

Gleanings from the Annual Report

By

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EACH YEAR the Director of the Station renders an annual report to the Governor of the State and to the Secretary of the Treasury of the United States covering both the fiscal and scientific happenings of the previous experimental year. This year the director has set up a set of questions and of the answers obtained either during the year or arrived at during the year as result, perhaps, of several years experimentation. A series of these questions and answers will be printed in succeeding issues of the Bimonthly Bulletin. Because of the immediate interest in different aspects of crop problems this issue is confined to recent information on such problems.

How much foundation seed did the Station distribute directly from the Stations in 1943?

North Dakota seed producers interested in getting and maintaining pure stocks of seed were supplied with the following quantities of seed of the variety or selection designated:

Hard Red Spring Wheat

Pilot 13 wheat—53 bushels
Rival wheat—5 bushels

Durum wheats (supplied by Fargo and Langdon Stations)

Stewart—1161 bushels
Carleton—402 bushels
Oats
Marion—217 bushels

Barley

Tregal—390 bushels

Flax

Koto—169 bu. (under contract)
Renew—45 bu. " "
B5128—27½ bu. " "
B 5585 (Victory) " "
16 bu. " "

About how much choice seed of new varieties was produced

by North Dakota farmers in 1943 under contract with the Station?

Stewart durum—18000 bushels
Carleton durum—6000 bushels
Ns 2829 wheat—15000 bushels
B. Golden flax—2000 bushels
Koto flax—3000 bushels
Renew flax—750 bushels
B 5128 flax—750 bushels
B 5585 (Victory) flax—
225 bushels
C. I. 1073 flax—80 bushels

WHEAT QUESTIONS

What lies ahead in durum breeding?

Through the splendid cooperation afforded by the Division of Cereal Crops and Diseases of the Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, United States Department of Agriculture, in assigning Mr. Glenn S. Smith, assistant agronomist, to this Station as a cooperator in charge of durum breeding two new varieties of durum, named Carleton and Stewart have been developed and distributed by this Station—

the first hybrid durum wheats to be grown commercially in the United States.

Glenn S. Smith, breeder of Carleton, a stiff-strawed durum, and of Stewart, a somewhat higher yielding durum has now set his eyes on a new goal in durum breeding, namely the production of earlier varieties with shorter straw. Hybrid material of this character is now being grown in Station greenhouses. Progress is also being made in selecting a strain of durum promising resistance to the black point disease.

Is the gluten or the starch in a wheaten flour the more important in determining the length of time that a flour dough should be machine mixed?

As a result of studies in which the mixing performance of flour doughs has been tested in a recording dough mixer, R. H. Harris, Cereal Technologist, finds that the gluten is the factor of chief consequence. He now proposes to discover what particular part of the gluten is responsible for this behavior.

What may one expect from continuous wheat cropping on the Fargo clay at Fargo?

As an average of the period 1919 to 1942 inclusive continuous wheat sowed in 6-inch drills on unmanured land returned an average annual yield of 16.0 bushels per acre of hard red spring wheat. When sowed in 12-inch drills and given some annual inter-tilling but no manure the average annual yield for the same period was 17.3 bushels. In 1943, the 6-inch drills returned 20.3 bushels per acre, and the 12-inch drills 17.7 bushels per acre.

(Data supplied by T. E. Stoa, Agronomist)

How much does phosphate fertilizer help?

In four years trials at the Langdon Substation under the supervision of Superintendent Victor Sturlaugson, wheat on unfertilized plots has returned an average annual yield of 23.9 bushels per acre; a 0 - 43 - 0 phosphate fertilizer application made an average yield of 26.2 bushels per acre; a 6 - 30 - 0 application of ammonium phosphate fertilizer made 28.0 bushels to the acre, and a 10-48-0 granulated ammonium phosphate fertilizer made 29.3 bushels to the acre. All these fertilizers were applied at the rate of 50 pounds per acre. In 1943 a straight phosphate fertilizer 0 - 43 - 0 failed to increase yields as it had done in the previous three years, whereas the ammonium phosphate increased yields. Such discordant results are not unusual in fertilizer trials, hence the necessity for continuing them over a long period of years in order to secure dependable results.

How much greater wheat yields may we expect from growing wheat in rotation than under continuous culture on the Fargo clay soil?

In the period 1919 - 1942 inclusive, wheat after sweet clover returned average annual yields of 23.9 bushels per acre in the rotation corn, barley, sweet clover, wheat. When field peas were used in place of sweet clover in a similar rotation the average annual yield was 23.2 bushels per acre but when millet or timothy was substituted the average annual yields dropped to 16.5 bushels per acre, only insignifi-

cantly better than under continuous culture. In the same period wheat after winter rye in the four year rotation corn, winter rye, wheat, sweet clover returned average annual yields of 20.9 bushels per acre. All of the foregoing yields were in unmanured rotations.

What causes "black point" on wheat kernels?

"Black points" on wheat kernels are most often associated with the fungus, *Alternaria* spp. according to W. E. Brentzel, station plant pathologist. Other fungi and bacteria may also cause this trouble. In 1942 Brentzel found much black point caused by *Helminthosporium sativum* as well as by *Alternaria*. Seed disinfectants such as Ceresan quite regularly increased the yield of grain from black point-infected seed.

What did the Station learn about wheat varieties in 1943?

The Station tested 22 varieties and hybrid selections of hard red spring wheat at Fargo in 1943, and 8 varieties and selections of Durum wheats. 15 hard red spring wheats were tested at Langdon, and since Langdon is in the principle Durum area it tested 12 varieties and hybrid selections of Durum wheat. The Edgeley station tested 12 varieties and selections of spring wheat and 3 varieties and selections of Durum. The Dickinson station, a western station, tested 26 varieties and selections of hard red spring wheat and 3 varieties of Durum wheat. The Williston station (Upland) tested 11 varieties of hard red spring wheat and no Durum. The Hettinger station tested 9 varieties of hard red spring wheats. In

cooperation with the Walsh County Agricultural School at Park River 8 varieties and selections of hard red spring wheats and 3 Durum wheats were tested at that point.

In general, the comparison of varieties as to yield and disease resistance, observations were similar in 1943 to those in 1942 hence there will be no detailed discussion in this report. In the trials at Fargo selection Ns 2829 led all hard red spring wheats. and in the trials at Langdon all varieties of hard spring wheat were high yielders with little difference, except a significantly lower yield of Marquis wheat.

The differences in yield at Edgeley and Dickinson were not of a high order and the same can be said of Williston. There were large differences between varieties at Park River, Regent being notably low.

There was some leaf rust on varieties in the eastern part of the State in 1943, and the black chaff disease was generally rather common, as were also certain areas where blight and scab infection were common. The reader is referred to report on wheats published in the Bimonthly Bulletin of this Station, January, 1943, article on "Progress in Improvement of Wheat Varieties for North Dakota."

Reprints will be sent to interested inquirers.

What is the effect of advancing maturity upon the moisture content of a hard red spring wheat (Thatcher), and of an amber durum (Carleton) and correspondingly upon test weight per bushel, unofficial grade, and other characteristics?

Samples of Thatcher wheat harvested and threshed out July

16, 20, 27, and August 2, contained 69%, 59.8%, 47.7% and 24.7% moisture at these respective dates; weighed 42.8 lbs., 54.3 lbs., 60.9 lbs., and 62.1 lbs., to the bushel at these respective dates, were rated as to unofficial grade Sample grade Red Spring; No. 4 Northern Spring; No. 1 Hard Dark Northern Spring; and No. 1 Hard Dark Northern Spring at these respective dates. On July 16, Thatcher wheat contained 14.3% protein, on July 20 13.6%; on July 27, 13.4%, on August 2, 14.3% protein. The flour yield on July 16, was 48.9%, on July 20, 62.0%, on July 27, 70.1%, and on August 2, 70.7%. Flour ash was 0.78% on July 16, 0.59% on July 20, 0.46% on July 27, and 0.47% on August 2. The crumb color steadily improved with advancing maturity. Loaf volumes were 145 c.c. on July 16, 155 c.c. on July 20, 172 c.c. on July 27, and 165 c.c. on August 2. Carleton durum wheat harvested and threshed July 22 contained 69.0% moisture, on July 28, 57.4% moisture, on August 3, 51.2% moisture, and on August 10, 24.4% moisture. The weights per bushel at the respective dates were 46 lbs., 60.1 lbs., 61.2 lbs., and 62.3 lbs., the respective unofficial grades were Sample Grade Durum, No 1 Amber Durum; No. 1 Hard Amber Durum, and No. 1 Hard Amber Durum, the respective protein percentages were 12.8%, 12.3%, and 12.2%, and 13.7%, the respective flour yields were 50.6%, 64.8%, 69.5%, and 67.2%, and the respective ash contents of the flour were 0.95%, 0.68%, 0.63%, and 0.69%.

(Data supplied by R. H. Harris, Cereal Technologist, and L. D. Sibbitt, Assistant Cereal Technologist.)

FEED CROP QUESTIONS

How does the Agronomy department at the Experiment Station rate the different varieties of oats with respect to percent of crown rust under conditions at Fargo, where rust was severe?

Crown rust (a leaf rust) infection on oats ranged from as little as 3 percent on the highly crown rust resistant varieties such as Vicland and Boone to as high as 95 percent on Gopher, Exeter, and Victory, according to T. E. Stoa, Station Agronomist.

Rainbow, although having a high resistance to stem rust, showed 60 percent infection with crown rust. Marion rusted to the extent of 65 percent, Vanguard 75 percent, Tama and other rust resistant varieties showed from 3 to 5 percent infection. Ajax showed 35 percent crown rust at Fargo, but in spite of that fact, equalled in yield such varieties as Vicland and Tama. Ajax however produced decidedly lighter oats.

Ajax led in yields at Fargo, Edgeley, and Langdon, and was insignificantly outyielded by Rainbow at Park River. Vicland and Exeter topped the yields at Williston on the upland non-irrigated station and Vicland led all others under irrigation, Exeter not being included.

The reader is referred to a review of progress in testing oats varieties which was published in the Bimonthly Bulletin by T. E. Stoa and C. M. Swallers in Jan. 1943, Vol. V, p. 17-22. Reprints will be sent on request.

How did the station rate the Barley varieties in 1943?

Barley variety trials were conducted at seven points in the

State. Trials at Fargo were damaged by excessive water in early June, hence results were considered less dependable than usual. "Kindred" was the highest yielder at Fargo with 28.5 bushels per acre. It was followed by the following varieties, yields stated in bushels per acre:

Manchuria, 27.3; Trebi, 26.2; Min. II—30-45, 23.8; Tregal, 22.8; Olli, 22.0; Velvon, 21.3; Spartan, a two-rowed variety, 20.9; "Magnusson" 16.1; Plush, 14.6; and Wisconsin 38, 13.6. The standard error was 9.26%, and the significant difference was 3.3 bushels per acre.

The yields in bushels per acre for the seven varieties tested at Langdon were as follows: Trebi, 64.2; Plush, 62.9; Tregal, 60.4; Velvon, 59.8; Manchuria, 55.4; Wisconsin 38, 51.9; Ezond, 51.9. The standard error was 3.04%, and the significant difference was 2.9 bushels.

The yield in bushels per acre for the nine varieties tested at Edgeley were: Trebi, 47.1; Velvon, 44.3; "Kindred" 43.1; Wisconsin 38; 42.9, Manchuria, 39.6; Tregal, 39.2, Odessa 38.5, Plush, 36.9, and Spartan, a two-rowed variety, 32.8. The standard error was 10.3% and the significant difference was 5.9 bushels.

The yield in bushels per acre for the twelve varieties and selections tested at Dickinson were:

Odessa, 33.9; Velvon, 31.0; Trebi, 30.9; Manchuria, 30.5; Plush, 30.2, Tregal, 30.1, Rex, 28.9, Hannchen, 28.7, Steigum, 28.5, Spartan, 24.2, Ezond 22.0, Lico, 19.6. Spartan, Hannchen, Steigum, and Rex are two-rowed varieties. The standard error was 18.4%, and the significant difference was 8.0 bushels.

The yield in bushels per acre of the seven different varieties at the irrigation station at Williston were Trebi, 77.1; Velvon, 54.4; Tregal, 52.6; Manchuria, 45.0; Spartan, 43.4; Wisconsin 38, 32.8; Plush, 26.9. The standard error was 14.73%, and the significant difference was 8 bushels. Relatively better yields were obtained on the non-irrigated station at Williston as follows: Velvon 83.4; Tregal, 78.5; Trebi, 72.6; Plush, 68.9; Manchuria, 66.5; and Spartan, a two-rowed variety, 65.8 bushels per acre. The standard error on the immediately foregoing tests was 4.28%, and the significant difference was 4.4 bushels.

Five varieties tested at Hettinger returned yields in bushels per acre as follows: Spartan, 31.3; Tregal, 23.6; Trebi, 14.2; Manchuria, 12.9 and Wisconsin 38, 12.2. The standard error was 16.1%, and the significant difference was 4.9 bushels. For further information see article on barley in this issue of the Bimonthly Bulletin.

FLAX QUESTIONS

What is the story with respect to flax varieties in 1943?

That 1943 was a stern year for testing flax varieties is evident from the report of T. E. Stoa, Agronomist. For some reason rust which was of serious consequence 10 to 15 miles from the Station at Fargo, was not an important factor in determining yields at the Fargo Station. Neither was pasmo as heavy at the Fargo Station as in an area southwest of Fargo. Eastern, central and northern portions of North Dakota reported moderate to heavy rust on flax. The highest yielding flaxes at Fargo in 1943 of the 26 varieties tested

were B. 147, and B 5128, two unnamed selections each of which yielded 16.4 bushels per acre. The lowest yielding variety was Renew with 9.4 bushels per acre. The standard error was 15.36%, and the significant difference 3.5 bushels. Bison flax yielded 13.6 bushel per acre, a yield not significantly below the highest yielding variety. The highest yielding variety at the Edgeley substation was B 5128 with 15.2 bushels per acre and the lowest was Walsh with 8.9 bushels per acre at Edgeley. The standard error was 18.2% and the significant difference 3.0 bushels. The highest yielding varieties at the Langdon substation were B 5128 and Renew, each with 28.2 bushels per acre, the lowest was Bison with 21.6 bushels per acre. The standard error was 6.9% and the significant difference 2.8 bushels. The highest yielding variety at the Dickinson substation was B 5128 with 12.2 bushels per acre and the lowest yielding variety was Biwing with 6.2 bushels per acre. Bison returned 7.2 bushels per acre. The standard error was 22.1% and the significant difference 3.2 bushels. Under irrigation conditions at Williston the highest yielding variety was R522 (C. I. 977) with 37.6 bushels per acre. This was closely followed by B5128 with 35.1 bushels per acre. The lowest yielding variety was Bison with 24.7 bushels per acre. The standard error 11.75% and significant difference was 3.8 bushels.

Will treatment of low germinating flaxseed with seed disinfectants increase the stand of flax?

In trials conducted in 1943 with several varieties of low germinating flaxseed, W. E. Brentzell, Plant Pathologist, found that

better stands of flax (i.e. better emergence) were established when the flaxseed was treated with such seed disinfectants as Ceresan, Spergon, or Arasan.

CORN QUESTIONS

What progress is being made by the Experiment Station in developing hybrid corn suitable for North Dakota?

Wm. Wiidakas, plant breeder in charge of corn breeding reports that the Station has released four early North Dakota corn hybrids. Of these Nodakhybrid 201, 202, and 203 have been found to be well suited to northeastern, central, and western North Dakota. These three hybrids grow taller, bear ears higher on the stalk, and are more resistant to lodging and smut than the commonly grown open pollinated variety, Falconer, and yield as high or higher. In 1943 foundation seed stocks for 435 acres were released. The foundation seed stocks produced in 1943 should make it possible to plant 800 to 1000 acres for production of Nodakhybrid seed corn in 1944.

Nodakhybrids 14, 203, 201, 202, and 302 were tested by four farmers near Dickinson. All preferred Nodakhybrid 203 for picking, 14 was liked because earliest, of high yield, and good quality. Nodakhybrid 202 was selected as a preferred variety by a Red River Valley farmer near Fargo, while a second Red River Valley cooperator selected Nodakhybrid 302 as his preference because of resistance to lodging. Some 254 acres of Nodakhybrid seed producing fields were harvested in 1943 from the foundation seed supplied by the station with the estimated production of

3000 to 3800 bushels of Nodak-hybrid seed.

How did certain Nodakhybrids, hybrid corns produced by this Station, compare in yield with other hybrids and open pollinated varieties in 1943?

Strictly comparable tests were conducted by Wm. Wiidakas,

corn breeder, with the cooperation of substation superintendents and other cooperators including the main station at Fargo, substations at Edgeley, Dickinson, and Williston and on farms in Grand Forks and Burleigh counties.

The average yield of these six trials follow:

	Yield per acre	Moisture in corn at harvest ¹	Fodder yield per acre ²
Early			
Falconer	32.2 bus.	41.0%	2.01 tons
Nodakhybrid 203	32.0 bus.	36.2%	1.80 tons
Nodakhybrid 201	35.3 bus.	38.1%	2.08 tons
Nodakhybrid 202	33.1 bus.	39.7%	1.98 tons
Nodakhybrid 204	33.1 bus.	42.8%	1.93 tons
Wisconsin Hybrid 240	33.6 bus.	39.8%	1.97 tons
Wisconsin Hybrid 255	31.2 bus.	39.2%	2.02 tons
Medium Early			
Minn. 13 (Haney strain)	27.9 bus.	43.5%	1.97 tons
Rainbow (Mandan strain)	33.9 bus.	47.1%	2.92 tons
Minhybrid 800	29.9 bus.	45.9%	2.27 tons
Wis. Hybrid 279	30.5 bus.	46.3%	2.05 tons
Minhybrid 702	29.3 bus.	48.7%	2.15 tons

¹Average moisture in ears from trials at Fargo, Grand Forks and Burleigh County.

²Average fodder yields at Fargo, and substations at Edgeley and Dickinson.

SOYBEAN QUESTIONS

What did the Station learn about Soybeans in 1943?

Soybeans did surprisingly well in 1943 in spite of late planting (June 23) and early frost (September 9 and 10). The several varieties, planted in drilled rows two feet apart returned the following average yields in bushels per acre: Goldsoy 17.9; Early White Eyebrow 17.0; Kabott 16.5; Early Mandarin 15.2; Norsoy 14.2; Mandarin (McRostie strain) 11.8; Pagoda 11.3; Kagon 11.1; Cayuga 11.0; Minsoy 9.9; Manchu

9.7; Wis. Black 9.1; Agron. Sel 3, 7.3; Ontario 5.9. Goldsoy, Norsoy, and Early Mandarin are being increased for ultimate distribution. (Data supplied by T. E. Stoa, Agronomist.)

Is the Station doing any breeding work on Soybeans?

This Station is cooperating extensively with the Regional Soybean Laboratory of the United States Department of Agriculture. Four plant breeding nurseries were planted at Fargo in 1943. Nursery No. 1 included 25 early selections planted on June

10 in single rows, replicated four times, rows 18 inches apart. The average yields in bushels per acre from this nursery were as follows: Wis. Mandarin 839-14, 25.4; Goldsoy 24.6; Dimmock-Mandarin 20.4; Wis. Mandarin 507, 19.7; Minsoy 19.2; Kabott 18.5; H4 17.8; Mandarin 17.6; Ontario 16.1; Mandarin (McRostie) 14.4; H3 14.2; Pagoda 13.0; H2 12.7; Wis. Man. 606, 11.4; P. I. 92470, 10.8; H5, 10.7; Wis. Man. Sel. 3, 7.5; Man. 831, 6.9; Wis. Man. 3, 6.6; H1 50; O.A.C. 211, 4.8; Habaro 4.6; Earlyana 3.8; P. I. 68666, 3.4; Richland 2.8. Chemical analysis made by the Regional Soybean Laboratory of the U.

S. Department of Agriculture showed oil content ranging from a low of 16.1% to a high of 20.7%; and an iodine number (Wijs) ranging from a low of 132.3 to a high of 144.4, and a protein content ranging from a low of 33.3% and a high of 39.8%.

Goldsoy outyielded 14 other varieties and strains in nursery No. 2 planted June 10 in triplicated two-row plots, rows 18" apart returning 29.9 bushels per acre as compared with only 17.4 for Minsoy.

(Data supplied by T. E. Stoa, Agronomist.)

SWEET CLOVER QUESTIONS

Does sweet clover have any insect enemies?

The Department of Entomology (J. A. Munro and H. S. Telford) report that the sweet clover weevil (*Sitona cylindricollis* (Fabr.)) was noted in North Dakota for the first time in 1941 when it appeared in Williams and Pierce counties. By 1942 it was fairly abundant in the northeastern counties and as far south as Federal Highway No. 10. The southern counties suffered little damage in 1943.

The adult weevils eat the leaves of the sweet clover plant, frequently destroying all of the leaves. The grub or immature forms spend their existence in the soil feeding upon the roots

of sweet clover; just how much damage the grubs do is not known but it is probably not serious.

What are the effects of different systems of handling sweet clover upon the soil moisture in Fargo clay soils?

In an extensive series of samples taken late in the fall each year on land to be sown to wheat the following year, T. E. Stoa, Agronomist, and Clarence Swallers, Assistant in Agronomy, have determined the percentage of moisture at 0-6"; at 6" - 12"; at 12" - 24"; at 24" - 36" and at 36" - 48". Results have been reported in percentages of the dry weight of soil. As an average of the period 1939 to 1943 the following

following year—the first column amounts of moisture were found on land intended for wheat the indicates the cropping or treatment of the soil previous to seeding wheat:

Treatment given:	Moisture in				
	0-6" layer	6-12" layer	12-24" layer	24-36" layer	36-48" layer
Fallow (no sweet clover)	35.4%	34.0%	34.3%	32.5%	32.7%
2nd yr. sweet clover plowed under at about 4" height, then sown to flax	29.0%	30.9%	28.6%	28.9%	29.0%
2nd yr. sweet clover plowed under at about 4" height, then fallowed	36.1%	35.4%	33.7%	31.1%	30.6%
2nd yr. sweet clover plowed under when 8" to 12" high for green manure, and then fallowed	34.2%	33.5%	33.7%	30.3%	32.5%
2nd yr. sweet clover 1 crop of hay removed, plowed midseason and fallowed	32.1%	32.8%	32.2%	29.8%	32.5%
2nd yr. sweet clover 2 hay crops removed fall plowed	29.6%	30.1%	30.7%	28.2%	28.6%
2nd yr. sweet clover 1 hay crop and a seed crop removed, fall plowed	27.0%	29.4%	29.0%	25.0%	28.2%

It is evident that the longer the sweet clover occupies the land the more it pulls down the soil moisture. Emphasis is also laid on the fact that these samples were taken in years of relatively high precipitation.

Do all sweet clover varieties suffer the same amount of sweet clover weevil injury?

Examinations made by Station entomologists of leaves of sweet clover collected August 7, 1943, indicated some difference in the extent of injury, i.e. number of feeding notches left by the weevil. Their observations (in cooperation with the Department of Agronomy) showed Grundy County variety was the least injured and Sangamon the most injured. The 15 varieties observed in these were planted May 22, 1943. Differences in degree of insect injury as between

varieties were not large. Probably what is more important than attempting to find a weevil resistant variety of sweet clover is to choose a variety which will produce the greatest amount of foliage in the early part of the season.

Has the sweet clover weevil any natural enemies?

The humble Great Plains toad (*Bufo cognatus*), which abounds in North Dakota, particularly in wet seasons, is a heavy feeder on insects. Station entomologists examined 74 specimens taken from the neighborhood of sweet clover fields in 1943. Sweet clover weevils were found in 54 of these toads, and on the average made up nearly 60 percent of the number of all insects eaten by the toads. These 54 friendly toads consumed 1407 sweet clover weevils, as well as numerous

other insect pests. Stomachs of toads were frequently found gorged with sweet clover weevils.

Are there suitable chemicals which can be used for sweet clover weevil control?

J. A. Munro and H. S. Telford, Station entomologists, are investigating the possible use of a poison bait using coumarin, the chemical substance which ac-

counts for the odor of sweet clover hay, as an attractant.

They found that neither Dutox (barium fluosilicate) or 1 percent nicotine dust with sulfur effected satisfactory control. DN sulfur dust (0.8% dinitro-orthocyclo-hexylphenol) proved 96.6 percent effective by Chamberlin and Fluke of the Wisconsin Station when dusted on young sweet clover plants. (See Journal of Economic Entomology 36(5):797, 1943)

POTATO QUESTIONS

How many the potato varieties recently introduced from other states be expected to behave as to maturity and other characteristics?

Upon the basis of tests and observation made by the Department of Horticulture, Harold Mattson (Horticulturist) describes the three white varieties Chippewa, Katahdin, and Pawnee as **promising**. Chippewa is

medium as to maturity and has few eyes; Katahdin is a late variety; Pawnee is medium as to maturity and has flat tubers. Three red varieties are also classed as **promising**, Pontiac which is **medium** as to maturity requirements; Red Warba, which is very early with red tubers, and Warba which is very early with red eyes.

Other new varieties are briefly described as follows:

	Maturity	Remarks
White Varieties		
Earlaine	early	low yield
Earlaine -2	medium	rough tubers
Golden	late	yellow flesh
Houma	medium	long stolons
Mesaba	early	mosaic
Mohawk	medium	low yield
Norkota	late	large vine
Sebago	late	blight resistant
Sequoia	very late	rough tubers
Red Variety		
Kasota	medium	pale red skin

What was the relative proportion of table stock and seed stock potatoes marketed from North Dakota in 1942?

Perry V. Hemphill (Assistant Agricultural Economist) conducted a survey in the 7 principal potato producing counties. He found that in that year 52 percent of the production mar-

keted was sold as table stock, 21 percent as certified seed, and 27 percent as select seed.

What were the marketing channels used in marketing North Dakota potatoes in 1942?

The channels used for marketing table stock and seed stock were similar except that terminals or distant firms and brokers

buy a somewhat larger percentage of the table stock.

On the basis of 572 replies to a questionnaire, these represent-

ing an 18 percent sample of inquiries delivered to potato producers in 1942, the following represents the 1942 marketing channels:

Marketing Channels for 1942 Crop of North Dakota Potatoes

	Table Stock	Seed	Table stock and seed combined
Cash sale to local dealer or firm at home town or shipping point.....	51%	51%	51%
Cash sale to dealer or firm beyond shipping point but in North Dakota or western Minnesota.....	8%	7%	8%
Cash sale to buyer who buys in the community for a terminal or distant firm	19%	15%	17%
Cash sale by wire, phone, or letter to a terminal or distant firm.....	4%	6%	5%
Consigned to commission firm at terminal or distant market.....	4%	4%	4%
Sale made through a potato broker who arranged the terms of sale with the buyer.....	13%	5%	9%
Other channels.....	1%	12%	6%

The percentages given are percentages of bushels of potatoes marketed through the various marketing channels.

How do prices of North Dakota table stock potatoes compare with prices of potatoes from other states in the Chicago market?

P. V. Hemphill, Assistant Agricultural Economist has made a careful study of daily Chicago market reports over the period 1935-36 to 1942-43, for North Dakota, Nebraska, Colorado, Idaho, and Wisconsin stock. He finds that, in general the prices of North Dakota potatoes are lower than the prices of potatoes from Nebraska, Colorado, and Idaho, but are usually in line with the prices of potatoes from Wisconsin and Minnesota. North Dakota started offering washed potatoes two to three years later than some of the competing

states, washing not having become significant in North Dakota until 1941. Potato growers in North Dakota and in this region appear to be more reluctant to grade out full U. S. No. 1 grade than the growers of some of the competing states. It is increasingly apparent that such competition must be met.

What determines the sales value of a lot of potatoes in the opinion of North Dakota food stores?

P. V. Hemphill, Assist. Economist finds that North Dakota food store managers rank the following qualities in order of importance: (1) cleanness, (2) uniformity, as to size, (3) smoothness (4) shallow eyes, (5) brightness. The first three were the most important.

When the consumers buy potatoes do they prefer a small, medium or large potato?

In interviews with food store managers P. V. Hemphill Ass't Economist used a potato sizing gauge. A potato 2 inches in average diameter or less was called a small potato, a potato with an average diameter of 2½ inches was called medium, and a potato with an average diameter of 3 inches was called large. About 77% of the managers ranked a medium-sized potato as first choice. 57% of the managers put large potatoes as second choice although 77% of the managers ranked large potatoes as either 1st, 2nd, or 3rd choice. No managers ranked small potatoes as first choice.

What variety of potatoes do North Dakota town consumers prefer?

P. V. Hemphill, Assistant Agricultural Economist has interviewed the managers of retail food stores in 12 North Dakota towns including in his study 22 food stores in western North Dakota. 18 food stores in central North Dakota, and 20 food stores in eastern North Dakota.

These 60 stores each handled on the average 1260 bushels of potatoes each year. About 43% of their customers preferred Triumphs, 41% preferred Early Ohios, and only 6% preferred Cobblers. These preferences differed in different parts of the State. In the Williston, Minot, Dickinson, Mandan, and Bismarck food stores 72% preferred

Triumphs, 17% Early Ohios, and 2% Cobblers. In Central North Dakota, that is, in Devils Lake, Jamestown, and Valley City only 22% preferred Triumph, 59% preferred Early Ohio, and 9% preferred Cobbler, while in Park River, Grafton, Grand Forks, and Fargo, the distribution was Triumph 29%, Early Ohio 50%, and Cobbler, 7%.

The still heavy preference for Early Ohio, a variety which is commercially less important than formerly may be due to lack of familiarity with other varieties.

How does the speed of the elevator belt affect injury to potatoes?

26 diggers were checked in the potato growing area in the vicinity of Grand Forks, Grafton, and Nash by T. E. Long, Ass't. Agricultural Engineer. In seven trials with a speed of 179 to 212 feet per minute, .17% of the tubers suffered major cuts and 1½% minor cuts. 26.3% suffered major bruises and 13.3% of the potatoes suffered minor bruises. Eleven potato diggers operated at a speed of from 248 to 297 feet per minute showed 3% tubers with major cuts and .7% with minor cuts. 26.6% of these tubers showed major bruises and 16.6% minor bruises. Eight diggers operated at a speed of from 301 to 356 feet per minute showed an average percent cut of 2.8% major cuts and 1.9% minor cuts. This group of diggers operated at a higher speed showed 19% major bruises and 16.7% minor bruises. Variation in soil, moisture, and previous crop causes some difference in digging injury.

QUESTIONS ABOUT NEW CROPS

What are the possibilities of growing Russian Dandelion (Kok-saghyz) in North Dakota as a possible source of rubber?

Tests made by the Station both in 1942 and 1943 have not been encouraging. In 1942 fall plantings made unsatisfactory stands. 1942 spring plantings became dormant after July, 1943, but sent up some new shoots and "greened" up again by September and October, 1943. Root samples of these plantings taken October 12 - 14, 1943, were hardly bigger than younger roots sampled from the same plantings in 1942.

1943 plantings at Fargo, Langdon, Edgeley, Park River, and Chaffee made fair to poor stands. Samples of 1942 dried roots analyzed by the laboratory of the United States Department of Agriculture contained from 3.19% to 3.47% rubber.

What are the possibilities of growing vetches in North Dakota?

Since there is a demand for vetch seed in the southern states, T. E. Stoa, Agronomist, is exploring the possibilities of growing them as a spring seeded crop in this State. Five lots of vetch were seeded at Fargo April 21, 1943. Good stands were obtained of hairy vetch and poor stands of common vetch, purple vetch and Hungarian vetch. Hairy vetch and purple vetch showed a good seed set, and common vetch a fair seed set, while Hungarian vetch showed a poor seed set. Seeds matured fairly well on hairy and purple vetch, but poorly on common vetch and

Hungarian vetch. Vetches tend to remain green until late with blossoms and ripe seed on the some plant hence harvest must be delayed until after a heavy frost, or the crop must be swathed. Hairy vetch tends to shatter its seed.

What are the possibilities of converting certain weeds and wild plants into useful economic crops in North Dakota?

The common milkweed and certain species of wild indigo are under investigation by O. A. Stevens, Associate Botanist.

Stevens has plantings of milkweed under observation at the Main Station at Fargo and at the Substation at Edgeley. The Edgeley planting was severely damaged by insects, probably the caterpillar of the milkweed butterfly.

Stems have been harvested for fiber determination and sent to three different cooperating agencies for fiber tests.

Field observations made on native colonies of milkweeds do not indicate that the weed is likely to become a pest should it be introduced as a field crop.

Stevens made plantings of the wild indigos, *Amorpha fruticosa* and *Amorpha nana* as a possible source of a desirable insecticide. It is not yet known whether or not the *Amorpha nana* possesses insect-killing properties. Further searches will be made for possible sources of the plant. As soon as sufficient quantities of these plants can be increased they will be submitted to the chemist for analyses and to the entomologists for testing as to insecticidal value.

How long does it take to develop a new variety of potatoes?

The following tells briefly the steps taken by H. Mattson, Horticulturist in one particular case.

1938 Pontiac crossed with Minnesota No. 75-5 producing 4599 seeds

1939 1585 seedlings grown in greenhouse from seeds of Pontiac x Minnesota 75-5 cross

1940 1585 seedlings grown of Pontiac x Minnesota 75-5

of which increase from 162 were saved for planting in 1941

1941 162 seedlings saved in 1940 were planted and increase from 31 saved for planting in 1942

1942 31 seedlings planted and only 3 saved—of which 1 was discarded after winter tests

1943 two seedlings increased in 1943 to be compared with Triumph and Pontiac in 1944.

The Estimated Honey Production for North Dakota in 1943 is 1,995,000 pounds, compared to a honey crop of 2,112,000 pounds in 1942. The yield of honey per colony in 1943 is 95 pounds, or 7 pounds above the yield per colony in 1942. There were 21,000 colonies of bees in North Dakota in 1943, a reduction of 3,000 colonies from the 1942 number. North Dakota honey producers had on hand for sale on August 20, 1943 only 60,000 pounds of honey, compared to 182,000 pounds on the same date in 1942. (Data from September 27, 1943 release of the Office of the Agricultural Statistician, Bureau of Agricultural Economics, United States Department of Agriculture, Fargo, North Dakota.)

Sweet Clover Seed Production in North Dakota is estimated at 58,000 bushels of field run seed in 1943, some 71 percent larger than the 34,000 bushels harvested in 1942. The yield per acre, 2.3 bushels, is the same as in 1942. Some 25,000 acres of sweet clover were cut for seed in 1943, compared to 15,000 acres cut for seed in 1942. The 1943 loss in cleaning is estimated at 24 percent, leaving 44,000 bushels of clean seed for market and home use. (Data from September 27, 1943 release of the Office of the Agricultural Statistician, Bureau of Agricultural Economics, United States Department of Agriculture, Fargo, North Dakota.)