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CELERY GROWING IN COLORADO

BY

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CELEY GROWING IN COLORADO

By L. J. REID

Climatic conditions in Colorado have made irrigation a necessity and, as a result, we find that the growing of certain crops has been very much specialized. Thus, celery growing has become an important industry in those sections where conditions are such as to make it most profitable. Celery delights in our cool nights and its crispness is improved thereby.

It is only in the last century that celery has become an important article of human diet. The wild celery, a native of the swamps and lowlands of England and Europe, is a small, tough plant of bitter taste. This has been improved by selection and better culture methods until today it is much used on our tables. Since the draining of the muck beds of the Great Lakes, commercial growing has made rapid progress until certain sections have become famous as a result of the extensive raising of this vegetable.

In the vicinity of the largest cities of the state a very intensive system of gardening is carried on. Under these conditions, from two to ten acres are all one man can care for, and even then help must be employed at many times. Those who grow celery in the field during the summer generally grow lettuce, radishes and cucumbers in hotbeds and coldframes during the colder seasons. Some of these beds are used in the spring for the raising of the celery plants.

Soils.—Since celery is a native of moist land, it is natural to suppose that it should be grown on muck soil, and it is true that the largest crops are generally grown in this way. However, it is well known that celery grown on mucky soil is not of as good quality as that grown on firmer ground. Celery growing in Colorado is mostly confined to the river bottom lands, for the reason that these have more sand than is usually found in the uplands; they contain more vegetable matter; are less liable to excessive drying out; and usually the water supply for irrigation is more certain. The ideal celery soil is a rich, loose sandy loam. Owing to our dry climate it has come about naturally that celery growing is confined mostly to those low lying lands where the water is close to the surface, and on soils which never become very dry. Alkali in small quantities does no harm. In fact, some of the best celery land is white with alkali during the winter.

Preparation of the Land.—Since the farms are small, there has been very little crop rotation, but instead heavy manuring has been practiced. A cheap supply of manure is always available in the vicinity of large cities, where the celery gardens are usually located. As a rule, this may be obtained for the hauling; any kind of manure being used, but care must be taken not to apply that which
contains much straw or rubbish, as it interferes with cultivation and irrigation. The grower usually hauls as much manure as he has time to, thus sometimes applying as much as fifteen or twenty loads to the acre. This is the practice of those growing Self-blanching on the heavier bottom lands. The Pascal growers do not manure so heavily, claiming that if they did their upland soils would become too light. However, they often use a few hundred pounds per acre of commercial fertilizer, mostly composed of slaughter house refuse. This is drilled in beside the row during the growing season. A garden drill with an extra large hopper is used for distributing the fertilizer.

The ground is plowed six or eight inches deep and worked into good garden shape before setting the plants. Some practice plowing about twelve inches deep every third year.

Varieties.—In commercial growing only two varieties are being used at the present time to any great extent. These are the Golden Self-blanching for the early market, and Giant Pascal for the late market. These supply all that the present market requires, for by proper methods, Golden Self-blanching can be put on the market from early August until the Giant Pascal is ready and this latter can be held as long as it is profitable to keep it in storage. The Golden Self-blanching is not as crisp and tender nor of as good quality as the Giant Pascal, but owing to its earliness, the ease with which it is blanched and the fact that so much more can be grown to an acre, it is far the more important in respect to the amount grown. Pascal celery does not come onto the market until about the first of November and we are entirely dependent on the Self-blanching up to that time.

Seed.—Most of the seed is procured from American dealers, but the growers nearly always ask for French grown seed, because in that country the seed is usually more carefully selected. A few growers have sometimes grown their own seed and obtained excellent results by its use. Sometimes a grower will raise enough seed one year to last him several seasons, preferring to do this rather than use seed bought from unknown sources. So far as the writer knows, there is no one in this section growing his own seed each year. The reason given is not because good seed cannot be grown here, but because the price of seed is so low that it is unprofitable to grow it for sale, and the growers will not go to the bother of keeping plants over winter just for their own seed. Owing to failures as the result of poor seed, it seems as though the use of home grown seed would be more than justified, even though it cost more.

Vitality of seed is quite variable, so it is impossible to figure the number of plants which may be procured from a given amount. It is estimated in buying seed that one can count on 2,500 plants per ounce of seed, but this is very conservative, for some growers
1. Spent hotbeds in which Golden Self-blanching plants are grown.
2. Double rows of Golden Self-blanching, July 3d.
3. Blanching double rows by means of boards. Owing to the field being very level it was necessary to irrigate in the wide spaces between the rows the last time. It is best to always irrigate in the narrow spaces,
get as high as 25,000 stocky plants per ounce when they have good seed. The number of plants suitable for planting depends upon the vitality of the seed and the care of the grower. It is the practice to sow enough seed to secure more plants than will be needed and then select the best of these. Very often a surplus stock can be sold at a good profit, and it is also advisable to have extra plants for resetting in case of damage to young plants by drought or hail-storm.

Raising the Plants.—Celery seed is very slow in germinating and sometimes great difficulty is experienced in getting a good stand of plants. Here is where the gardener must ever be on the alert. The seed bed and young plants must never be allowed to become dried out, and yet water must not be allowed to stand on the surface. The young plants are very tender, and a fine spray should be used in watering them. The seed is sown broadcast in the beds or sometimes in very shallow drills four or six inches apart. The seed should be covered very lightly, if at all. Germination will take place in about three weeks.

The Golden Self-blanching celery is usually sown between March 1st and 15th in mild hotbeds from which have been taken one or two crops of radishes or lettuce. These beds are made with about one foot of manure, over which is spread between six and twelve inches of soil, and the whole is covered with glass sash. By the time one or two crops of lettuce have been taken from a bed, the manure does not give a strong heat, but just enough to protect on frosty nights. If one desires this celery for the August market, it is quite necessary that some artificial heat of this sort be given the seed bed, but fresh beds should be used only with great care or the plants will not be strong. For later sowing of the seed, frames simply covered with sash may be used.

The Pascal celery is mostly sown between April 1st and 15th in frames under cloth, although a great deal is sown in the open ground. The advantages of growing under cloth are that the soil is kept from drying out and the young plants are protected from extremes of temperature. It is not considered profitable to transplant celery, so it is left in the original beds until ready for setting in the field, although much more stocky plants may be secured by giving an extra shift.

When the plants are grown in hotbeds, as many as eight thousand are sometimes raised under a three by six-foot sash. However, when less expensive beds are used, it is better to use more room, as one thus gets far stockier plants. Many growers sow one-fourth ounce of seed to one sash three by six feet, but this crowds the plants somewhat. It is very important that the plants be carefully "hardened off." This is done by gradually getting them accustomed to the wind and sun. The sash is raised more and more each pleasant day until the plants can stand to be entirely uncovered. It is very
important that they should never be allowed to become cold enough to be frosted, as this no doubt is one of the principal causes of going to seed.

Several methods are in use for making the plants stocky. Transplanting has already been mentioned, but this is an expensive process. Clipping the tops off lightly once or twice while in the beds is practiced to quite an extent. A few growers have a knife so mounted on wheels that it can be run under the plants, so as to cut off the tap root, thus causing more side roots to develop.

**Setting of Plants in the Field.**—When the ground has been thoroughly prepared and danger of frost is over, the plants may be set in the field. If an early crop is desired it is, of course, necessary that the plants be set early, so as to give them as much time as possible to get their full growth. If the plants are crowded in the seed bed, it is a good practice to thin them and use the plants removed for the first setting. This gives the remaining plants a better chance.

A small furrow is made and the irrigating water is turned into it. This settles the soil and puts it in good condition for setting the plants. After the water has seeped out of the ditch it is the plan of most growers to run a small stream into the furrow again. The surface of the water this second time leaves a line along the edge of the furrow and the plants are set along this line, thus making them all at the same level. In this way none of the young plants are covered when irrigated, and yet all are close to the water. Where Self-blanching is grown, a row is set on each side of the furrow, making two rows about twelve inches apart. Where Giant Pascal is raised, plants are set only on one side of the furrow, and that on the south side if the furrows run east and west, so that the plants may escape the reflection of the sun’s rays from the water. The furrows are made about four feet apart. The plants are set from six to eight inches apart in the row. With single rows four feet apart, plants eight inches apart in the row, 16,710 plants would be required per acre; with plants six inches apart in the row, 21,780 plants would be used per acre. When Self-blanching is grown in double rows, just double this number of plants would be used. It is well to have an abundance of plants so that later on any vacant places may be filled.

The beds are watered very thoroughly before removing the plants for setting, and then the plants may be pulled out singly by the roots if it is desired to thin the beds somewhat. The plants are arranged in bunches which can be held conveniently in the left hand. They are put in a box over which is thrown a wet sack to protect from the sun while being carried to the field. In setting, some simply lay a plant on the first finger of the right hand and stick it into the mud on the side of the furrow; others, where the soil
is heavier, make a hole in the soil with a pointed dibble held in the right hand and place a plant in the hole with the left, the dibble then being stuck into the soil beside the plant to close the hole. It is a good plan to wet the roots with puddled mud just before starting to set a handful. There is quite a knack and a whole lot of hard work in setting, but it can be learned much more quickly by watching a good workman and by doing it oneself than by reading how to do it.

Cultivation.—Since celery is transplanted to fields which are clean of weeds, the plants have the start of the weeds. However, it is generally necessary to give one or two hand weedicings. A wheel hoe is used once or twice, and four or more cultivations are given with the horse and a harrow-tooth cultivator in the wide spaces. Some make a practice of cultivating once a week during the growing season. Those who Blanch with dirt often use a five-tooth cultivator the last time or two, so setting the teeth as to throw some dirt toward the rows.

Irrigation.—Concerning irrigation each grower has his own ideas as the result of his experience under his particular conditions. Some do not irrigate more than two or three times during the season. Others irrigate nearly every week, commencing at the time of setting. On sandy, well-drained soils it is necessary to irrigate very often. One must use his own judgment, always remembering that celery grows in swamps in its natural condition and, therefore, cannot stand drought.

During the growing season the water is run in the furrows which were made at the time of setting the plants. If double rows are used, as soon as the crop has a good start this furrow will be completely hid by the tops of the plants, but the water will still follow the ditches in good shape if they have been kept clean of weeds. Since the ditch at this time is shaded by the plants, the soil dries out less rapidly and does not bake so badly.

Blanching.—Blanching consists in so excluding the light that tender stalks free from coloring matter may be obtained. Self-blanching varieties for the early market are blanched entirely with boards. The banking of celery high with earth during the hot summer days sometimes hurts the crop. Blanching with boards keeps the celery cleaner, but is quite expensive, owing to the great cost of lumber, so it is generally practiced only for a part of the early crop. Boards twelve or fourteen inches wide by any convenient length, usually sixteen feet, are used. It takes about twenty thousand feet of lumber to blanch an acre at one time, but since during the warm part of the year the blanching will be completed in about three weeks, the boards may be used to blanch a second lot. If the boards are carefully piled each year so they will not warp and
5. A double row digger made by a local blacksmith
are protected from the weather in some way, they will last many years. The manner of their use may be seen in one of the illustrations. Some use wire hooks to hold the boards together instead of using stakes.

By far the largest part of the crop each year is blanched by means of earth. One horse is used on a celery hiller, which runs between the rows and throws the dirt against the plants. It is generally necessary to run this machine through twice in order to do a good job, and some times two horses must be used tandem to pull the hiller. Some growers like to finish the earthing with shovels or hand tools, but this adds to the expense. The celery hiller has iron rods so fixed as to lift the leaves out of the way so they will not become covered with earth. About four weeks are necessary for blanching with earth in the field.

For later use a great deal of celery is left to grow in the field as long as there is no danger of frost, and then removed to trenches for blanching. Giant Pascal is either blanched in this way or is partly blanched in the field by means of "papering," and then removed to the trenches. A great deal of self-blanching is also blanched in trenches. The celery is removed from the row, without trimming the roots too closely, and put into long, narrow trenches, so that about two-thirds of the plant will be below the level of the ground. From twelve to eighteen inches is as wide as the trenches should be made, for, if too large quantities are stored together, there is danger of loss from heating. The tops of the plants are covered with light material only as there is danger of freezing. When extreme cold weather comes, earth must be used for protection. Careful watch must be kept to see that the celery does not spoil from being covered too deeply, and yet, if it is allowed to become frozen to any great extent, it will be unsalable. As soon as the plants are set in the trench, water is turned in and a thorough irrigation is given. This will usually furnish enough moisture for the crop until it is ready for the market. If, as is often the case with Giant Pascal, the celery is not dug until late and is to be kept far into the winter, a second or a third irrigation may be necessary in dry seasons.

There is a limited market for "papered" Giant Pascal celery. By this is meant the wrapping of each plant in paper during the latter part of the growing season. This work is commenced in August, and boys are usually hired to do it at two and one-half cents per dozen plants wrapped. Old daily papers are used, and one string holds the paper in place. It is important that this work be postponed until the celery is high enough so that the tops of the leaves will be above the paper after wrapping. Old papers can be bought for eight or ten dollars per ton. As soon as there is danger of frost the celery is dug, put in trenches, and handled in the same
way as the other; but has, however, the advantage of being cleaner and is already partly blanched.

STORING.—Since the California and Florida crops get onto the market during the winter and spring, it has not been found profitable to store celery for any great length of time. In some states large celery storehouses have been used for keeping celery during the winter. In Colorado, there are few weeks during the winter but what it is possible to dig celery from the trenches and get it onto the market. However, considerable is lost in the trenches by freezing and occasionally the weather stays so severe that it is impossible to get the celery out to supply the demand. It is quite probable, therefore, that storehouses will be used to a considerable extent in the near future.

HARVESTING AND MARKETING.—Where only a small area is devoted to celery, the plants are usually loosened from the ground by means of a spade. The roots are cut off and the plant is laid to one side. Where the acreage is larger, especially where soil is used entirely for blanching, a celery digger is used. Different styles of home-made machines are being used for this purpose, but the principle of them all is to run an edged tool just under the plant, thus cutting off the root so it can be taken up by hand. One of these machines for use in loosening a double row is shown in an illustration.

Golden Self-blanching celery is usually “shipped in the rough.” A few of the outside leaves are removed and the celery is packed directly into crates, as shown in an illustration. The number of dozen plants in the crate is marked on the outside, the side of the crate is nailed, and the crate is ready for the car. These crates are usually 20x22 inches by 24 inches deep. As can be seen in the illustration, the top is entirely open, except for a strip along each edge. When celery is to be packed for “shipment in the rough,” one of the other sides is left open so that the plants may be packed in from the side. The remaining side is then nailed on and the celery is thus held securely in place. A crate will hold from four to seven dozen of celery, according to its size at the time of marketing.

Most of the Pascal celery and some of the Self-blanching is carefully trimmed, washed, and tied in bunches of twelve before marketing. In this case the crates are lined with paper before the celery is laid in them. All celery must be washed, bunched, and trimmed before it gets to the retailer, and if this is not done by the grower it must be done by the commission merchant. Some dump the celery into a washing tank and scrub the dirt off by means of hand brushes. Others place the celery in a rack with sides of woven wire, the rack being so pivoted that it can be turned over. A hose is turned on and the dirt washed off. The rack is then turned over and the celery is washed on the other side. Of course, all of the soft outer leaves are pulled off of each plant before washing and the root is trimmed down to a pointed shape. For convenience in bunching, pegs are stuck into holes
in the table or two small boards are fixed so that the celery can be held in a neat bunch of twelve until tied with a string or tape.

Colorado celery is mostly shipped south and east. Texas takes a great many cars, and Kansas City, New Orleans and St. Louis are good markets. During the season of 1908 shipments were made as far east as Pittsburg. The crop is marketed through commission men and through fruit and vegetable associations.

Cost of Growing.—The cost of growing depends on the value of the land, the kind of celery grown, amount grown on an acre, methods of handling and methods of marketing. It can readily be seen that there is more expense in raising forty thousand early plants to the acre than in raising thirty thousand for the late market. It costs more to get the crop ready for the market, because the plants have to be raised under glass and the crop will most likely be blanched with boards. However, the early crop commands a considerable higher price than that which is marketed later.

Some growers claim that $70 per acre will cover cost of manuring, plowing, growing plants, setting, irrigating and harvesting, when shipped in the rough. This does not include rent of land. However, the expense is liable to run considerable higher than this, especially if the crop is blanched with papers, or if it is trenched, washed and bunched before marketing. In the latter case expenses may frequently run over $150 per acre. Of course, if prepared in this way, one should get enough to pay for the extra work. Eastern growers sometimes expend as high as $400 per acre on this crop, largely due to the great cost of commercial fertilizers and manures.

If the grower has good success he should be able to sell his crop for $250 per acre even at the low prices of last season. Some growers, when prices have been extra good, have secured over $1,000 per acre for their crop, but this, of course, is exceptional.

Growing for the Local Markets.—At the present time the growing of celery is confined mostly to the vicinity of the large cities which do not have any local growers, and consequently have to ship in all their celery. Since celery wilt rapidly, it could be furnished in much better condition by local growers who, in this way, would be able to secure the best price. Nearly all our towns have at least some river bottom land well adapted for this crop, the principal requirements being a rich soil retentive of moisture with a steady supply of irrigation water.

Diseases and Difficulties in Growing.—There are no serious insect pests to interfere with celery growing in Colorado at the present time.

There is always more or less complaint of pithiness, but even this does not seem to be a serious trouble under our conditions. Under irrigation the crop may be kept growing evenly and steadily and this probably lessens the per cent. of pithy celery. It is, of course, of great advantage to get seed of the best grade, as pithy celery will much more likely result if a poor quality of seed is used.

The greatest drawbacks in celery growing is the production of “seeders.” The plants may appear perfectly normal until along in the summer, when they suddenly send up a seed stalk, thus making the plants valueless. It is not an unheard of thing to have one-half of the crop suddenly go in this way. There are many theories as to the cause of this. Many think it is the result of the plants becoming frosted while in the seed bed or in the early part of the season. There is not much question but what a severe freezing may cause a large part of the plants to go to seed the first season. However, it appears that a severe drying out of the young plants may cause the same difficulty. It is generally agreed that a severe check of any sort may cause this trouble, evidently producing the same result as passing through the winter.

One thing which caused considerable failure during the past season was that so many poor plants were set in the field. If we expect to get good marketable celery we must not use small, dwarfed or stunted plants. Celery growing requires very careful, intelligent work in the spring and proper handling throughout the summer, but it gives good returns to him who knows how and is willing to do his part in assisting nature.