killing frost.

† Maturity - Headed (H) pollen shedding (P), past pollen (PP), early milk (EM), milk (M) soft dough (SD), dough (D), hard dough (HD)

## 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
<b>Forage Grasses (perennial)</b>			
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
<b>Forage Legumes (biennial or perennial)</b>			
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		
Hard Red Spring.....		75-90	Early spring
Durum .....		90	Early spring
Winter .....		75-90	Aug. 20 to Sept. 20
<b>Miscellaneous Crops</b>			
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.