2-1951

EC100 Revised 1951 Crop Varieties in Nebraska

H. H. Wolfe

J. D. Furrer

Follow this and additional works at: https://digitalcommons.unl.edu/extensionhist

Wolfe, H. H. and Furrer, J. D., "EC100 Revised 1951 Crop Varieties in Nebraska" (1951). Historical Materials from University of Nebraska-Lincoln Extension. 2103. https://digitalcommons.unl.edu/extensionhist/2103

This Article is brought to you for free and open access by the Extension at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Historical Materials from University of Nebraska-Lincoln Extension by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.
CROP VARIETIES IN NEBRASKA

Martin milo grain sorghum planted on the contour.
CONTENTS

Introduction .............................................. 3
Hybrid Corn ............................................. 5
Winter Wheat ........................................... 12
Spring Wheat ........................................... 17
Winter Rye ............................................... 20
Spring Rye ............................................... 21
Oats ....................................................... 21
Spring Barley ........................................... 29
Winter Barley ........................................... 34
Spelt and Emmer ........................................ 35
Alfalfa .................................................... 35
Sweetclover ............................................. 40
Red Clover ............................................... 42
Madison Vetch .......................................... 43
Lespedeza ................................................ 44
Birdsfoot Trefoil ....................................... 44
Ladino Clover .......................................... 45
Crimson Clover ......................................... 45
Strawberry Clover ...................................... 46
Alsike Clover .......................................... 46
Kudzu ..................................................... 46
Soybeans .................................................. 47
Safflower ................................................ 49
Grain Sorghums ......................................... 50
Forage Sorghums ........................................ 55
Sudan Grass ............................................. 58
Millets ...................................................... 59
Flax ......................................................... 61
Buckwheat ............................................... 62
Perennial Grasses ....................................... 62
    Cool-season grasses .............................. 62
    Warm-season grasses ............................ 67
Crop Varieties in Nebraska

H. H. Wolfe and J. D. Furrer

INTRODUCTION

AGRONOMIC research has indicated that each crop variety grown has its own particular adaptation. It is vitally influenced by such 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 that 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, vocational education instructors, and soil conservationists, as well as for farmers in selecting varieties recommended 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 in Lincoln, at substations near North Platte, Scottsbluff, and Valentine, and at the Box Butte Experiment 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 map on page 4. 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 in the tables or the varietal descriptions.

The varieties discussed herein are classified as recommended, acceptable, and not recommended. Recommended varieties include those
CROPPING DISTRICTS FOR NEBRASKA EXCEPT FOR CORN
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 or have not been sufficiently tested. When seed of recommended varieties is not available, fairly satisfactory results may be expected by using one of the acceptable varieties. *Varieties not recommended* should not be grown. They have either proved to be inferior in performance or have not been sufficiently tested to be recommended in the state.

**HYBRID CORN**

**RECOMMENDATIONS FOR NEBRASKA**

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

<table>
<thead>
<tr>
<th>Maturity classification</th>
<th>ZONE (See page 6 for map showing corn maturity zones)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zone I nonirrigated and Zones 1 &amp; 2 irrigated</td>
</tr>
<tr>
<td>Early</td>
<td>Nebr. 501</td>
</tr>
<tr>
<td></td>
<td>Nebr. 503</td>
</tr>
<tr>
<td></td>
<td>Nebr. 504</td>
</tr>
<tr>
<td></td>
<td>Ind. 608C</td>
</tr>
<tr>
<td></td>
<td>Ia. 306</td>
</tr>
<tr>
<td></td>
<td>Nebr. 601</td>
</tr>
<tr>
<td></td>
<td>Nebr. Exp. 1219B</td>
</tr>
<tr>
<td>Midseason</td>
<td>Nebr. Exp. 893B</td>
</tr>
<tr>
<td></td>
<td>U. S. 35</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nebr. 801W</td>
</tr>
<tr>
<td></td>
<td>Kans. 2234</td>
</tr>
<tr>
<td>Full-season</td>
<td>Nebr. 701</td>
</tr>
<tr>
<td></td>
<td>Ohio C92</td>
</tr>
<tr>
<td></td>
<td>U. S. 13</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For irrigated land only in Zone IV.

The hybrids recommended for the maturity zones are not definitely confined to the zones as indicated. To a certain extent overlapping occurs as climate and soils along adjoining sides of the zone lines are much the same.
CORN MATURITY ZONES FOR NEBRASKA
CORN

Recommended Yellow Hybrids

IOWA 4417
(Wf9 x M14) x (B8 x I153)

Iowa 4417, the earliest of all Nebraska Certified Hybrids, is suitable for dry land in the panhandle or for replant purposes in other areas. In an average of three years’ tests it has yielded 10.4 bushels more and contained 2.4 per cent less moisture at harvest than Dawes No. 2.

IOWA 4316
(Wf9 x M14) x (L289 x I205)

Iowa 4316 matures in 106 to 110 days and 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.

NEBRASKA 301
(Wf9 x N6) x (A374 x A375)

Nebraska 301 is a hybrid of 102–106 days relative maturity at Lincoln. The hybrid is a few days earlier than Iowa 4316 and consequently should be useful as a replant corn in areas where relatively short-season corns are grown. In addition, the hybrid has done well in the northeastern part of the state and in the panhandle area under irrigation. It is too late for the dryland areas in the panhandle in most years. Nebraska 301 yields well in its maturity group and is an attractive hybrid in the field. During the past two years in the early hybrid group tests it has been drier at harvest than Iowa 306 and Iowa 4316 and has outyielded these two hybrids by 2.2 and 4.1 bushels per acre, respectively.

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.
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 hybrids of this relative maturity 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 under irrigation in the Platte valley. 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.

NEBRASKA 503
(Wf9 x N6) x (187-2 x 07)

Nebraska 503 matures in 110 to 114 days. It is adapted to a growing season suitable for Nebraska 501, Nebraska 502, Iowa 306, and Iowa 4059. The plants are of medium height, dark green in color, and have a slight two-ear tendency. The ears are borne at a desirable height. The grain is orange-yellow in color and of good depth. It is a very attractive hybrid, having good ear retention as well as being an excellent yielder. It has excellent standing ability, but may root lodge under some conditions.

NEBRASKA 504
(Wf9 x Hy) x (N6 x M14)

Nebraska 504 (Exp. 1073B) has a maturity rating of 110-114 days at Lincoln. It has a good yield record in the Nebraska corn performance tests over the past four years. It appears well adapted in central Nebraska and elsewhere in areas where the 500 series hybrids are grown. The hybrid is rather short, dark green, and attractive in appearance. The grain tends toward the hard side, especially in drier seasons.

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

Nebraska 601 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 large and cylindrical with rather deep, medium-rough, soft, starchy kernels.

**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. It is an easy picker as well as an excellent yielder, but under conditions causing early maturity this hybrid may drop ears badly.

**NEBRASKA 701**

(Wf9 x 38-11) x (Hy x 041)

Nebraska 701 is a full-season yellow hybrid which matures in 118 to 122 days. It is quite similar in pedigree and appearance to U. S. 13, and will undoubtedly replace U. S. 13 within a few years. Nebraska 701 has a better all-round performance and has outyielded U. S. 13 by a rather large margin in comparable tests. It is darker green in color, and somewhat shorter than U. S. 13, and is equal, if not superior, in standing ability and ear retention.

**NEBRASKA EXP. 1219B**

Nebraska Exp. 1219B has a maturity rating of 114–118 days at Lincoln and would therefore compare with the 600 series hybrids. It has performed well in tests and appears especially well suited to dry land planting in central and south central Nebraska because of its apparent drought resistance.

**NEBRASKA EXP. 893B**

Nebraska Exp. 893B has performed consistently well during the five years it has been tested in this state. The hybrid is of 118–122 days relative maturity at Lincoln and compares therefore with the 700 series hybrids. It is of medium height, yields well, and being relatively stiff-stalked shows some tolerance to corn borer injury.
Acceptable Yellow Hybrids

**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.

**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 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 to mechanical picking. The ears are medium-large with good husk covering. The kernels are deep, medium-rough, and rather starchy.

**U. S. 35**

(Wf9 x 38-11) x (Hy x R4)

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

**Yellow Hybrids Not Recommended**

**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 an undesirable tendency for this hybrid to drop its ears. The kernels are of medium depth and are dimple dented but are somewhat rough. This hybrid is largely being replaced by Iowa 306.
Recommended White Hybrids

KANSAS K2234

K2234 is a white hybrid that matures in 122 to 126 days. It is quite drought 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, vitreous kernels. Because of its maturity, its best performance may be limited to southeastern Nebraska.

NEBRASKA 801W

(K63 x K64) x (K41 x N72)

A new white hybrid, Nebraska 801W (5010C) has a relative maturity of 122–126 days at Lincoln. Although this is the same general maturity indicated for K2234, the moisture content of Nebraska 801W at harvest has been consistently lower than that of K2234, thus extending its range of adaptability north and westward in the state. The husks of 801W open as the plants mature which facilitates drying. It has a 3.2 bushel yield advantage over K2234 in southeastern Nebraska for the past three years.

Hybrid Popcorn Recommended

K4

(Sg18 x Sg30A) x Sa24

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 that of open-pollinated varieties.

PURDUE 38

(Sg32 x Sg16) x Sa14

This hybrid has been the most productive entry in trials in Nebraska, Kansas, and Indiana, and has given a good account of itself in other states. The popping expansion ratio is not of the best, averaging about 27 to 1 as compared with 23 to 1 for a good strain of open-pollinated popcorn.

The ears have 14 to 18 rows of large, deep kernels, medium reddish-orange in color. The popped kernels are large, somewhat mottled, and fairly round with few hulls. The plants are tall (6½ to 7 feet), usually develop two ears, and remain standing until harvest. The tendency of the ears to have large butts makes it one of the most satisfactory hybrids for use with mechanical pickers.
POPCORN  WINTER WHEAT

PURDUE 31
(Sgl6 x Sgl8) x Sa24

This hybrid combines high yield with good expansion and excellent quality and has become one of the popular three-way hybrids. The ears are medium to large (7 to 8 inches) with 14 to 16 rows of medium-yellow kernels. It is intermediate in kernel size. The plants are 6 to 6½ feet tall, vigorous, and stand well to maturity. Under good conditions this hybrid will develop at least two good ears per stalk.

WINTER WHEAT
RECOMMENDATIONS FOR NEBRASKA

<table>
<thead>
<tr>
<th>Districts</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Southeast)</td>
<td>Pawnee</td>
<td>Turkey</td>
</tr>
<tr>
<td></td>
<td>Nebred</td>
<td>Tenmarq</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blackhull</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Iobred</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comanche</td>
</tr>
<tr>
<td>(East central)</td>
<td>Pawnee</td>
<td>Turkey</td>
</tr>
<tr>
<td></td>
<td>Nebred</td>
<td>Iobred</td>
</tr>
<tr>
<td>(Northeast)</td>
<td>Nebred</td>
<td>Turkey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Iobred</td>
</tr>
<tr>
<td>(South central)</td>
<td>Nebred</td>
<td>Turkey</td>
</tr>
<tr>
<td></td>
<td>Cheyenne</td>
<td>Tenmarq</td>
</tr>
<tr>
<td></td>
<td>Pawnee</td>
<td>Blackhull</td>
</tr>
<tr>
<td></td>
<td>Comanche</td>
<td></td>
</tr>
<tr>
<td>(Central)</td>
<td>Nebred</td>
<td>Pawnee</td>
</tr>
<tr>
<td></td>
<td>Cheyenne</td>
<td>Turkey</td>
</tr>
<tr>
<td>(North central)</td>
<td>Nebred</td>
<td>Turkey</td>
</tr>
<tr>
<td></td>
<td>Cheyenne</td>
<td></td>
</tr>
<tr>
<td>(Southwest)</td>
<td>Nebred</td>
<td>Turkey</td>
</tr>
<tr>
<td></td>
<td>Cheyenne</td>
<td>Tenmarq</td>
</tr>
<tr>
<td></td>
<td>Pawnee</td>
<td>Blackhull</td>
</tr>
<tr>
<td></td>
<td>Comanche</td>
<td></td>
</tr>
<tr>
<td>(West)</td>
<td>Cheyenne</td>
<td>Nebr. No. 60</td>
</tr>
<tr>
<td></td>
<td>Nebred</td>
<td>Turkey</td>
</tr>
</tbody>
</table>

Recommended Varieties
PAWNEE

Pawnee was selected from a Kawvale x Tenmarq cross in cooperative experiments by the Nebraska and Kansas Agricultural 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
WINTER WHEAT

is early in maturity, less winter-hardy than Turkey, higher in test weight than Turkey, and its milling and baking characteristics are satisfactory to the trade. It has a short, rather stiff straw. Pawnee has a tendency to shatter, a fault which is accentuated in central and western districts. At Lincoln, Pawnee has outyielded Cheyenne by over five bushels per acre on the average, and has outyielded Turkey by over seven bushels per acre. It has also been high in yield in cooperative tests in southeastern Nebraska. Pawnee wheat has yielded as much as Cheyenne at North Platte, but has yielded less at Alliance. Winterkilling seems involved at Alliance, but in recent years this has not been a depressing factor on the yield of Pawnee at North Platte. In the southwest district Pawnee can be used satisfactorily as an early variety planted on a part of the acreage to help spread the period of harvest, while Nebred or Cheyenne is used for the full-season variety.

NEBRED

Nebred was selected from a strain of 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. Nebred, however, is very susceptible to leaf rust. 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 Pawnee in more recent years. Cheyenne is characterized by stiff straw and short, erect heads, making it a good variety for combining. It is somewhat tolerant 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.

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 that of Ten-
marq but lower than that of 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. In general, it has yielded less than Pawnee in southeastern Nebraska.

**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 winterkilling has not been a factor, the yields of Nebraska No. 60 have not compared so favorably with those of other varieties, especially at Lincoln. It is still popular in some sections of western Nebraska and is an acceptable variety for the northwest district.

**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 samples called Turkey collected from different parts of the country differ quite widely in growth characteristics when compared in adjacent plots. 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, the smuts, 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 the cross Marquis × P1066 made 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 winterkilling. The variety has slight resistance to leaf and stem rust but may be damaged severely in some years. The grain is inclined to “yellowberry” rather easily, and the test weight may be low; however, 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 Nebraska.
WINTER WHEAT

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 winterhardy, 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 yielded less than Tenmarq at Lincoln and about the same at North Platte and Alliance. In cooperative trials it has yielded about the same as Tenmarq in most tests. Blackhull is acceptable in the southern two tiers of counties of Nebraska.

IOBRED

Iobred is a variety developed by the Iowa Agricultural Experiment Station. At Lincoln the yields have been low. Also, in cooperative tests in eastern Nebraska it has failed to outyield Pawnee, Nebred, or Turkey. Iobred has brown chaff, short, broad kernels, stiff straw, and is moderately resistant to leaf and 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 of Nebraska.

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, moderately resistant to hessian fly, is fairly early, but 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 trials 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
WINTER WHEAT

has been distributed by the Kansas, Colorado, 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. It is doubtful if the variety will find a place in Nebraska.

TRIUMPH

Triumph is an early maturing variety developed in Oklahoma. Because of its earliness it escapes damage from rust. Low yields have been recorded in most of the Nebraska tests. It lacks winter-hardiness, has a short straw, and the grain is fair to good in quality.

MINTURKI

Minturki is a selection developed in Minnesota from the cross Odessa x Turkey. It is late in maturing and is very winter-hardy. It is resistant to bunt but is susceptible to stem and leaf rust.

MINTER

Minter is from the cross Hope-Minturki x Minturki developed in Minnesota. It resembles Minturki but is resistant to stem rust as well as to bunt. The grain is also of better quality than that of Minturki. The variety matures late and has a weak straw. Based on a limited number of tests it appears promising in northeastern and north central Nebraska.

IOHARDI

Iohardi is from the cross Iobred x Minhardi which was developed by the Iowa Agricultural Experiment Station. It is late in maturity and quite winter-hardy. The brown chaff of Iobred is also characteristic of this variety.

BLUE JACKET

Blue Jacket was developed in Kansas by Earl G. Clark. It is similar to Blackhull, but has a stiffer straw.

YOGO

Yogo is a northern wheat grown extensively in Montana and Canada. It is a late maturing variety with a tall, weak straw. It is resistant to bunt and has fair quality grain.

CHIEFKAN

Chiefkan is a beardless, black-glumed, hard red winter wheat developed in Kansas by Earl G. Clark. The variety has shown considerable yielding ability in Nebraska when not injured by winterkilling. It has nearly equalled Cheyenne in yield at Lincoln but has been far below Pawnee. It has some resistance to leaf rust, but 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 decidedly inferior. The variety does not have a place in Nebraska.

**RED CHIEF AND SUPER 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 may be slightly better. In yield tests in Nebraska, Red Chief has been about equal to Cheyenne at Lincoln and North Platte but lower than Pawnee, whereas at Alliance, Red Chief has yielded seven bushels to the acre less than Cheyenne.

**KIOWA**

Kiowa (Chiefkan x Oro-tenmarq) is a wheat released in Kansas. In western Kansas where it is recommended, Kiowa has outyielded Comanche one to three bushels. It is resistant to bunt but is more susceptible to loose smut than Comanche or Tenmarq. The variety is somewhat more susceptible to leaf rust than Comanche or Pawnee and is equal to or slightly more resistant to stem rust than those varieties. Kiowa is similar to Comanche in susceptibility to hessian fly. The milling and baking characteristics are acceptable.

**SPRING WHEAT**

**RECOMMENDATIONS FOR NEBRASKA**

<table>
<thead>
<tr>
<th>District</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>North central and West</td>
<td>Mida</td>
<td>Ceres</td>
</tr>
<tr>
<td></td>
<td>Thatcher</td>
<td>Pilot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rival</td>
</tr>
</tbody>
</table>

**Recommended Varieties**

**THATCHER**

Thatcher is a beardless spring wheat selected from an Iumillo (durum)-Marquis x Marquis-Kanred cross developed by the Minnesota 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 ten years. Thatcher is resistant to stem rust, is relatively early, has a short, stiff straw, and its milling and baking characteristics are satis-
factory. Its disadvantages are susceptibility to leaf rust, scab, mildew, and some races of bunt. Sometimes it grows so short as to make harvest difficult. The grain has a dull red color, is inclined to be low in test weight, and has a tendency to bleach if there is considerable moisture at harvest time. Thatcher is a recommended variety for north central and western Nebraska, the only districts where spring wheat is recommended.

MIDA

Mida was first released in 1944 after being developed at the North Dakota Agricultural 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 some resistance to leaf rust and high resistance to stem rust and stinking smut but 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 grown in north central and western Nebraska.

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 ten 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.

PILOT

Pilot is a 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. It is resistant to stem rust and to bunt, and is reported to have excellent milling and baking characteristics. The 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 nearly identical average yields. Rival is resistant to 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 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 nearly 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, chaff and kernels, and in the absence of rust gives a fairly good yield. It is among the late maturing spring wheat varieties.

HUMPBACK AND DIXON

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 being Mindum, Stewart, and Carleton. Durum wheats usually show considerable resistance to rust and because of this are good yielders in bad rust years. Until the rust-resistant Thatcher, Mida, Pilot, and Rival varieties were included in the tests in Nebraska, Mindum was one of the highest yielding varieties. Durum 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.
HENRY

Henry is a rust-resistant spring wheat variety developed by the Wisconsin Agricultural Experiment Station. In Nebraska tests it has been among the highest yielding varieties but it has not gained acceptance by the milling trade and therefore is not recommended.

WINTER RYE

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 in 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 no proof that it is different from other varieties in this respect. It is recommended for southeastern Nebraska for early grazing, both fall and spring.

Acceptable Variety

DAKOLD

Dakold was selected in North Dakota for unusual winter-hardiness. It has narrow, dark green leaves and is fairly late. If high cold resistance is desired, this is the variety to use; but in the absence of winter-killing the yields may be lower than those of 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

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

RECOMMENDATIONS FOR NEBRASKA

<table>
<thead>
<tr>
<th>Districts (Southeast)</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinton</td>
<td></td>
<td>Andrew</td>
</tr>
<tr>
<td>Nemaha</td>
<td></td>
<td>Marion</td>
</tr>
<tr>
<td>Cherokee</td>
<td></td>
<td>Otoe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mindo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Benton</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bonda</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Districts (East central)</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinton</td>
<td></td>
<td>Ajax</td>
</tr>
<tr>
<td>Nemaha</td>
<td></td>
<td>Andrew</td>
</tr>
<tr>
<td>Cherokee</td>
<td></td>
<td>Mindo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Benton</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bonda</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Districts (Northeast)</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinton</td>
<td></td>
<td>Ajax</td>
</tr>
<tr>
<td>Mindo</td>
<td></td>
<td>Andrew</td>
</tr>
<tr>
<td>Nemaha</td>
<td></td>
<td>Benton</td>
</tr>
<tr>
<td>Cherokee</td>
<td></td>
<td>Bonda</td>
</tr>
<tr>
<td>Marion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Districts (South central)</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunker</td>
<td></td>
<td>Kanota</td>
</tr>
<tr>
<td>Osage</td>
<td></td>
<td>Fulton</td>
</tr>
<tr>
<td>Otoe</td>
<td></td>
<td>Neosho</td>
</tr>
<tr>
<td>Cedar</td>
<td></td>
<td>Clinton</td>
</tr>
<tr>
<td>Nemaha</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cherokee</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Districts (Central)</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nemaha</td>
<td></td>
<td>Kanota</td>
</tr>
<tr>
<td>Cherokee</td>
<td></td>
<td>Fulton</td>
</tr>
<tr>
<td>Osage</td>
<td></td>
<td>Clinton</td>
</tr>
<tr>
<td>Otoe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cedar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brunker</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Districts (North central)</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nemaha</td>
<td></td>
<td>Kanota</td>
</tr>
<tr>
<td>Cherokee</td>
<td></td>
<td>Fulton</td>
</tr>
<tr>
<td>Brunker</td>
<td></td>
<td>Mindo</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Districts (Southwest)</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osage</td>
<td></td>
<td>Kanota</td>
</tr>
<tr>
<td>Brunker</td>
<td></td>
<td>Fulton</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Districts (West)</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osage</td>
<td></td>
<td>Kanota</td>
</tr>
<tr>
<td>Brunker</td>
<td></td>
<td>Fulton</td>
</tr>
</tbody>
</table>
Recommended Varieties

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 most of the races of stem rust and crown rust (except races 45 and 57) and races of smuts commonly found in Nebraska. It is highly resistant to leaf spot diseases and to Victoria blight and root rot. It has had an outstanding yield record in the eastern one-third of the state, and is an acceptable variety when grown under irrigation.

NEMAHA

Nemaha is a variety developed from the cross Victoria-Richland x Morota-Bond in cooperative experiments by the Iowa, Kansas, and Nebraska Agricultural Experiment Stations and the United States Department of Agriculture. Nemaha is similar to Clinton in many respects. However, it ripens two to five days earlier and is slightly shorter. It is resistant to Victoria blight and to most of the races of smut, crown rust, and stem rust commonly found in Nebraska, and to the most prevalent ones in the United States. It has given high yields of plump, high-testing grain. Generally, the grain is light red in color, but may have a pinkish-ivory or yellow cast or be striped with gray. The straw is stiff and resists lodging. Consequently, Nemaha can be used as an irrigated oat in the Lower Platte Valley.

CHEROKEE

Cherokee is from the same cross as Clinton, but it matures approximately three days earlier than Clinton and is three to four inches shorter. Kansas, in 1948, and Nebraska, in 1949, released seed of this variety. It has the same disease resistance, stiff straw, and high test weight that are characteristic of Clinton and Nemaha. Cherokee has given excellent yields in Nebraska. The grain is similar to that of Nemaha. Cherokee is sometimes referred to as Ames No. 2. Cherokee can successfully be grown under irrigation in the Lower Platte Valley.

CEDAR

Cedar was developed from the cross Victoria x Richland in co-operative experiments between the Iowa and Nebraska Agricultural Experiment Stations and the United States Department of Agriculture. In plot tests at Lincoln during the last 11 years, Cedar had an average
yield of approximately seven bushels per acre more than Otoe, but in turn it has been exceeded by Clinton, Nemaha, and Cherokee. At North Platte and Alliance, Cedar has yielded as high as Brunker, Osage, Kanota, and Fulton, which are the recommended and acceptable varieties. In cooperative tests in eastern Nebraska, Cedar has proved to be a good producer except when damaged by Victoria blight. In the West district Cedar is an acceptable variety to be grown under irrigation. 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 Victoria blight and root rot. In the absence of Victoria blight, Cedar can be considered an acceptable or recommended variety in Eastern, Central, and South Central Districts.

**Osage**

Osage is a selection from the cross Victoria-Richland x Fulton. The original cross from which Osage was selected 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 Victoria blight and root rot. It has good yielding capacity, earliness of maturity and good quality grain. It can be grown successfully under irrigation in the West District. 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, Osage is especially recommended for central, western, and southern Nebraska, except southeast where Victoria blight has damaged it extensively.

**Otoe**

Otoe, originally known as Nebraska No. 518 or Burt 518, was selected from Burt in Nebraska. At Lincoln during the last 17 years it yielded 6.4 bushels per acre more than Kherson, but considerably less than the newer recommended varieties in recent tests. Its record at North Platte and Alliance has been fairly good, but it seems best adapted to central and south central Nebraska. Otoe is characterized by early maturity, some stem rust resistance, yellowish grain, and straw a little stiffer than that of Brunker. The grain is inclined to be lighter in test weight than that of most other varieties. Otoe is particularly suitable under conditions of delayed planting. It is resistant to Victoria 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 the two varieties have been nearly equal. Otoe exceeded Brunker one bushel to the acre in a 16-year test at Lincoln. In cooperative tests in central and western Nebraska, its yield record has been very good. Brunker should not be used on ground where growth may become rank. It is best adapted to the western two-thirds of the state.

**MINDO**

Mindo is from the cross Bond x (Minota-White Russian x Black Mesdag). It was developed in Minnesota and released in 1946. It matures two to three days earlier, and has averaged two inches shorter than Clinton. Mindo is resistant to Victoria blight and to races of smut, crown rust (except races 45 and 57), and stem rust common in Nebraska. It has a good yield record at Lincoln and in northeast Nebraska.

**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 varieties such as Clinton and Cedar, which have stiffer straws. Marion is a white oat with thin hulls and large groats. The variety is resistant to Victoria blight and root rot.

**Acceptable Varieties**

**FULTON**

Fulton is a variety that was selected from a Fulghum x Markton cross at the Kansas Experiment Station. It is resistant to most races of smut, is early, yields well, and has a fair test weight. Kernels are light red in color, resembling white oats more than Kanota, but ordinarily it grades red. Fulton 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.

**KANOTA**

Kanota is a red oat and 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 outyielded by several varieties, but at North Platte it has yielded comparatively better. At Alliance it has been among the best in yield.

**BENTON**

Benton is from the same cross as Clinton and was developed at the Iowa Agricultural Experiment Station. It is very similar to Clinton;
however, it grows a little taller, and it has not yielded quite so well as Clinton in eastern Nebraska. Benton possesses the same disease resistance to Victoria blight, smut, crown rust, stem rust, and leaf spot diseases. It has a high test weight.

**BONDA**

Bonda is a selection from a Bond x Anthony cross developed in Minnesota and released in 1946. It is similar to Clinton in its maturity, disease resistance, and test weight, but grows slightly taller. It has yielded nearly as much as Clinton in eastern Nebraska.

**ANDREW**

Andrew is a new variety developed at the Minnesota Agricultural Experiment Station from the cross Bond x Rainbow. It matures fairly early and is resistant to Victoria blight, crown rust, stem rust (except race No. 8), and the smuts. It has a fairly stiff straw, high test weight, and has given good yields of grain. Under irrigation in the Lower Platte Valley Andrew has outyielded other irrigated oats.

**TAMA, BOONE, VIKOTA, AND VICLAND**

Like Cedar, these varieties were selected from a Victoria x Richland cross. They resemble Cedar in most respects, but none of them appear to be as well adapted to Nebraska conditions. They have yielded about the same as Cedar over a period of years with Boone showing the lowest yield in the group. Vicland was distributed in Wisconsin, Vikota in South Dakota, and Boone and Tama in Iowa. All four varieties are resistant to several important races of crown rust, stem rust, and smut. All are susceptible to Victoria 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. However, it is susceptible to Victoria blight and root rot.

**AJAX**

Ajax has some resistance to stem rust but is rather susceptible to crown rust and is likely to be damaged in rust years. It has a relatively strong straw and grows several inches taller than Clinton and Nemaha. Ajax matures several days later than Clinton, Nemaha, and other varieties commonly grown in Nebraska but has given rather good yields of plump white grain. Of the Canadian varieties thus far tested, it appears to be the best adapted for Nebraska conditions. Ajax can successfully be grown under irrigation.
Varieties Not Recommended

**TROJAN**

Trojan is another Burt selection made at the U.S. Dry Land Field Station, Akron, Colorado. In Nebraska tests it 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.

**BEAVER**

Beaver is a Canadian variety from the cross Vanguard x Erban. It matures three to four days later than Clinton and grows somewhat taller. It is susceptible to smut and crown rust, and is only moderately resistant to stem rust. Beaver has not been tested for yield at Lincoln.

**SHELBY**

Shelby is a new variety developed at the Iowa Agricultural Experiment Station from the cross Anthony x Bond. It is resistant to Victoria blight, the smuts, stem rust, and to most races of crown rust common in Nebraska. Shelby is two to three days later than Clinton, which appears to be too late for Nebraska conditions in most years.

**ZEPHYR**

Zephyr is another new variety developed at the Minnesota Agricultural Experiment Station from the cross Bond x Anthony. It is similar to Bonda, only later, and does not have as stiff a straw. However, it does better than Bonda on light soils in Minnesota. It resists Victoria blight, stem rust, crown rust, and the smuts and has a high test weight.

**EATON**

Eaton is an Iogold x Bond cross developed in Iowa. It is resistant to Victoria blight, crown rust, and smut, but is susceptible to some races of stem rust. It does not appear to be as lodge resistant as Clinton and other Bond crosses. Eaton matures at about the same time as Cedar and Clinton.

**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 was developed from a cross made in 1926 between Hajira and Banner at the Dominion Rust Research Laboratory, Winnipeg.
Vanguard
Manitoba, Canada. It was distributed in small quantities for the first time to farmers in Canada in 1937. Vanguard is a midseason, mid-tall, stiff-strawed, white oat with spreading panicles and mid-long, 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 most other Canadian oat varieties, Vanguard is too late in maturity for Nebraska. During the last several years at Lincoln the variety has yielded less grain than recommended varieties.

James
James is a new hulless oat released in South Dakota for 1950 planting. It is medium to stiff-strawed, being four to six inches taller than Clinton, and matures about the same time as Marion. James is resistant to Victoria blight and most races of rust and smut common to Nebraska. James is not recommended for Nebraska.

Legacy
Legacy was developed from a cross between Banner and "Eighty-Day" made in 1906 by the Cereal Division, Central Experiment Farm, Ottawa, Ontario, Canada. It is a 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, and mid-long 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 a five-year test it yielded 51 bushels per acre compared to 61.1 bushels for Otoe and 62.7 bushels for Nemaha.

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 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 oat than a variety and many selections have been made from it. The original Kherson was described as being early, productive, drought escaping, and undoubtedly was of great value. Many varieties now available 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 the 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. When seeded early Fulghum will give a fairly good yield, but it will not stand late seeding.

**COLO**

Colo oats is from the cross Hancock x (Morota x Bond). It is similar to Marion in appearance and parentages. Colo should be tested further to determine its value in Nebraska.

**OVERLAND**

Overland is a selection from the cross Victoria Richland x Bannock made at Laramie, Wyoming. It is a stiff-strawed white-grain oat which is approximately the same height as Nemaha and Cherokee but is 8 to 14 inches shorter than Colorado 37. Overland is resistant to the smuts and to many races of stem rust. It is, however, susceptible to Victoria blight and should not be grown where the disease is present. Overland is an acceptable oat under irrigation in western Nebraska.

**COLORADO 37**

Colorado 37 is a selection made in 1900 at the Colorado Agricultural Experiment Station from an unnamed commercial variety. It is a tall, relatively stiff-strawed variety having white kernels of high test weight per bushel. It is resistant to Victoria blight, but has been susceptible to oat smut; consequently, the seed should always be treated to control the disease. Colorado 37 is an acceptable oat under irrigation in western Nebraska.
MO. 0-200

Mo. 0-200 (Columbia x Bond x Iogold) is a new oat released in Missouri in 1949. It matures about the same time as Nemaha. Mo. 0-200 is resistant to most common forms of rusts and smuts and to Victoria blight. The seed is light red in color. It has given good yields in Nebraska for 1950 but has a weak straw. Mo. 0-200 should be tested further to determine its value for Nebraska.

**SPRING BARLEY**

**RECOMMENDATIONS FOR NEBRASKA**

<table>
<thead>
<tr>
<th>Districts</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Southeast)</td>
<td>Velvon 11</td>
<td>Trebi</td>
</tr>
<tr>
<td></td>
<td>Feebar</td>
<td>Spartan</td>
</tr>
<tr>
<td></td>
<td>Plains</td>
<td>Spartan</td>
</tr>
<tr>
<td>(East central)</td>
<td>Velvon 11</td>
<td>Trebi</td>
</tr>
<tr>
<td></td>
<td>Plains</td>
<td>Mars</td>
</tr>
<tr>
<td></td>
<td>Feebar</td>
<td>Spartan</td>
</tr>
<tr>
<td>(Northeast)</td>
<td>Velvon 11</td>
<td>Trebi</td>
</tr>
<tr>
<td></td>
<td>Ezond</td>
<td>Mars</td>
</tr>
<tr>
<td></td>
<td>Feebar</td>
<td>Spartan</td>
</tr>
<tr>
<td>(South central)</td>
<td>Velvon 11</td>
<td>Trebi</td>
</tr>
<tr>
<td></td>
<td>Ezond</td>
<td>Spartan</td>
</tr>
<tr>
<td></td>
<td>Spartan</td>
<td>Spartan</td>
</tr>
<tr>
<td></td>
<td>Feebar</td>
<td>Spartan</td>
</tr>
<tr>
<td>(Central)</td>
<td>Velvon 11</td>
<td>Titan</td>
</tr>
<tr>
<td></td>
<td>Ezond</td>
<td>Trebi</td>
</tr>
<tr>
<td></td>
<td>Spartan</td>
<td>Titan</td>
</tr>
<tr>
<td></td>
<td>Feebar</td>
<td>Titan</td>
</tr>
<tr>
<td>(North central)</td>
<td>Velvon 11</td>
<td>Titan</td>
</tr>
<tr>
<td></td>
<td>Ezond</td>
<td>Trebi</td>
</tr>
<tr>
<td></td>
<td>Spartan</td>
<td>Titan</td>
</tr>
<tr>
<td></td>
<td>Feebar</td>
<td>Titan</td>
</tr>
<tr>
<td>(Southwest)</td>
<td>Velvon 11</td>
<td>Trebi</td>
</tr>
<tr>
<td></td>
<td>Ezond</td>
<td>Club Mariout</td>
</tr>
<tr>
<td></td>
<td>Feebar</td>
<td>Gem</td>
</tr>
<tr>
<td></td>
<td>Plains</td>
<td>Spartan</td>
</tr>
<tr>
<td></td>
<td>Ward*</td>
<td>Otis</td>
</tr>
<tr>
<td></td>
<td>Reno*</td>
<td>Titan</td>
</tr>
<tr>
<td>(West)</td>
<td>Velvon 11</td>
<td>Club Mariout</td>
</tr>
<tr>
<td></td>
<td>Ezond</td>
<td>Gem</td>
</tr>
<tr>
<td></td>
<td>Feebar</td>
<td>Spartan</td>
</tr>
<tr>
<td></td>
<td>Plains</td>
<td>Otis</td>
</tr>
<tr>
<td></td>
<td>Trebi</td>
<td>Titan</td>
</tr>
</tbody>
</table>

* Winter 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. Velvon 11 is a smooth-bearded, six-rowed variety with a white grain. It is medium-early in maturity, has a moderately stiff straw, and possesses considerable resistance to loose smut as well as some resistance to covered smut.

EZOND

Ezond is essentially a smooth-bearded Trebi with somewhat stiffer straw. It is a selection from the cross Trebi-Louden x Trebi made at Aberdeen, Idaho. It is a six-rowed variety with bluish kernels. Ezond has outyielded Trebi by 11 per cent at Lincoln over a period of several years. At North Platte it has been about 3 per cent above Trebi, and at Alliance it has been among the highest yielding varieties. It is especially recommended for central and western Nebraska.

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 hail-storm when the crop is ripe may cause severe shredding. Spartan has been a relatively high yielding variety during years of below average precipitation, but during years of good precipitation its yield is below Velvon 11 and Ezond. It is a fairly early variety and is recommended for the western two-thirds of the state.

TREBI

Trebi is a six-rowed, rough-bearded type, medium-late in maturity with weak straw. 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. Ezond has yielded on an average 11 per cent more than Trebi at Lincoln since 1936. 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 the west district.

FEEBAR

Feebar is a six-rowed, semi-smooth awned barley developed and recently distributed by the South Dakota Agricultural Experiment Station. It is stiff strawed and resistant to stem rust. It is a feed barley
only, having a high protein content. At Lincoln, Feebar has given excellent yields and is midway between Spartan and Velvon 11 in date of heading. At North Platte it yielded somewhat less than Velvon 11, Trebi, and Ezond. It has a moderately large, plump seed, and the heads are dense and erect with long, spreading awns. Feebar is susceptible to loose smut, leaf rust, spot blotch, and bacterial blight.

PLAINS

Plains is a six-rowed, smooth-awned, early maturing barley developed and recently distributed by the South Dakota Agricultural Experiment Station. It is as early as Spartan barley, has stiff straw and resistance to stem rust. It is susceptible to loose smut, leaf rust, spot blotch, and bacterial blight. It has large, plump seed and beards which break off easily in threshing. In the past two years at Lincoln it has outyielded all varieties except Feebar, but has been outyielded at North Platte by Velvon 11, Ezond, and Trebi. Plains is especially recommended for the south central, central, and western districts.

FRONTIER

Frontier is a late-maturing 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 somewhat resistant to loose smut, but it is quite low in test weight in eastern Nebraska. It should not be grown except in western counties under irrigation.

Acceptable Varieties

TITAN

Titan (Trebi x Glabron) is a six-rowed, smooth-awned, medium-early variety released by the University of Alberta. This variety has moderately stiff straw and is resistant to common races of loose smut. Titan is acceptable largely for central and western Nebraska.

GEM

Gem is a six-rowed, semi-smooth-bearded, relatively strong-strawed selection from Atlas x Vaughn, the same cross as Beecher. It was named and released by the Idaho Experiment Station in 1947. Gem is three days later in heading and three to five inches taller than Beecher at
Lincoln. At Lincoln for the past two years it has yielded slightly more than Velvon 11, at North Platte 10 bushels less, and at Alliance eight bushels more. Additional data are needed to properly evaluate the variety, but it has given a good performance the past two years.

**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 11 and Ezond in the western sections of Nebraska. It is an acceptable variety for the western half of Nebraska.

**MARS**

Mars is a new variety developed and distributed by the Minnesota Experiment Station. It is an early, stiff-strawed, six-rowed, smooth-bearded type, resistant to stem rust and moderately resistant to spot blotch. Mars is three to four days earlier than Velvon 11. At Lincoln for the past three years it has been among the highest yielding varieties, but in most other locations in the state its yield has been similar to that of Spartan.

**OTIS**

Otis (Munsing x Spartan) is a two-rowed white barley recently released by Colorado. It is an early maturing, stiff-strawed variety which grows two to three inches shorter than Velvon. At Lincoln Otis has outyielded Spartan by nearly six bushels per acre, but has yielded less than such varieties as Velvon, Trebi, Ezond and Plains. Under drouthy conditions Otis can be expected to yield as much if not more than later maturing six-rowed varieties. Otis is an acceptable barley for the west and southwest cropping districts.

**Varieties Not Recommended**

**BEECHER**

Beecher is a very early maturing, six-rowed variety developed from an Atlas x Vaughn cross and first distributed by Colorado. It has semi-smooth beards and resembles Club Mariout except for its shorter, stiffer straw. It is highly susceptible to loose smut. Beecher, like Spartan, has been low in yield during the past few years of favorable moisture.

**FLYNN**

Flynn is a six-rowed, smooth-awned, white-kernelled 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 was never much interest in it. Flynn made its best record during the drought.
SPRING BARLEY

MANCHURIA

Manchuria is a malting type. It is a late-maturing, six-rowed, rough-bearded variety. Since 1935 it has been the lowest yielding variety tested at Lincoln but 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. It also yields considerably less than recommended varieties.

WISCONSIN 38

Wisconsin 38 is from the cross Oderbrucker 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. This variety tends to have long, weak necks that break readily as the grain ripens and the straw dries. At Lincoln since 1936 it has yielded an average of two bushels less than Spartan. This variety might be grown successfully in the extreme northeastern counties, but recommended varieties are to be preferred.

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 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.

MOORE

Moore is a malting barley developed and released at the Wisconsin Experiment Station. It is a white, six-rowed, smooth-awned spring variety which matures later than Trebi. It is tall, stiff-strawed and resistant to rusts but susceptible to smuts.
Montcalm barley is a six-rowed, smooth-awned barley developed at MacDonald College, Quebec, Canada. It is a selection from a cross between Michigan Black Barbless x Common Six-row and Manchuria. Montcalm is about as late in heading as Wisconsin 38, or slightly later. It is rather weak-strawed and about three inches taller than Spartan. This variety yielded quite well in tests at Lincoln and looks promising for the grower and the malting industry. Malters and brewers have recognized Montcalm as a good malting variety.

Compana, a two-rowed variety distributed in Montana, 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 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 was at one time a very popular variety in the state, being smooth-bearded and moderately late in 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 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. A few hardy varieties of winter barley have been developed recently, but it is not likely that a variety as hardy as the best winter wheats grown in the state will be produced. Since winter barley is grown in southwestern Nebraska to a limited extent, two varieties are being certified to provide a pure source of seed for farmers desiring it.

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-row 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 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 positions 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 infallible 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 gram pounds per acre for a four-year period:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Yield (gram 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>Winter rye</td>
<td>1568</td>
</tr>
<tr>
<td>Spring wheat</td>
<td>906</td>
</tr>
<tr>
<td>Barley</td>
<td>1212</td>
</tr>
<tr>
<td>Common emmer</td>
<td>817</td>
</tr>
<tr>
<td>Spring rye</td>
<td>1165</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

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 Cossack, 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 Cossack, being about equal to Grimm in this respect. It is slightly more susceptible to leaf spot diseases and leaf hopper 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 years.

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, but fields planted with Arizona seed will not be eligible for the production of certified seed.

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 1926, 16 years after sowing, it was recognized as having a practically perfect stand aside from depredation 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 Hardistan has yielded 94 per cent as much as Grimm. It has been somewhat lower in seed productivity. In controlled freezing tests it has proved consistently more cold resistant than Grimm. One of its outstanding characteristics is 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 Garver County, Minnesota, in 1857. It became widely recognized as a cold-resistant variety in 1905 when the Minnesota Agricultural Experiment Station first drew attention to its cold resistance and its ability to overwinter in northern regions.
ALFALFA

Grimm has become the standard variety over the northern sections of the United States and Canada. The hardiness of this variety is probably due in part to the presence of the yellow-flowered alfalfa in its ancestry, and in part to natural selection under the severe climatic conditions 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 or 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 bacterial wilt 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.

COSACK

Cossack alfalfa was introduced from Siberia through the efforts of the United States Department of Agriculture. 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 in 1910 by the Office of Foreign Plant Introduction of the United States Department of Agriculture. The seed was labeled *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 in 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 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 and Kansas Common. In this way southern-grown Common has become adapted to southern areas and northern Common to northern areas, with a corresponding difference in 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 it often assumes a regional designation even when production under those conditions is for only one generation. This would not provide an opportunity to prove its 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.

STAFFORD

Stafford apparently originated from the open-pollinated seed of an individual white-flowered plant in a field of Cossack alfalfa. The selection was made by Clarence Stafford, Haigler, Nebraska, and is now being extensively tested by the University of Nebraska Agricultural Experiment Station. Tests thus far indicate that the variety is somewhat similar to Cossack. It is not resistant to bacterial wilt and appears to be no more resistant to cold weather than Kansas Common. Cossack, on the other hand, is somewhat higher in cold resistance. Stafford can be expected to perform about as well as Cossack and Kansas Common, but where bacterial wilt is a serious factor, a resistant variety such as Ranger should be grown.
ALFALFA

TURKISTAN

Turkistan alfalfa includes all alfalfa of Turkistan origin. Usually it is uniformly purple-flowered but 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 winterkilling. 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 Argentina.

**SWEETCLOVER**

**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 drouth 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, the seed crop will be very difficult to harvest. 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 seedling time. Spanish produces over 70 per cent more forage than Common White in the first year, and in the second year produces 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 excellent 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 foliage than Common Yellow. 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, a yellow-flowered biennial sweetclover, 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 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 drouth 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, in many instances 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 of unknown origin which 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 with 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 which continues to be of minor importance in Nebraska. It is of chief value for plowing under as green manure in the late summer or early fall, and for seeding when biennial clovers have failed. Although 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**

**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 has shown good survival in 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 out-yielded 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 the 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.

**MAMMOTH**

Mammoth red clover matures about two weeks later than Common red clover and is larger and coarser. It is commonly more hairy and in the autumn of the first year blooms little or not at all. Mammoth 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 Mammoth clover are likely to become somewhat woody; therefore, it is ordinarily grown on poorer soils where it grows less rank. If grown for hay Mammoth 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. In each state, however, 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.

**MADISON VETCH**

Madison vetch is a certified selection of hairy vetch. The seed was derived from Emmanuel Stonacek's farm near Norfolk where it has been growing for 10 to 15 years. Hairy vetch (*Vicia villosa*) is a winter annual which has slender, weak stems. Unless grown with a supporting crop the mass of plants seldom exceeds three feet in height. The leaves and stems are hairy and silvery in color. Flowers are blue-violet, borne on a stalk in dense one-sided clusters. Hairy vetch produces two to eight spherical black seeds in each pod. Vetch prefers a sandy or sandy loam soil and should be seeded in the fall with a supporting crop of rye. It is important to inoculate the vetch seed just before seeding. It is valuable in short crop rotations where sweetclover cannot successfully be grown. The amount of nitrogen added to the soil by vetch is nearly equal to the amount added by sweetclover.
LESPEDEZA

Lespedeza is a legume which may have value on some soils in southeastern Nebraska. Lespedeza has its greatest value on less fertile, acid soils, and it is possible to obtain a satisfactory stand 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, but 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. Korean lespedeza 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 starts growth earlier in the fall than ordinary Korean lespedeza from which it was selected, 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. Perennial species, however, 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
BIRDSFOOT TREFOIL

Birdsfoot trefoil is a long-lived, deep-rooted perennial, which makes it somewhat drouth 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 White Dutch 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 White Dutch clover. It does not flower as profusely as White Dutch 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 northeastern United States. It is not drouth 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.

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 that of red clover and more rounded. Crimson clover is adapted to cool, humid weather. It will not survive too severe or too changeable winter temperatures as are frequently found in Nebraska and 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 drouth better than White Dutch clover. It is somewhat similar to the White Dutch clover frequently seen in lawns, but it has pink flowers and the flower head resembles 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.

ALSIE CLOVER

Alsike clover thrives best in a cool, moist climate and 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 make a heavy growth on water-soaked and water-covered soil. 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 borne 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, but it does best on good clay loam. Kudzu is not likely to become a successful field crop in Nebraska. While the old roots may live through the winter, the rooted joints of each season 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.
SOYBEANS

RECOMMENDATIONS FOR NEBRASKA

<table>
<thead>
<tr>
<th>District</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams</td>
<td>Lincoln</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chief</td>
<td></td>
</tr>
<tr>
<td>(Southeast)</td>
<td>Varieties of East Central and Northeast districts for late plantings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adams</td>
<td>Lincoln</td>
</tr>
<tr>
<td></td>
<td>Hawkeye</td>
<td></td>
</tr>
<tr>
<td>(East central)</td>
<td>Varieties of Northeast district for late plantings</td>
<td>Dunfield</td>
</tr>
<tr>
<td></td>
<td>Hawkeye</td>
<td>Lincoln (except in northern part)</td>
</tr>
<tr>
<td>(Northeast)</td>
<td>Adams (except in northern part)</td>
<td>Richland (except in northern part)</td>
</tr>
</tbody>
</table>

Recommended 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. 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. It is best suited to east central and southeastern Nebraska. Lincoln soybeans are eligible for certification.

HAWKEYE

Hawkeye is a new variety developed from the cross Mukden x Richland. It matures at about the same time as Richland and stands about as well although it grows three to four 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 needed before definite recommendations can be made. Hawkeye soybeans are eligible for certification.

ADAMS

The Adams variety was developed at the Iowa Agricultural Experiment Station in cooperation with the U. S. Regional Soybean Laboratory from a cross of Illini x Dunfield and was first released to farmers for increase in Iowa and some other Corn Belt states in 1949. It equals Lincoln in yield, stands slightly better, matures about two days earlier,
and has a slightly higher oil content. It is as tall as Lincoln and has gray pubescence, white flowers, light colored pods, and pale yellow to whitish-yellow seeds with a buff to light brown hilum.

While it is not meant to replace Lincoln entirely, Adams may be grown on part of the present Lincoln acreage throughout the Corn Belt and may largely replace Lincoln in the northern part because it is earlier. In Nebraska, Adams is adapted to the east central and southeastern areas. Preliminary data indicate that its earliness may make it superior to Lincoln in the area north of the Platte river.

**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 where its yield shows up more favorably due to its ability to use the larger growing season.

**Acceptable Varieties**

**RICHLAND**

Richland has the outstanding characteristic of lodge resistance when grown on soils of 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.

**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 lodge resistance of Dunfield make it well liked where combine harvesting is employed. This variety is eligible for certification.

**Varieties Not Recommended**

**ILLINI**

Illini yields approximately the same as the Dunfield variety although the oil content is less. In time of maturity it is nearly a week later. The plants are less erect and lodge more than those of Dunfield or Lincoln. The stem tip growth is somewhat twining. Illini can be grown in east central and southeastern Nebraska, but is considered less desirable than Lincoln.

**EARLYANA**

Earlyana is a variety developed and recently released by the Indiana Experiment Station. It is earlier than Hawkeye, but it does not
yield as well and is less desirable from the standpoint of its poor lodge resistance on rich soils and its tendency to shatter badly when mature. Its use should be confined to less fertile soils where a variety of very early maturity is desired.

**MUKDEN**

Mukden is adapted to the east central and northeastern sections of Nebraska. It is somewhat earlier than Lincoln. It is not recommended since it is inferior with respect to yielding ability and oil content. It has about the same height and lodge resistance as Lincoln.

**MANCHU**

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

**BAVENDER SPECIAL**

Bavender Special is a selection made by Mr. Bavender, Whitten, Iowa. In plot tests it has produced yields that average a bushel and a half higher than Hawkeye. However, under farm conditions severe lodging results in excessive losses when combining that probably offset the yield advantage obtained in plot tests where even prostrate stems are picked up. In maturity it averages five days later than Hawkeye, and definitely lower in oil content. It has brown pubescence, purple flowers and a somewhat elongated seed with black hilum. Under farm conditions Hawkeye and Lincoln should prove equal or superior to Bavender Special in yield and are more desirable for commercial use.

**SAFFFLOWER**

Nebraska 852 safflower is a new high-yielding variety eligible for certification and recommended for western Nebraska. It has a higher oil content than the Indian variety, is a higher yielder, and is of the non-rosette type which is a factor in weed control. Also, Nebraska 852 consistently germinates over 90 per cent, whereas the Indian variety generally has a low germination. It is quite drouth resistant and is fairly resistant to early spring freezes.

**N3**

N3 is a new, spineless variety of safflower. In yield and oil content N3 is approximately equal to the Indian variety. Seed of this variety is characterized by its very small seed size. It is adapted to the panhandle of Nebraska, but should be grown under irrigation. It has no advantages over other certified varieties except for its spinelessness. N3 is eligible for certification in Nebraska.
N6

N6 is a new, certified variety of safflower which is adapted to western Nebraska under irrigation. N6 has the highest yield of any variety when grown under irrigation. It is characterized by large, open seed heads, and for this reason has a tendency to shatter during harvest. Because of its high yield potential and rapid growth in early spring, this variety may be of considerable interest in irrigated lands.

N8

N8 is another new certified variety of safflower recommended for the dryland farming area east of the panhandle to North Platte and in southwestern Nebraska. At North Platte, N8 can be expected to yield two or three times as much oil per acre as N852. It is less subject to shattering than any other variety. On dry land west to Sidney, N852 and N6 usually yielded more oil per acre than N8. This variety does not seem to be quite as drought resistant as either N852 or N6,

GRAIN SORGHUMS

RECOMMENDATIONS FOR NEBRASKA

<table>
<thead>
<tr>
<th>District</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Southeast)</td>
<td>Martin Midland</td>
<td>Early Kalo</td>
</tr>
<tr>
<td>(East central)</td>
<td>Martin Midland</td>
<td>Early Kalo</td>
</tr>
<tr>
<td>(Northeast)</td>
<td>Martin Midland</td>
<td>Early Kalo</td>
</tr>
<tr>
<td>(South central, central and southwest)</td>
<td>Martin Midland</td>
<td>Early Kalo Westland</td>
</tr>
<tr>
<td>(North central)</td>
<td>Martin Midland</td>
<td>Coes</td>
</tr>
<tr>
<td>(West)</td>
<td>Coes Norghum</td>
<td></td>
</tr>
</tbody>
</table>

Recommended Varieties

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 3½ feet. It is quite lodge resistant, combines easily, and threshes out clean from the glumes. Midland yields about the same as Early Kalo.
GRAIN SORGHUM

It has an elongated, somewhat open head with the reddish-brown, kalo-type seed. The seed is a little larger and has a softer texture than that of Early Kalo and must be planted at a slight increase in rate per acre.

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 3½ 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.

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 4½ 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.

NORGHUM

Norghum is a new, early-maturing grain sorghum developed and released by South Dakota. In tests at Alliance it matures approximately two weeks earlier than Martin, making it the earliest recommended variety of grain sorghum grown. It is a combine-type sorghum growing approximately four feet tall. Norghum is adapted in the west district and the northern section of the north central district. In the remainder of the state other grain sorghum can be expected to give high yields. Because of its earliness, Norghum should be seeded at approximately one-third heavier rate than other grain sorghums. Norghum is eligible for certification.

Acceptable 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 sometimes difficult to harvest with a combine. It is somewhat resistant to chinch bug injury, and 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.
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.

Varieties Not Recommended

ALLIANCE

Alliance is a selection from a cross between Early Pink and Highland. It matures 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.

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.

HIGHLAND

Highland is an early maturing variety selected from Dawn 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. Heads of Highland are long, erect, and open. The kernels are white, sometimes with reddish-black spots.

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 in 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
GRAIN SORGHUM

susceptible to lodging than Western Black hull. Pink Kafir has given high grain yields and good forage yields at Lincoln when drouth 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.

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 yield of grain is only fair, 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.

CLUB

Club is a selection from Dawn Kafir that matures in 115 to 120 days at Lincoln. The plants are approximately 4½ 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.

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 2½ feet in height, and is sufficiently lodging 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, but has shown up much better farther west at North Platte. Even at North Platte, Day yields considerably less than Early Kalo, Martin, and Coes. Day has a short, erect, compact head. The kernels are medium to large and are yellow in color.

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 about 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 in 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 yield-
ing capacity. During the drought years it was widely grown, but since it lodges 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 about 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. In a normal year, however, 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.

**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.

**GROHOMA**

Grohoma 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 Grohoma 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.

**GURNO**

Gurno can be considered to be a combine type of grain sorghum. It has an elongated, semi-compact, cylindrical-shaped head with large white seeds. The seed head and plant have much the same appearance as Feterita except for dwarfness and plant height. Gurno may have a tendency to lodge if left in the field to be combined. Gurno matures in approximately 100 days.
### FORAGE SORGHUMS
#### RECOMMENDATIONS FOR NEBRASKA

<table>
<thead>
<tr>
<th>District</th>
<th>Recommended</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(Southeast)</strong></td>
<td>Atlas</td>
<td>Leoti</td>
</tr>
<tr>
<td></td>
<td>Axtell</td>
<td>Kansas Orange</td>
</tr>
<tr>
<td></td>
<td>Rox</td>
<td>Early Sumac</td>
</tr>
<tr>
<td></td>
<td>Norkan</td>
<td></td>
</tr>
<tr>
<td><strong>(East central)</strong></td>
<td>Atlas</td>
<td>Leoti</td>
</tr>
<tr>
<td></td>
<td>Axtell</td>
<td>Early Sumac</td>
</tr>
<tr>
<td></td>
<td>Rox</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Norkan</td>
<td></td>
</tr>
<tr>
<td><strong>(Northeast)</strong></td>
<td>Axtell</td>
<td>Atlas</td>
</tr>
<tr>
<td></td>
<td>Norkan</td>
<td>Black Amber</td>
</tr>
<tr>
<td></td>
<td>Rox</td>
<td>Early Sumac</td>
</tr>
<tr>
<td></td>
<td>Leoti</td>
<td>Ellis</td>
</tr>
<tr>
<td><strong>(South central, central, and southwest)</strong></td>
<td>Axtell</td>
<td>Atlas</td>
</tr>
<tr>
<td></td>
<td>Norkan</td>
<td>Black Amber</td>
</tr>
<tr>
<td></td>
<td>Rox</td>
<td>Early Sumac</td>
</tr>
<tr>
<td></td>
<td>Leoti</td>
<td>Ellis</td>
</tr>
<tr>
<td><strong>(North central)</strong></td>
<td>Leoti</td>
<td>Rancher</td>
</tr>
<tr>
<td></td>
<td>Rox</td>
<td>Early Sumac</td>
</tr>
<tr>
<td></td>
<td>Norkan</td>
<td>Ellis</td>
</tr>
<tr>
<td></td>
<td>Black Amber</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fremont</td>
<td></td>
</tr>
<tr>
<td><strong>(West)</strong></td>
<td>Leoti</td>
<td>Rancher</td>
</tr>
<tr>
<td></td>
<td>Black Amber</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fremont</td>
<td></td>
</tr>
</tbody>
</table>

#### Recommended Varieties

**ATLAS**

Atlas was developed from a field cross between Sourless Sorgo and Blackhull Kafir. The tall, sweet, juicy stalks of Sourless Sorgo 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 in 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 seven 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 those of 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 that of 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 that of Leoti although it is somewhat below that of Norkan. 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 are medium in size and buff or reddish-brown in color.
Rox Orange sorgo was developed by the Wisconsin Agricultural Experiment Station. It matures in 105 to 110 days at Lincoln and grows over 6 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 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 Sumac, and at North Platte it has given yields about equal to those of Early Sumac. At Lincoln, yields of Fremont have been far below those of other varieties discussed above. The heads are compact and the kernels are light reddish-brown in color.

Acceptable Varieties

Early Sumac was selected from standard Sumac at the Fort Hays Experiment Station, Hays, Kansas. It matures in 105 to 114 days at Lincoln, about the same as Leoti, and it grows about 6 feet tall. This variety tends to lodge and is susceptible to head and kernel smut. The heads are short, erect, and compact, and the kernels are very small and are reddish-brown in color.

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. It grows over 7 feet tall. It has given high forage yields at Lincoln, about equal to those of 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 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.
Ellis is a new forage variety developed at the Fort Hays Experiment Station, Hays, Kansas, from the cross Leoti x Atlas. It is very similar to Leoti in all characteristics except that it has a white seed which has a "waxy" type of endosperm starch. Ellis has yielded a little less forage than Leoti in Nebraska tests.

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 the 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, the straw color being predominant. None of the common sudans compare with Wheeler 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. The 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 the Texas Sweet sudans are as safe to pasture as Wheeler in Nebraska. Until such information is available, it is advisable to go slowly 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 early growth and 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.

**MILLETS**

Millet is 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 in 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 is 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 are 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 has not yielded as well in Nebraska. Yields of forage are less than 60 per cent as much as those of Black Amber Sorgo in Nebraska.

SIBERIAN

Siberian millet is a foxtail type 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 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 distinguished 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. Turghai 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 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 with other varieties. It is the earliest variety grown. Two gray-seeded varieties, Fladimir and Deenbrook, have not been very promising.

JAPANESE MILLET

Japanese millet is a coarse-growing millet 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**

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 have proved to be best. In western Nebraska the late maturing varieties have an advantage and are to be preferred.

**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.

**REDWING**

Redwing is an early maturing variety, being about a week earlier than Bison. It is moderately resistant to wilt but 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, but it is very susceptible to rust. The seeds are medium to
large in size and 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 is Bison, however. The seeds are medium-large in size. This variety is certified in Nebraska, but the acreage grown is very small.

**BUCKWHEAT**

In some years buckwheat is seeded late following a failure of a previous crop. In 1944 it was seeded on eastern Nebraska land where corn had been washed out. There are two varieties of common buckwheat. *Japanese* is tall, late, and has large, angular, black seeds. *Silver-hull* 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 cool-season and warm-season groups is convenient not only to indicate their seasonal growth responses, but also to inform the public in generalized terms of the best methods and times for seeding and the best methods of managing 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 Experiment 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 1884 to the California Experiment 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 corn belt states with an increasing demand. The best sources of this type of bromegrass are the certified varieties, Lincoln, Achenbach, and Fischer.

Lincoln bromegrass is a variety introduced by the Nebraska Experiment 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 fields with suitable history and performance in field tests were accepted 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 on soils of low fertility. It is tolerant of drought 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 or more pounds per acre have been reported from good soils and average yields of 300 pounds per acre are not uncommon. It is recommended throughout Nebraska and for similar latitudes in other states where bromegrass is adapted.

Lyon bromegrass was developed by outcrossing B-9 (an improved strain of Lincoln) to a large group of carefully selected pollen sources. This variety appears to have the best seed quality of any bromegrass under test. It also yields more forage than Lincoln and is recommended for the same area.

Lancaster is a synthetic variety developed by hybridization of five unrelated plants selected on the basis of their inbred and outcrossed progenies over a period of years. In tests this variety has out-yielded all other strains in both forage and seed, and it is now recommended for Nebraska.
Achenbach brome grass is a variety named by the Kansas Experiment 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 brome grass, but it is somewhat lower in seed production when moved northward.

Fischer brome grass, a variety similar to the Lincoln and Achenbach brome grasses, is being certified by the Iowa Experiment 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 brome grass at an early date.

CRESTED WHEATGRASS

Crested wheat grass 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 brome grass. 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 the Panhandle section of Nebraska and in certain areas in northern Nebraska favored by the temperatures associated with higher altitudes. It is not well adapted to eastern and southern Nebraska. It is an extremely variable grass in growth habits and head type but does not have the variability in adaptation found in brome grass. Accordingly, the seed from northern sources is as well adapted as locally produced seed. Crested wheat grass is a bunch grass, but its ‘bunchy’ habit of growth may be overcome to a certain extent by seeding a small amount of western wheat grass with it.

Standard or Common crested wheat grass is the most important variety now being grown extensively throughout the northern Great Plains. Its excellent seed yield and seed characters make it easy to establish, and it produces a fair yield of forage even under adverse conditions.

Fairway crested wheat grass is a rather dwarfed, 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, usually yields less forage, and the forage is less palatable for livestock than that of crested wheat grass.
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. 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. Because of its low relative palatability and its rapid-spreading habit, western wheatgrass is excellent for seeding in drainage-ways, terrace outlets, and gullies where they are included in the pasture. Such areas should be grazed only slightly. Western wheatgrass is not generally recommended in pasture mixtures as it is aggressive and will crowd out 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 and are preferred to strains from farther north.

INTERMEDIATE WHEATGRASS

Intermediate wheatgrass is a promising new grass closely related to both western and crested wheatgrass. It is an erect perennial that forms a dense sod by creeping rootstalks, which makes it excellent 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 and thus can be easily cleaned and planted with ordinary equipment. Intermediate wheatgrass is adapted to approximately the same area as bromegrass.

Nebraska 50 intermediate wheatgrass is a new certified variety resulting from three generations of selection within the unselected source material of this grass. The strain retains the excellent seed characters, seedling vigor, and ease of establishment which have been noted in the performance of this grass. The strain appears more uniform in seed and forage characters than the parent material. This variety produces a very tough sod which may make it valuable in sodding waterways. Adequate tests have not yet been conducted to determine whether it has a wider range of adaptation than bromegrass.
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.

Ioreed 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.

Tall wheatgrass is a perennial bunchgrass introduced from northern Turkey in 1936. It has hardiness to cold and seems to be quite drouth resistant. It stools well so that one plant may make a good sized clump. It is very resistant to alkali and will do well on alkali soils where other grasses die out completely. It starts growth early in the spring and matures seed around the first week in August. Its palatability can be considered fair, being inferior to bromegrass and intermediate wheatgrass, but it is more palatable than western wheat. Tall wheatgrass is a good seed producer and shows promise for re-vegetation of alkali areas.

Russian wild rye is a perennial bunchgrass introduced from Russia about 1927. It is an erect grass producing an abundance of long, basal leaves. It starts growth early in the spring and continues into the summer provided moisture is available. Russian wild rye has a deep, fibrous root system which competes well with weeds and is both drouth and cold resistant. The forage produced is relished by livestock, particularly during the summer months. It is adapted to a fairly wide range of soil types, but does best on fertile, clay loams. It may be used in pasture mixtures to lengthen the grazing season.

Canada wild rye is a native, cool-season perennial bunchgrass. Its aggressive growth makes it an excellent grass for becoming established and holds down light, sandy soil. When used for this purpose it is a desirable grass. The use of Canada wild rye in a mixture with other grasses may be desirable since it is generally considered to be a short-lived perennial. It is considered to be only a fair grass when used for pasture purposes.
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 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 and 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. The seed is chaffy and 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 from not to exceed 200 miles south of 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 sections of the state for harvests of adapted strains of big bluestem are in southeast Nebraska and along the eastern border of the sandhills.

**LITTLE BLUESTEM**

Little bluestem is a native, warm-season, perennial bunchgrass common to most of Nebraska. It has a deep, fibrous root system and attains a height of 8 to 12 inches on dry land and two to three feet under more favorable conditions. The foliage often turns red late in the summer. Little bluestem is somewhat inferior in palatability to other native grasses such as big bluestem and switchgrass.

**SWITCHGRASS**

Switchgrass is a native, long-season, perennial grass belonging to the same group as the millets. It is associated with big bluestem in the prairie hays of eastern Nebraska and the sandhills. Best adapted to the more favorable planting sites with respect to moisture, it will probably prove to be most useful in the transition areas bordering the sandhills 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 that 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.

**Nebraska 28 switchgrass** is a variety resulting from two generations of selection within the Holt county type originally collected in 1935. The plants are small and probably are best adapted for pasture seedings on sandy soils in northern Nebraska where switchgrass rust has not been a serious factor.

**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 midspring seeding and forms an important part of the mixture during the first years before the effects of grazing or the competition of other grasses become 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.

**Nebraska 52 side-oats grama** is a synthetic variety produced by the recombination of several selected types of this grass. These types were selected out of the progeny of a hybrid population of plants found growing alongside an old wagon trail. The original seed collection was made in 1935 near the Niobrara river in Holt county. Many of the spaced plants from this seed exhibited hybrid vigor and a resemblance to plants of this species originating from sources much farther south than Nebraska. It is believed that they represented naturally occurring hybrids between locally adapted plants and plants grown from seed introduced with hay from passing wagon trains in the early days. Several generations of selections were made in this material toward the elimination of poor plants and toward six different morphological types. The different types were recombined in 1945 and the seed increased as one experimental variety in 1946. This strain appears to be the most leafy of any side-oats grama available for growing in this
region at this time. It is a few days later in maturity than other locally adapted strains.

**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 drouth-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 difficult 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 drouth-resistant grass climatically adapted to areas of low rainfall and high summer temperatures. However, 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. As it does not compete with taller grasses or weeds this grass 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. Buffalograss is excellent
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 must 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 sandhills 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, both as pasture and hay.

**Nebraska 27** sand lovegrass is a strain which resulted from the increase of seed from a few selected plants brought to the Experiment Station's garden from Holt county in 1936. This variety has proved superior in winter-hardiness to an Oklahoma strain when compared under Nebraska conditions. Sand lovegrass is palatable and nutritious as measured in grazing trials in Oklahoma. It provides good summer pasture on several different soil types, including sandy soils.