
Oregon State Agricultural College Extension Service

Corvallis, Oregon

Vegetable Storage

By

A. G. B. BOUQUET
Horticulturist (Vegetable Crops)

THREE sources of vegetables are available for fall and winter use; first, semi-hardy and hardy crops that can be gathered from the garden; second, vegetables that have been canned or dried; and third, vegetables in storage.

This publication deals with practices of storing vegetables grown for home consumption so that they may be kept as long as desirable with the least loss from shrinkage and decay.

Vegetables for storage. Some fifteen or more crops can be kept successfully in storage and methods of storing each one of these crops are discussed in the following paragraphs. Vegetables for storage must be sound, in the proper stage of development, and free from blemishes such as cracks, cuts, bruises, or injuries due to insects or diseases, all of which induce rots and molds. For these reasons crops which are put in storage should be carefully inspected previous to storage in order that diseased or injured specimens may be eliminated.

Storage places. Vegetables can be stored in the cellar or basement under the house, in outdoor pits or banks of soil, in special houses built for storage such as onion houses, or in outdoor cellars. A cellar or basement containing a furnace is usually too warm and dry for vegetable storage unless a room is partitioned off, building the partitions of non-heat-conducting material such as wood pulp-insulating material or with two lines of flooring with a hollow space between them. There should be at least one screened inlet of cold air to assist in ventilating and regulating temperature.

The construction of outdoor earth pits is discussed in the paragraphs concerning root crops. Special houses are built for such crops as onions, especially when grown on a commercial scale.

Shelves or racks are useful for holding such vegetables as squash and pumpkins, as well as boxes or crates of peppers, tomatoes, eggplant, and onions. Bins are oftentimes used for holding potatoes and should be made so as to be raised a few inches from the floor to permit free circulation of air and to prevent the bins from becoming nesting places for mice or rats.

Conditions for storage. Temperature, moisture, and ventilation are important factors in storing vegetables. Moderately high temperatures cause shrinkage and breakdown, whereas temperatures below 32° F. may cause freezing injury and subsequent decay. With the exception of squash, pumpkins, dry beans, tomatoes, and peppers, temperatures ranging from

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a few degrees above 32° to 40° or 45° F. are most suitable. The optimum humidity or air moisture varies with the vegetables being stored. Root crops shrink badly in an atmosphere of low humidity, but potatoes, onions, squash, and dry beans store best under relatively dry conditions. Ventilation can be provided by proper air inlets, which can be opened during periods of relatively warm weather so as to admit the cool night air, closing them in the daytime to exclude the warmer air of the day. During cold weather the air openings will have to be partly or entirely closed.

Beans and peas. Harvest individual pods or pull up entire plant with pods on and spread in a dry place. Thresh as soon after harvesting as pods are dry. After threshing, fumigate with carbon bisulfide to kill weevils. The dosage is from 5 to 8 pounds to 100 bushels of seed, or 1 pound to 100 cubic feet of space. For small lots, use a half-gallon jar of threshed seed, pour one tablespoonful of carbon bisulfide over the seed and tightly close the jar, leaving it for 48 hours. Dry peas or beans for table use should be well aerated after fumigation before being used for food. For complete information consult Circular of Information 273, *Bean and Pea Weevils*.

Beets, carrots, parsnips, salsify, turnips, rutabagas. In Western Oregon roots are best stored by leaving them in the ground with the tops cut off an inch or two above the apex of the roots, putting sufficient earth over the rows to keep them from being injured by cold weather. If the roots are dug to be stored in the cellar, they must be placed in-moist earth or sand, otherwise there is considerable shrinkage. Outdoor pits are often used for root crops. To construct such a pit choose a well-drained location, digging a trench from 8 inches to 12 inches deep and of suitable size to hold the amount of roots to be stored. Where the soil is well drained and the temperatures are likely to be severe it would be well to have the bottom of the pit at least two feet below the ground level. Line the pit with straw and fill with the roots, heaping them into a cone-shaped pile. Cover with the same material used to line the pit, then add soil to a depth of three inches or more, according to the severity of the winter. Ventilation may be obtained in small pits by extending a hollow tile pipe or flue of rough boards through the middle of the pile of vegetables. This flue should start a few inches above the bottom of the pit and extend several inches above the surface of the pit covering. The top of the pipe or flue should be capped to keep out rain.

Parsnips are the hardest of all roots and may often be satisfactorily stored by being left in the ground all winter, especially in the western part of the state. In contrast to carrots, the sugar content of parsnips increases after cold weather and during storage.

Cabbage. Well-matured, solid cabbage will keep well in a cool cellar laid on a shelf preferably not more than two layers deep. Cabbage keeps best at about 32° to 40° F., but is not injured by slight freezing. In the field the heads can be protected as they stand in the rows by putting a few of the large thick outer leaves over the apex of the heads before night. In some cases where it is desirable to store cabbage through the winter to keep it from being frozen or to remove it from low ground which may be overflowed in the winter, the heads may be removed to higher ground and stored in a trench plowed out sufficiently deep to cover both stems and heads. The entire plant is taken from the row and placed in a trench with either the head inverted or right side up, covered with a sufficient quantity of soil to keep it from freezing. In this manner of storage the heads should be solid and the outer leaves left on as the heads are placed in the furrow.

Cauliflower. Closely trimmed heads of cauliflower will keep well for a few weeks even though the stubs of the jacket leaves about the head become yellow and finally fall off. The temperature for keeping cauliflower should be as nearly 34-40° F. as storage conditions will permit.

Celery. Protection of this vegetable from cold weather can be obtained by having the plants banked with boards, soil, or both. Celery will freeze in the field at a temperature of about 28° or 29° F. If one has a frost-proof cellar or outhouse, plants not yet fully grown nor blanched may be dug up with the roots on and placed in moist sand or soil. Water should be applied at intervals to keep the plants rooted and there should also be sufficient aeration to keep the plants in a healthy condition. Some home gardeners store their celery in a protected coldframe, covering the frame with boards and straw to keep out cold temperatures. Celery plants blanched with boards and subject to freezing temperatures may be further protected by using gunny-sacking or burlap over the plants at night, removing the material in the daytime. Commercial celery keeps well in crates in temperatures approximating 31½° to 32° F.

Eggplant can be kept for several weeks after freezing temperatures occur by cutting the fruits from the plants and placing in boxes with a lining of dry sawdust. Particular care must be taken to keep the eggplant from being bruised before storage. It should then be put in as cool a place as possible where the temperature will approximate 45° to 50° F. and the humidity is relatively high. Old sacks covering the plants and fruit in the field during light frosty weather will lengthen harvest for several weeks.

Onions. Previous to putting onions in storage, the bulbs are pulled in the field and laid in windrows for curing, three rows of onions usually comprising a windrow. The onions lie in the rows for two and a half to three weeks, depending on the weather, at the end of which time they should be dry and well enough cured to be brought into the storage house. Onions are stored on racks usually piled from 8 to 12 inches deep and having their tops on when in storage. The average freezing point of onions is about 30° F., so that a temperature of 36° to 45° F. is best. It is necessary to have a good circulation of cool air so that there may be a comparatively low percentage of humidity. Onions should not be handled in storage while frozen, but should be allowed to thaw out gradually if they have been subjected to temperatures below 30° F. Poorly shaped onions will usually have a short period of dormancy and will sprout readily. Well-shaped onions of long-keeping strains may have a dormancy period of several months, and in some cases have been known to keep for almost a year before sprouting. In the basement storage room of a house, onions may be kept satisfactorily in a slatted or open crate.

Peppers. Green or red peppers may be stored for several weeks without much shrinkage, provided the temperature is not above 50° or 55° F. and the relative humidity is high. The thick-meated peppers, such as the California Wonder, which are unblemished by bruises are most suitable for storage. The fruits can be harvested from the plants in the field for a longer season in the fall if they are covered with burlap as suggested for eggplant. Such material will keep the fruits from being frosted during periods in the fall when the nightly temperature falls below 32° F.

Potatoes. The best storage temperature for table or seed potatoes is one high enough for the first few days to permit of suberization of wound injuries, preferably 50° to 60° F. After this, the tubers are best kept at as nearly 34° to 38° F. as possible. Light should be excluded; and while a fairly high degree of humidity is desirable, there should be an ample supply of aeration. Potatoes should be dried off before storing and, following digging, should be sorted carefully before the tubers are stored permanently. Those potatoes damaged in digging are unlikely to keep as long as the sound tubers. Types of potato storage houses including outside pitting, dugouts, or cellars as well as insulated structures are fully discussed in the bulletin on potato storage listed below.

Pumpkin and squash. There is often considerable decay of these two vegetables in storage. Decay may be largely prevented if the specimens are fully matured in the field, are carefully handled when being harvested and brought in to the storage place, and are not subjected to low temperatures and high humidity when stored. Skin bruises must be avoided if the squash are to keep for any length of time. After the squash have been cut from the vines in the field, they may be left in groups but not piles for two weeks or so if the weather is favorable, being protected by the squash vines if frosts occur. The fruit should be stored one deep on racks or shelves in a dry, well-ventilated storehouse where the humidity is relatively low and the temperature is between 50° and 60° F. A slightly higher temperature may be maintained during the early part of the storage. Moderately warm attic temperatures, 65°-75° F., will probably prevent decay but there will be greater shrinkage than at 55°-60° F. On the other hand, a cool, moist storage place induces mold, especially if there has not been much care used in preventing exterior abrasions or bruises.

Tomatoes. Fruits that are in the turning stage or beginning to show color when picked will ripen normally when stored at 50° F. At 40° F. there will be no normal ripening in tomatoes of any stage of immaturity. The lowest temperature at which full ripening with good color and flavor will develop is 55° F. At this point the rate of ripening is comparatively slow, but there is no decay nor breakdown. This temperature is recommended for either storage or delayed-ripening purposes. It is not necessary to wrap tomatoes when they are being put into the storage room, nor is it necessary that they be kept in the dark. Firm, fully ripe tomatoes also keep satisfactorily at 55° F. If the tomatoes are chilled down to 36° to 40° F., they may be expected to break down rather readily when brought up to higher temperatures. All fruits for storage should be carefully handled without bruises and the fruit itself should be sound.

PUBLICATIONS USEFUL IN HOME VEGETABLE GROWING

Oregon State Agricultural College

Extension Bulletin 443, The Farm Vegetable Garden.

Extension Bulletin 444, Growing Fall and Early Winter Vegetables.

Extension Bulletin 457, Planting the Subsistence Vegetable Garden.

Extension Mimeograph Circular 282, A Monthly Schedule of Operations in Growing Vegetables for Home Use on the General Farm.

Extension Bulletin 459, Vegetable-Crop Insect-Pest Control Program.

Mimeograph circulars are also available regarding the following crops or operations in vegetable growing: Asparagus; globe artichokes, cannery beets, snap beans for fresh marketing and canning, broccoli, late cabbage, cantaloups and muskmelons, greenhouse cucumbers, cucumbers for pickles, cauliflower, cannery carrots, celery production and marketing, sweet corn growing and marketing, growing and forcing witloof chicory, mushroom growing, lettuce, onions, rhubarb growing and forcing, growing squash and pumpkin, growing and marketing green peas, spinach growing and marketing, growing and marketing tomatoes, greenhouse tomatoes, the manure-heated hotbed, the flue-heated hotbed, operation and maintenance of the cold-frame, growing early vegetable plants under glass, fertilizers for vegetable crops.

U. S. Department of Agriculture, Washington, D. C.

Farmers' Bulletin 847, Potato Storage and Storage Houses.

Farmers' Bulletin 1673, The Farm Garden.

Circular 415, Some Effects of Freezing on Onions.

Technical Bulletin 268, Effect of Various Temperatures on the Storage and Ripening of Tomatoes.