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Corn

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CORN.

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Corn.

LUTHER FOSTER, AGRICULTURIST.

The corn experiment has been in progress for three years. It was originally made to determine if corn can be successfully grown in this section of the state. Incident to the work comes, first, variety tests; second, the corn growing season; third, methods of planting and cultivation.

In 1885, my first season in Dakota, the total acreage of corn in Brookings county was very small, probably not five per cent. of the whole crop. The patches planted that year, with the exception of a few on the highest points, were killed by a frost the last of June. The general belief then was that corn could not be successfully grown, except for fodder, in this section of Dakota. I have special reference here to the Sioux Valley from Flandrau north, which was the only portion of the state under my observation at the time.

The two seasons following, '86 and '87, scarcely any corn at all was planted, the results of '85 having pretty thoroughly convinced farmers that corn growing could not be made a success. On the organization of the Station in 1888, experiments were at once started to determine as far as possible what could be relied on in corn culture for at least the north-eastern part of the state.

There seems to be a very distinct dividing line running irregularly across the state, south of which corn is, and has been so considered from the beginning, an assured crop, all the larger Dents maturing readily; but north of this line only the early Flints and the smallest of the Dents are to be considered reliable. While the state taken as a whole, cannot be consider-

ed a corn growing state, such as Iowa, Illinois, or Nebraska, there is now no doubt that corn may surely be relied on as one element in mixed farming.

VARIETY TEST.

In this experiment the plats were all sufficiently large to give field conditions, and no more care was taken in the planting and cultivation than should be given to corn in the ordinary farm operation. The depth of plowing was eight inches, which loosened the soil deep enough for the corn to withstand the effects of any ordinary drouth. The Flints were planted with a check-rower and the Dents by hand, covered with a hoe. Except where especially noted, the cultivation was done with implements made for shallow stirring.

The plan for work in this test included all the hardier varieties of both the Dents and Flints that were to be obtained, as well as many supposed to need a little longer season than ours for maturity. The list of varieties briefly described below includes only those that have proven best adapted to this section of the state. Some are only known by local names, and are no doubt, mixtures since they vary much in color, form, and in some other characteristics, showing that they are not well established, but some of these mixed varieties are surest to mature.

NOTES ON DENT VARIETIES.

DAVIS' WHITE—This corn is a white Dent and is among the largest of those usually classed as small Dents, being the largest variety grown on the station grounds. The stalks are coarse, and leaves or blades few and small as compared with other varieties. Twenty-five per cent was nubbins and soft corn.

Average height of stalk	7 ft
Average height of ear	2 ft 6 in.
Average length of ear	7 in.
Average diameter of ear	1¾ in.
Average diameter of cob	⅞ in.
Yield in shelled corn per acre	32.4 bu.
70 lbs in the ear shelled	55.5 lbs.

One hundred and eighteen days from planting to first hard frost did not complete maturity.

QUEEN OF THE NORTH.—Also known as Pride of the North

and Dakota Dent, is a small yellow Dent, and more generally grown north of the large Dent limits than any other variety. One hundred and eighteen days, the time from planting to the first killing frost, did not quite mature it, and ten per cent. was soft corn. In size of stalk and number and size of leaves, this variety is a fair medium among the small Dents. While the ears were the smallest of all, they were the farthest from the ground, their height being an average of three feet. The stalks were nearly equal to the highest, being 6 feet, 10 inches.

Average length of ear	5 5-10 in.
Average diameter of ear	1 5-8 in.
Average diameter of cob	11-16 in.
Yield of shelled corn per acre	30.8 bu.
70 lbs in the ear gave	50 lbs shelled corn.

HUGHSON'S DENT.—This variety of light yellow Dent was brought into Brookings county several years ago by Mr. John Hughson. It no doubt came from a mixture of several varieties, one of which is evidently the Queen of the North. It is by no means a well established kind, since it varies much in color and in texture, running from a clear dent to a semi-flint. In early maturity, among Dents, it stands second only to Loveland's. The planting of May 17th was fully ripe September 10th, 116 days. Fifteen per cent. was small and imperfect ears.

Average height of stalk	6 ft. 6 in.
Average height of ear	2 ft. 7 in.
Average length of ear	6.5 in.
Average diameter of ear	1⅝ in.
Average diameter of cob	1 in.
Yield of shelled corn per acre	29.2 bu.
70 lbs in the ear gave	57.5 lbs shelled corn.

LOVELAND'S DENT.—This corn takes its name from Mr. T. Q. Loveland, who has successfully grown it in this county since 1879. It is decidedly earlier than any other variety of corn tested by the Station, excepting a few of the smaller Flints. In color it varies from a dark reddish to a very light amber, bordering on yellow. The dark ears resemble much the King Philip Flint and many believe it to be a mixture of this Flint with some variety of Dent. The variation in color, the appearance of some suckers, and the fact that the dents on some ears are scarcely noticeable, give foundation for that belief. The stalks are rather

small and blades fairly large and numerous. Time required to mature, one hundred days. Fifteen per cent. was nubbins.

Average height of stalk	6 ft. 3 in.
Average height of ear	1 ft. 9 in.
Average length of ear	6.5 in.
Average diameter of ear	1¾ in.
Average diameter of cob	⅞ in.
Yield of shelled corn per acre	35.5 bu.
70 lbs in the ear shelled	55.5 lbs.

DAKOTA KING.—This variety is known in some places as Prince Albert, and in others as Minnesota King. The first seed for the use of the Station was obtained from the Davis farm near the College, three years ago, where it had been grown the two previous seasons. While the corn in general appearance much resembles the Flints, the kernels are nearly all dented, but in hardness it may well be called a semi-flint.

Average height of stalk	6 ft. 6 in.
Average height of ear	2 ft. 8 in.
Average length of ear	7 in.
Average diameter of ear	1 11-16 in.
Average diameter of cob	⅞ in.
Yield of shelled corn per acre	33.6 bu.
Of small and imperfect corn	20 per cent.
Time to mature	116 days.
70 lbs corn shelled	56 lbs.

No suckers and only an average in size of stalks and number of blades.

GOLD COIN.—In 1888 the Station secured the seed of this variety from Mr. J. A. Lucas, proprietor of the Kiote Seed Farm. It is a well defined variety, resembling somewhat the Queen of the North, but is darker yellow and deeper grained. While not the earliest, it is one of the best and purest kinds grown by the Station.

Average height of stalk	? ft
Average height of ear	2 ft 3 in.
Average length of ear	6.5 in.
Average diameter of ear	1¾ in.
Average diameter of cob	⅞ in.
Yield of shelled corn per acre	34.2 bu.
70 lbs in the ear gave	60 lbs shelled corn.
Per cent of small corn	10.
Time to mature	116 days.

NOTES ON FLINT VARIETIES.

PRIDE OF DAKOTA.—This is an eight-rowed, clear white Flint. It is one of the smallest grown on the Station grounds,

the average height of stalk being 4 feet, 11 inches. The ears are slender, 6.5 inches in length, and come out very close to the ground, the average height being 6 inches. The plat eared very evenly, and was entirely ripe when frost came. Suckers and leaves were numerous. Thirteen per cent. was nubbins.

Average diameter of ear	1⅜ in.
Average diameter of cob	⅝ in.
Average yield in shelled corn per acre	26.2 bu.
70 lbs in the ear gave	55.2 lbs shelled corn.
Days to mature	116.

SQUAW.—A ten-rowed yellowish white Flint, similar to the Pride of Dakota, and identical with it in all its measurements, but a better yielder. Thirteen per cent. was nubbins. It was entirely ripe before frost, taking 111 days to mature.

Yield of shelled corn per acre	35.4 bu.
70 lbs in the ear gave	56 lbs shelled corn.

MANDAN INDIAN.—An eight-rowed parti-colored corn, smallest of all the flints experimented with. Also of this class it was the earliest to ripen, requiring but 101 days to mature. Ears slender, many of them small, but well formed, and even over the plat. It has a wide and brilliant range of color, either solid or mottled. Suckers and leaves abundant. Twenty per cent. was nubbins and small ears

Average height of stalk	4 ft 2 in.
Average height of ear	6 in.
Average length of ear	6.5 in.
Yield of shelled corn per acre	26.4 bu.
70 lbs in the ear gave	57.3 lbs shelled corn.
Average diameter of ear	1 5-16 in.
Average diameter of cob	⅝ in.

MERCER.—A twelve-rowed yellow Flint, one of the tallest varieties grown. Suckers and leaves not so numerous as in some other kinds, but still plentiful. Ear medium in size, fairly good form, and even in distribution. Thirteen per cent. was nubbins and small corn. Days to mature, 104.

Average height of stalk	6 ft. 3 in.
Average height of ear	1 ft. 7 in.
Average length of ear	7 in.
Average diameter of ear	1 7-16 in.
Average diameter of cob	13-16 in.
Yield per acre of shelled corn	22.1 bu.
70 lbs in the ear gave	53.5 lbs shelled corn.

In the first planting the planter failed to drop the corn and the plat was re-planted the 3rd of June. This made it a little late in ripening so that the frost of September 12 injured it to a slight extent.

KING PHILIP.—A ten-rowed Flint, shading in color from dark reddish amber to a light amber. Ears large, well formed, and evenly distributed; suckers are quite numerous and leaves abundant. It was all ripe when the frost of September 12 came. One hundred and eighteen days required for maturity. Fourteen per cent. was nubbins.

Average height of stalk	6 ft 2 in.
Average height of ear	2 ft
Average length of ear	7 in.
Average diameter of ear	1½ in.
Average diameter of cob	¾ in.
Yield per acre in shelled corn	24.1
70 lbs in the ear gave	51.6 lbs shelled corn.

COMPTON'S EARLY.—A yellow Flint, ears many rowed and somewhat resembling the Dents in general shape and appearance. Suckers few, kernels small, and leaves abundant. All ripe before frost came. Days required to mature, 103. Thirteen per cent. nubbins.

Average height of stalk	6 ft
Average height of ear	1 ft. 4 in.
Average length of ear	7 in.
Yield per acre in shelled corn	20 bu.
70 lbs of corn in the ear gave	54.2 lbs shelled corn.
Average diameter of ear	1⅝ in.
Average diameter of cob	13-16.

EARLY SIX WEEKS.—Another of the yellow Flints, ears many rowed, rather short and thick with small kernels. Suckers almost entirely absent and leaves few. It is one of the early ripening varieties, maturing in 103 days. Eared fairly well and with unusual evenness over the piece. Twenty-five per cent. nubbins.

Average height of stalk	5 ft. 7 in.
Average height of ear	1 ft. 6 in.
Average length of ear	4.5
Average diameter of ear	1¾ in.
Average diameter of cob	1 in.
Yield per acre in shelled corn	24.2 bu.
70 lbs in the ear gave	56.4 lbs shelled corn.

LANDRETH'S EXTRA EARLY.—A good Flint, ears slender, medium long, eight-rowed, and of a light yellow color. Suckers quite numerous, and leaves in abundance. It eared well and evenly, ripening before frost. Matured in 118 days. Twenty per cent. nubbins.

Average height of stalk	6 ft.
Average height of ear	2 ft
Average length of ear	7.5 in.
Average diameter of ear	1 5-16.
Average diameter of cob	9-16.
Yield per acre in shelled corn	32.6
70 lbs in the ear gave	56.4 lbs shelled corn.

EARLY CANADA.—One of the larger Flints, eight rowed, ears long and slender, and a clear bright yellow in color. It is a good yielder and ripened before the frost, requiring 112 days to mature. Suckers few, leaves abundant. 13 per cent nubbins.

Average height of stalk	6 ft. 1 in.
Average height of ear	1 ft. 8 in.
Average length of ear	8 in.
Average diameter of ear	1⅜ in.
Average diameter of cob	⅝ in.
Yield per acre in shelled corn	30.5 bu.
70 lbs in ear gave	56.4 lbs shelled corn.

BLUE BLADE.—One of the surest varieties of Flints grown. Ears large, eight rowed with big kernels, loosely set in cob. Color, dull white, bronzed at the tip. Suckers and leaves were plentiful. The earing was unusually good and very even over the plat. Matured in 118 days. Fourteen per cent. nubbins.

Average height of stalk	6 ft.
Average height of ear	1 ft. 7 in.
Average length of ear	8½ in.
Average diameter of ear	1⅝ in.
Average diameter of cob	⅝ in.
Yield per acre in shelled corn	22.3
70 lbs in the ear gave	55 lbs shelled corn.

SMUT NOSE.—An eight-rowed corn, in color running from dull yellow at base to reddish amber at tip. In height it is a little below the average of the larger Flints, with numerous suckers and leaves. Ears not so slender as some, but of good form and fairly even in distribution. It ripened in 111 days and was safe before frost. Twenty per cent. nubbins.

Average height of stalk	5 ft. 9 in.
Average height of ear	1 ft. 2 in.
Average length of ear	7 in.
Average diameter of ear	1½ in.
Average diameter of cob	¾ in.
Yield per acre in shelled corn	25.8 bu.
70 lbs in the ear gave	57.4 lbs shelled corn.

SELF HUSKING.—An eight-rowed corn, of a clear, bright amber color. Ears rather long and slender, and unusually even in diameter from base to point. In ripening they push outside of the husks, as indicated by the name. The earing was good, and evenly distributed over the plat. A good many suckers and abundant blades. Ripe by Sept 6, maturing in 106 days. It yielded many small and imperfect ears, 33 per cent. being nubbins.

Average height of stalk	5 ft. 10 in.
Average height of ear	1 ft. 4 in.
Average length of ear	8 in.
Average diameter of ear	1 5-16 in.
Average diameter of cob	¾ in.
Yield per acre in shelled corn	23.8 bu.
70 lbs in the ear gave	54.5 lbs shelled corn.

CHADWICK.—A clear yellow, eight rowed Flint, ear medium with kernels of good size. and firmly set. Tallest of all the Flints grown here, and most abundant in suckers and leaves; eared well and evenly. It ripened by September 1st, requiring 108 days for maturity. Many ears were under sized, 25 per cent. being classed as nubbins.

Average height of stalk	6 ft. 6 in.
Average height of ear	1 ft
Average length of ear	7 in.
Averge diameter of ear	1⅜ in.
Average diameter of cob	⅝ in.
Yield in shelled corn per acre	25.3 bu.
70 lbs in the ear gave	58.4 lbs shelled corn.

	Time of Planting	Percent of Stand.	Date of Maturity.	Days to Mature.	Height of Stalk—Ft and in.	Height of Ear—Ft and in.	Average Length of Ear—in.	Average No. Rows per Ear.	Weight of Shelled corn in 70lb of ears	Yield per Acre—Shelled Corn.	Per Cent of Nubbins.
FLINTS.											
Squaw	May 17	100	Sept 5	111	4-11	6	7	8.8	55.5	35.4	13
Pride of Dakota	" 17	100	" 5	111	4-11	6	6.5	9	55	26.2	13
Mandan Indian	" 23	100	" 1	101	4- 2	6	6.5	8	56.4	26.4	20
Hudson Bay	" 23	98	frosted some	....	6- 4	1- 8	5	13	53	24.1	50
Mercer	June 3	98	Sept 15	104	6- 3	1- 7	7	12	53.5	22.1	15
King Phillip	May 17	100	" 12	118	6- 2	2	7	8	51.6	24.1	14
Compton's Early	" 23	100	" 3	103	6	1- 4	7	12	53.5	20	13
Early Six Weeks	" 23	100	" 3	103	5- 7	1- 6	4.5	14.5	56.4	24.3	25
Landreth's Extra Early	" 17	100	" 12	118	6	2	7.5	8	56.4	32.6	20
Early Canada	" 23	100	" 12	112	6- 1	1- 8	8	8	56.4	30.5	13
Blue Blade	" 17	100	" 12	118	6	1- 7	8	8	55	22.3	14
Smut Nose	" 17	100	" 5	111	5- 9	1- 2	7	8	57.4	25.8	20
Self Husking	" 23	100	" 6	106	5-10	1- 4	8	8.8	54.5	23.8	33
Chadwick	" 16	100	" 1	108	6- 6	1	7	8	58.4	25.3	25
DENTS.											
Loveland	" 17	100	Aug 24	100	6- 3	1- 9	6.5	12	55.5	33.5	20
Hughson	" 17	98	Sept 10	116	6- 6	2- 7	6	15	57.5	29.2	20
Davis White	" 17	99	some frosted	....	7	2- 6	7	14	55.5	32.4	33
Queen of the North	" 17	100	some frosted	....	6-10	3	5.5	13.5	59	30.8	33
Dakota Dent	" 17	100	some frosted	....	6- 4	2- 6	6.5	13	59	21.8	40
Dakota King	" 19	100	Sept 12	116	6- 6	2- 8	7	8.5	56	33.6	25
Gold Coin	" 19	100	" 12	116	7	2- 3	5.5	11	60	34.2	25

LENGTH OF CORN SEASON.

TIME OF PLANTING.—To determine the relative advantages of early, medium early, and late planting, duplicate plats of several varieties of corn, both Flint and Dent, were planted at intervals of one to five days each, beginning May 1st, and ending the 10th day of June. The experiments of the past three seasons have all shown the same thing, namely, that while corn may be planted any time after the beginning of May, without danger of the seed rotting, no gain is made, either in yield or earliness of of maturity, by planting before the conditions of soil and atmosphere are right. These conditions usually come between the 10th and 20th of the month. The plantings made through the first half of May showed no difference in yield or maturity. The dividing line seems to lie somewhere from the 15th to the 25th, after which there is a gradual decline in yield and an increase in

small, immature ears. The appearance of soft corn is also noted.

CLOSE OF SEASON.—The length of the corn season cannot be definitely determined for the frost is a variable element, coming for the three seasons the experiment has been running, respectively on the 11th, 15th, and 12th days of September. The conclusion that may be drawn from these experiments, is to plant as early in May as the ground can be made ready, and on no account to defer the work beyond the 20th, in order to get the best results in growth, yield and maturity. It would seem useless in this locality to plant varieties requiring more than one hundred twenty days for maturity, counting from May 15th.

THICK AND THIN PLANTING.

Since the evidence of the variety experiment goes to show that only the Flint and small Dent varieties of corn can be successfully grown in this section of the State, the Station has, the past season, undertaken some work with regard to establishing what degree of thickness, under the best conditions of farm work, will return the largest yield per acre. For each of the two methods of planting, in drills and hills, duplicate plats were taken. On the one Gold Coin, a good early variety of Dent, was planted, and on the other Landreth's Extra Early Flint. The cultivation was the same as in all the method and variety tests; once hoed and five times cultivated.

DRILLS.—Under this method ten rows of each plat were drilled with one grain every six inches; the seeond ten every eight inches and so on, the distance increasing to eighteen inches. The drills were in all cases three feet, six inches apart. The following is a table of results:

THICK AND THIN—DRILLED.	Bu. Shelled Corn per Acre.	Per Cent of Nubbins.	Per Cent of Stalks without Ears.
DENT (GOLD COIN).			
One kernel every 6 inches	14	all	33
" " " 8 "	24.23	75	30
" " " 10 "	28.06	50	25
" " " 12 "	25.53	25	10
" " " 16 "	25.53	10	2
" " " 18 "	25.53	5	....
FLINT (LANDRETH'S EXTRA EARLY).			
One kernel every 6 inches	17.22	50	75
" " " 8 "	20.45	25	66
" " " 10 "	21.53	12	60
" " " 12 "	21.53	10	50
" " " 16 "	21.53	10	30
" " " 18 "	19.38	10	30

HILLS.—The rows were made three feet, six inches apart, and the hills in the row the same distance. After the corn was well up so that a perfect stand was assured, the first ten rows in each plat were thinned to a single stalk per hill, the second ten to two and so on, the last ten rows reaching six stalks per hill.

The results were as follows: In the first ten rows, seventy-five per cent of the stalks bore two ears each, and these were very large for the variety used. The second ten rows had large ears, no barren stalks, and gave in the total a much larger yield than was obtained from the first ten but had fewer stalks bearing two ears.

The rows containing three stalks per hill showed plainly the effect of the extra number by the appearance of some nubbins, a few barren stalks, and none carrying two ears. With four stalks per hill the per cent of nubbins and vacant stalks increased and the number of large ears corresponding decreased. All of this degenerating tendency was more decidedly marked in the next division. One half of the stalks were barren and not a single ear representative in size was to be found.

In the rows containing six stalks, these same points were intensified.

A reference to the table will show that with the Dents, the

maximum yield was reached at three stalks per hill, for the Flints at two. It should be noticed, however, that the Flints were not kept free from suckers.

THICK AND THIN—IN HILLS.	Yield per Acre—Shelled Corn.	Per Cent of Nubbins.	Per Cent of Stalks without Ears.
DENT—(GOLD COIN).			
1 Stalks per hill	20.45	0	0
2 " " "	28.03	5	0
3 " " "	30.62	10	5
4 " " "	30.62	25	13
5 " " "	25.80	40	40
6 " " "	22.95	60	59
FLINT (LANDRETH'S EXTRA EARLY).			
1 Stalks per hill	21.53	10	0
2 " " "	24.73	10	5
3 " " "	23.66	10	10
4 " " "	21.53	13	20
5 " " "	20.45	20	25
6 " " "	22.59	25	25

DEEP AND SHALLOW CULTIVATION.

In this experiment an ordinary double shovel plow was used for the deep cultivation, and harrow and spring-tooth cultivators for the shallow. The work in both cases was made as nearly as possible the same as that given by the best farmers. In deep cultivation the greater part of the damage is done in the last two ploughings by running the plow unnecessarily deep and close to the corn thus cutting off the lateral roots which at this time are reaching well out from the hills. In our work we avoided the extreme of either method, the object of the experimentbeing not to show how wide the variation may be but rather what it is as cultivation is commonly done. In each method the plats were cultivated five times and hoed once, the last cultivation being made the 7th day of July. The average yield per acre of the shallow cultivated plats was 31.26 bushels and of the deep 28.15 bushel, making a difference of 3.11 bushels per acre in favor of shallow cultivation.

Experiments in frequency of cultivation, depth of planting and with the Flint varieties in freeing from suckers, were begun

the past year but in the single season nothing of importance enough for publication was developed.

GENERAL REMARKS.

While corn does fairly well on all moderately rich, deep soils, a sandy loam with a good sub-soil is everywhere recognized as the best. Corn is a deep feeder and is thus well fitted to withstand drought if it is put on land that has been loosened to a good depth.

In this state where the per cent. of small grain is so large, the crop has a secondary value that should be strongly marked, that of freeing the field from weeds. In a rotation of field crops this fact is of special importance.

The following general deductions, drawn from experiments and observations, agree essentially with the practice of the best corn growers of the state:

1st. Plow the field intended for the next year's corn crop immediately after harvest to a depth of from six to eight inches. This early ploughing will destroy the weeds not yet matured and give an opportunity for the seeds that have ripened to grow and be cut down by the frost. The depth is necessary in order that the roots may run freely in search of moisture and food.

2nd. Just before planting in the spring, cultivate the surface thoroughly for the purpose of killing all the weeds that have started and reducing the surface soil to that condition of fineness which gives capillary power to draw water from the subsoil and hold it for the use of the plant. This latter work may be well done with the Disc, Acme or any other of the modern pulverizers.

3rd. Plant as soon after the first of May as the season will permit, since in our short summers a few extra days may add much to the complete maturity of the crop.

4th. Stir the surface often, keep the harrow and cultivator moving from planting time until the corn is laid by. This frequent stirring keeps the crust broken and is of great value in exposing fresh soil to absorb atmospheric moisture and with it plant food.