6-1947

EC100 Revised 1947 Crop Varieties in Nebraska

C. O. Gardner

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Crop Varieties in Nebraska

by

C. O. Gardner

Extension Circular 100 Revised
June 1947

Extension Service of the University of Nebraska College of Agriculture and United States Department of Agriculture. Brokaw,
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CROP VARIETIES IN NEBRASKA

by

C. O. GARDNER

INTRODUCTION

Agronomic research has indicated that each crop variety grown has its own particular adaptation. It is vitally influenced by such ecological factors as rainfall, temperature, humidity, day length, and length of growing season. A variety may be quite outstanding in one section of Nebraska, yet that same variety grown in another section of the state may be only mediocre in performance. Therefore, it is highly important that each Nebraska farmer be informed as to the best crop varieties for his area so maximum production can be achieved within the state.

"Crop Varieties in Nebraska" is designed primarily as a ready reference for use by county agricultural agents and soil conservationists in making varietal recommendations in Nebraska. The recommendations made in this publication are largely based on the actual performance of each variety in tests conducted throughout the state under the outstate testing program as well as in tests conducted at the Agricultural Experiment Station at Lincoln, at sub-stations near North Platte, Scottsbluff, and Valentine, and at the Box Butte Experimental Farm near Alliance.

For the purpose of conducting outstate tests and to facilitate making varietal recommendations, the state has been divided into eight cropping districts as shown in the accompanying map. Within each district the ecological factors influencing varieties are thought to be sufficiently uniform to permit definite recommendations for each district. Some crops such as alfalfa have a wide range of adaptation, and any of the winter-hardy varieties of alfalfa can be grown in the state wherever sufficient moisture is available. Small grain varieties, on the other hand, have a narrower range of adaptation, so that it is advisable to recommend specific varieties for each of the eight districts. The adaptation of each variety is indicated either in the tables or in the varietal descriptions.

The varieties discussed herein are classified as recommended, acceptable, and not recommended. Recommended varieties include those that have shown a definite superiority in performance in the districts where they are recommended. No variety is so designated until it has been thoroughly tested over a period of years. Acceptable varieties are those that have performed well over a period of years but have not been particularly outstanding. When seed of recommended varieties is not available, fairly satisfactory results may be expected by using one of the acceptable varieties. Varieties not

1 Assistant Extension Agronomist, University of Nebraska, Lincoln, Nebraska. Acknowledgment is given to the various members of the Agronomy Department who have contributed information which has been used in discussing the many crop varieties and in making recommendations.
recommended should not be grown. They have either proved to be inferior in performance or have not been sufficiently tested to be recommended in any district in the state.

EXPERIMENT STATION HYBRIDS RECOMMENDED FOR NEBRASKA

The following certified numbers are recommended on the basis of performance tests over the state. Early maturing hybrids, mid-season hybrids, and full-season hybrids are listed for each district.

<table>
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<tr>
<th>District</th>
<th>Maturity classification of recommended hybrids</th>
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<td>Section</td>
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<td>II (East Central)</td>
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<td>Nebr. 501</td>
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<tr>
<td>District III</td>
<td>Iowa 4316</td>
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<td>(Northeast)</td>
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<tr>
<td></td>
<td>Iowa 939</td>
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<td></td>
<td>Iowa 306</td>
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<td></td>
<td>Nebr. 502</td>
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<td>Nebr. 501</td>
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<td>Dryland</td>
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<td>Nebr. 502</td>
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<td>Nebr. 501</td>
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<td>District VI</td>
<td>Iowa 4316</td>
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<td>(North Central)</td>
<td>Iowa 306</td>
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<td></td>
<td>Iowa 939</td>
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<tr>
<td></td>
<td>Iowa 306</td>
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<tr>
<td>Dryland</td>
<td>Iowa 4316</td>
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<td>District VII</td>
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<td>(Southwest)</td>
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<tr>
<td>(Northwest)</td>
<td>Iowa 939</td>
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<tr>
<td></td>
<td>Iowa 306</td>
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</table>

HYBRID CORN

Recommended Yellow Hybrids

**Iowa 4316**

(Wf9 x M14) x (L289 x I205)

Iowa 4316 matures in 106 to 110 days, the earliest of all the Nebraska certified hybrids. It has shown excellent yielding ability and general all-round performance in its maturity class. The plants are relatively small and
tend to remain green after the husks are dried and the ear has begun to ripen. The ears are borne low on the stalk and are fairly large with 12 to 16 rows of deep, medium-rough, well-dented kernels.

**Iowa 939**  
(L289 x I205) x (Os420 x Os426)  
Iowa 939 matures in 110 to 114 days. The plants are of medium height and dark green in color. It has a relatively wide range of adaptation with respect to soil and climatic conditions. The ears are carried quite uniformly at medium height. There is some tendency for this hybrid to drop its ears, which is an undesirable characteristic. The kernels are dimple dented but are somewhat rough. They are of medium depth. This hybrid is quite largely being replaced by Iowa 306.

**Iowa 306**  
(Wf9 x Os420) x (L289 x I205)  
Iowa 306 matures in 110 to 114 days, just slightly later than Iowa 939. In the past it has been the most widely grown early hybrid in Nebraska. The plants are of medium height with good lodge resistance and ear retention. This makes it an excellent corn for mechanical picking. The ears are medium large and of good quality with somewhat rough kernels.

**Indiana 608C**  
(Wf9 x Hy) x (A x Tr)  
Indiana 608C matures in 110 to 114 days. It was developed at the Indiana Experiment Station and has proved itself to be especially well adapted to the soils and climate of central, northeastern, and southwestern Nebraska. The plants are of medium height with dark green foliage, and they are fairly lodge resistant. The shanks are strong making this hybrid well suited for mechanical picking. The ears are medium-large with good husk covering. The kernels are deep, medium-rough, and rather starchy.

**Iowa 4059**  
(Wf9 x Hy) x (L289 x I205)  
Iowa 4059 matures in 110 to 114 days and is very resistant to lodging and ear dropping, which makes it one of the best hybrids in the state for mechanical picking. The plants are tall with the ears borne at a uniform and desirable height. The ears are large with a starchy kernel of good quality.

**Nebraska 501**  
(Wf9 x Hy) x N6  
Nebraska 501 matures in 110 to 114 days. This hybrid is a three-way cross that has been outstanding in yield in areas where midseason hybrids are best adapted. The plants are relatively short and very resistant to lodging. The ears are short and thick with short shanks. The kernels are deep, rather smooth, and dark yellow in color.
Nebraska 502
(Wf9 x 187-2) x (N6 x A)

Nebraska 502 matures in 110 to 114 days. It has been outstanding in yield in the Platte Valley under irrigation. The plants are of medium height and are dark green in color. They are very attractive in appearance particularly as vegetative maturity is reached since the stalks remain green while the husks dry out as the ears begin to ripen. The ears are medium-long and cylindrical in shape. The kernels are medium rough and have a slightly reddish cast.

U. S. 35
(Wf9 x 38-11) x (Hy x R4)

U. S. 35 matures in 114 to 118 days. The plants are tall and quite resistant to lodging. The ears are carried relatively high on short shanks, and they are easily husked. They are large and thick carrying deep, medium-rough, relatively starchy kernels. This hybrid does well under irrigation, and it has proved to be excellent for mechanical picking.

Nebraska 601
(Wf9 x 38-11) x (07 x 187-2)

Nebraska 601, formerly called Nebraska 1001, matures in 114 to 118 days. It has made an excellent record in both performance and yield where full-season corns are adapted. The plants are of medium height and have considerable resistance to stalk breaking. The foliage is dark green. Ears are borne at a medium height on medium to long shanks. The ears are thick and carry 16 to 18 rows of deep, somewhat smoothly dented kernels of good quality.

Ohio C92
(Wf9 x 38-11) x (Hy x 07)

Ohio C92, which is similar to Nebraska 601 and U. S. 35, matures in 118 to 122 days. While this hybrid was developed in Ohio, it has proved to be one of Nebraska’s best adapted hybrids. It has excellent stalk quality and a good root system, making it highly resistant to lodging and suitable for mechanical picking. The plants are medium tall and are dark green in color. The ears are cylindrical with rather deep, medium-rough, soft, starchy kernels. The shelling percentage of this corn is unusually high.

U. S. 13
(Wf9 x 38-11) x (Hy x L317)

U. S. 13, a full-season yellow hybrid, matures in 118 to 122 days. The plants are medium tall and the ears are borne at a medium height on short shanks. The ears are large with deep, medium-rough kernels and are easily husked.

Illinois 201
(Wf9 x 38-11) x (187-2 x L317)

Illinois 201, a full-season yellow hybrid, matures in 118 to 122 days. The plants are tall with very dark green
foliage, and they are fairly lodge resistant. The ears are long and slender and are borne on a long shank. The slender ears make this hybrid unsuitable for mechanical picking unless it is grown on good ground under favorable conditions, which promotes larger ear size.

**Yellow Hybrids Not Recommended**

**Nebraska 463**

(Os420 x A) x (N6 x 66)

Nebraska 463, a yellow hybrid, matures in 110 to 114 days. The plants are of medium height, and they are quite susceptible to stalk breaking, which is an undesirable characteristic. This hybrid does have strong shanks and is not as subject to ear dropping as is Iowa 939. The ears are medium rough with reddish-yellow kernels. Since other hybrids in the same maturity or are resistant to lodging and are higher yielding, this hybrid is no longer recommended.

**Recommended White Hybrids**

**Kansas K2234**

K2234 is a white hybrid that matures in 122 to 126 days. It is quite drouth resistant and very resistant to stalk breaking. The plants are tall and the ears are borne well up on the stalk. The ears are large with 14 to 16 rows of broad, deep, starchy kernels.

**Hybrid Popcorn Recommended**

**K4**

K4 popcorn matures in 112 to 115 days. It is of the yellow-pearl and South American types, its lines being derived from these varieties. It is a good producer yielding 46 per cent more than the open-pollinated variety over a three-year testing period. It also has a popping expansion 25 per cent higher than open-pollinated varieties.

**WINTER WHEAT VARIETIES RECOMMENDED FOR NEBRASKA**

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<td>Turkey Tenmarq Blackhull Iobred Comanche</td>
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<td>Turkey Iobred</td>
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<td>District V (Central)</td>
<td>Nebred Cheyenne</td>
<td>Turkey</td>
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<td>Turkey</td>
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<td>District VII (Southwest)</td>
<td>Nebred Cheyenne</td>
<td>Turkey Tenmarq Blackhull Comanche</td>
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<td>Cheyenne Nebred</td>
<td>Nebr. No. 60 Turkey</td>
</tr>
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</table>
WINTER WHEAT VARIETIES

Recommended Varieties

Pawnee

Pawnee was selected from a Kawvale x Tenmarq cross in experiments cooperative between the Nebraska and Kansas Experiment Stations and the United States Department of Agriculture. The outstanding characteristics of the variety are moderate resistance to leaf and stem rust and to bunt, high resistance to loose smut, and moderate resistance to the forms of hessian fly common to Nebraska. The variety is early, less winter-hardy than Turkey, has a better test weight than Turkey, and its milling and baking characteristics are satisfactory to the point where Cheyenne has outyielded Cheyenne by over five bushels per acre on the average and has outyielded Turkey by over seven bushels per acre. Also in cooperative tests in southeastern Nebraska it has been high in yield. At North Platte and Alliance, Pawnee has not outyielded Cheyenne because of its lack of winter-hardiness, and it has a tendency to shatter when grown west of the recommended area. Pawnee was first released in the fall of 1942.

Nebred

Nebred was selected from a Turkey wheat at the Nebraska Agricultural Experiment Station. The variety is resistant to the forms of bunt present in Nebraska and is less susceptible to stem rust than Turkey or Cheyenne. It is midseason as to maturity and more winter-hardy than Turkey. The grain mills well and the flour gives a large loaf of bread having a slightly yellow color. Nebred has yielded a little less than Cheyenne in tests at Lincoln, North Platte, and Alliance. It is recommended for the entire state.

Cheyenne

Cheyenne is the result of a selection made from Crimean wheat at the Nebraska Agricultural Experiment Station in 1922. At North Platte and Alliance it has been the highest yielding variety, while at Lincoln it ranked first over a 15-year period but has been exceeded by Cheyenne in more recent years. Cheyenne is characterized by stiff straw and short erect heads making it a good variety for combining. It is somewhat resistant to hessian fly but is susceptible to bunt, leaf rust, and stem rust. Flour from Cheyenne wheat requires a long mixing time in order to give good bread. Cheyenne is slightly more winter-hardy than Turkey and is recommended in Nebraska for the western two-thirds of the state.

Acceptable Varieties

Nebraska No. 60

Nebraska No. 60 is one of the first improved types or selections of Turkey distributed in Nebraska. It differs from Turkey in being more winter-hardy and slightly later. In years when winter killing has not been a factor,
the yields of Nebraska No. 60 have not compared so favorably with other varieties, especially at Lincoln. It is still popular in some sections of western Nebraska and is an acceptable variety for the panhandle region.

**Turkey**

Turkey is one of the most widely grown varieties of hard-red-winter wheat. It is more a type than a variety since it has been shown that so-called Turkey wheat from different parts of the country differs quite widely in growth characteristics. Most Turkey wheats are winter-hardy, a little late in maturity, have straw that lodges rather easily, and are susceptible to leaf rust, stem rust, smut, and hessian fly. The milling and baking characteristics of Turkey are acceptable to the trade. Turkey is popular with many farmers, but tests show Pawnee, Cheyenne, and Nebred to be higher in yield in their respective areas of adaptation. The variety is acceptable for the entire state.

**Tenmarq**

Tenmarq was selected from a Marquis (spring) x Crimean selection (winter) cross at the Kansas Agricultural Experiment Station. It is fairly early, rather winter-tender, has fair straw strength, short, plump kernels, and yields well in the absence of winter killing. The variety has some resistance to leaf rust and being early may escape serious damage from stem rust in some years. The grain is inclined to "yellowberry" rather easily, and the test weight may be low but the milling and baking characteristics are well liked by most of the trade. The yield of Tenmarq at Lincoln has been about the same as for Nebred, but at North Platte and Alliance it has been lower than this and other adapted varieties. Tenmarq is an acceptable variety in the southern two tiers of counties of Districts I, IV, and VII.

**Blackhull**

Blackhull is a well known and widely grown variety in the central and southern Great Plains. It was developed and distributed by Earl G. Clark, a Kansas farmer. As the name indicates, the glumes or chaff turn black in most seasons serving as a means of identification. Blackhull is earlier than Turkey, less winter-hardy, often escapes rust damage, and is noted for its high test weight. In seasons when the weather is wet prior to harvest, Blackhull may lodge due to diseases that occur during rainy weather when the wheat is heading. The milling and baking characteristics of Blackhull are acceptable to the trade. During the last few years Blackhull has not yielded as well as Tenmarq at Lincoln and Alliance and only slightly more at North Platte. In cooperative trials it has yielded about the same as Tenmarq in most tests. Blackhull is acceptable in the southern two tiers of counties in Districts I, IV, and VII.

**Comanche**

Comanche was selected from an Oro x Tenmarq cross and was released in Kansas in 1942. It is best described as a bunt resistant Tenmarq, since it carries resistance to
most bunt forms found in Kansas and Nebraska. At Lincoln its yield has been about equal to Tenmarq but lower than Pawnee. It is hardly equal to Cheyenne in yield at North Platte and Alliance because of lack of winter-hardiness. Its test weight is better than that of Tenmarq. In areas where Blackhull and Tenmarq have performed satisfactorily Comanche could be used, which, in Nebraska, would be the southern two tiers of counties. It will probably be unable to compete in yield with Pawnee in southeastern Nebraska.

Iobred

Iobred, a variety developed by the Iowa Experiment Station, enjoys considerable popularity in eastern Nebraska but in yield tests at Lincoln has been very low. In the cooperative tests in eastern Nebraska it has failed to outyield Pawnee, Nebred, or Turkey. Iobred has brown chaff, short, broad kernels, stiff straw, is resistant to leaf rust and moderately resistant to stem rust. Its worst fault is an inclination to shatter under dry conditions at harvest. Iobred is acceptable in the eastern two tiers of counties in Districts I, II, and III.

Varieties Not Recommended

Kawvale

Kawvale is a semi-hard variety developed by the Kansas Station. Over an 11-year period at Lincoln it gave an average yield of 1.4 bushels per acre less than Cheyenne. It has considerable leaf rust resistance, and is a “late ruster” with regard to stem rust. It is resistant to loose smut and moderately resistant to hessian fly and is fairly early, but it shatters badly. It causes difficulty in grain grading, and although it looks like a soft wheat, it mills and bakes like a variety of hard wheat.

Iowin

Iowin is a variety from Iowa, differing from Turkey by having broader, lighter green leaves and taller stems which may turn purple in some years. Its kernels are rather soft, but it has some resistance to stem rust. At Lincoln it failed to outyield Turkey, and in cooperative tests in eastern Nebraska it has been outyielded by Pawnee and Tenmarq.

Wichita

Wichita is a very early winter wheat selected from the cross Early Blackhull x Tenmarq. It is nearly as early as Early Blackhull, and it has been distributed by the Kansas, Oklahoma, and Texas Stations as a substitute for Early Blackhull. It has no disease resistance, has a rather weak straw, and is very winter-tender. Its milling and baking characteristics are acceptable. At both Lincoln and North Platte it has averaged less than Pawnee for yield, but it was number one variety at North Platte in 1944 because it escaped damage from stem rust. It is doubtful if the variety will find a place in Nebraska.
Chiefkan

Chiefkan is a beardless, black-glumed, hard-red-winter wheat developed by Earl G. Clark in Kansas. The variety has shown considerable yielding ability in Nebraska when not injured by winter killing. It has nearly equalled Cheyenne in yield at Lincoln but has been far below Pawnee. It has some resistance to leaf rust, but it is very susceptible to other common diseases such as loose smut and covered smut. The grain has good color, a heavy test weight, and mills satisfactorily, but the baking behavior is rather inferior. The variety does not seem to have a place in Nebraska.

Red Chief

Red Chief was also released to Kansas farmers by Earl G. Clark, Sedgwick, Kansas. The exact origin of the variety is not known, but it is thought to be a selection from a natural Redhull x Chiefkan hybrid. Red Chief is very similar to Chiefkan in most characteristics. It is beardless and has red chaff, and the grain is dark red in color and high in test weight. Like Chiefkan this variety has little or no disease resistance and is even more susceptible to bunt. The milling and baking characteristics are similar to those of Chiefkan, but in general may be slightly better. In yield tests in Nebraska Red Chief has been slightly above Chiefkan at Lincoln and Alliance, but decidedly lower than Pawnee.

**SPRING WHEAT VARIETIES RECOMMENDED FOR NEBRASKA**

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<tr>
<th>Districts</th>
<th>Recommended</th>
<th>Acceptable</th>
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<td>Districts VI and VIII</td>
<td>Thatcher</td>
<td>Ceres</td>
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<td>Mid a</td>
<td>Pilot</td>
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<td></td>
<td>R ival</td>
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**SPRING WHEAT VARIETIES**

_Recommended Varieties_

**Thatcher**

Thatcher is a beardless spring wheat selected from a Iumillo (durum)-Marquis x Marquis-Kanred cross developed by the Minnesota Agricultural Experiment Station and the United States Department of Agriculture. It was released in Minnesota in 1934 and by 1939 was the leading variety of spring wheat in the United States. At Alliance, North Platte, and Lincoln, Thatcher has yielded slightly more than Ceres during the last eight years. Thatcher is resistant to stem rust, is relatively early, has a short, stiff straw, is drought resistant, and its milling and baking characteristics are satisfactory. Its disadvantages are susceptibility to leaf rust, scab, mildew, and some races of bunt; and sometimes it grows so short as to make harvest difficult. The grain has a dull red color and is inclined to be low in test weight, and if there is considerable moisture at harvest time it has a tendency to bleach. Thatcher is a recommended variety for Nebraska in District VI and VIII, the only districts where spring wheat is recommended.
Mida

Mida was first released in 1944 after being developed at the North Dakota Experiment Station. A selection from the 3-way cross Ceres x (Hope x Florence) was crossed with a Canadian wheat in 1933. A single plant was selected from this cross during the stem rust epidemic of 1935, and from this plant Mida was developed. It shows high resistance to both leaf and stem rust and to stinking smut; however, it is very susceptible to loose smut. The milling and baking qualities of Mida are satisfactory and the protein content has been found to be above that of Thatcher. It has a high test weight and is about one day later than Thatcher. It shows less lodging than other spring wheat varieties except Thatcher, which is only slightly better in this respect. Mida has been one of the highest yielders among spring wheat varieties where they are adapted.

Acceptable Varieties

Ceres

Ceres is a bearded spring wheat developed at the North Dakota Agricultural Experiment Station from a Marquis x Kota cross. It was released in 1926 and spread rather rapidly for a number of years. It has yielded slightly less than Thatcher at Alliance, North Platte, and Lincoln during the last eight years. Ceres has some resistance to stem rust, is medium in time of maturity, has fair straw, and the milling and baking characteristics are acceptable. In years of heavy stem rust epidemics, Ceres will be injured, but in the absence of rust it may be expected to yield fairly well. While Ceres is not recommended in Nebraska, it is classed as acceptable in Districts VI and VIII.

Pilot

Pilot is a new, bearded spring wheat developed cooperatively by the United States Department of Agriculture and a number of the experiment stations in the spring wheat area. It was distributed in 1939 in Montana, North Dakota, and South Dakota. Pilot has been nearly equal to Thatcher in yield at Alliance and has outyielded Thatcher at Lincoln and Alliance. Pilot is resistant to stem and leaf rust and to bunt, and is reported to have excellent milling and baking characteristics. Its straw tends to be weak and under conditions of heavy growth may be inclined to lodge.

Rival

Rival was selected from a Ceres x Hope-Florence cross at the North Dakota Agricultural Experiment Station and was first distributed in 1939. At the three Nebraska stations Rival and Pilot have average yields that are nearly identical. Rival is resistant to leaf and stem rust, is fairly tall, medium early and has large hard kernels. Its milling and baking characteristics are acceptable to the trade. Under some conditions the variety may have a tendency to shatter.
Varieties Not Recommended

Komar

Komar is a sister selection of Ceres and was developed in North Dakota. The variety was distributed by Colorado and Nebraska because it seemed to give a better yield than did Ceres. It has failed to become popular because the kernels are so hard as to be objectionable to the milling trade.

Marquis

Marquis is a beardless spring wheat which for many years was considered as the standard hard-red-spring variety. It was always a favorite of the trade, but because of susceptibility to rust, it has been replaced by the newer varieties. In Nebraska its yields have been very low in all tests, but in the northwestern part of the state it is still grown on a limited acreage. It is characterized by rather short straw, heads, chaff and kernels, and in the absence of rust it gives a fairly good yield. It is among the latest maturing spring wheat varieties.

Humpback and Dixon

Humpback and Dixon are found in limited amounts in western Nebraska. Humpback has pubescent or hairy glumes while Dixon has smooth glumes. Both have rather large, soft kernels which are distinctly humped. These varieties are objectionable to the trade, and when found as mixtures in a sample will cause a discount in price. In yield tests they have never given a good performance. The growing of these varieties should be discouraged.

Durum

Durum is a market class of wheat used for the manufacture of semolina and macaroni. There are several varieties of durum with the best ones being Mindum, Kubanka, Stewart, and Carleton. Durum wheats usually have considerable resistance to rust and because of this are good yielders in bad rust years. Until Thatcher, Pilot, and Rival were included in the variety tests in Nebraska, Mindum was one of the highest yielding varieties. Durum varieties should be grown only under contract because most elevators are not equipped to keep the grain separate, and if mixed with common wheat, a discount will be given. Most durum wheats have amber colored grain, although one variety, Pentad (D-5), has red grain. Its chief use is for feed.

WINTER RYE VARIETIES

Recommended Varieties

Rosen

Rosen is a variety obtained from Michigan. It is rather late, with large, well-filled heads and large, mostly dark-green kernels. It is fairly winter-hardy and has given good results in Nebraska. The plump kernels and good test weight make it a popular variety.
Balbo

Balbo was distributed by the Tennessee Agricultural Experiment Station about 1933, having been received from Italy in 1919. The variety has an erect habit of growth, is very early, and can be pastured earlier in the fall and spring than can other varieties. It is highly resistant to hessian fly. Hardiness tests have shown it to be about as winter-hardy as a good winter wheat which means that it is less hardy than most rye varieties. Claims of high pasture yield have not been substantiated by field tests. It is also claimed that it will not taint milk, but there is some doubt if it is different from other varieties in this respect. It is recommended for southeastern Nebraska for early grazing, both fall and spring.

Acceptable Varieties

Dakold

Dakold was selected in North Dakota for unusual winter-hardiness. It has narrow, dark green leaves and is fairly late. The heads are small and the kernels rather dark in color. If high cold resistance is desired, this is the variety to use, but in the absence of winter-killing it may not yield too well when compared with earlier varieties.

Varieties Not Recommended

Common

Common rye includes all rye of uncertain pedigree that is grown on many farms in Nebraska. Rye is an open-pollinated crop and must be isolated if it is to be kept pure. Left alone nature probably selects the better adapted types in a field and these tend to increase. For best results, a pure variety should be used.

Abruzzes

Abruzzes is another Italian variety, very similar to Balbo in habit of growth but probably not as good for Nebraska. It provides fairly early pasture in the fall and spring. It is not as cold resistant as Dakold.

SPRING RYE VARIETIES

Spring rye is of minor importance when compared with winter rye, and only in isolated cases will it equal the yield of winter rye. The crop can be seeded late and it will mature quickly, although best results are obtained from early seeding. Where winter varieties survive, they give higher yields than spring rye.

OATS VARIETIES

Recommended Varieties

Cedar

Cedar was developed from the cross Victoria x Richland in cooperative experiments between the Iowa and Nebraska Agricultural Experiment Stations and the United States Department of Agriculture. In plot tests at Lincoln during the last eight years Cedar had an aver-
OATS VARIETIES RECOMMENDED FOR NEBRASKA

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<tr>
<th>District</th>
<th>Recommended</th>
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<tr>
<td>District I (Southeast)</td>
<td>Clinton</td>
<td>Marion</td>
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<td>District VIII (Northwest)</td>
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age yield of approximately seven bushels more per acre than Otoe. At North Platte Cedar has not given good yields, but at Alliance it is only slightly lower in yield than Kanota which is the leading variety. In cooperative tests in eastern Nebraska Cedar has proved to be a good producer. It is classed as a yellow, common oat with short, stiff straw; the grain is of good quality. It carries resistance to several important races of both crown and stem rust and to smut. Cedar is susceptible to halo blight, a minor oat disease, and to Helminthosporium blight and root rot. Seed was first released in Nebraska in the spring of 1943.

Clinton

Clinton was developed from the cross Richland-Green Russian x Bond by the Iowa Agricultural Experiment station in cooperation with the United States Department of Agriculture. This variety is medium early short to mid-tall, with a straw that resists lodging. The kernels are rather short, yellow and plump, with an occasional weak awn. The grain usually is outstanding in quality and high in test weight. Under Nebraska conditions Clinton is slightly later in ripening and grows a little taller than Cedar. In general it can be described as being resistant to the races of stem and crown rusts found in Nebraska and is highly resistant to leaf spot diseases and to the new Helminthosporium blight and root rot. For the past two years it has had an outstanding record in tests in the eastern one-third of the state.

Osage

Osage is a selection from the cross Victoria-Richland x Fulton. The original cross from which Osage was se-
lected was made at Aberdeen, Idaho, in 1935. Osage has resistance to several important races of crown and stem rusts, but is somewhat susceptible to the smut race that attacks Fulton and to Helminthosporium blight and root rot. It has good yielding ability, earliness of maturity and good quality grain. It tillers exceptionally well and has a short stiff straw. The kernels are light yellow in color and are usually awnless. Because of its earliness, it is especially recommended for central and southern Nebraska.

Otoe

Otoe, originally known as Nebraska No. 518 or Burt 518, was selected from Burt in Nebraska. At Lincoln during the last eight years it yielded nearly seven bushels per acre than Cedar but over eight bushels more than Kherson. Its record at North Platte and Alliance has been fairly good, but it is best adapted to southeastern Nebraska. Otoe is characterized by early maturity, some stem-rust resistance, yellowish grain, and straw a little stiffer than for Brunker. The grain of Otoe is inclined to be lighter in test weight than for most other varieties. It is particularly suitable under conditions of delayed planting. Otoe is resistant to Helminthosporium blight and root rot.

Brunker

Brunker was selected from Burt oats at the U. S. Dry Land Field Station, Akron, Colorado. It is a yellow oat and its outstanding characteristics are early maturity, good yield record, and some resistance to smut. One of its faults is weak straw and, as a result, the variety lodges very easily. Brunker has slightly outyielded Otoe at Alliance, but at North Platte and Lincoln in recent years the two varieties have been nearly equal. In cooperative tests in central and western Nebraska its yield record has been very good. Brunker should not be used on low ground where growth may become rank. It is best adapted to the western two-thirds of the state.

Trojan

Trojan is another Burt selection made at the U. S. Dry Land Field Station, Akron, Colorado. In Nebraska tests has yielded about the same or slightly less than Brunker. It is early, has white grain, stiff straw, and is resistant to smut. The kernels are small and the grain usually weighs less per bushel than that of some other varieties. Because of its short, stiff straw, erect growth, and moderate to light tillering, this variety makes a good companion crop. It also does rather well under irrigation and should be most useful in irrigated regions where an early oats is desired. Trojan is a recommended variety for the western two-thirds of the state.

Fulton

Fulton is a variety that was selected from a Fulghum x Markton cross at the Kansas Agricultural Experiment Station. It is resistant to most races of smut, is early, yields well, and has a fair test weight. It has kernels
that are light red in color, resembling white oats more than Kanota but ordinarily it grades red. It is susceptible to crown and stem rust, has weak straw and if planted early may be injured by late spring frosts. It may be planted later in the spring than Fulghum or Kanota and still give a good yield. Fulton has produced about the same yield as Trojan at Lincoln, North Platte, and Alliance during the last seven years. This variety is not very uniform in height.

Kanota

Kanota is a Fulghum type oat and in some areas of Nebraska is called "winter" oats, but it is not winter-hardy enough for Nebraska. Kanota is a red oat, which is very susceptible to both smut and rust. If seeded early, it will give a good yield and behave as an early variety, but if seeded late, the yield is greatly reduced. At Lincoln Kanota has been out-yielded by several varieties, but at North Platte it has yielded comparatively better; and at Alliance it has been right at the top in yield, being exceeded only by Fulton.

Tama

Tama is from the same cross as Cedar, Victoria x Richland, and resembles Cedar in almost every respect. It is resistant to several important races of crown rust, stem rust and smut, but it is susceptible to Helminthosporium blight and root rot. It is intermediate in color between white and yellow and the grain is of good quality. This variety has a short, stiff straw and is resistant to lodging. It has yielded slightly less than Cedar in areas where these two varieties are adapted. On thin soil Tama may not grow tall enough to be satisfactory.

Acceptable Varieties

Boone, Vikota, and Vicland

Like Cedar and Tama, these varieties were selected from a Victoria x Richland cross. They resemble Cedar and Tama in most respects, but none of them appear to be as well adapted to Nebraska conditions. They have all yielded less than Cedar over a period of years with Boone showing up as the lowest yielder of the three. However, on bottom land in northeastern Nebraska, where the soil is rich and when moisture is plentiful, Boone has done well. Vicland was distributed in Wisconsin, Vikota in South Dakota, and Boone in Iowa. All three varieties are resistant to several important races of crown rust, stem rust, and smut. All three are susceptible to Helminthosporium blight and root rot.

Marion

Marion was selected from a Markton x Rainbow cross. It is a few days later in maturity than Cedar and the other Victoria x Richland selections and grows several inches taller. It is better adapted to thinner soils where other varieties do not grow so tall. On rich land this variety may not stand up as well as other varieties such as Clinton and Cedar, which have stiffer straws. It is a
white oat with thin hulls and large groats. The variety is resistant to Helminthosporium blight and root rot.

**Neosho**

Neosho is a selection from the cross Fulghum-Markton x Victoria-Richland. It was developed in Kansas and has a stiff straw and a narrow panicle. It matures at about the same time as Cedar and has a light red grain and a good test weight. This variety is highly resistant to smut and possesses considerable resistance to the rusts. It is an acceptable variety in the southern two tiers of counties.

**Varieties Not Recommended**

**Erban**

Erban was developed by the Ontario Agricultural College at Guelph, Canada, from a cross between Banner and Early Ripe (a strain of Burt). It was distributed to farmers for the first time in 1935. Erban is a mid-season white oat with a spreading panicle. It has shown no resistance to the rusts and smuts, and is too late in maturity for Nebraska. In tests at Lincoln it has given a very low yield.

**Vanguard**

Vanguard was developed from a cross made in 1926 between Hajira and Banner at the Dominion Rust Research Laboratory, Winnipeg, Manitoba, Canada. It was distributed in small quantities for the first time to farmers in Canada in 1937. Vanguard is a midseason, midtall, stiff-strawed, white oat with spreading panicles and middling, rather plump grains with some awns. It has been highly resistant to the prevailing races of stem rust but has shown no resistance to crown rust and smut. Like all other Canadian oat varieties, Vanguard is too late in maturity for Nebraska. During the last two years at Lincoln the variety has yielded 38.3 bushels compared with 55.9 bushels per acre for Cedar.

**Legacy**

Legacy was developed from a cross between Banner and "Eighty-Day" made in 1906 by the Cereal Division, tral Experiment Farm, Ottawa, Ontario, Canada. It is an early to midseason variety with spreading panicles, and rather slender, mostly awnless, white grains. Legacy has no resistance to the rusts and smuts, and it is not adapted to Nebraska. It has yielded only 73 per cent as much as Cedar at Lincoln during the last four years.

**Cartier**

Cartier was developed at Macdonald College, Quebec, Canada, from a cross between Alaska and Early Triumph. Cartier is an early to midseason variety in Nebraska, has spreading panicles, middling white grains that are usually awned. It is susceptible to the rusts and smuts of oats, and has not shown any promise for Nebraska. At Lincoln in 1944 it yielded 18.1 bushels per acre compared with 32.7 bushels for Otoe and 48.0 bushels for Cedar.
Gopher

Gopher was developed and distributed by the Minnesota Agricultural Experiment Station, University Farm, St. Paul, Minnesota. It was first distributed to farmers in 1923. It is an early to midseason, white oat similar to Nebraska 21 with slightly larger and plumper kernels that usually are awnless. It has no resistance to the rusts and smuts. Gopher has not given yields equal to the better varieties in Nebraska.

Iogold

Iogold is a variety selected from Kherson at the Iowa Agricultural Experiment Station. It is described as being early, stiff-strawed, and highly resistant to stem rust. It has been used as a parent in many crosses. In Nebraska the variety did not give a yield equal to Kherson and therefore was discarded from the variety tests in 1942.

Kherson

Kherson is more nearly a type of oats than a variety and many selections have been made from it. The original Kherson was described as being early, productive, and drought escaping, and undoubtedly was of great value. Many varieties are now available that are earlier and higher yielding. The variety has been surpassed in almost all characters.

Nebraska No. 21

Nebraska No. 21 is a selection from Kherson developed at the Nebraska Agricultural Experiment Station, and was first distributed in 1917. It became quite popular and considerable acreage was grown. It is similar to Kherson, being medium early and having white grain. It usually outyields Kherson, but in turn is outyielded by Otoe, Brunker, Cedar, and newer varieties.

Fulghum

Fulghum is the parent variety from which Kanota was selected. The two are very similar, although Kanota has been continued as a representative of the red oat type. Fulghum is often called a “winter” type, but it is not winter-hardy enough for Nebraska. When seeded early it will give a fairly good yield, but it will not stand late seeding.

SPRING BARLEY VARIETIES

Recommended Varieties

Velvon 11

Velvon 11 was selected from the cross Colorado 3063 x Trebi made by the Utah Agricultural Experiment Station. It was released in 1945 and has been outstanding in yield in most sections of Nebraska, especially in the northeast section and in the western part of the state. It is medium early in maturity, has a stiff straw, and possesses considerable resistance to loose smut as well as some resistance to covered smut. Velvon 11 is a smooth-bearded, six-rowed variety with a white grain.
### BARLEY VARIETIES RECOMMENDED FOR NEBRASKA

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<td>District I (Southeast)</td>
<td>Velvon 11</td>
<td>Spartan Trebi</td>
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<td>Spartan Trebi</td>
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<tr>
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<td>Velvon 11  Ezond Spartan</td>
<td>Trebi</td>
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<td>Ward * Reno *</td>
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<tr>
<td>District VIII (Northwest)</td>
<td>Velvon 11  Ezond Beecher Spartan Trebi Club Mariout</td>
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* Winter Barleys

**Ezond**

Ezond is essentially a smooth-bearded Trebi. It is a selection from the cross Trebi-Louden x Trebi made at Aberdeen, Idaho. It is a six-rowed variety that is slightly earlier than Trebi, and it has outyielded Trebi by about 8 per cent at Lincoln over a period of several years. At North Platte it has been about 10 per cent above Trebi, and at Alliance it has been the highest yielding variety except for Velvon 11. It is especially recommended for central and western Nebraska. Ezond has a bluish kernel.

**Spartan**

Spartan is a two-rowed, smooth-bearded variety having a very stiff straw. The grain usually has had a weight per bushel superior to all other varieties tested. It has a tendency to shatter when overripe and is therefore not well adapted for combine harvesting. A light dust storm when the crop is ripe may cause severe shattering. Spartan has been a high yielding variety at Lincoln since 1930 and also has been among the high yielding varieties at North Platte and Alliance. It is a fairly early variety and is recommended for all districts of the state.

**Trebi**

Trebi is a six-rowed, rough-bearded type, medium-late in maturity. It has lost some of its popularity since better adapted, high-yielding varieties have been developed. This variety was distributed from Idaho after having been selected in Minnesota from barley brought into the United States from the south side of the Black Sea. Spartan has averaged four bushels per acre more than Trebi at Lincoln since 1930. At North Platte Trebi has
been a good yielding variety, and at Alliance, where the later varieties are better adapted, it has produced very satisfactory yields. Trebi is recommended primarily in Districts VII and VIII.

**Beecher**

Beecher is a very early maturing, six-rowed variety developed from an Atlas x Vaughn cross and first distributed by Colorado. It resembles Club Mariout except for its shorter, stiffer straw and smoother beards. During the last six years this variety averaged about two bushels less than Spartan at Lincoln. It has had a good yield at North Platte and has yielded very well in the cooperative small grain tests in the central and south central counties. At Alliance, Beecher is apparently too early for maximum yields. For the three-year period at Alliance, Ezond outyielded Beecher by 11.5 bushels. Beecher is recommended in the southwestern counties in District VII and the south half of District VIII.

**Acceptable Varieties**

**Club Mariout**

Club Mariout is a six-rowed, rough-bearded variety introduced from Egypt. It has a dense head and is somewhat resistant to covered smut, but it is very susceptible to lodging. It has yielded about the same as Spartan at Lincoln, North Platte, and Alliance but has yielded considerably less than Velvon II and Ezond in the western sections of Nebraska. It is an acceptable variety in Districts VI, VII, and VIII.

**Flynn**

Flynn is a six-rowed, smooth-awned, white-kerneled barley with fair straw strength and moderate height. It is grown quite extensively in Kansas and at one time was on the Nebraska Certified list of varieties, but there never was much interest in it. Flynn made its best record during the drought years.

**Mars**

Mars is a new variety produced and distributed by the Minnesota Experiment Station. It is an early, six-rowed, smooth-bearded type resistant to stem rust and moderately resistant to spot blotch. At Lincoln Mars has been about as early as Spartan and has been comparable in yield; however, it has yielded considerably below Velvon 11.

**Varieties Not Recommended**

**Manchuria**

Manchuria is a malting type. It is a six-rowed, rough-bearded variety. It is late in maturing and although at Lincoln since 1935 it has been the lowest yielding variety tested, it may give a relatively better performance in the northeastern counties.

**Wisconsin 37**

Wisconsin 37 is a smooth-bearded, white-seeded, six-rowed variety. It has a good straw, moderate resistance
to barley stripe, and good malting quality. This variety is susceptible to rust and is quite late in maturity for Nebraska, and it also yields considerably less than recommended varieties.

**Wisconsin 38**

Wisconsin 38 is from the cross Oederbrucker x Lion. It is a six-rowed, smooth-bearded variety with white kernels and good malting quality. It has a moderately stiff straw and moderate resistance to barley stripe. Wisconsin 38 matures too late for Nebraska conditions and it is susceptible to some root rots and head blights. Also, this variety tends to have long, weak necks that break readily as the grain ripens and the straw dries. At Lincoln it has yielded about 5 bushels below Spartan. This variety might be grown successfully in the extreme northeastern counties, but recommended varieties are to be preferred.

**Frontier**

Frontier is a barley variety developed in Wyoming, where it has been rather outstanding. In that state it is a thrifty, vigorous barley with rough awns and a strong straw, and it has given some very high yields under irrigation. In Nebraska, Frontier has done well in counties bordering Wyoming and has been about as good as Velvon 11 in the Scottsbluff area. However, in tests at Lincoln, Frontier has yielded below all of the recommended varieties of barley and appears to be poorly adapted. It is very resistant to loose smut, but it is quite low in test weight in eastern Nebraska. It should not be grown except in counties in the panhandle region.

**Bay**

Bay barley was developed in Michigan from a cross between Minnesota No. 450 x Spartan. It is a six-rowed, smooth-bearded variety with a moderately stiff to stiff straw. It has good malting qualities, and it matures slightly earlier than Wisconsin 38. However, Bay barley still matures too late for Nebraska and yields considerably less than recommended varieties.

**Kindred or “L”**

Kindred or “L” barley is a rust resistant selection from Wisconsin 37 which was developed by Mr. Lykken, a farmer near Kindred, North Dakota. It is a six-rowed, rough-bearded variety that has white kernels, good malting qualities, and some resistance to root rot. However, Kindred has a weak straw, which is a decided disadvantage.

**Feebar**

Feebar is a new South Dakota variety which is a feed barley only. It possesses a stiff straw, high protein content, and resistance to stem rust. It has given high yields in South Dakota, but it has been tested only one year in Nebraska. At Lincoln it yielded comparatively well, but at North Platte it yielded somewhat less than Velvon 11 and Ezond.
Compana
Compana is a two-rowed variety distributed in Montana that is inferior to Spartan when grown in Nebraska and therefore is not recommended. It seems to be more susceptible to chinch bugs than other varieties tested.

Short Comfort
Short Comfort is a six-rowed, smooth-bearded variety that was quite popular in Nebraska before the drought period of the middle 1930's. It has been replaced by other varieties which will give higher yields and better quality of grain.

Glabron
Glabron was at one time a very popular variety in the state, being smooth-bearded and moderately late maturity. For the 1935-39 period at Lincoln it had an average yield of 13.7 bushels per acre or nearly 10 bushels less than Spartan and at North Platte for the period 1931-39 it had the lowest average yield of all varieties tested.

WINTER BARLEY VARIETIES
Winter barleys are not generally recommended in Nebraska; however, they have been grown with considerable success during the past few years in the southwestern counties of the state, in northwestern Kansas, and in northeastern Colorado. There have been a few hardy varieties of winter barley developed recently, but it is not likely that one will be produced that will be as hardy as the best winter wheats grown in the state. Since so much winter barley is grown in southwestern Nebraska, two varieties are being certified to provide a pure source of seed for farmers desiring it.

Reno
Reno winter barley was developed in Kansas and was first distributed to farmers in 1939. It is recognized as one of the most winter-hardy varieties grown at the present time. This variety is early to mid-season in maturity and medium in height. It has a moderately stiff straw and yields well in years when winters are not too severe. Reno is a six-rowed barley with rough awns and bluish kernels.

Ward
Ward winter barley was developed in Oklahoma and was first distributed in 1936. It is very similar to Reno in its habits of growth. It is one of the most winter hardy varieties grown. It is midseason in maturity, medium in height, and has a moderately stiff straw. Ward is a six-rowed barley with rough awns and bluish kernels.

SPELT AND EMMER
Both winter and spring types of spelt and emmer are known. The crop commonly called spelt (spelts) (speltz) in Nebraska is not spelt but is spring emmer. The nearest known production of spelt of any consequence is in
Michigan. This is of the winter type and will not produce seed if planted in the spring. Emmer and spelt can be distinguished from each other in the threshed grain by noting the position of the rachis joint. This joint or segment is usually attached to the end of the emmer kernel and to the side of the spelt kernel. This is not an infallable rule for each kernel, but with kernels in the mass it is reliable.

Tests with spring emmer have been conducted at both the North Platte and Lincoln Experiment Stations. In both instances emmer gave lower yields than oats or barley. The following figures are from the Lincoln station and represent average yields of hull-free grain in pounds per acre, for a four-year period:

<table>
<thead>
<tr>
<th>Crop Type</th>
<th>Yield (pounds per acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter wheat</td>
<td>1638</td>
</tr>
<tr>
<td>Khapli Emmer</td>
<td>977</td>
</tr>
<tr>
<td>Spring wheat</td>
<td>906</td>
</tr>
<tr>
<td>Barley</td>
<td>1165</td>
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<tr>
<td>Common Emmer</td>
<td>817</td>
</tr>
<tr>
<td>Spring rye</td>
<td>1212</td>
</tr>
<tr>
<td>Hulless barley</td>
<td>816</td>
</tr>
<tr>
<td>Oats</td>
<td>1095</td>
</tr>
</tbody>
</table>

Emmer ripens a week to ten days later than oats which no doubt accounts in part for its poor showing. It has a test weight of 30 to 40 pounds per bushel and has a feeding value, pound for pound, slightly higher than oats. Winter emmer is not hardy under Nebraska conditions.

**ALFALFA VARIETIES**

**Ranger**

Ranger alfalfa is outstanding for its resistance to bacterial wilt. It is a synthetic variety produced through the cooperative efforts of the Nebraska Experiment Station and the Division of Forage Crops and Diseases, U. S. Department of Agriculture. Ranger was synthesized from five selections developed from the varieties Cossock, Turkistan, and Ladak, which give it a wide genetic base. Consequently, it exhibits considerable variability, both in habit of growth and in flower color. It is distinctly variegated in flower color, but only occasionally, if at all, are yellow flowers observed. Plants vary in habit of growth from decumbent to upright. Ranger recovers after cutting more rapidly than Ladak or Cossock, being about equal to Grimm in this respect. It is lightly more susceptible to leaf spot diseases and leaf copper yellowing than Grimm but is less susceptible than Hardistan or Turkistan. Ranger is superior to Hardistan and Turkistan in seed production, again being about equal to Grimm. Likewise, it is about equal to Grimm in forage production and in cold resistance. In irrigated and sub-irrigated regions and in humid areas where bacterial wilt of alfalfa is a serious factor, Ranger alfalfa will maintain a productive stand for several years whereas wilt susceptible varieties seldom last more than three.

Seed of Ranger is now being produced in Arizona under rules established by the International Crop Improvement Association. Experimental evidence indicates that seed produced in the Southwest under these regulations will retain the desirable characteristics necessary
for more northern states. Arizona certified Ranger alfalfa, is, therefore, an excellent source of seed for forage production in Nebraska. Fields planted with Arizona seed will not be eligible for the production of certified seed, however.

Hardistan

Hardistan came from an old superior field of alfalfa belonging to Arnold Brothers in Dawson County, Nebraska. Special attention was first called to this field by County Extension Agent A. R. Hecht, who described it as the most outstanding field known in Dawson County. In 1927, 16 years after sowing, it was recognized as having a practically perfect stand aside from predation by pocket gophers. Hecht investigated the history of the seed from which this field had been sown and found it was obtained from a seed house as Turkistan seed.

In Nebraska tests it has yielded 94 per cent of Grimm. It has been somewhat lower in seed productivity. In controlled freezing tests it has proved consistently more cold resistant than Grimm. One of the best characteristics is its wilt resistance. Hardistan has maintained stands under bacterial-wilt conditions several years longer than Grimm. At the end of ten years in the demonstration plots in the Platte Valley, Hardistan still had a practically perfect stand, while Grimm had “gone out” in four years.

Grimm

The present commercial stocks of Grimm are the progeny of an original importation from Germany made by Wendelin Grimm into Carver County, Minnesota, in 1857. It became widely recognized as a cold-resistant variety when the Minnesota Agricultural Experiment Station first drew attention to its cold resistance, and its ability to overwinter in northern regions in 1905.

It has become the standard variety over the northern sections of the United States and Canada. The hardiness of Grimm alfalfa is probably due in part to the presence of the yellow-flowered alfalfa in its ancestry, and in part to the presence of natural selection which took place under the severe climatic condition to which it was subjected for a long period of years in Minnesota. Its variegated flower colors, which indicate its yellow-flowered ancestry, range from green, smoky black, to purple and white, although at present the variegation tends toward the lighter colors.

Grimm alfalfa has been used as a standard in the yield tests at Nebraska, and, although it has been outyielded by several strains in single tests, it is near the top in average yield over a long period of years. It is susceptible to the bacterial-wilt disease, and for this reason its stand maintenance has been poor under conditions where this disease has been a factor. Because of its extreme susceptibility to this disease it is not now recommended for long rotations where wilt is known to be prevalent.

Cossack

Cossack alfalfa was introduced from Siberia through the efforts of the United States Department of Agricul-
ture. It is somewhat more variegated in flower color than Grimm, with yellow blossoms conspicuous. It rates as the highest forage-producing strain in yield tests in Nebraska.

In controlled freezing tests its average for cold resistance has been slightly higher than that of Grimm. It is not resistant to bacterial wilt, but appears to be somewhat more tolerant to it than Grimm under ordinary field conditions, withstanding the disease perhaps one or two years longer than Grimm.

**Ladak**

Ladak is an introduction from the province of Ladak, Kashmir, in northern India, made by the office of Foreign Plant Introduction of the United States Department of Agriculture in 1910. The seed was labelled Medicago falcata but it proved to consist of hybrids between the yellow-flowered species *M. falcata* and the purple-flowered species *M. sativa*. No other alfalfa grown commercially in the United States shows such a diversity of habit of growth and flower color. An outstanding characteristic of this variety, exceeding all other varieties in this respect, is its ability to make an exceptionally heavy first crop. It is therefore especially suited for growing in those regions where only one cutting per season is normally obtained.

In tests at the Nebraska Experiment Station, Ladak has averaged 3 per cent lower in yield than Grimm, while it has averaged slightly higher in cold resistance. This variety has not proved wilt resistant where the disease is severe, but apparently it is more tolerant of the disease than is Grimm, maintaining a stand from one to three years longer.

**Common**

Common alfalfas include the ordinary purple-flowered strains which trace largely to Chilean origin. Through the years the crop has been remarkably changed by natural selection, and, after being grown for many generations in an area, it has come to be designated by the name of the area in which it is grown, for example, Nebraska Common, Kansas Common, etc. In this way southern-grown Common has become adapted to southern areas and northern Common to northern areas, with corresponding difference in their cold resistance.

In Nebraska yield tests, the hardy northern Common strains have produced almost as well as Grimm, while the southern non-hardy strains have not maintained a stand under severe conditions. Strains of Common originating in northwestern Nebraska, or to the north of this area in the Dakotas and Montana, have proved about as cold resistant as Grimm in controlled freezing tests. It is probable that some of the so-called Northern Common of today has also had an admixture of Grimm and Turkistan. Dakota 12 is essentially the same as Dakota Common.

One difficulty with the Common alfalfa is that often a regional designation is given after production under those conditions for perhaps only one generation which
would not provide opportunity for adaptation to the new conditions. In addition to the domestic regional strains, imported Common alfalfas are also found on the market.

**Buffalo**

Buffalo is a new variety produced at the Kansas Agricultural Experiment Station in cooperation with the U. S. Department of Agriculture. It is similar to Kansas Common except that it is much more resistant to bacterial wilt and is somewhat more tolerant to cold. It is generally recommended for the same area as Kansas Common.

**Turkistan**

Turkistan alfalfa includes all alfalfa of Turkistan origin. Usually it is uniformly purple-flowered, slower growing than Common. The majority of importations are fairly cold resistant and wilt resistant. Turkistan alfalfa has obtained considerable publicity because of its being somewhat resistant to bacterial wilt. There are distinct regional strains as in the case of the Common.

**Hybrid Alfalfa**

Hybrid vigor in alfalfa has been clearly demonstrated at the Nebraska Agricultural Experiment Station in cooperation with the U. S. Department of Agriculture. Basic lines are now being developed and methods are being studied for making this increased vigor available to farmers. Whether this will be done through the use of a commercial hybrid similar to those now used in corn or through the development of a superior synthetic variety will depend upon the results of experiments now in progress.

**Atlantic**

Atlantic is a new, high-yielding strain developed at the New Jersey Agricultural Experiment Station. It is well adapted to the eastern United States but is not resistant to bacterial wilt.

**Orestan**

Orestan is the commercial increase of a lot of seed originally introduced from Turkistan and released commercially by the Oregon Agricultural Experiment Station. It has a high degree of resistance to bacterial wilt and has been high yielding under western conditions.

**Nemastan**

Nemastan is another Turkistan introduction and is being released by the Nevada Agricultural Experiment Station to be used in the intermountain area where both bacterial wilt and stem nematodes are serious enemies of alfalfa. Nemastan has a high degree of resistance to both.

**Argentine**

When domestic seed is scarce and prices are high, much poorly adapted alfalfa seed is imported from Argentina. In variety trials at Lincoln during the period 1922 to 1938, Argentine alfalfa produced less forage than
Nebraska Common and had an average stand survival of only 59 per cent. These and more recent tests indicate much variability among different lots of Argentine seed. All are susceptible to bacterial wilt and subject to frequent and severe winter-killing. Because of these and similar records throughout the northern half of the United States, it is required by law that seed of this origin be stained 10 per cent orange-red to provide easy identification and to indicate the danger involved in planting it. The use of Argentine seed in Nebraska is not recommended. In addition to the direct hazards involved, planting Argentine seed in seed producing areas will unfavorably affect through cross pollination and mechanical mixture the hardiness and, therefore, the desirability of Nebraska-grown seed for years to come. Southern domestic seed is even less desirable than the red-stained seed from Argentine.

SWEETCLOVER VARIETIES

Evergreen

Evergreen is a white-flowered biennial sweetclover developed in Ohio by mass selection of desirable roadside plants over a period of years. This variety has the ability to germinate quickly, and it grows rapidly in the seedling stage, which enables it to overcome first-year weed competition. Its outstanding characteristics are late maturity and heavy forage production in both the first and second years. In some seasons Evergreen can be pastured fully three weeks longer than Common White in the second year of growth. It also starts growth a little earlier in the spring of the second year providing earlier pasture. Evergreen can be expected to produce over 70 per cent more forage than Common White in the first year, 35 per cent more in the second year, or a total of about 50 per cent more for the two years. Evergreen produces seed abundantly under favorable temperature and moisture conditions, but because of its late maturity the development of a good seed crop is often prevented by midseason drought and high temperatures. Growth is more upright than that of Common White, and because of its extremely rank growth, this variety should be cut back to about 10 inches high when it is 20 inches tall in the second year. Otherwise, it will be very difficult to harvest the seed crop. From present knowledge concerning its adaptation, it appears that the production of Evergreen seed should be confined to the higher moisture areas of eastern Nebraska and to irrigated areas elsewhere. Evergreen is a state certified variety.

Spanish

Spanish is a white-flowered biennial sweetclover received from the Madrid Botanic Garden in Spain. Like Evergreen it germinates quickly and grows vigorously in the seedling stage enabling it to overcome first-year weed competition and adverse climatic conditions at seeding time. In the first year Spanish produces over 70 per cent more forage than Common White; however,
in the second year this advantage is not so marked being about 10 per cent more. Spanish is unusually uniform in type of growth and in time of flowering, and the variety is distinctive in appearance. It reaches maturity at about the same time as Common White and can be grown successfully wherever Common White is adapted. Spanish is a state certified variety.

**Madrid**

Madrid is a yellow-flowered biennial sweetclover received from the Madrid Botanic Garden in Spain. It is an early maturing variety that has proved to be an excellent variety for the central dry-farming areas of the Great Plains. Stands are easily established because of quick germination and vigorous seedling growth. Madrid may be distinguished in the field among a group of commonly grown varieties by a peculiar cast of very dark foliage. It is outstanding in first-year pasture and hay production yielding over 50 per cent more forage than Common Yellow; however, in the second year there is very little difference between the two. The first-year growth is relatively resistant to fall freezes, remaining green longer than commonly grown varieties. It starts second-year growth comparatively early, matures slightly later than Common Yellow, and is an excellent seed producer. Madrid is adapted to all parts of Nebraska except the very dry areas. It is a state certified variety.

**Common Yellow**

Common Yellow is a yellow-flowered biennial sweetclover, which is the most commonly grown variety in Nebraska. It is smaller and less upright than Common White with many of the lower branches prostrate. The internodes are shorter and the stems are finer. Second-year growth is more upright and it may attain a height of three to five feet. It generally flowers and matures 10 to 15 days earlier than Common White, and the total growth is less. The first and second-year hay is of comparatively good quality. Due to early maturity, this variety generally is not recommended for use as a second-year pasture crop. Early maturity and small vegetative size are important factors in making Common Yellow a reliable producer of seed. It is relatively easy to establish stands of Common Yellow, and at Lincoln it has shown an ability to overcome first-year drought and weed competition better than have the commonly grown white-flowered varieties.

**Common White**

Common White is a large, white-blossomed, coarse-growing variety of biennial sweetclover. Under favorable conditions, it may attain a height of 30 inches in the first year and seven feet in the second year. As a general purpose crop, it is distinctly superior to Grundy County and Common Yellow, because it normally produces more hay and pasture and matures later in the second year. Great variations occur in the growth from different lots of seed purchased under this name, which in many instances are due to mixtures with Grundy
County and Common Yellow. The true Common White flowers in late June and early July and may be classed as medium in time of maturity.

Grundy County

Grundy County is a white-flowered variety of biennial sweetclover, which is of unknown origin but was first noted in Grundy County, Illinois, about 1917. It is of comparatively uniform growth and maturity. Grundy County does not generally attain a height greater than four feet in its second year, and as it matures 10 days to two weeks earlier than Common White, its second-year pasturing season is relatively short. It is distinctly inferior from the standpoint of forage yield, but its quality is excellent. As Grundy County yields seed abundantly and is easily harvested, it has become popular in many northern seed growers and has entered increasingly into the seed trade, making difficult the purchase of seed of genuine Common White.

Hubam

Hubam is an annual white-flowered variety that continues to be of minor importance in Nebraska. It is of chief value for plowing under in the late summer or early fall for green manure, and for seeding when biennial clovers have failed. Though its pasture and hay yields have exceeded somewhat those of the common biennial types in the first year of growth at Lincoln, its relative merit is distinctly lessened by its early maturity, and by the necessity of seeding each year. The annual type has proved of less value for soil improvement than the biennial.

RED CLOVER VARIETIES

Midland

Midland red clover originated as a composite of four old strains from Illinois, Ohio, Indiana, and Iowa and was originally called Central Corn Belt Blend. It has good growth characteristics, is winter-hardy, and has some resistance to northern anthracnose. In Nebraska Midland has given uniformly good stands and vigorous growth in the first season, and it has shown good survival the second season. Hay yields of Midland have been slightly higher than common red clover. This variety is eligible for certification in Nebraska.

Cumberland

Cumberland red clover originated as a composite of three identified superior strains, Kentucky No. 101 or No. 215, Tennessee Anthracnose Resistant, and Virginia Sanford. It has good growth characteristics and is resistant to southern anthracnose and crown rot. In experimental plots at Lincoln, Cumberland has shown up very well and has outyielded Midland in forage production. If it proves to be sufficiently winter-hardy, Cumberland should be a very good variety for southeastern Nebraska; however, further testing is necessary to determine its winter-hardiness.
Kenland

Kenland is a new superior red clover variety that has been developed by the Kentucky Agricultural Experiment Station in cooperation with the Division of Forage Crops and Diseases, U. S. Department of Agriculture. Kenland has proved to be more than twice as resistant to southern anthracnose as any other variety, and when this disease is prevalent, Kenland will produce greater yields than other improved varieties such as Cumberland. Even when anthracnose is not a factor, Kenland will yield as well as other improved strains. In the southern part of the Red Clover Belt the most outstanding characteristic of Kenland is that it is longer lived than other strains. It has maintained good stands into the third year. Kenland has not been sufficiently tested in Nebraska to make definite recommendations. In a few years that it has been tested at Lincoln, Kenland has been outstanding in yield; however, there is still some question as to its winter-hardiness.

Mammouth

Mammouth red clover matures about two weeks later than common red clover and it is larger and coarser. It is commonly more hairy and in the autumn of the first year blooms little or not at all. Mammouth does not recover quickly after cutting, so that only one crop can be harvested each season. On the other hand it generally lives longer than common red clover and is often used in pasture mixtures. On low ground the stems of Mammouth clover are likely to become somewhat woody; therefore, it is ordinarily grown on poorer soils where it grows less rank. If grown for hay Mammouth should be cut in the early-bloom stage because of the tendency of the stems to become woody.

Common

Common red clover is the standard clover grown throughout the corn belt. It is extremely variable and yields less than the new, recently developed strains. It is also more susceptible to red clover diseases such as anthracnose. However, in each state a common strain is grown in the crop rotation with good success. The new strains are largely selections from common red clover which have been tested and selected for high yields, disease resistance, and winter-hardiness over a period of several years.

LESPEDEZA

Lespedeza is a legume which may have value on some soils in southeastern Nebraska. On less fertile, acid soils Lespedeza has its greatest value. It is possible to obtain a satisfactory stand of Lespedeza on these soils when other legumes will fail. For best results it should be left on the land year after year. Although it is only a fall annual, it will reseed itself each year, and farmers have found that it makes excellent pasture.

Korean Lespedeza

Korean Lespedeza is the kind generally available commercially. It is ideally suited to Kentucky, Missouri, and
southern Illinois; however, in Nebraska the growing season is normally not long enough for the plant to develop seed except in the extreme southeastern counties. It can probably be grown farther north, but such seedings would no doubt fail to maintain themselves from year to year. It is larger, coarser, and earlier maturing than Common Lespedeza and has broader leaves. It can be easily identified by the large, light-colored stipules borne in pairs at the base of each branch. Also, at maturity the leaves of Korean Lespedeza turn forward so that the tips of the branches resemble small cones, and the hairs on the stems are appressed upward.

**Early Korean (No. 19604)**

Early Korean Lespedeza was selected from Korean it starts growth earlier in the fall than ordinary Korean Lespedeza and matures its seed earlier in the following year. It can be expected to mature its seed satisfactorily in all the counties of District I and in the southern counties of District II. It has been found to be susceptible to a bacterial disease, lespedeza wilt, which may limit its usefulness. Seed is available from Iowa seed houses, usually under the name “Giant Lespedeza.”

**Common Lespedeza**

Common Lespedeza is grown in many of the southern states and is commonly called Jap clover. It matures seed too late to survive as far north as Nebraska and should not be grown in this state.

**Sericea**

*Lespedeza sericea* is a perennial species in commercial use; however, perennial species are generally low in feeding value and somewhat unpalatable to livestock. It appears to have little, if any, value in Nebraska.

**BIRDSFOOT TREFOIL**

Birdsfoot trefoil is a legume somewhat like alfalfa that shows some promise in pasture mixtures with bromegrass in Nebraska. It is tolerant to much higher soil acidity than other legumes except lespedeza, and it has possibilities farther north where lespedeza is not suited. Birdsfoot trefoil is a long-lived, deep-rooted perennial, which makes it somewhat drought resistant once a stand is established. The stems are fine and weak and tend to lodge except when supported by some strong grass such as bromegrass. The crowns are low-set and are not as subject to grazing injury as are the crowns of alfalfa. The leaves are composed of five leaflets rather than three as found in alfalfa and sweetclover, the flowers are a bright yellow with four to seven in a cluster, and the seed pods are long, straight, and slender. Seed is difficult to harvest as it shatters easily; consequently, the seed is scarce and the price is correspondingly high. Also, stands are difficult to establish. Birdsfoot trefoil starts growth in the spring about the same time as alfalfa and sweetclover, and it will continue growth just as late in the fall. Not enough is known
about Birdsfoot trefoil to recommend it for extensive use in Nebraska, but it may have possibilities in pasture mixtures on thin, sloping soils that are relatively high in acidity.

**LADINO CLOVER**

Ladino clover is a giant form of common white clover. It is a rapid-growing perennial legume which spreads by creeping fleshy stems that root at the nodes. The shape, color, and markings of the leaves, the shape and color of the flower heads, and the size and color of the seed are similar to those of common white clover. It does not flower as profusely as common white clover, but the flower heads and the plants are two to four times as large. Ladino clover is best adapted to the more fertile, moisture-retaining soils in states having relatively cool summer temperatures such as in northeast United States. It is not drought resistant, and neither will it stand on soils that remain wet for long periods. Pastures of Ladino clover grass mixtures should be grazed rotationally and should not be grazed too closely. This clover is not adapted to Nebraska conditions and will not do as well in pasture mixtures as other legumes.

**CRIMSON CLOVER**

Crimson clover is a winter annual, which was introduced from Europe. It has bright crimson blossoms, and the leaves and stems resemble those of red clover but are distinguished by the rounded tips of the leaves and more hair on both stems and leaves. It is seeded in the fall and forms a rosette. In the spring, flower stems develop rapidly and the seed forms and the plant dies with the coming of hot summer weather. The seed is yellow and is about twice as large as red clover and more rounded. Crimson clover is adapted to cool, humid weather. It will not survive too severe or too changeable winter temperatures such as we frequently have in Nebraska, and it is not recommended for this state.

**STRAWBERRY CLOVER**

Strawberry clover is more resistant to alkali than any other clover grown in the United States. It thrives on wet, seepy ground, which may be crusty with alkali, and seems to be able to establish itself in a heavy salt grass sod by transplanted runners or from seed. It has the ability to survive flooding for periods of one to two months without being killed, yet it will also survive under periods of drought better than White Dutch Clover. It is somewhat similar to White Dutch Clover frequently seen in lawns, but it has pink flowers and the flower heads resemble a strawberry. Strawberry clover spreads and establishes itself by stout, creeping runners and by seed scattered by grazing cattle. It may have possibilities in heavily irrigated hay meadows and in wet, seepy meadows which are somewhat alkaline.

**ALSIKE CLOVER**

Alsike Clover thrives best in a cool, moist climate, and it is adapted to about the same general region as Red
Clover. It is especially adapted to low, wet, fertile land or to “sour” land where Red Clover will not grow. It has been known to grow a year in water-soaked and water-covered soil where it made a heavy growth. On heavy soils in the extreme eastern section of Nebraska, Alsike Clover has possibilities in pasture mixtures or on wet meadows which are too acid or too wet for other legumes.

KUDZU

Kudzu is a perennial leguminous vine native to Japan. It has large leaves, somewhat like those of a bean but longer, and sometimes each leaflet is coarsely lobed. The stems are coarse and long and the flowers are a deep purple and are born in clusters. Little seed is set in the United States, but new growth comes from the roots each year. Kudzu is a valuable forage crop in the South and may either be grazed or cut for hay. It is a hot-weather plant, so growth is delayed until the ground warms up and it stops with the first frost. Kudzu will grow on many soil types and can thrive on soils too acid for alfalfa or clover; however, it does best on good clay loam. Kudzu is unlikely to become a successful field crop in Nebraska. While the old roots may live through the winter, the rooted joints of each season will winterkill and thick stands are difficult to establish. Where alfalfa, sweetclover, red clover, or lespedeza cannot be grown profitably, Kudzu may be a substitute. Its most profitable place would seem to be in deep gullies, on steep slopes, and on rocky fields or other places not suitable for general cultivation.

SOYBEAN VARIETIES RECOMMENDED FOR NEBRASKA

<table>
<thead>
<tr>
<th>District</th>
<th>Varieties Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>District I</td>
<td>Lincoln, Illini, Chief, Varieties of Districts II and III for late plantings</td>
</tr>
<tr>
<td>(Southeast)</td>
<td></td>
</tr>
<tr>
<td>District II</td>
<td>Lincoln, Dunfield, Illini, Varieties of District III for late plantings</td>
</tr>
<tr>
<td>(East Central)</td>
<td></td>
</tr>
<tr>
<td>District III</td>
<td>Richland, Earlyana, Mukden, Dunfield (except in northern part)</td>
</tr>
<tr>
<td>(Northeast)</td>
<td></td>
</tr>
</tbody>
</table>

SOYBEAN VARIETIES

Lincoln

Lincoln is a high-yielding variety developed at the Illinois Agricultural Experiment Station with the cooperation of the U. S. Regional Soybean Laboratory. Where adapted it has consistently outyielded all other commonly grown varieties in Nebraska tests. In 61 tests over a period of five years, in several corn-belt states, Lincoln has shown an increase in yield of 23.9 per cent over the average of Dunfield and Illini. It has also exceeded Dunfield in percentage of oil, percentage of
protein, and iodine number of the oil. Its upright growth and resistance to lodging make it well adapted to combine harvesting. Being about two days earlier in time of maturity than Illini, it is best suited to east central and southeastern Nebraska. Lincoln soybeans are eligible for certification.

Richland

Richland has the outstanding characteristic of lodge resistance when grown on soils of very high fertility. It is an excellent combine variety because it grows erect on rich soils where other varieties may go down badly. In Nebraska tests it has given good yields and the grain is high in protein and oil content. Since it matures about five days earlier than Dunfield it is especially adapted to highly fertile land in northeastern and east central Nebraska. Richland soybeans are eligible for certification.

Dunfield

Dunfield is a medium-early variety recommended because of its desirable growth habits and its consistently good performance in yield tests over a period of years. The plants mature uniformly and are very shatter resistant. The erect growth and lodging resistance of Dunfield makes it well liked where combine harvesting is employed. This variety is eligible for certification.

Illini

Illini yields approximately the same as the Dunfield variety. In time of maturity it is nearly a week later. The plants are less erect than are those of Dunfield and the stem tip growth is somewhat twining. Illini is best suited to the east central and southeastern parts of Nebraska.

Earlyana

Earlyana is a variety developed and recently released by the Indiana Experiment Station. It is earlier than Richland and grows taller on soils of average fertility. Earlyana yields about as well as Richland but it is less desirable from the standpoint of its poor lodging resistance on rich soils. Its very early maturity makes it adapted to the extreme northeastern section of the state and to other areas where a variety of such early maturity is desired.

Mukden

Mukden is grown in northern Iowa and is especially suited to the east central and northeastern sections of Nebraska. It is somewhat earlier than Dunfield, but it is slightly inferior to this variety with respect to yielding ability. It has about the same height and lodging resistance as Dunfield. Seed can be obtained locally or from Iowa where it is grown as a certified variety.

Chief

Chief is a selection from a cross between Manchu and Illini developed and released by the Illinois Experiment Station. The plants are tall and are similar to Illini in
erectness. Since it matures about a week later than Illini, its production should be restricted to southeastern counties. In that section of the state it outyields all other varieties.

**Manchu**

Manchu is one of the older varieties that is still being grown by many farmers. However, the introduction of new superior varieties such as those described above puts the Manchu in the class of acceptable but not recommended soybeans.

**Hawkeye**

Hawkeye is a new variety developed from the cross Mukden x Richland. It matures at about the same time as Richland but grows 3 to 4 inches taller. It yields slightly higher than Richland, and the beans have a higher oil content. This new variety is expected to replace much of the Richland acreage in areas where early varieties are best adapted; however, further testing in Nebraska is desirable before definite recommendations can be made.

### GRAIN SORGHUM VARIETIES RECOMMENDED FOR NEBRASKA

<table>
<thead>
<tr>
<th>District</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>District I (Southeast)</td>
<td>Club Kafir Midland</td>
<td>Pink Kafir Western Blackhull</td>
</tr>
<tr>
<td>District II (East Central)</td>
<td>Club Kafir Early Kalo Midland</td>
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<tr>
<td>District III (Northeast)</td>
<td>Early Kalo Midland Martin</td>
<td>Day Milo</td>
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<tr>
<td>District IV, V and VII (South Central, Central, and Southwest)</td>
<td>Early Kalo Martin Midland Coes</td>
<td>Day Westland Colby</td>
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<tr>
<td>District VI (North Central)</td>
<td>Early Kalo Coes Midland Martin</td>
<td>Day Highland Colby</td>
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<tr>
<td>District VIII (Northwest)</td>
<td>Coes</td>
<td>Highland</td>
</tr>
</tbody>
</table>

**GRAIN SORGHUM VARIETIES RECOMMENDED**

**Recommended Varieties**

**Early Kalo**

Early Kalo is an early maturing selection from kalo that matures in about 100 days at Lincoln. The plants grow about 3½ feet tall, and they are fairly uniform in height. Susceptibility to lodging following maturity makes this variety difficult to harvest with a combine. It is intermediate in resistance to chinch bug injury, but it can be grown with considerable success in southeastern Nebraska except when there is a heavy infestation. Early Kalo gives a good yield of grain, which is reddish-brown in color, often with dark spots. The heads of this variety are medium long to long, erect, and semi-compact.
Club

Club is a selection from Dawn Kafir that matures in 115 to 120 days at Lincoln. The plants are approximately 4 1/2 feet tall, and they are quite resistant to chinch bugs. This variety has been outstanding in yield at Lincoln, being well above Early Kalo, but it matures too late for western Nebraska. It is too tall to combine. The heads are short, erect, and compact. The grain is white with reddish-black spots near the tips.

Midland

Midland is a selection from Kalo that matures in a little over 100 days at Lincoln. It is a combine type with an average height of about 3 1/2 feet. It is quite lodge resistant, combines easily, and threshes out clearly from the glumes. Midland yields about the same as Early Kalo. It has an elongated, somewhat open head with the reddish-brown, kalo-type seed. The seed is a little larger than that of Early Kalo.

Martin

Martin is a selection from Wheatland that matures in slightly over 100 days at Lincoln. It is a combine-type sorghum that grows about 3 1/2 feet tall. It is more lodge resistant than Early Kalo and shows some resistance to the diseases that frequently attack milos. However, it is susceptible to chinch bugs and should not be grown in southeastern Nebraska. Martin is a good yielder but is somewhat under Early Kalo in this respect. It has long, semi-compact heads with fairly large, orange-brown colored seeds.

Westland

Westland is very similar to Martin. It is a selection from Wheatland that matures in 105 to 110 days at Lincoln, a little later than Martin. It is a combine-type sorghum growing approximately 3 feet tall. It is somewhat resistant to diseases that frequently attack milos, but it is susceptible to chinch bugs. Under Nebraska conditions it has yielded considerably less than Martin. The head and grain resemble Martin.

Improved Coes

Improved Coes matures in slightly less than 100 days at Lincoln, making it one of the earliest varieties of grain sorghums grown. It grows about 4 1/2 feet tall. It is more lodge resistant than Early Kalo and yields approximately the same as that variety. Its extreme earliness makes it a good variety for the panhandle region and southwestern Nebraska. The grain is white in color, sometimes with pink spots. The heads are long, erect, and semi-compact to open.

Acceptable Varieties

Western Blackhull

Western Blackhull is a full season variety that matures in about 115 days at Lincoln. It grows nearly 5 feet tall and it is quite resistant to chinch bugs. In yield it is somewhat higher than Early Kalo but lower than Club.
The stalks are often used as forage although this variety is grown primarily for grain. It has a medium long, erect, semi-compact head and the grain is white in color with reddish-brown to black spots.

**Day**

Day is a selection from the cross Early White Milo x Dwarf Yellow Milo. It matures in slightly over 100 days at Lincoln. Day is short, averaging about 2 ½ feet in height, and it is sufficiently lodge resistant to usually permit combining. It is highly susceptible to chinch bugs and should not be grown in southeastern Nebraska. Day has been a low yielder at Lincoln because of this susceptibility; however, farther west at North Platte it has shown up much better. Even at North Platte, Day yields considerably less than Early Kalo, Martin, and Coes. Day has a short, erect, compact head, and the kernels are medium to large and are yellow in color.

**Colby**

Colby is a selection from the same cross as Day. It is similar to Day in appearance except that the heads are less compact and are extended farther above the top leaf. Colby has never equaled Day in yield and it is highly susceptible to charcoal rot, which usually results in lodging at the time of maturity. The heads are medium length and semi-compact with a tendency to recurve. The kernels are medium to large and are yellow in color.

**Pink Kafir**

Pink Kafir was selected in Kansas from material originally introduced from Africa. It is a full-season sorghum requiring 115 to 120 days to reach maturity at Lincoln, and it grows over 5 feet tall. It is more susceptible to lodging than Western Blackhull. This variety has given high grain yields and good forage yields at Lincoln when drought was not a factor. The heads are long, erect, and semi-compact. The kernels are small to medium and are pink to nearly white with some dark brown or red spots.

**Highland**

Highland is an early maturing variety selected from Kafir. It matures in slightly less than 100 days at Lincoln. It grows a little over 4 feet tall, is somewhat susceptible to lodging, and has a tendency to give poor stands. Coes is a much more desirable variety to grow. Heads of Highland are long, erect, and open. The kernels are white, sometimes with reddish-black spots.

**Hegari**

Hegari requires around 110 days to reach maturity at Lincoln and it grows about 4½ feet tall. Under favorable growing conditions it produces high yields. When the crop produces only a fair yield of grain, the fodder is very palatable to livestock. The value of the fodder decreases as the grain yield increases. Heads are short to medium in length, erect, and semi-compact. The
grain of this variety is white with reddish-brown to black spots.

**Varieties Not Recommended**

**Kalo**

Kalo is a selection from the progeny of a natural cross between Pink Kafir and Dwarf Yellow Milo. It matures in about 105 days at Lincoln and grows around 4 feet tall. It has never been very popular in Nebraska as there are too many better varieties available. Kalo is susceptible to chinch-bug injury, and is likely to lodge if left standing after full maturity. The stalks do not make good forage. The heads are medium length, erect, and semi-compact. The kernels are medium-sized and yellow, often with dark splotches.

**Sooner**

Sooner is a selection from the cross Early White Milo x Dwarf Yellow Milo. It is early maturing and has a rather high potential yielding capacity. During the drouth years it was widely grown, but since it lodges too badly when mature, it is no longer recommended. The heads are short, often recurved, and compact. The kernels are large and yellow. Some dwarf types similar to Sooner are being tested in Nebraska. They are more lodge resistant than Sooner and show some promise for the south central section of the state.

**Plainsman**

Plainsman is a new combine-type developed in Texas from a cross between kafir and milo. It requires around 110 days to reach maturity at Lincoln. The plants grow about 3 feet tall. When planted early or when frost is delayed in the fall, yields compare favorably with Early Kalo; however, in a normal year frost may occur before the grain is mature. Plainsman has a semi-compact head, and the kernels are orange in color.

**Early Hegari**

Early Hegari matures in approximately 100 days at Lincoln. It is similar in appearance to Hegari except that it is shorter, averaging about 4 feet in height. This variety has given high yields in all tests where it has been included, but since it is highly susceptible to charcoal rot, it is not recommended. The heads and grain resemble Hegari.

**Alliance**

Alliance is a selection from a cross between Early Pink and Highland. It matures very early in a little over 95 days at Lincoln. The plants grow about 3½ feet tall and they are quite similar to Early Kalo in appearance. This variety is quite susceptible to charcoal rot and should not be left standing for combine harvesting. The heads of Alliance are semi-compact and the kernels are pink-orange in color.

**Feterita**

Feterita was one of the first grain sorghums grown in Nebraska. It is fairly well adapted in this state, but
frequently poor stands result because of the soft seeds quickly rotting in cold, wet soil. Feterita stalks do not make good forage although they are sometimes used for that purpose. Heads of Feterita are short, erect, and compact. The kernels are very large and chalky white, usually with red and black spots.

Grohama

Grohama originated in Oklahoma, and its parentage is somewhat in doubt. This variety received much unjustified promotion several years ago, and it is still grown to a limited extent in several states. Grain from Grohama is not of good quality and yields have not been promising. The heads are long, erect, and semi-compact. The kernels are medium sized to large and are a buff or light brown in color.

FORAGE SORGHUM VARIETIES RECOMMENDED FOR NEBRASKA

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FORAGE SORGHUM VARIETIES

Recommended Varieties

Atlas

Atlas was developed from a field cross between Soursor and Blackhull Kafir. The tall, sweet, juicy stalks of Soursor and the white palatable seed and lodge resistance of Blackhull Kafir have been combined in Atlas to provide a dual-purpose variety that produces both grain and forage of excellent quality. Atlas is a full-season variety that requires over 120 days to mature at Lincoln. It grows over 7 feet tall and produces the highest forage yields of any of the forage sorghum varieties grown in southeastern Nebraska and under irrigation farther west. It also produces a grain yield comparable to Early Kalo, but sometimes the grain does not mature in time to avoid frost damage. Atlas is superior to other forage sorghum varieties in quality of seed and resistance to lodging. It is highly resistant to damage by chinch bugs. Heads of Atlas are medium length,
erect, and compact. The kernels are medium-sized and are white with reddish-brown to black spots.

**Axtell**

Axtell is an early selection of Atlas developed in Kansas. It is approximately a week earlier in maturing than Atlas and is just a little shorter in plant height. Otherwise, it is identical to Atlas in appearance. At Lincoln it yields an average of about a half ton less forage per acre than Atlas, but it exceeds Atlas in grain yield by about 7 bushels. This new variety is definitely better adapted to Nebraska than Atlas because of its ability to mature earlier and avoid frost damage. The heads and kernels are similar to Atlas.

**Norkan**

Norkan is a selection from a cross between Atlas and Early Sumac. It matures in 105 to 110 days at Lincoln and grows over 6 feet tall. This variety is best described as an early Atlas, but it is not as lodge resistant as Atlas. At Lincoln Norkan has yielded a little less than Axtell in both grain and forage, but at North Platte it has yielded about the same amount of grain as Axtell. Heads are medium in length, erect, and compact. Kernels are medium-sized and are white with reddish brown to black spots.

**Leoti**

Leoti is of unknown origin but it was grown locally in Kansas for many years before it was officially tested. It matures in 105 to 110 days at Lincoln and grows over 6 feet tall. The forage produced is of excellent quality, and Leoti yields about the same as Norkan, Black Amber, and Rox Orange, but less than Atlas and Axtell. Leoti lodges severely under certain conditions, although it is more lodge resistant than Black Amber. The heads are medium in length, erect, and semi-compact with the upper branches of the head drooping. Much of the threshed grain is enclosed in the shiny, orange-brown glumes. The seed is light brown. Its grain yield is somewhat below that of Atlas, Axtell, and Norkan but is equal to Black Amber and Rox Orange.

**Black Amber**

Black Amber sorgo was one of the first sorghum varieties to be grown in Nebraska. It matures in 95 to 100 days at Lincoln and grows over 7 feet tall. Because of its rather slender stalks, severe lodging may result when growth is heavy. Black Amber yields about the same amount of forage as Leoti and Norkan, and its grain yield is also comparable to Leoti although it is somewhat below Norkan in this respect. The quality of forage is less desirable than that of Leoti. The heads of Black Amber are of medium length, erect, and open. The seeds are enclosed in heavy, shiny, black glumes, and they are medium in size and buff or reddish-brown in color.

**Rox Orange**

Rox Orange sorgo was developed by the Wisconsin Agricultural Experiment Station. It matures in 105 to
110 days at Lincoln and grows over six feet tall. It yields just slightly more forage and grain than Black Amber and Leoti, and the forage is of a very high quality. Rox Orange is especially suited for farm production of syrup and molasses. The heads are quite compact and erect and the kernels are orange-brown in color.

Fremont

Fremont is an early maturing forage variety developed in Colorado. It matures in 95 to 100 days at Lincoln and grows about 6½ feet tall. This variety is best described as an early Early Sumac, and at North Platte it has given yields about equal to Early Sumac. At Lincoln, yields of Fremont have been far below other varieties discussed above. The heads are compact and the kernels are light reddish-brown in color.

Acceptable Varieties

Early Sumac

Early Sumac was selected from standard Sumac at the Fort Hays Experiment Station, Hays, Kansas. It matures in 105 to 110 days at Lincoln, about the same as Leoti, and it grows about 6 feet tall. This variety tends to lodge and it is susceptible to head and kernel smut. The heads are short, erect, and compact, and the kernels are very small and are reddishbrown in color.

Kansas Orange

Kansas Orange was selected from Orange Sorgo at the Kansas Agricultural Experiment Station. Like Atlas Sorgo, it matures quite late in the season requiring over 120 days to reach full maturity at Lincoln, and it grows over 7 feet tall. It has given high forage yields at Lincoln about equal to Atlas Sorgo, but it is too late to mature grain consistently. In some years, Kansas Orange lodges severely, and it is susceptible to chinch bugs. The heads are of medium length, erect, and semi-compact. The kernels are of medium size and are orange-brown in color.

Rancher

Rancher is a very early Black Amber type developed by the South Dakota Experiment Station. It was selected primarily for its low prussic acid content. This variety is not productive enough to be grown in any counties except those bordering on South Dakota and Wyoming. The heads and kernels are similar to those of Black Amber Sorgo.

SUDAN GRASS

Recommended Variety

Wheeler

Wheeler Sudan Grass was found growing on the farm of Mr. Wheeler at Bridgeport, Kansas. Since it was the best lot of seed available in Kansas, it was used as foundation seed in beginning their sudan certification program in that state. Its most outstanding characteristic is the rapidity with which it establishes a stand and
grows during the first few weeks after planting. It is the highest yielding variety that has been tested at Lincoln and is now certified in Nebraska.

Acceptable Varieties

Common Sudans

Common sudans are quite variable in seed color which ranges from black to straw color, but most of the seed is of the straw color. None of the common sudans compare with Wheeler sudan in yield, and one can never be certain of the purity of such sudans. Sudan grass crosses readily with sorghums, and the use of such crossed seed increases the danger of hydrocyanic poisoning when the crop is grazed by cattle.

Texas Sweet Sudan

Texas Sweet Sudan was developed by the Texas Experiment Station as the result of a cross between Sudan grass and Leoti. By making several backcrosses to Sudan the Sudan type of vegetation was retained but the seed has reddish or sienna colored glumes. These strains from this cross have not yielded as much forage as Wheeler at Lincoln, but they do produce higher seed yields and they are more resistant to chinch bugs. The forage is more palatable to livestock as pasture and bundle feed. There is some evidence at present which indicates that these strains are slightly higher in prussic acid. It has not been determined whether it is as safe to pasture the Texas Sweet Sudans as Wheeler in Nebraska. Until such information is available, it is advisable to go slow in recommending these strains for production in the state.

Tift

Tift is a Sudan strain which was the result of a cross at the Experiment Station in Georgia. At Lincoln it has given high forage yields, is somewhat more lodge resistant, and later in heading than Wheeler, but it has rather coarse stems. Not enough information is available to recommend it to Nebraska farmers.

California 23

California 23 approaches Wheeler in its rapid growth and it is a week to ten days later in heading. Judging from the meager data available, it is more susceptible to chinch bugs and somewhat lower in yield than Wheeler Sudan.

MILLET

Millets are adapted to all parts of Nebraska and have value as a catch crop for both hay and seed. They mature in 70 to 85 days, give hay yields of 2 to 4 tons per acre, and produce seed yields of from 15 to 50 bushels per acre. Millet hay is satisfactory roughage for sheep and cattle but unsuitable for horses. Ground, hull-free millet seed has a feeding value of 85 to 90 per cent as much as that of corn. The foxtail millets have proved to be best in Nebraska.
Common

Common millet, a foxtail type, was one of the first millets grown in Nebraska. It is fine stemmed and leafy, with a close, compact head. The head tapers slightly toward the upper end, while the lower part of the head tends to be looser than the middle or upper part. The seed is yellow to straw color, oval to elliptical in outline, and decidedly flattened on one side. Common millet is one of the earliest maturing foxtail millets and it yields about 75 per cent as much forage as Black Amber Sorgo.

German

German millet is also a foxtail type and is quite similar to Common millet. It is one of the most commonly grown millets in Nebraska. It has a large, lobed head with long bristles which are green to purple. The seed dull yellow and more or less round. German millet has heavy stems and broad leaves, and it is medium to late in maturity. It will yield a little more hay than Common millet, but the quality of the hay is not so good.

White Wonder

White Wonder, another foxtail type, is also one of the most common millets in Nebraska. It has stout stems and it is fairly early in maturity. The head is lobed, except in the more unfavorable years and the seeds are a dull yellow. It compares favorably with Common millet and German millet in hay and seed yield.

Hungarian

Hungarian millet, a foxtail type, is early to medium-early in maturity. It has small compact heads, which closely resemble Common millet in size and shape. The bristles, however, are usually purple in color which, with the intermixture of dark-colored seeds, gives the head a darker appearance. The seeds are about the same size and shape as Common millet, but vary from pale yellow to brown, and sometimes very dark purple. Seeds of both colors are found within the same head, but the colors are not mixed in a single seed. Hungarian millet does not do as well under dry conditions as Common millet, and in Nebraska it has not yielded as well. Yields of forage are less than 60 per cent as much as Black Amber Sorgo in Nebraska.

Siberian

Siberian millet is a foxtail type that is quite similar to Common millet. However, it is said to be more vigorous and the head is somewhat larger. It is medium-early in maturity, has a medium-sized head that is not lobed, and has purple bristles. The seeds are similar in shape to Common millet, but they are always orange in color, which makes for easy identification. In Nebraska Siberian millet has yielded about equal to Hungarian and less than Common, German, and White Wonder.

Proso or Hog Millet

Proso Millet is grown primarily for its seed as the stems are too coarse to make good forage. It is dis-
tinted from the foxtail millets by its open-panicled head, similar to that of oats. The seed is larger than foxtail millet and the hulls may be any one of several colors depending upon the variety. White, cream, yellow, red, brown, black, and gray varieties exist. Stems are coarse, hollow, and hairy and their height varies with the different varieties. Grain yields of Proso millet have been rather unsatisfactory in Nebraska, especially in the eastern section.

Quite a number of varieties of Proso are grown. Turgai has spreading panicles and yellowish-brown seed. Tambov and Red Russian have spreading panicles and reddish-brown seed. Early Fortune has a compact-type head and large, reddish-brown seed. Yellow Manitoba, one of the most commonly grown varieties, has a loose, one-sided head and yellowish seed. Black Voronezh has a similar type head and brownish-black seed. Both White French and White Ural have white seed. White French grows much taller than other Proso, has a coarse stalk, and is extremely late in maturity. White Ural has a spreading panicle and is very short as compared to other varieties. It is the earliest variety grown. Two gray-seeded varieties, Fladimir and Deenbrook, have not been too promising.

Japanese Millet

Japanese millet is a coarse growing millet that is closely related to barnyard grass. It is sometimes called Barnyard millet for this reason. The stems are rather thick and erect and the seed head is a dense mass of short racemes with the seed usually enclosed in a gray hull. The seeds are more or less flat on two sides and rounded on the third. Japanese millet is not very extensively grown in Nebraska as the foxtail types produce a better quality hay and yield considerably more.

Pearl Millet

Pearl millet is an erect, tall annual that sometimes attains a height of several feet. The stems are woody with a dry pith and without sugar content. They become hard as growth progresses and the crop has little value for forage unless it is cut before it is more than three or four feet high. Pearl millet has the lowest value of all millets and is not recommended for Nebraska.

FLAX VARIETIES

The quality of seed planted and the cultural practices followed are much more important in producing flax in Nebraska than is the selection of a variety. There has been no significant difference in the yields of the varieties tested at Alliance, although at Lincoln slight differences have been noted. For eastern Nebraska the early maturing varieties such as Redwing have proved to be best. In western Nebraska the late maturing varieties such as Bison have an advantage and are to be preferred.

Redwing

Redwing is an early maturing variety being about a week earlier than Bison. It is moderately resistant to
wilt, but it is somewhat susceptible to rust and pasmo. It is less susceptible to rust than Bison, however. The seed is small to medium in size and produces an oil of high drying quality.

**Bison**

Bison is a late maturing variety that has given the best yields in tests at Alliance. It is highly resistant to wilt and moderately resistant to pasmo; however, it is very susceptible to rust. The seeds are medium to large in size and are brown in color. The flowers are a deep blue. This variety yields a higher percentage of oil than do smaller seeded varieties, but the oil is of somewhat lower quality.

**Biwing**

Biwing is a cross between Redwing and Bison, which combines to a high degree the high oil quality of Redwing with the high oil content of Bison. It is slightly later than Redwing, resistant to wilt, moderately susceptible to pasmo, and susceptible to rust. It is less susceptible to rust than Bison, however. The seeds are medium large in size. This variety is certified in Nebraska, but the acreage grown is very small.

**Dakota**

Dakota is a new, high-yielding variety recently released in North Dakota. It was developed from a cross Renew x Bison, and it is resistant to both wilt and rust. In addition it shows fair tolerance to pasmo. Dakota is medium early in maturity and produces medium-sized brown seeds having high oil quality and satisfactory oil yield.

**Koto**

Koto is a selection from a cross (Russian x Argentine) x Bison made in North Dakota. It is medium early in maturity, and it is resistant to wilt and moderately resistant to rust. Although Koto is moderately susceptible to pasmo, it is more resistant than some of the other varieties. The flowers are dark-blue and the seed is brown. In seed size, oil content, and oil quality this variety resembles Biwing.

**BUCKWHEAT**

In some years buckwheat is seeded late following a failure of a previous crop. In 1944 buckwheat was seeded in eastern Nebraska on land where corn had been washed out. There are two varieties of common buckwheat. **Japanese** is tall, late, and has large, angular, black seeds and **Silverhull** is shorter, earlier, and has smaller rounded seeds that are gray in color. Since buckwheat is readily cross pollinated, much crossing occurs and the type of seed usually found is more or less intermediate between the two varieties. Buckwheat is recommended only as a special or emergency crop.

**PERENNIAL GRASSES**

The classification of grasses into two groups, viz., cool-season grasses and warm-season grasses, is convenient.
not only to indicate their general seasonal growth responses, but also for the purpose of informing the public in generalized terms concerning the best methods and times for seeding grasses and the best methods of management of established stands. The presentation of recommended grass varieties and seed sources is here necessarily limited to the grasses most commonly available at the present time.

Cool-Season Grasses

This group of grasses includes those which start growth early in the spring, make their maximum forage production during the spring months, and mature seed early in the summer. Grasses in this group make little growth during hot dry periods of midsummer but frequently renew growth in late August or in September under favorable moisture and temperature conditions.

Bromegrass

Bromegrass is the leading grass in eastern Nebraska and in other parts of the state on favorable planting sites and under irrigation. For best production over a period of years it should be planted with a legume, but it may be grown in pure stands for seed production or erosion control. Yields of seed can be increased profitably by annual early spring applications of commercial nitrogen or by repeated applications of barnyard manure. The yields of forage and the protein content of the forage are also increased by these practices.

There are two types of bromegrass in the United States. These probably originated from seed introduced into this country from different sources. The type grown in the northern states appears to have originated from a large shipment of seed made to the South Dakota station from Russia in 1898, as judged by field tests of the seed from these sources. The type which has become naturalized in the latitudes of the central states appears to have originated from a seed introduction coming from Hungary in 1894 to the California station. It was introduced into Nebraska and Kansas during the 1890's where it has made its greatest spread during the last 25 years. This type is now spreading eastward through the cornbelt states with an increasing demand. The present best sources of this type of bromegrass are the certified varieties, Lincoln, Achenbach, and Fischer.

Lincoln bromegrass is a variety introduced by the Nebraska Station under that name in 1942. It was developed from several old fields in Nebraska thought to have been derived from seed of Hungarian origin. The oldest of these fields traces to seedings made during or prior to 1898. Only those with suitable history and performance in field tests were accepted as fields for foundation seed. Lincoln bromegrass is a large, aggressive, high-yielding grass which forms a good sod. Because of its size and potential yield it requires a readily available supply of nitrogen, a limiting factor after several years of growth or on soils of low fertility. It is tolerant of drouth and heat, has excellent seedling vigor, and is
more easily established on critical planting sites than bromegrass which is now available from northern seed sources. Seed yields of 500 pounds or more have been reported from good soils and average yields of 300 pounds or more are not uncommon. It is recommended throughout Nebraska and for similar latitudes in other states where bromegrass is adapted.

**Achenbach** bromegrass is a variety named by the Kansas station in 1944. It was developed on the farm of Achenbach Bros., Washington County, Kansas, where it has been grown for over 45 years. According to correspondence, the seed for this strain was obtained in the late 1890's from a farm near Sutton, Nebraska, and it is presumed to have the same origin as the Lincoln strain. In tests in Nebraska it produces similar yields of forage to those of Lincoln bromegrass but it is somewhat lower in seed production when moved northward.

**Fischer** bromegrass is a variety similar to the Lincoln and Achenbach bromegrasses, which is being certified by the Iowa station. It was discovered on the Fischer farm near Shenandoah, Iowa, where it was established from seed obtained in Ohio. Circumstantial evidence indicates that it is a strain which was derived from Achenbach bromegrass at an early date.

**Crested Wheatgrass**

Crested wheatgrass is a leading cool-season grass in the dry regions of the northern Great Plains and on certain critical planting sites not adapted to the production of bromegrass. It starts growth very early in the spring furnishing pasture early in the season before native grasses should be grazed. It must be utilized early in the season as it becomes unpalatable at maturity and makes little growth after seed production in the summer. It is best adapted to Nebraska in the panhandle section and in certain areas in northern Nebraska favored by the temperatures associated with higher altitudes than those of eastern and southern Nebraska. It is an extremely variable grass in growth habits and in head type but does not have the variability in adaptation as found in bromegrass. Accordingly the seed from northern sources is as well adapted as locally produced seed. Crested wheatgrass is a bunchgrass but its "bunchy" habit of growth may be overcome to a certain extent by growing a small amount of western wheatgrass with it.

**Standard or Common** crested wheatgrass is the most important variety now being grown extensively throughout the northern Great Plains. It has an excellent seed yield and seed characters which make it easily established, and it produces a fair yield of forage even under adverse conditions.

**Fairway** crested wheatgrass is a rather dwarf, fine-stemmed, leafy strain selected in Canada for use on lawns and fairways. It is more difficult to establish than the common or standard strain, but it produces a more uniform sod once it has been established. It has a smaller, finer seed, is usually somewhat lower in yield of forage, and the forage is less palatable for livestock than common crested wheatgrass.

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Western Wheatgrass

Western wheatgrass is one of the most important native grasses that can be classified in the cool-season group. Because of its aggressive nature, it finds its greatest usefulness in plantings where erosion control is of primary importance; however, it also provides good early pasture. It starts growth early in the spring and, like crested wheatgrass, must be grazed early in the season if maximum utilization is to be obtained. Once western wheatgrass is allowed to head and mature, it is usually left ungrazed by livestock, especially if other more palatable grasses are present in the pasture. Because of its low relative palatability and its rapid-spreading habit, western wheatgrass is an excellent grass for seeding in drainage-ways, terrace outlets, and gulches where they are included as a part of the pasture. Such areas should be grazed only slightly. Western wheatgrass is not generally recommended in pasture mixtures as it is so aggressive that it will crowd out other more palatable grasses; however, a small amount seeded with crested wheatgrass will tend to overcome the "bunchy" habit of growth of the latter. In the drier sections of the plains it is an important component of native hays. For this purpose it should be cut early in the season before it reaches maximum heading or maturity. The best adapted strains for Nebraska conditions are found in central Nebraska, northern Kansas, and south central South Dakota in preference to strains from farther north.

Intermediate Wheatgrass

Intermediate wheatgrass is a promising new grass closely related to both western wheatgrass and crested wheatgrass. It is an erect perennial that forms a dense sod by creeping rootstalks, which makes it an excellent grass for erosion control in waterways. It is outstanding in its ability to germinate quickly and to develop rapidly in the seedling stage, and it can be planted satisfactorily at slightly greater depths than other common grasses. Its pasture season corresponds closely to that of other cool-season grasses. It must be cut in the early-bloom stage to produce good hay. It makes a rapid recovery after a hay or seed crop has been removed. Seed of intermediate wheatgrass is large, smooth, and relatively heavy so that it can be easily cleaned and planted with ordinary equipment. Intermediate wheatgrass is adapted to approximately the same area as bromegrass.

Reed Canarygrass

This grass offers some promise for erosion control purposes and pastures on lands too wet in the spring to produce crops of bromegrass. It is tolerant to wet conditions during part of the year and once established will withstand considerable dry weather. Strains from northern Iowa and from Minnesota appear to be more winter-hardy than strains from the west coast states. Reed canarygrass was developed in Iowa as a composite of ten superior selections of open-pollinated seed sources which were superior in forage yields, disease resistance, leafiness, and forage quality. It is now being
certified in Iowa and can be expected to perform well in eastern Nebraska wherever Reed Canarygrass appears to be better adapted than bromegrass.

Green Needlegrass

Green needlegrass appears to be particularly well adapted to the heavy soils in central and western Nebraska. It is more drouth resistant than brome, and a new selection, Mandan, produces a fairly good yield of forage for pasture; however, it has not been extensively tested in Nebraska. It is advisable to keep green needlegrass grazed fairly close; otherwise, a short needle is produced that is objectionable to sheep. Seed should be processed prior to seeding to remove the heavy awn; otherwise, it will not permit planting with a grain drill. Seed should be held over one year after harvest before seeding as there is a high percentage of dormancy in newly-harvested seed. Green needlegrass seedlings develop slowly and two to three years are required before this grass reaches maximum production of seed and forage.

Warm-season Grasses

Warm-season grasses start growth during mid-spring and make their maximum forage production during the warm season of the year. The grasses in this group vary considerably as to the time of year in which they produce seed.

Big Bluestem

Big bluestem is a native, long-season, perennial grass belonging to the same group of grasses as the sorghums. It is the most important constituent of native prairie hays in the eastern part of Nebraska and in the sandhills. It ranks high in palatability among the grasses. This grass has the greatest potential yield of any of the perennial grasses which may be grown in Nebraska. It is best adapted to planting sites where the soil fertility and moisture content are favorable. It has a chaffy seed which is difficult to harvest and cure. Stands are established with some difficulty and are slow to come into maximum production. Because of seed dormancy, year-old seed will give better results in stand establishment than new seed.

Because of its day-length adaptation and its long season of growth the strains of big bluestem which are best adapted to Nebraska conditions should come from local areas or not to exceed 200 miles south from the section where they are to be planted. Strains from too far south will not mature seed before frost and many are not winter-hardy in Nebraska. On the other hand, strains from too far north will not yield as well as local strains or strains from short distances south of the region in which they are to be planted. The best section of the state for harvests of adapted strains of big bluestem are in southeast Nebraska and along the eastern border of the sandhills.
Switchgrass

Switchgrass is a native, long-season, perennial grass belonging to the same group of grasses as the millets. It is associated with big bluestem in the prairie hays of eastern Nebraska and the sandhills. It is accordingly best adapted to the more favorable planting sites in respect to moisture, and it will probably prove to be most useful in the transition areas bordering the sandhill region. In its early stages of growth this grass is palatable for cattle but less so for sheep. The grass is coarse at maturity. It has a millet-like seed that is easily harvested, cleaned and sown. Seed should be stored throughout one summer period after harvest before it is planted because of the high percentage of dormancy in newly-harvested seed. The best source of seed in Nebraska is in the sandhills, particularly if it is to be used near the region. Strains of this grass cannot be moved far southward from their place of origin because of increasing danger of infestation by rust. Southern strains moved northward are usually considered too late in maturity and too coarse for use as pasture.

Side-oats Grama

Side-oats grama is another native, perennial, warm-season grass. During the somewhat dry period from 1936 to 1941, this grass increased in abundance in native stands. Meadows and pastures throughout Nebraska and northern Kansas form the chief source of adapted strains. Strains from farther south are subject to winter injury when grown in the state. Side-oats grama ranks high in palatability, along with big bluestem among the warm-season group. When seeded it is best used in mixture with other grasses such as blue grama and buffalograss. It is easily established by mid-spring seeding and forms an important part of the mixture during the first years before the effects of grazing or the competition of other grasses becomes too severe. The seed has no prolonged dormancy and should be used the year following its harvest or, at most, in the second year as it loses viability unless carefully stored.

Blue Grama

Blue grama is a warm-season, short grass commonly associated with buffalograss. It occurs widely throughout the Great Plains as a dominant grass. Although blue grama is a typical bunchgrass, it forms a good sod of particular value for use on uplands and on slopes that should be removed from cultivation. It is one of the most drought resistant grasses. It is climatically adapted to the central and western parts of the state but it should be considered also throughout eastern Nebraska for use on planting sites made critical due to slope, exposure, or erosion. Under such adverse conditions it may do relatively better than grasses of larger growth habit or with higher moisture and nutrient requirements.

There are many naturally occurring strains of blue grama. The best sources of adapted, high-yielding strains are native stands in south central Nebraska and northern Kansas. Strains originating in the Nebraska
sandhills and northward have been shown by experimental tests to be lower in yield than strains from near the Platte River or southward. Strains from Oklahoma and Texas lack winter-hardiness. The seed of blue grama is frequently hard to obtain because of its failure in some years to produce a good seed crop. This may be due to failure on the part of the grass to set seed due to adverse weather conditions or to failure to harvest the crop before shattering. Strains vary in earliness of seed maturity, so that seed may be produced at varying times throughout the summer season.

Blue grama is easily established from seed by mid-spring sowings. The seed has no prolonged dormancy and accordingly should be used the year following its harvest or, at most, in the second year as it loses viability unless carefully stored. Because of seed shortages and the general adaptation of blue grama grass, it is best used in a mixture with buffalograss with which it ranks closely in palatability.

Buffalograss

Buffalograss is a typical sod-forming short grass of the Great Plains. It is a drought resistant grass climatically adapted to areas of low rainfall and high summer temperatures although it does best under these conditions when it receives additional moisture and nutrients due to a favorable planting site. It is not unadapted to regions of high rainfall under certain conditions. It does not compete with taller growing grasses or weeds and owes its survival in pure stands to removal of competition by grazing or close mowing. It offers possibilities for use throughout the state if these conditions are realized. It is an excellent grass for erosion control on slopes and on planting sites exposed to high summer temperatures.

The present sources of adapted seed are the short grass pastures in south central Nebraska and in northern Kansas, where it is being harvested annually by seed companies and enterprising individuals. Among the drought resistant grasses of the plains it offers the most promise from the standpoints of commercial seed production and improvement by selection and breeding for desirable seed and forage production. Newly harvested seed burs should be treated to break the seed dormancy if satisfactory germination is to be obtained.

Sand Lovegrass

Sand lovegrass is a bunchgrass native to Nebraska. It is relatively abundant in many upland sandhill hay meadows and, with switchgrass, is one of the first invaders of abandoned cropland where the soil is sandy. It is rapidly becoming important as a part of the mixture in reseeding sandy areas to grass. Its foliage is relished by livestock.