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UNIVERSITY OF WYOMING
 AGRICULTURAL
 EXPERIMENT STATION



VEGETABLE CULTURE AND VARIETIES
 FOR WYOMING

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†On leave.

Table I. Requirements for an Irrigated Garden to supply sufficient Vegetables for an average family of five persons, (two adults and three children.) Row lengths in dry land gardens should be increased from fifty to one-hundred per cent.

VEGETABLES	Length of row—Feet	Number of plants	Quantity of seed
Asparagus.....	72 to 96	36 to 48	roots
Beans, snap.....	200 to 300	.....	2 to 3 lbs.
Beans, shell.....	100	.....	1 lb.
Beans, lima.....	100	.....	1 lb.
Beet.....	175	.....	2 to 4 ozs.
Broccoli.....	10 to 24	6 to 12	1 pkt.
Cabbage.....	100 to 150	50 to 75	1 pkt.
Carrot.....	150	.....	1 oz.
Cauliflower.....	36 to 48	18 to 24	1 pkt.
Celery.....	25 to 50	50 to 100	1 pkt.
Collards.....	40 to 80	25 to 50	¼ oz.
Corn, sweet.....	300 to 600	.....	¾ to 1½ lbs.
Corn, pop.....	150 to 200	.....	¼ to ½ lb.
Cucumber.....	36 to 48	18 to 24	¼ oz.
Eggplant.....	24 to 48	12 to 24	1 pkt.
Endive.....	25	.....	1 pkt.
Horseradish.....	24 to 48	12 to 24	roots
Kale.....	40 to 80	25 to 50	¼ oz.
Lettuce.....	50 to 75	.....	¼ to ½ oz.
Muskmelon.....	30 to 60	12 to 24	¼ oz.
Onions, seed.....	200	.....	2 ozs.
Onions, sets.....	100	.....	1 lb. sets
Onions, perennial.....	25 to 50	.....	¼ to ½ lb. sets
Parsley.....	5 to 10	.....	1 pkt.
Parsnip.....	50 to 100	.....	¼ to ½ oz.
Pea.....	300	.....	3 lbs.
Pepper.....	24 to 48	12 to 24	1 pkt.
Pumpkin.....	72	24	¼ oz.
Radish.....	25 to 50	.....	¼ to ½ oz.
Rhubarb.....	36 to 54	12 to 18	roots
Rutabaga.....	100	.....	½ oz.
Spinach.....	100 to 200	.....	1 to 2 ozs.
Squash, summer.....	18 to 36	6 to 12	¼ oz.
Squash, winter.....	72	24	¼ oz.
Swiss Chard.....	25 to 50	.....	¼ to ½ oz.
Tomato, fresh use.....	96	24	1 pkt.
Tomato, canning.....	200 to 300	50 to 75	¼ oz.
Turnip.....	50 to 100	.....	¼ to ½ oz.
Watermelon.....	36 to 72	12 to 24	1 pkt. to ¼ oz.

Vegetable Culture and Varieties for Wyoming*

By M. F. BABB AND W. L. QUAYLE

A garden to supply as much as possible of the family food should be the aim of everyone who can get the use of a plot of ground. A well-planned garden produces not only an abundance of nutritious food but it produces it in great variety and for year around use. If properly managed, a vegetable garden will give greater returns than a similar area planted to any other crop.

Vegetables, both in and out of season, because of their mineral and vitamin content, are a requisite for keeping the family in good health. The garden will supply a large amount of the food required, at very little expense other than the labor of planting and caring for it at odd times. Although the food that can be produced in a garden represents a considerable part of the family budget, the more important consideration is that, if there is no home garden, the use of vegetables by the average family will very likely be wholly inadequate for the maintenance of good health.

VARIETAL TESTS

As a result of our varied climatic conditions and soil types, many vegetable varieties that are beautifully portrayed in catalogues and highly recommended by seedsmen in other states prove disappointing under Wyoming conditions. Many of them are too late for some of our areas which have a short season, and some are not well adapted to dry farms.

At high elevations gardening is limited to the growing of the more hardy types of vegetables. Fortunately, however, these include the majority of the vegetable crops, many of which grow much better at high altitudes than in the hotter climate of lower elevations. Furthermore, the flavor and quality of most vegetables grown at the Wyoming high altitude experiment farms are unsurpassed.

*A report of vegetable investigations conducted by the Department of State Experiment Farms, University of Wyoming, under the direction of W. L. Quayle in cooperation with M. F. Babb, Associate Physiologist, U. S. Department of Agriculture, Bureau of Plant Industry, Fruit and Vegetable Crops and Diseases, Cheyenne Horticultural Field Station.

To encourage the growing of home vegetable gardens and to determine suitable varieties for the various altitudes and soil conditions in the state, the Department of Experiment Farms, in cooperation with the Cheyenne Horticultural Field Station of the U. S. Department of Agriculture has tested a number of kinds and varieties of vegetables for the purpose of finding those most suited to Wyoming conditions. The wide distribution of these plantings on Wyoming Experiment Farms† together with additional plantings made by the Cheyenne Horticultural Field Station has made it possible to test vegetable varieties in all of the principal agricultural areas of the state. This work has been the means of accumulating many facts about varieties and methods of culture, and is the basis of the information contained in this bulletin. In addition, these plantings have had a demonstrational value. Many farmers and ranchers in the vicinities of experimental farms where these vegetable experiments were conducted have seen the possibilities of vegetables growing and have become acquainted with new vegetables, many of which have never been known before in the state.

The tests at the different state experimental farms were made over a period of several years. These farms differ widely in their soil and climatic conditions. In the western part of the state, the experiment farms at Afton, Eden, and Lyman are all irrigated and are about 6,500 feet in elevation. Their soils vary from a light sandy loam at Eden to a heavy clay loam at Lyman. Afton has a coarse, dark, gravelly loam. The average frost-free period is 53 days at Afton, 89 at Eden, and 92 at Lyman.

In the eastern part of the state, the experiment farms in general are lower in altitude, varying from 3,700 feet at Sheridan to 6,000 feet at Cheyenne. Dry farming methods are used entirely at Sheridan and Gillette, where the soils are medium loams.

The Torrington and Worland Experimental Farms, where irrigation is used, have elevations of about 4,200 feet, but the soil types are entirely different, Torrington having a very light,

†In addition to the garden variety tests made by the Cheyenne Horticultural Field Station near Cheyenne and at other places in the state, cooperative garden variety tests have been made at the experiment farms located at Afton, Eden, Gillette, Lyman, Sheridan, Torrington, and Worland. Experimental work at Worland was closed November 1, 1939. The Sheridan Station is operated cooperatively by the University of Wyoming and the United States Department of Agriculture.

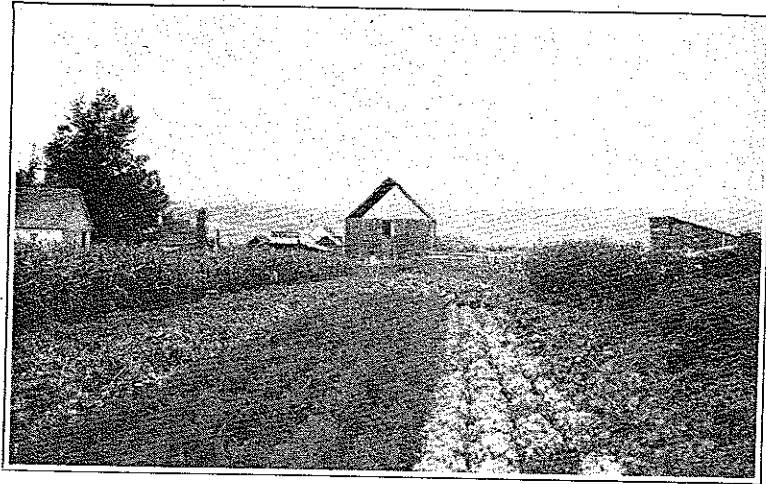
sandy loam, and the Worland station having a heavy, clay loam. These farms in the eastern part of the state have considerably longer growing seasons, the frost-free periods varying from 134 to 140 days. In this part of the state the summers are comparatively hot, a condition which makes the growing of certain cool-season crops a little difficult but which is ideal for many of the more tender crops.

Of course in each of the principal agricultural areas of the state there are places where conditions are not typical of those obtaining on the experimental farm serving that area. Seasons may be longer or shorter and growing conditions may be different due to altitude, canyon breezes, dead air pockets, unusual exposure, soil type, or other local factors. For example, a farmer on the west slopes of the Big Horn Mountains might have a much shorter and much cooler growing season than the experimental farm at Worland. Therefore, results of some of the high altitude stations might be more applicable to his conditions than those of the nearby experimental farm. However, Wyoming farmers and ranchers usually are well acquainted with these local variations and can modify their variety selections and cultural practices accordingly.

GENERAL INSTRUCTIONS

The garden should be located near the dwelling where spare moments can be used in tending the crops and where the various vegetables can be harvested readily when at their best. Land with a slight slope is better than flat land. At low altitudes where summers are hot an eastern slope is best. At altitudes of about 6,000 feet or higher a southern slope is preferred. A sandy loam soil is better for most vegetable crops than the heavier types. However, with good management successful gardens can be grown on all types of agricultural soil.

Windbreaks near the garden may or may not be beneficial. In areas having seasons long enough for tender vegetables to mature before fall frosts, windbreaks are beneficial in protecting plants from a storm damage and from drying summer winds. However, in areas having short growing seasons, windbreaks increase the danger from early fall frosts by preventing free air movement across the garden.



Irrigated garden in Lincoln County conveniently near the dwelling.

In irrigated gardens the rows should be spaced generally from 3 to $3\frac{1}{2}$ feet apart, depending on the cultivating equipment available, except for asparagus, cucumber, muskmelon, watermelon, winter squash, and pumpkin that require about 6 to 7 feet between rows. On farms having tillage implements for narrow rows, such as a beet cultivator, root crops, onions, lettuce, parsley, and spinach may be spaced close enough to permit cultivation with such equipment. For dryland gardens these row spacings may be somewhat increased, but in general it is better to give plants more room by increasing the space between plants in the rows. The distances between plants suggested for various crops in this bulletin are generally those for irrigated gardens; for dryland gardens these distances should be increased from 50 to 100 per cent. An irrigated garden of from one-third to one-half acre should provide sufficient vegetables for an average family of five persons. Because of the greater spacing required between plants and the lower yields expected, a dryland garden should contain from three-quarters to one acre. Because dryland gardens should be planted on summer fallowed ground, an equal area should be summer fallowed for next year's garden.

Soil preparation should follow the best local practices for tilled crops. Barnyard manure is generally beneficial. On irri-

gated gardens it should be applied at the rate of 16 spreader loads to the acre and plowed under. For dryland gardens manure should be applied as a top dressing in spring, preferably in the summer fallow year, and worked into the surface soil with tillage equipment.

Commercial fertilizers are seldom necessary in Wyoming soils and may even do damage. Exceptions to this are found in areas long under cultivation where 50 to 150 pounds of treble-superphosphate per acre may be beneficial. Soil amendments such as lime or sulphur should not be used except on the advice of a soils specialist.

Cultivation is primarily for the purpose of controlling weeds. It should begin early when weeds are just starting and should be repeated whenever necessary to check weed growth. Cultivation should always be shallow.

For starting plants of tomato, pepper, eggplant, cabbage, cauliflower, broccoli, onions, and celery hot beds and cold frames are convenient. Instructions for their construction and operation will be found in U. S. Department of Agriculture Farmers Bulletin No. 1743.

To secure a continuous supply of crops such as corn, cabbage, carrots, etc., it is generally better to plant early, midseason, and late varieties at the same time rather than to make successive plantings of one variety.

Not all crops can be grown successfully under dryland conditions. Those crops generally adapted to dryland culture, where the soil is normally well supplied with moisture, are marked with an asterisk (*).

PERENNIAL VEGETABLES

ASPARAGUS, HORSERADISH, PERENNIAL ONION, RHUBARB

These crops are hardy in all parts of Wyoming and, as they furnish the first green vegetables of spring, they should be a part of every home garden. They should be planted by themselves, either at one side of the garden or in a separate space, where they will not interfere with preparation of the land for the annual crops. Perennial vegetables may be grown with very little irrigation, because they are harvested in early spring when

natural soil moisture is most plentiful. However, irrigation during the summer aids growth and increases yields the following spring.

**Asparagus: (36 to 48 plants or from 72 to 96 feet)¹*

Asparagus may be started from seed or by setting out 1 year old seedling roots purchased from seed houses or nurseries. The later method is usually best for home gardeners. However, if seed is used, it should be sown as early in the spring as possible at one inch intervals. One ounce of seed should produce 800 plants, and it is best to raise from three to four times as many plants as are required for the permanent planting in order that the small roots may be discarded. The seedlings should be left in the ground over winter and set in their permanent places the following spring. Seedlings or purchased roots are set in trenches 6 inches deep and spaced from 2 to 3 feet apart under irrigation or from 4 to 5 feet apart under dryland conditions. About 2 inches of soil should be placed over the crowns as they are set and the trench is gradually filled as the plants develop. No harvest should be made the first spring but during the second spring 2 or 3 cuttings may be taken. In subsequent years the cutting season can be extended, but should probably always cease by the middle of June to give the plants an opportunity to store materials for the following spring's crop. In harvesting, the spears are cut off about 1 inch below the soil surface when they are from 6 to 9 inches in height or before they start to branch.

If plants are purchased it is better to order large one-year-old crowns than two-year-old crowns, as the latter are sometimes injured by standing too long in the nursery row.

Varieties recommended for Wyoming are Mary Washington and Martha Washington, and of these most growers prefer the former variety.

**Horseradish: (12 to 24 plants)*

Horseradish is almost always started from root cuttings or sets taken from mature plants. Such sets may be obtained from seed houses or by digging up old plants and cutting off the side

¹This and similar notations in this bulletin refer to the number of feet of row space or number of plants in an irrigated garden required to supply an average family of five persons (two adults and three children.) For dryland gardens the number of plants or feet of row space will need to be increased from 50 to 100 per cent.

roots. These are usually from one-third to one-half inch in diameter and from 4 to 8 inches in length. They are set in shallow trenches in early spring and spaced about 2 feet apart. The roots are ready for harvesting the following spring and, if the side roots are trimmed off and replanted, a continuous supply of horseradish is assured.

There are not many varieties of horseradish. Most seed houses list only Bohemian (also called Maliner Kren).

**Perennial Onion: (25 to 50 feet)*

Of the perennial onions the Perennial Tree, or Egyptian, and the Potato, or Multiplier, are most common. The Perennial Tree onion is started by planting small onion-like sets or bulblets which are formed in clusters on the tops of the mature plants. These may be purchased from seed houses or secured from mature plants in established plantings. One pound of sets is sufficient for 100 feet of row. They are set from 4 to 5 inches deep and from 2 to 4 inches apart usually in August and will produce tender bunching onions the following spring. A few of these plants left unharvested will produce clusters of bulblets by midsummer and these may be used for planting. These mother plants should be lifted every 2 or 3 years and divided. The mature bulbs formed at the base of the mother plants may also be used in cookery. The Potato, or Multiplier onion, is started from sets which may be purchased or secured by lifting and dividing mature plants. They are planted and grown like Egyptian type but instead of top sets or bulblets the mother plants produce several small bulbs which may be used for eating or replanted to produce green bunching onions for spring use.

There are red and white types of the Perennial Tree, or Egyptian onion, the white type being more popular. Two or three types of Multiplier are known, differing mainly in color, and most seed houses list them as "Multiplier" or "Potato" sets.

**Rhubarb: (12 to 18 plants)*

As rhubarb does not come true to type if seed is used, new plantings should be started from sets or root cuttings. These may be purchased or they may be secured by lifting and dividing