

Oregon Agricultural
Experiment Station

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AGRICULTURE.

1.~POTATOES.

2.~ROOTS.

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POTATOES.

Potatoes were grown on the experimental grounds last season, in small plats to determine the character of growth, and adaptability to climate and soil; and in larger plats that a test of the yield might be made.

Seventy-one varieties were grown in small plats of from twenty to fifty hills each, and fifty-nine varieties in plats occupying one fortieth of an acre.

The soil, in which the potatoes were grown, is a clay loam. It is a soil, which is common in the Willamette Valley, occupying the higher portions of the land bordering on the white land.

Wheat was grown on the land the year before, producing a yield of thirty bushels per acre. After securing the wheat, the soil was given a good coating of barn-yard manure. This was plowed under as deep as possible during the winter. The land was again plowed six inches deep in spring just before planting. In addition to the plowing, the soil was thoroughly worked with a Clark cutaway harrow and a spring tooth harrow.

Too much stress can not be placed upon working soil thoroughly before planting. This is true in preparing soil for all crops, and especially is it true of potatoes, which require more moisture than some of the narrow leaved plants. The potato does not send its roots as far, in search of moisture as the corn plant; hence the surrounding moisture must be conserved in every possible way.

In the Willamette Valley, if the soil is thoroughly worked to a good depth before planting, there is little to fear from the dryness of the season.

The ground was further prepared by marking one way with rows 3 feet apart, and with furrows the other way the same distance apart making the rows three feet each way. The furrows were made with the shovel plow to the depth of six inches.

The seed was cut leaving two to three eyes on each piece. One piece was dropped in each hill, and was covered with a hoe, so that the hill was a little above the surrounding ground. Deep covering will many times prevent the seed from becoming dried up before it germinates.

Unleached hard wood ashes, at the rate of 600 pounds per

acre, were sowed broad cast over the field, after planting was finished. Much valuable fertilizer goes to waste upon nearly every farm, in the shape of wood ashes. All kinds of root crops are especially benefited, by the potash contained in ashes. There is little danger of getting too much potash on the farm. It is one of the three substances, nitrogen, phosphoric acid, and potash, which form the "tripod" of Agriculture. Without the presence of these three, the farmer must close out his business. He will be closed out, sooner or later, whether he wills it or not, if he does not carefully guard the source of these substances.

After sowing the ashes the clod crusher was run over the field, to fill up the furrows, where the hoe had failed to do the work; and at the same time, to compress the dirt more closely about the seed.

It is a good plan to roll the potato ground after planting, if the soil is a little dry. This will assist the capillarity of the soil, enabling it to bring moisture up to the seed, thus insuring a more vigorous growth at the out-set.

During the cultivation the ground was kept as level as possible, believing that by this means we prevent the escape of moisture more, than when the soil is thrown up in ridges. Some, if not all of the best authorities upon potato culture in this country, recommend level culture for potatoes, and in fact for all kinds of plants. If we cultivate deep, some of the feeders of the plants are severed, and we thus cut off the means of gathering moisture and food.

In table I the date of planting, date of digging, and yield are given. The time of ripening is also indicated by the letters E. M. and L. signifying whether they are early, medium early or late.

The varieties are grouped according to yield, for more convenient reference. No. 1 in the list seems to have far out yielded the others. This is a rough, course grained potato, very firm, and a good keeper. Skin is a flesh color; inside white but not as clear white as some.

Of the seven other varieties, which yielded over two hundred bushels per acre, there is none better than the Sultan, so far as appearance and manner of growth indicate. It is a white, smooth potato; round in shape. Flesh is white and fine in texture. No

cooking test has been made, hence we only judge by its appearance.

The Early Rose needs no introduction. It is enough to say that it is one of the best early sorts, although not as early as some others. It is classed here as a medium early variety, as it has proved to be, for the past two years.

Dakota Red is one of the best late varieties, so far as yield and quality when cooked, are concerned. It is too ugly in appearance to become a favorite in the market.

The Champion is a flesh colored potato, rough in outline and course in texture. The eyes are deep giving the potato a rough appearance.

Thorburn's Late Rose is a good late variety resembling the Early Rose in shape and color.

The Tilden is also a rough potato, but a very firm, good keeper; flesh white; skin pinkish in color.

Of the varieties which yielded one hundred and fifty bushels, and under two hundred, the Gen. Logan, Pacific, Garfield, and White Cloud, are the most desirable types. These have been grown three successive years. Some of the other varieties are doubtless equally good; but they have not been tested long enough to warrant a conclusion.

Of the early varieties none excel the Early Sunrise and Silver Skin. The former is a flesh colored potato, white inside, and an excellent cooking potato. The Silver Skin is a handsome white potato as its name indicates. It is smooth and fine in texture.

Jones' Prize Taker proved successful, in some portions of the state, as grown from seed sent out by the Experiment Station, one year ago. It is not a heavy yielder; but the quality of the potato is all that could be desired.

A large number of the varieties tested have been grown only one season; hence further conclusions are withheld, until a more extended trial can be given them.

In order that a more thorough trial may be made, with some of those varieties which have proved successful at the Station, we will send to persons desiring to test them, a pound package each of two varieties; one early and one late, upon receiving address and ten cents, to pay for postage and packing, for each pound ordered.

Address orders to Agriculturist,
Oregon Experiment Station,
Corvallis, Oregon.

(6)

Table I.

NAME.	No.	Date of Planting.	Date of Harvesting	Early, Med'm Late.	Yield per Acre in Bush.
Riley.....	1	May 18	Oct. 6	L	396
Champion.....	2	"	4	M	272
Dakota Red.....	3	"	4	L	263
Early Rose.....	4	"	3	M	239
Sultan	5	"	4	M	233
Commander.....	6	"	6	L	234
Thorburn's Late Rose.....	7	"	5	L	226
Tilden	8	17	Sept. 28	L	210
Burpee's Superior.....	9	"	28	M	187
Dublin Chief.....	10	"	30	M	178
Gen. Stark.....	11	"	30	M	187
Pacific.....	13	"	29	M	175
Garfield.....	14	"	30	M	187
Burling	15	18	Oct. 1	L	181
Paragon.....	16	"	6	M	177
Rubicund.....	17	"	6	M	180
Antwerp.....	18	"	7	M	175
Dakota Boss.....	19	"	7	M	175
Gen. Logan.....	20	17	Sept. 28	L	169
White Cloud.....	21	"	29	M	169
White Star.....	22	"	30	M	151
Peerless.....	23	"	29	L	150
Kent.....	24	"	Oct. 1	L	159
Rochester Favorite.....	25	18	3	L	162
Jumbo.....	26	"	1	L	156
White Rose.....	27	"	4	L	173
Vam.....	28	"	5	L	169
Parsons Prolific.....	29	"	6	L	155
O. K.....	30	"	8	L	168
Perfect Peach blow.....	31	17	Sept. 28	L	134
State of Maine.....	32	"	27	E	130
Silver Skin.....	33	"	28	E	145
Early Sunrise.....	34	"	27	E	141
O. K. Mammoth.....	35	18	Oct. 1	L	138
Alexander's Prolific.....	36	"	1	M	141
Wig Wag.....	37	"	1	L	139
George III.....	38	"	1	L	131
White Lion.....	39	"	3	M	146
Plymouth Rock.....	40	"	3	M	134
Zoar.....	41	"	4	M	144
Atlantic.....	42	"	5	M	141
Garnet Chili.....	43	"	7	L	142
Defiance.....	44	19	7	M	141
Princess.....	45	"	8	M	143
Manhattan.....	46	"	8	L	140
Magnolia.....	47	"	5	M	126
Garnet.....	48	"	8	L	127
Burpee's Improved.....	49	18	5	M	115
Pride of Mason.....	50	"	5	M	123
James Vick.....	51	"	7	L	122
Capricorn.....	52	"	7	L	117

Table I.

NAME.	No	Date of Planting.	Date of Harvesting	Early' Medi m Late.	Yield per Acre in Bushels
Old Merino.....	53	May 19	Oct. 7	L	115
Starr Russet....	54	"	8	L	115
Rural Buttercup.....	55	"	7	E	103
Jones' Prize Taker.....	56	"	7	E	113
Addison.....	57	"	7	M	123
Comforter.....	58	" 18	1	M	119
Rural New York No 2.....	59	" 17	Sept. 27	M	80

FERTILIZER TESTS

Several plats were put out, with a view of testing some of the commercial fertilizers found in the markets upon this coast.

Table No II gives the yield per acre from the fertilized plats, as compared with a plat where no fertilizer was used.

The fertilizer was applied by sowing in the furrow or trench, and mixing thoroughly with the soil, before planting. In this way, the soil did not come in direct contact with any considerable amount of the fertilizer.

The sodium nitrate seemed to be too strong for the young shoots, killing them before they came through the ground. This fertilizer is of doubtful value to the potato crop.

Each of the other fertilizers produced a marked increase in the yield.

Peruvian Guano is one of the best fertilizers, that has been tested on the experimental grounds, in growing potatoes. Its action is quick, producing a marked increase in vigor of growth, from the time the potatoes start to grow, until they are matured. This fertilizer, as seen in the table, nearly trebles the yield over the plat where no fertilizer was used.

At 30 cents per bushel, the increase amounts to forty-seven dollars and ten cents per acre.

These figures may be higher than will be realized in general culture; but if it is reduced one half, there is still sufficient margin to warrant a thorough trial of this material.

What is said of guano is largely true of kainite, (German Potash Salts) and Superphosphate. These substances cost less

than the guano. The superphosphate sells for 2 to 2½ cents per pound, in the Portland market, and the kainite for 4 cents.

Mapes' Potato Fertilizer gave a good increase over the yield from the plat which received no fertilizer: but it did not quite come up to that, from the three just mentioned. This fertilizer is one which is especially prepared for potato culture, and is listed at a little less than 2½ cents per pound in eastern markets.

It will be seen that unleached ashes, gave a fair increase in the yield. It is quite sufficient, to warrant the outlay in their application;

There were some indications of a too strong application of these, leading us to think that better results might be obtained by sowing them broad-cast, rather than in drills.

The potatoes which were fertilized received the same kind of cultivation as the remainder of the field, and were on the same kind of soil.

The plats were 1-40th acre in size. Burbank Seedling was the variety grown in this test.

Table II.

Name of Fertilizer.	Date Planting	Date Harvesting	Yield per acre Bushels.	Increase over no Fertilizer.	Remarks.
Kainite.....	May 20	Oct. 7	226¾	145¾	400 lbs per acre
Superphosphate.....	"	"	227¼	146	" " "
Peruvian Guano.....	"	"	239	157¾	" " "
Sodium Nitrate.....	"	"	89	7¾	" " "
Mapes' Potato Fert.	"	"	198¾	117½	" " "
Unleached Ashes...	"	"	129½	48½	800 " "
No Fertilizer.....			81⅓		

Mangels.

Table No. III, shows the comparative yield of eleven varieties of mangle wurzels, grown under like conditions.

Generally the Globe variety did the best. The Mammoth Prize Red, gave a good yield; but it is not so smooth and fine in texture, as the Globe varieties.

The Orange Globe, is a standard variety throughout the country. It is easily harvested, on account of its carrying very few fine roots.

The varieties which produce a large number of fine roots, which adhere to the parent root, are objectionable on account of

holding so much dirt. They can not be stored in as good condition, and they do not keep as well.

The question is often asked, as to the comparative feeding value of roots and corn silage. In order to answer this question briefly, there is published in this Bulletin, a table showing the composition of roots, and corn silage, also the nutritive ratio of these substances.

By nutritive ratio, is meant the relative amount of digestible albuminoids or nitrogenous food elements, compared to the amount of digestible carbohydrates, or respiratory and fat producing substances.

It will be seen that roots have a less amount of carbohydrates than corn silage, with the exception of potatoes, which, on account of the large amount of starch contained, are relatively high in these substances.

The roots come nearer to a balanced ration than the silage; but because of the large percent of water contained, they do not make a satisfactory ration when fed alone. The same is true of silage; the best results being realized, when some nitrogenous food, such as linseed meal, bran, clover hay etc., is fed with it.

The chief objection to raising roots, on a large scale, is the expense of hand labor, which can not be wholly dispensed with. There is a time in the growth of roots, when hand labor must be used; and just at this critical time labor is scarce and wages high.

In growing corn all of the labor, to the time of harvesting, can be performed with horses. A much larger amount of dry food material can be obtained per acre from corn, than from roots, under ordinary circumstances.

However, no farmer can afford to neglect raising a small plat of roots to feed young stock, thus keeping them healthy and vigorous,

The roots were grown on a clay loam soil, which was manured the winter before, with a moderate application of barn-yard manure. The soil was plowed ten inches deep, and thoroughly harrowed.

The rows were three feet apart, and plants thinned to 8-12 inches in the row. Only one hand hoeing was necessary, at which time the plants were thinned to the required distance.

Table III.
Mangel Wurzel.

NAME OF VARIETY.	Date of Planting.	Date of Harvesting.	Yield per acre, tons cwt.	REMARKS
Mammoth Prize Red	May 19	Oct. 24	8-1	Long Red variety.
Chirk Casteel.....	"	"	6-17
Carter's Warden.....	"	"	7-14	Globe variety.
Orange Globe.....	"	"	10-4	Globe variety.
Vaughan's Mam.....	"	"	7-16	Long Red variety.
Giant Yellow.....	"	25	8-13	Intermediate.
Golden Tankard.....	"	"	7-14	Between Globe and Long var.
Eschendorf.....	"	"	8-17	Medium Red.
Kniver's Globe.....	"	"	8-6	Yellow Globe variety.
Eschendorf.....	"	"	7-19	Medium Yellow.
Dignity.....	"	"	6-10	Yellow Globe variety.

Carrots.

Thirteen varieties of carrots were grown in plats, on the same kind of soil as the mangels. They were sowed in rows the same distance apart, and the plats received the same amount of cultivation as the mangels.

Some of the varieties gave a very fair yield, while others did not yield enough to make them of value, for feeding stock.

The smaller varieties, such as Jersey Queen, Altringham, and and Coreless are good table varieties.

Of the varieties which have been grown successfully upon the experimental grounds for several years, the Long White Belgian takes the lead, and the improved Long Orange is next. The Yellow Belgian is similar to the White Belgian in its manner of growth, but the flesh has a yellow tinge. The crown does not grow as high above the ground, and is more stocky than the white variety.

Among the new varieties grown, the Mastodon makes the best yield. It is smooth, uniform in shape and yellowish in color. The flesh is very firm, which is indicative of good keeping qualities.

Nicols' Improved is not as desirable as some of the varieties

which did not yield quite as much. It is not as smooth, as the last one mentioned, yet it may improve upon further trial.

The White Vosges, grown for the first time, last season, is one of the best varieties. It is the most uniform in shape, of any variety, and is very smooth. The flesh is white and firm. The root maintains its size, toward the bottom, better than any other. Some of the varieties have a tendency to send a slim root, deep into the ground, which never develops to a desirable size.

In growing carrots, we have met with better success, than in growing mangels. The beets are affected by the dry weather, which prevails during the summer months, more than the carrots. Very often the Mangels will scarcely recover, from the effects of the drouth sufficient to make growth, after the rains come in September or October. It is not so with the carrots, which send their roots deeper, and are thus able to gather moisture from the lower layers of the soil. These roots seem to enjoy the dry weather, and, while they do not make much growth, are in a vigorous condition to make rapid strides during the fall. In 1891, the season was quite dry for mangels, yet the larger varieties of carrots produced specimens weighing from six to eight pounds.

The question is often asked: "are carrots good for dairy cows?" While we have never had an opportunity to use them in a butter dairy, they are constantly fed on the College farm to cows which furnish milk to the boarding hall, and no complaint is made as to taint, or quality of milk. It will be seen, in the table showing the composition of roots, that carrots do not contain as high a proportion of digestable carbohydrates. Bran, shorts, ground oats or oil meal would assist in making a good milk ration, when carrots are fed. For young calves and colts, and for older horses, carrots are a most excellent food to keep the digestive organs in a healthy and vigorous condition.

H. T. FRENCH,

Agriculturist.

Carrots.

NAME OF VARIETY.	Date of Planting.	Date Harvesting.	Yield per acre tons, cwt.	REMARKS.
Jersey Queen.....	May 19	Oct. 26	5-14
Long White Belgian.....	"	"	7-4	Long slender variety.
Yellow Belgian.....	"	"	7-5	Large crown
White Vosges.....	"	"	7-6	Very smooth.
Long Scarlet Altringham.....	"	"	3-13	Not desirable for stock.
Danvers' half-long.....	"	"	6-13	Short, smooth.
Red St. Valery.....	"	"	5-5	Not desirable for stock.
New Long Red Coreless.....	"	"	2-17	Too small for stock.
Nicol's Improved.....	"	"	8—	Rough, not uniform.
Orange Belgian.....	"	"	4-13	Not desirable.
Improved Long Orange.....	21	"	6-6	Standard sort.
Mastodon.....	"	"	10-11	Excellent for stock.
Victoria.....	"	"	4-12	Rather rough.

Table showing composition of Roots, Tubers, and Corn Silage. *

NAME.	Percentage composition.						Per cent digestible matter		
	Water.	Ash.	Crude Protein.	Crude Fiber.	Nitrogen-free extract.	Ether extract	Crude Protein.	Carbohydrates.	Ether extract
Corn Silage.....	79.1	1.4	1.7	6.0	11.1	.8	1.2	11.8	.6
Mangels.....	90.9	1.1	1.4	.9	5.5	.2	1.1	4.8
Rutabagas.....	88.6	1.2	1.2	1.3	7.5	.2	.9	7.1
Turnips.....	90.5	.8	1.1	1.2	6.2	.2	.6	5.5
Red beets.....	88.5	1.0	1.5	.9	8.	.1	.9	7.6
Sugar beets.....	86.5	.9	1.8	.9	9.8	.1	1.1	9.2
Carrots.....	88.6	1.0	1.1	1.3	7.6	.4	1.0	7.1
Potatoes.....	78.9	1.0	2.1	.6	17.3	.1	1.4	16.1

*Taken from Report of Bureau of Animal Industry U. S. Dept. of Agriculture.