The State Agricultural College

The Agricultural Experiment Station.

BULLETIN NO. 21.

I. SUGAR BEETS. II. IRISH POTATOES. III. FRUIT RAISING.

Approved by the Station Council.

ALSTON ELLIS, President.

FORT COLLINS, COLORADO.

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The Agricultural Experiment Station,

FORT COLLINS, COLORADO.

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I.

SUGAR BEET CULTURE.

By FRANK L. WATROUS.

Sugar beets were first grown in the Arkansas Valley for sugar testing purposes, in the year 1890. Most of the work was done on this Station, but there were two or three enterprising farmers who thus early began to investigate the subject.

The work, that season, was altogether experimental. Little was known as to the best varieties for planting, subsequent cultivation, and most of all, nothing was known as to needed amount, or manner of irrigation. This year was spent in groping after facts and the product, though encouraging was not large. However, the work this year with that of the following season, proved among other things, that the Arkansas Valley was well adapted as to soil and climate, to the growing of sugar beets, and with this came a knowledge of the magnitude of the business. The farmers of this section, having already felt the consequences of soil deterioration, through the successive cropping of wheat on the same land, began to see an advantage, providing a market could be secured, in growing a crop not particularly difficult to cultivate, not too tender to be handled by ordinary labor, less deteriorating to the soil than wheat, and less liable than most other crops to suffer from the exigencies of climate or the depredations of insect enemies. A period of drouth in the latter part of the season is just what the sugar beet requires, so that an occasional water shortage at that time is no detriment to the crop.

The ideal sugar beet ground is a sandy loam, porous, warm and easy to cultivate. Topographically, the land should be smooth and nearly level, the better to facilitate proper irrigation.

An experiment made in 1891, would seem to indicate that in an ordinary season, one irrigation during the growing season is sufficient to produce the best results, both as to tonnage per acre and saccharine matter contained.

TABLE.

No.	Name.	Area.	Cultivated.	Hoed.	Irrigat'd.	Tons per A.	Sugar per ct.	Purity, Coef.
1	Vilmorin.....	¼ A	3 times	Twice	0	9	14.25	80.5
2	"	"	"	"	1	10 4-5	15.2	81.3
3	"	"	"	"	2	9 9-10	14.22	79.5
4	"	"	"	"	3	9 9-10	13.	76.0

Though it is quite generally understood that the irrigated beet is the best and most profitable, it has become apparent, not only here, but in the practical work in Utah and California, that unless irrigation and cultivation are carried on with a careful relative system, there will always be a lack of harmony between the crop and its environment, which will prevent the assimilation of the maximum amount of saccharine matter.

It will be readily understood, that hilly or uneven land cannot be made to produce equally good results on all portions, from the fact that on hillsides, water will run too fast to soak in well, while if there be low places, here, the water will stand, to the total ruin of the crop.

The season for planting at this Station extends from March 20th to June 20th and for harvesting from August 15th till November 15th. It is this wide range of the planting and harvesting season that, with suitable soil and facilities for proper irrigation, makes the Arkansas Valley especially adapted to beet raising for profit.

A number of experiments have been tried for determining the amount of seed to be sown per acre, depth of planting, proper space between rows, methods of irrigation, etc.

For field cultivation, the conclusion from many trials, both here and elsewhere, is that not less than 16 pounds of seed should be sown per acre. It is much better to thin than to plant again.

As to depth of planting, our best results have been obtained from planting from two to three inches deep. In very shallow planting, seed frequently becomes too dry for germination and in extremely deep planting, there may be

danger of the seed lacking sufficient germinating power to force its way up, or a spell of wet weather might cause it to rot.

The following is a table showing results in certain experiments, the past season relating to subjects in hand, which through the courtesy of Professor F. A. Huntley, my successor at the Rocky Ford Station, since July 1, 1892, I am permitted to use here :

TABLE.

Test.	Plat.	Name.	How Sown.	Depth. Inches.	Rows Apart, Ins.	Yield, Lbs.	No. Beets.	Tons per Acre.
A	1	Vilmorin	Drills	1	16	139	193	21.15
A	2	"	Drills	4	18	340	195	17.
B	1	"	1 seed every 2 ins. Drills	2	16	516	239	25.80
B	2	"	2 seeds every 4 ins.	2	18	525	262	26.25
C	1	"	Hills 8 ins. apart	2	8	489	344	24.95
C	2	"	Hills 12 ins. apart	2	12	528	191	26.4
D	1	"	Drills	2	12	497	312	24.85
D	2	"	"	2	16	505	251	25.25
Field	1	"	"	3	12 and 24	.....	Good Stand.	21.50

The size of "test" plats was one, one-hundreth acre each, and as the product of small plats is apt to average above field culture, this accounts for the excess in tonnage per acre, of first experiment over the last tabulated.

The following method of planting was adopted at this Station the past season, for field culture and has been found very satisfactory:

After land had been plowed, harrowed, and made quite smooth, even and free from lumps, stones or trash, seed was sown with an ordinary hand-drill, sowing 18 pounds to the acre, covering an inch or less in depth, in double rows one foot apart, separated by a space two feet wide. Then, with one horse and a shovel plow, a trench was made in this space, the dirt being thrown both sides to finish covering the seed. The rows are worked over quickly with a rake or hoe and seeding is completed. Beet seed requires considerable moisture to produce germination, hence, in a dry spring, water may be turned in these ditches and beets brought forward, independent of dry weather.

To facilitate proper irrigation, rows should not be more than 300 feet in length, preferably less. It should not be necessary to drench the upper end in order to moisten the lower end.

Proper cultivation, consists in hand hoeing, or working with a fine tooth cultivator, the surface of the ground being

stirred as soon after irrigation as practicable. From experience at this Station it seems safe to state that the more careful cultivation, with a proper amount of water when needed, the more sugar per acre; conversely, the less cultivation, with more irrigation, which necessarily follows, the less sugar per acre and consequently less profit, although yield in tons may be the same, or greater.

Thinning should be done when four or six leaves appear and it is considered best to have no two beets nearer than four inches to each other. This, however, is governed by the distance apart of the rows and the fertility of the soil.

The best varieties of sugar beets, so far as our experiments have determined, are the Vilmorin with its various strains, and Klein Wanzlebener.

As a fertilizer for sugar beet land I would recommend the plowing under of alfalfa.

The crop of sugar beets raised on the Station has been sold each year to different parties and used as feed for cattle, sheep and hogs. In each instance, good results have been reported.

Below will be found a list of beets raised on this Station during each of the past three years, with the chemical analyses of the same.

TABLE.

Year.	NAME.	Area.	Sugar, per cent.	Purity coef.	Tons Beets per A.	Pounds Sugar per A.
1890	Red Top	½ A.	11.94	.....	13 1-2	.....
1890	Dippe's Vilmorin	Row	14.29	.....	12 1-6	.....
1890	Florimond Desprez	"	14.95	.....	10 1-2	.....
1890	Simon Le Grande's White Imperial	"	13.44	.....	8 1-3	.....
1890	Bultean Desprez	"	12.99	.....	12 1-6	.....
1890	Dippe's Klein Wanzlebener	"	12.69	.....	15 1-8	.....
1890	French Rose. (Samples sent to A. R. Pierce, Pueblo, for analysis; no report.)	.....	.....	.....	9 1-2	.....
1890	German White	.....	.....	.....	13 1-3	.....
1890	Verbesita Rosa	.....	.....	.....	7 1-2	.....
1890	Late French Rose	.....	.....	.....	17 1-10	.....
1891	Vilmorin	¼ A.	14.25	80.5	9	.....
1891	"	"	15.2	81.3	10 4-5	.....
1891	"	"	14.22	79.5	9 9-10	.....
1891	"	"	13.	76	9 9-10	.....
1892	Klein Wanzlebener	1-100 A.	13.	76.9	24.829	4256
1892	Vilmorin	"	15.83	85.4	24.393	5673
1892	Lane's Imperial	"	9.66	76.	36.793	4629
1892	Vilmorin, Brabrant Imperial	"	14.24	80.5	34.412	6765

TABLE—Continued.

	NAME.	Area.	Sugar. per cent.	Purity. coef.	Tons Beets per A.	Pou'ds Sugar per A.
1892	Dippe's Improved Richest Sugar.....	"	14.73	81.4	27.443	5642
1892	Dippe's White Imperial...	"	13.32	79.3	23.304	4213
1892	Klein Wanzlebener	"	14.67	81.	33.754	3879
1892	Vilmorin.....	¼ A.	15.18	83.4	25.047	5435
1892	Lane's Imperial.....	1-100 A.	8.54	70.	40.293	4126
1892	Klein Wanzlebener	"	13.33	80.8	34.195	6309
1892	Vilmorin, Brabrant Imp.....	"	15.72	83.6	30.056	6769
1892	Dippe's Imp. Richest Sugar.....	"	14.92	78.5	27.878	5598
1892	" " White Imperial.....	"	13.88	81.2	32.888	6354
1892	Vilmorin.....	¼ A.	16.69	81.8	20.500	4801
1892	"	"	18.87	85.	18.730	5151
1892	"	"	15.87	84.9	25.700	5937

The excess in yield of the planting of 1892 over that of preceding seasons we believe to be due to different and more satisfactory modes of planting already described.

II. IRISH POTATOES.

By FRANK L. WATROUS.

The first serious problem that presented itself for solution after the Arkansas Valley Experiment Station was ready for work, was that of growing potatoes. All that was known on the subject, was that "potatoes would not grow," and it was impossible, the first season to form any plausible theory on which to base an experiment. The first year's work was to no purpose except as it produced ideas to be tested in the work of the following season.

From forty varieties grown the first season, only eight varieties gave any promise, and these were by no means good. Seed was saved, however, and a more varied system of planting adopted. The following spring, potatoes were planted as early as March 17th, in newly manured ground, which was further enriched by the application of ashes from a lot of sorghum stalks, burned for the purpose. The seed was small, having been stunted, by unfavorable conditions the previous season and the outlook for the experiment was not the best. However, some of these early potatoes produced fairly well, the tubers reaching marketable size.

In June of that season, some seed potatoes from Salt Lake were secured and planted June 20th, in rich soil and wood ashes added to the hills. These potatoes yielded at the rate of 160 bushels per acre and were fine in size and quality.

The above experiments gave us the following points:—First, that home grown seed could not be depended upon to produce the best results; second, there seemed to be a deficiency of some soil element which was needed to produce thrifty growth, or, supposing the soil to be complete, it was thought that the system of irrigation used, in conjunction with the extremely warm weather prevailing in summer, might produce a chemical or mechanical condition of the soil, or both, whereby the element lacking might be locked up in some unavailable form.

The potato resembles every other vegetable, in useful, profitable agriculture, in that it has certain specific, well defined wants, as to the chemical constituents of the soil and their mechanical constitution. Even where the proper plant food exists in the soil, if the plant is hemmed in by a hard, baked surface, there can be no healthy development. To produce healthy crops, soil must be pliable and porous, so that, with the aid of air and moisture, assimilation may take place readily and a hospitable relation exist between the plant and its environment.

With the hope to overcome some of these difficulties, which, it may be said, are common in many Western soils, especially where irrigation is practiced, a half acre was prepared in the following manner: On land occupied by sugar beets the season previous, straw was placed to a depth of eight or ten inches. June 5th the following season, the straw was burned and the ashes plowed under at once. Then on the 9th and 10th one-fourth of an acre was planted to seed of Mammoth Pearl and the other one-fourth acre to Rose Seedling. The seed was cut in large sized pieces, with one and two eyes and planted in furrows four to six inches deep.

As soon as tops appeared above the ground, a light harrow was brought into use and this was continued at intervals of a few days until the tops were so large as to make the work injurious, after which time they were cultivated with a small, fine-tooth cultivator. When the ground was partially shaded by tops, a furrow was run between each two rows from north to south. On August 1st, when plants were in blossom, the ground being dry, irrigation was commenced. The water was confined to furrows and allowed to run long enough to moisten the rows quite thoroughly. By this time, the roots were spreading so far that cultivation would have been injurious, so that in order to keep the soil in healthy condition, it was necessary to irrigate about once a week, for the remainder of the season, which was done.

Potatoes were harvested October 7th. The plat of Rose Seedlings produced at the rate of 108 bushels per acre. The plat of Mammoth Pearl at the rate of 252 bushels per acre. These potatoes, in both instances were of most excellent quality.

During the winter of 1891, two one-half acre plats were prepared in same manner as described in last experiment. The first one-half acre was burned over and plowed in March and planted with Rose Seedlings potatoes, March 24.

The second one-half acre was burned over and plowed, June 5th, then planted with Mammoth Pearl, June 9th. After-cultivation and irrigation was intended to be the same as in previous year.

Following is a tabulation giving data of the different plats for the past two seasons.

1891.

NAME.	Where Secured.	Area.	When planted	Harvest'd	Yield per A.	Expense per A.	Value.	Net.	Fertilizer.
Rose Seedling...	San Luis val.	¼ A	June 10	Oct. 7	108	$55.80	$ 64.80	$ 9.00	Straw Ashes
Mammoth Pearl.	"	"	"	"	252	55.80	151.20	95.40	"

1892.

Rose Seedling...	Table Rock	½ A	Mar. 10	Aug. 10	59	63.90	61.98	- 1.92	"
Mammoth Pearl.	"	"	June 11	Oct. 21	248	84.50	171.48	86.98	"

1891—SMALL PLATS.

NAME.	Where Secured	Planted	H'rvest'd	Yield per A bus.	Fertilizer.
Hercules	Station.	Mar. 17	June 25	90	Burned Bones.
California White	"	"	July 10	70	"
Chicago Market	Monument	June 3	Oct. 1	60	Ashes and rotted manure
California White	Station	"	"	84	"
Late Ohio	"	"	"	63	"
Hoag's Seedling	"	"	"	40	"
White Star	"	"	"	50	"
Mammoth Pearl	"	"	"	45	"
52 Seedling	"	"	"	35	"

1892.

New Early Market	Philadelphia	March 28	Oct. 19	152	Rotted Manure
Late Ohio	Monument	"	"	152	"
Mammoth Pearl	"	"	"	125	"
Rose Seedling	"	"	"	115	"
Rural New Yorker No. 2	Philadelphia	"	"	142	"

In estimating the expense of raising potatoes in the one-fourth and one-half acre plats, the regular farm wages were allowed, the value of the crop being estimated at the price it was actually sold for, so that the " net " is the amount gained or lost, after the work of raising the crop was paid for.

The failure of the one-half acre of Rose Seedlings, the past season, to produce a profitable early crop, was due to a very heavy frost in May which cut the vines to the ground, setting them back and making it necessary for the crop to come to maturity in the warmest weather, which has always proven an unfavorable time.

In explaining the efficacy of straw ashes as a fertilizer, it is not with the understanding that this amount of ashes, in

a strictly chemical sense, could be termed a strong fertilizer. The belief is, that the limited amount of potash salts contained in the ashes, is in a readily assimilative form and this, with the sudden action of the heat, causing friability, with the presence of the ashes in the soil, produces a most salutary condition, both chemically and mechanically.

The management ot the soil may of course, work a great advantage or disadvantage. To grow first-class crops of potatoes, the soil should be in such a state of cultivation that it will yield to several inches beneath the surface, under the pressure of the foot. This condition cannot be secured on ordinary soils, so long as the ground is flooded with water when irrigated.

It is difficult for the ordinary farmer to understand that irrigation is, or should be, a supplement to cultivation; that, stirring the surface soil, obstructs its capillarity and, virtually promotes the existence of an underground reservoir, retained by its mulch, or upper layer.

A proper understanding of the relative needs of plant and soil in connection with irrigation, is destined to make clear, many of the perplexing difficulties, which are met by Colorado agriculturists, and no crop will better repay for the application of the required knowledge, than the potato crop.

The use of straw ashes as a fertilizer is, perhaps, the easiest, quickest and at present, cheapest way in which to supply the mineral elements most needed in the growth of potatoes. However, it must not be inferred that this is the only, or even the best way to raise potatoes in the Arkansas Valley. This is simply, the pioneer work. Its results point to the attainment of a better knowledge of the co-operative and co-relative elements in nature and their nicer dependencies, which may be secured by the careful study of practical agriculture.

It is not improbable that a heavy crop of green alfalfa, plowed under in July or August, with, perhaps, the addition of a small amount of ashes or commercial fertilizer the following spring, may produce a very desirable combination for potato ground.

There is yet much work to be done in this line, but in the meantime, it is believed any farmer may raise potatoes, sufficient at least, for home consumption, by following the methods described in this bulletin and epitomized below:

1st.—Select the best soil.
2nd.—Cover with straw in Winter.
3rd.—Burn just before plowing and plow deep.
4th.—Use seed from higher altitudes.
5th.—Plant very early or very late, five inches deep, in rows north and south.
6th.—Stir the surface soil frequently when the plants are small.
7th.—Irrigate, if needed, in furrows when plants are in blossom and after

III. FRUIT RAISING.

By FRANK L. WATROUS.

A large majority of those who in times of uncertainty and scepticism, had the temerity to plant fruit trees along the valley of the Arkansas, have reason to be much encouraged by the results of their ventures in that direction. There have been, perhaps, fewer than usual of the more serious obstacles met with in new countries, excepting the depredatians of itinerant tree peddlers, whose presence and genius are confined to no locality.

It has been planned by the Station management, to start a good sized orchard of the well known, hardier varieties, and each spring to keep adding the new and promising varieties as they are brought out aiming, by careful discrimination in selections for planting, in manner of setting, in after culture and finally by close observation as to habits and general qualities, to establish a criterion in as many points as possible, thereby making the Station work helpful to the class of orchardists who desire to learn otherwise than by personal experience.

Obtaining trees from various localities, near and far, it was noticed that a decided advantage was gained, where trees were home-grown, being selected, from the nursery, dug and replanted the same day.

Of the various methods of planting, nearly all are good, if properly carried out. Giving ample room for the root system and carefully pulverizing and packing the soil about the roots are the principal points.

Trees need water frequently during the first season. Ordinarily, it has been found good practice, to irrigate young trees once in two weeks until September, then withhold the water till November and give one thorough wetting just before freezing weather. In case of very dry winters, an irrigation in February is beneficial. This applies of course, to well drained land. During the second season, once a month is considered often enough to irrigate if careful and thorough cultivation is given. There is nothing gained and there may be much loss by watering trees too frequently after they have become well established and the same rule applies in filling out and maturing fruit, as would be followed by a sagacious farmer, in perfecting his grain crops.

It was found good practice to seed an orchard, after the second year, to red clover, leaving a space three feet wide each side of the trees for cultivation and irrigation, the furrows being two feet from the trees, as water should never be allowed around the trunks. If needed for fertilizer, the clover may be plowed under and the ground re-seeded the following spring. It is not deemed best to cut hay from orchard grounds, but sheep and swine are often pastured there with good results, it being advisable, however, to watch closely and remove animals before feed becomes short, lest damage is done to the trees.

Many people meet with disappointment from the fact that trees do not come in bearing so soon as the tree agent had given reason to believe. It should be borne in mind that apple trees, according to varieties, require from four to thirteen years to arrive at profitable bearing. Plums require from three to ten years, grapes, three to five years and smaller fruits from one to four years.

As a rule, it pays to thin fruit on all trees until there is no danger of their breaking down without propping.

Conditions in this locality are favorable to early and heavy fruitage and in many instances, both fruit and tree have been injured from excessive bearing.

Trimming and training should be done while trees are young, and the best practice goes to recommend that limbs should not be started less than three feet, nor more than five feet from the ground. There are serious objections to branching beyond these limits in either direction.

As a remedy against the Apple Tree Borer and to promote the vigor of trees, the trunks and lower limbs may be washed in May, with the following mixture:—Take two thirds of a pailful of slaked lime, the same as for whitewash, add one pint of gas tar and one pound of hard soap. Dissolve one pint of lye and put into the mixture, then add enough common soil to produce a proper consistency for applying with a whitewash brush.

The closest attention is necessary in order to preserve fruit from damage by insects. The Codling Moth is destroyed usually, by spraying with the paris green solution, just after the blossoms fall. The proportions generally recommended are 160 gallons of water to one pound of paris green. This also is a remedy for Leaf Rollers and should be applied as soon as the enemy's presence is noticed.

Kerosene emulsion is a remedy for a vast number of insect pests. To make it, dissolve a pound of hard soap in two quarts of boiling water, then remove from the fire and add one pint of kerosene and stir violently with a small force pump, four or five minutes. When emulsified, it resembles rich cream. This emulsion may be used upon stock to kill

lice, but when applied to plants, it must be reduced by adding water until only one-fifteenth is emulsion. When the undiluted emulsion is left standing, it becomes a gelatinous mass, which is readily dissolved by using hot water.

Following is a list of varieties now growing upon the Station, giving such characteristics as were noted with accompanying data, the trees taken just as they stand in the orchard:

APPLES.

NAME.	No. Set.	Date Set.	Age, Yrs.	Where Secured.	Growth.	Habit.	Died.	Bearing.	Season.
Duchess	10	Apr. '89	2	College Nursery	Slow	Close	0	1892	Sum.
Wealthy	10	"	2	"	Medium	Spreading	0	.....	Aut.
McMahon's White	1	Apr. '91	2	Station Nursery	"	"	0	.....	"
McIntosh Red	1	"	2	"	"	"	0	.....	Win.
Ben Davis	11	Apr. '90	3	Rocky Ford Nur.	Fast	"	0	.....	"
Pewaukee	11	"	3	"	"	"	0	.....	Aut.
Fameuse	11	"	3	"	"	"	0	.....	"
Mann	11	"	2	"	Medium	Upright	0	.....	Win.
Early Harvest	11	"	3	"	Fast	Spreading	0	.....	Sum.
Cooper's Early White	11	"	3	"	Stocky	"	0	1891	"
Tetofsky	11	"	3	"	"	Upright	0	1891	"
Whitney No. 20	11	"	2	"	Slow	"	0	1892	Aut.
Wealthy	11	"	3	"	Fast	Spreading	0	.....	"
Red Astrachan	11	"	3	"	"	"	0	.....	Sum.
Salome	5	Apr. '89	2	Illinois.	Slow	Upright	0	1892	Win.
Peter	5	"	2	"	"	Spreading	0	.....	"
Missouri Pippin	5	Apr. '90	2	Rocky Ford Nur.	Fast	"	0	1891	"
Sops of Wine	6	"	1	Station Nursery.	Slow	"	0	.....	Sum.
Fall Winesap	10	Apr. '91	2	"	Fast	"	0	1892	Aut.
Alexander	9	"	2	"	"	"	0	.....	"
Smith's Cider	10	"	2	"	"	Upright	1	.....	Win.
Wagoner	9	"	2	"	Slow	"	2	.....	"
Baldwin	10	"	2	"	Fast	Spreading	2	.....	"
Utter's Red	9	"	2	"	Slow	Upright	3	.....	Aut.
20-oz. Pippin	10	"	2	"	Medium	"	0	.....	"
Yellow Belleflower	9	"	2	"	Slow	"	2	.....	Win.
Northern Spy	10	"	2	"	"	Spreading	3	.....	"
Walbridge	9	"	2	"	Medium	"	0	.....	"
Black Arkansas	10	Apr. '92	2	"	Fast	"	1	.....	"
Peter	9	"	2	"	Medium	"	1	.....	"
Wolf River	10	"	2	"	Fast	"	1	.....	Aut.
Yellow Transparent	9	"	2	"	"	Close	0	.....	Sum.

PEARS.

NAME.	No. Set.	Date Set.	Age, Yrs.	Where Secured.	Growth.	Habit.	Died.	Bearing.	Season.
Clapp's Favorite.....	16	Apr. '89	2	College Nursery	Medium	Upright	0	.....	Aut.
Flemish Beauty.....	4	"	2	"	"	"	0	.....	"
Longworth.....	5	"	2	Illinois	"	Spreading	0	.....	"
Kiefer's Hybrid.....	14	"	2	College Nursery	Slow	Upright	5	.....	um.

PLUMS.

NAME.	No. Set.	Date Set.	Age, Yrs.	Where Secured.	Growth.	Habit.	Died.	Bearing.	Season.
DeSota.....	10	Apr. '89	2	Greeley	Medium	Upright	0	1891	.....
Forest Garden	10	"	2	"	"	"	0	1891	.....
Chicasaw.....	10	"	2	"	Fast	"	0	1891	.....

A small experimental orchard of plums, prunes, cherries peaches and apricots was set in the springof 1892. They came from Stark Bros'. Nursery in Louisiana, Mo., and were in very poor condition when received. About 20 per cent. of these died.

Small fruits, especially grapes and stawberries have done remarkably well at the Station. Of the latter, Manchester and Jesse have given the best results. The following table gives data of different varieties of grapes:

GRAPES.

NAME.	When Set.	Loss.	Growth.	Beari'g	Color Fruit.	Size.
Moore's Early.....	1889	1	Slow	1891	Black	Large
Lady	1889	0	Medium	1891	White	Medium
Empire.....	1889	0	Slow	1891	"	"
Worden	1889	0	Medium	1891	Black	Large
Duchess.....	1889	0	Rank	1891	White	Small
Concord.....	1889	1	Medium	1891	Black	Large
Lady Washington.....	1889	0	Rank	1891	White	"
Pocklington	1889	0	Medium	1891	"	"
Niagara	1889	0	"	1891	"	"
Brighton	1889	0	Fast	1891	Red	"
Delaware.....	1889	0	Medium	1891	"	Small
Martha	1889	0	"	1891	White	"
Muscat	1890	0	Fast	1891	"	Large