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Harvest and Storage of Vegetables and Fruits

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You've done all of the work to grow great vegetables and fruits. Now, how do you know when to harvest them? Are there ways to store part of the harvest to enjoy during fall and winter time?

Goals of this fact sheet:

- Know when and how to harvest fruits and vegetables.
- Become familiar with different options to store produce for later use.

There are some basic guidelines on how to determine when vegetables and fruits are ripe. Most leafy vegetables (chard, lettuce, spinach, etc.) can be harvested as soon as they have some size. Pick the outer leaves and allow the inner leaves to continue to grow. However, each variety and growing situation is a little different so it is important to keep records for your own crops and garden. Determining maturity and harvesting some of the fruiting vegetables can be challenging. Cantaloupe is quite straightforward—the fruit is ripe when the point of stem attachment to the vine starts to loosen and the fruit detaches cleanly from the vine with a slight twist. However, it is harder to tell when a watermelon is ripe. There is the saying: "Thump the melon with your hand, if it sounds like thumping your head, it is under-ripe; if it sounds like thumping your tummy, it is overripe; but if it sounds like thumping your chest, it is just right." There is really little truth to this saying, since subtle sound differences are often hard to determine and may not be entirely accurate.

This fact sheet will focus mainly on storage techniques other than processing for storage. Root crops are some of the easiest to store because they can be left right in the garden. Just cover with soil, straw, or leaves until the soil freezes hard. To use, remove the cover, dig as needed, then recover. Take inside when temperatures below 28F are near. Many fruits and vegetables can be stored in a garage or basement or extra refrigerator.

Many homes have a cement storage room in the basement under the front stairs or an unheated basement storage room (*Figure 1*). These types of rooms are generally dry and cool (45-60F) and work well to store canned or bottled food and can also be used to store produce such as onions, hot peppers, green tomatoes, and winter squash. Store these vegetables in open boxes or containers so they stay dry. Many vegetables and fruits store best at conditions that are cooler or moister than basement storage rooms and so should be stored in plastic bags or moist sawdust. See Table 1 for details.



Figure 1. Unheated basement storage room.

A simple outdoor storage container can be made using a buried garbage can with layers of straw (*see Figure 2*) or a shallow pit or trench (*Figure 3*). These types of storage are used most often for cabbage, potatoes, and root crops (beets, carrots, and turnips). For a buried garbage can, select metal or plastic cans that are shorter, around 20 gallons, so that it is easy to reach down into the can to store and retrieve produce. In general, metal cans are more rodent proof than plastic cans. For in-ground

pit storage, excavate the soil down 6-12 inches and line it with straw or other insulating material. Place the vegetables in the pit and then cover with insulating material, a layer of soil, and then a tarp or piece of plastic to repel water. If there are rodents in the area, consider adding a covering of ¼" hardware cloth.

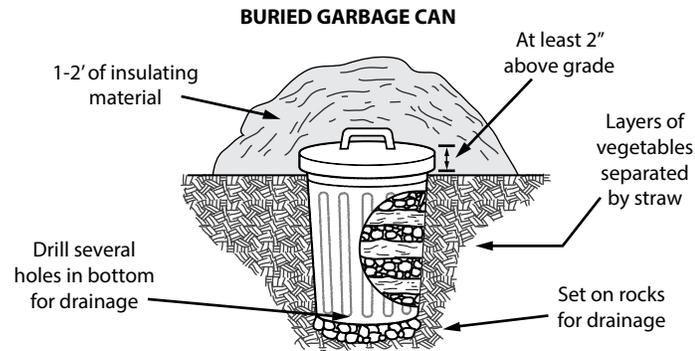


Figure 2. Simple outdoor storage in buried garbage can.

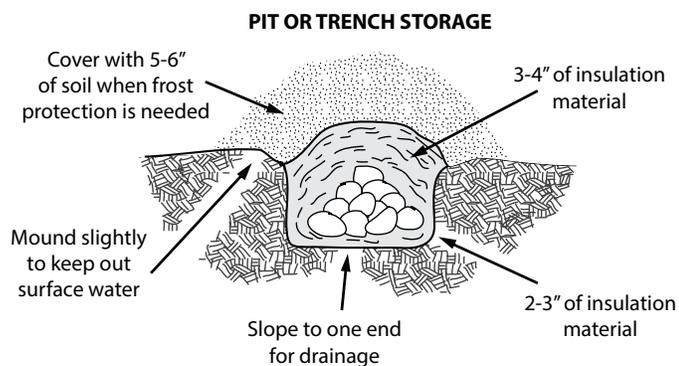


Figure 3. Pit or trench storage of vegetables.

The following tips should help you know when to harvest vegetables and fruit followed by storage guidelines. Select the best quality fruit or vegetable from the garden to store. Crops that have slight blemishes should go right to the kitchen and then be used. Avoid storing fruits and vegetables together because fruits release ethylene gas which speeds the ripening of vegetables. Produce can always be stored in the refrigerator or preserved by canning, drying, or freezing.

VEGETABLES

Asparagus: Harvest begins 2 years after planting. During the first harvest year, cut all 9-inch tall spears at ground level for up to 3 weeks. Over the next 3 years, gradually increase the length of the harvest season to 6-8 weeks. Tall growing spears suppress further spear growth, so cut all emerging spears during harvest season. Stop harvesting when the majority of spears are

smaller than a pencil in diameter. Store in a plastic bag for 3-5 days in the refrigerator.

Beans, Bush and Pole: Pick when pods are full size, with small seeds, and firm, crisp flesh. Pick every 2-3 days so plants will continue to flower and produce pods for several weeks after the initial harvest. Store in a plastic bag in refrigerator for 1 week.

Beans, Dry: Harvest when pods are dry and seeds are fully mature. Pull up the plants and put in a dry location or lay in a row in the garden for 5-7 days. Once the plants are dry, pick the pods, shell out the seeds, and spread on newspaper for a few days to allow the seeds to dry completely. Place in a sealed container in a cool, dry place for long-term storage.

Beets, Carrots, Parsnips, Turnips and other Root Crops: Harvest can start as soon as they are medium sized. Harvesting some of the plants helps thin the stand and gives the remaining plants room to grow. In the fall, leave plants in the soil but cover with a thick layer of straw or leaves. Remove covering and dig as needed through fall and winter. Roots crops that have been stored outside under mulch should be used quickly once they are brought inside. Or, dig and take indoors and store in a cool, moist location in bins or crates with layers of moist sand, peat moss, or sawdust. Store in plastic bag in refrigerator for 1-2 weeks.

Broccoli: Harvest when the heads are compact but before the flower buds open. With most varieties, mature heads are 6-12 inches in diameter. Cut with stems 8-10 inches long. Store in a plastic bag in refrigerator for 7-10 days.

Brussels Sprouts: Harvest when they are an inch or more in diameter. They can tolerate some frost and can be kept in the garden until after Thanksgiving. When outdoor conditions turn very cold, harvest and store inside. Store in cold garage leaving the sprouts on the stalk or remove the sprouts and store in a plastic bag in the refrigerator.

Cabbage: Most cabbage is mature about 60-70 days after planting. Harvest when the heads are firm, compact, and have reached full size. In the fall, after several frosts, pull up the plant with the root attached. Dig a trench in the garden, pull wrapper leaves around head, and invert so root sticks above ground. Fill in the trench with soil, mulch heavily like root vegetables, and use as needed. Alternatively, remove the loose outer wrapper leaves and wrap in newspaper tied with a string. Store in a cool, moist location or put outdoors in a buried container. Store in refrigerator for 1-2 weeks.



Figure 4. Cantaloupe stem at slip stage.

Cantaloupe: Fruits are ripe when the stem separates easily or slips from the vine. The background color of the fruit turns from green to yellow and the outside netting gets coarse and rough. Store for 1 week in refrigerator.

Cauliflower: Harvest when the head is fully sized and florets are tight. Cauliflower can withstand a light frost. Prepare for storage by cutting off the root, then wrap the head using the outer protective leaves. Place in a container and cover loosely with moist sand in a cool location.

Celery: The plant is mature when the stalks are fully sized—about 3 inches or more in diameter. Mulch heavily and leave in the garden until a hard frost. To store longer, pull up the root ball and tops and place in a shallow trench filled with moist sand. Cover with insulating material.

Garlic: Harvest in early-late July when the tops begin to yellow and fall over, but before the leaves are completely dry. Pull up plants and move to a well-ventilated area out of the sun for 2-3 weeks to cure. Store in a cool, dry location in mesh bags or with the tops braided together.

Kale: Harvest as soon as the leaves reach full size, removing the older outer leaves first. Kale can withstand a light frost and can be left in the garden late into the fall when it is covered with insulating material. To store, harvest and put in a trench similar to celery.

Kohlrabi: Harvest when the bulbs are about the size of large eggs—2-3 inches in diameter. It can be stored for a short time in a cool, moist location similar to beets.

Lettuce: Leaf lettuce can be picked any time after leaves have formed. Remove older leaves first and allow younger leaves to continue growing. Harvest crisphead lettuce when heads are firm. Butterhead lettuce is best harvested in the early heading stage. Store in refrigerator in plastic bag for 1 week.



Figure 5. Harvested onions.

Onions: Bulbs for storage are best grown from seeds and not from sets or transplants. Harvest in the fall (late September) before a hard freeze. The leaves should turn yellowish and started to fall over. Lift the onions from the ground and place them in a well-ventilated area out of direct sunlight for 2-3 weeks to cure. When the outer skin on the bulbs “rustle when disturbed” and the necks are dry, they can be stored long-term by placing in a cool, dry location. Onions store best just above freezing point.

Peppers, Hot: These peppers can be picked when they have reached their average size and color. They can be threaded together on a string and hung to dry in a well-ventilated location. Store in a cool, dry location for several years, but they are best used within 1 year.

Peppers, Sweet: Peppers are mature when they have reached their average size and color. Many varieties will turn from dark green to colored (red, orange, yellow, purple, etc) provided you give them sufficient time to ripen on the plant. Mature or ripe fruit can be stored in perforated containers in a cool, moist location. Another easy way to store peppers is to simply freeze the entire fruit or cut fruit into small pieces and then freeze.



Figure 6. Potato harvest.

Potatoes: Tubers can be carefully dug from around the outer edge of the plant in mid-season for small, new potatoes. Harvest the main crop when the vines have died down completely and the ground is dry. Harvest carefully to avoid scars and bruising. Move to a dark location and cure at 45-60F for about 2 weeks. Once cured, store in the dark in boxes or crates at 40F. Do not store potatoes and apples together as potatoes make apples taste musty.

Spinach: Harvest can begin as soon as leaves are big enough to handle—generally when there are 5-6 leaves. Larger, older leaves can be picked first and this allows younger leaves to keep growing. Once plants are mature, harvest the whole plant by cutting just below the ground. Store in refrigerator in plastic for 1 week.

Spinach, Summer or New Zealand: Harvest when plants have reached 10 inches in length. The branch tips are the most tender. Harvest continuously by breaking or cutting the branches 3 to 4 inches back from the tips. This also encourages side branching and more succulent growth for future harvests.

Summer Squash: Harvest at an immature stage approximately 3-5 days after flowering. Avoid leaving the fruits on the vine too long as the skin begins to toughen and quality decreases. Store in refrigerator in plastic bags for 5 days.

Sweet Corn: Ears are mature when the silks are dry and brown. The husks should still appear moist and green. Kernels in the tip of the ear should release milky juice when punctured and should be plump. Harvest by grasping the ear and snapping downward while twisting the ear. Store in the refrigerator for 3-5 days in plastic bags with husks intact.

Swiss Chard: Harvest as soon as leaves are big enough to handle (like spinach)—generally when there are 4-5 leaves. Larger, older leaves can be picked first and allow younger leaves to keep growing. Once plants are mature, cut fully grown leaves 2" from the ground. Store in refrigerator in sealed container for one week.



Figure 7. Tomatoes.

Tomatoes: Fruits are ripe when they have developed mature size and appropriate color. Check flavor and allow to fully ripen on the vine for best taste. If fruit is not fully mature and frost is threatening, protect by covering the plants with a tarp or blanket. Often there are a few more warm days to come after the initial first light frost. When a hard frost is imminent, pick mature green or slightly pink tomatoes for storage. Remove stems to avoid puncturing other fruits. Place tomatoes in a single or double layer in a box so that it is easy to check to see when they are ripe. Cover with paper to retain moisture and keep in the dark. At room temperature, they will ripen in about 2 weeks. Do not store below 50F.

Watermelon: With experience, the thumping technique can be useful. Better indicators of fruit maturity include when the curly tendril opposite the fruit is brown and withered, the ground spot under the fruit changes from white to yellow, and the outer skin color changes from bright, shiny to dull hue. Store in a refrigerator for 1-2 weeks.



Figure 8. Winter squash.

Winter Squash and Pumpkin: Fruits are ripe when their skin appears dull and waxy and the rind cannot be easily scratched with a fingernail. Leave fruits on vine until fully mature but harvest them after a light frost. Harvest by

cutting the stem with a knife and always leave at least a 1" stem to protect from decay. Cure by placing in a warm (75-85F), dry location for 10 days, then store in a dry area at 50-55F. Fruits rot quickly when stored below 45F.

Table 1. Summary Table of Storing Vegetables Longer Term.

1	2	3	4
Cold and Moist 32-40 F Humidity 90-95%	Cool and Moderately Moist 40-50 F Humidity 80-90%	Cold and Dry Optimum 32-40 F Humidity 60-70%	Warm and Dry 50-60 F Humidity 50-70%
Asparagus Beets Brussels Sprouts Broccoli Cabbage Carrots Cauliflower Celery Horseradish Kale	Kohlrabi Leeks Lettuce/Greens Parsnips Pea Radish Rhubarb Sweet Corn Turnips	Bean (snap) Cantaloupe Cucumber Eggplant Pepper Tomato (ripe) Watermelon	Bean (dry) Garlic Onions Pea (dry) Potatoes* Shallots
Usually stored between layers of moist sand, leaves, or sawdust in a box in basement or garage, or in a garbage can buried outdoors.	For cabbage and cauliflower, pull up roots and replant in sand outdoors, enclosed in wooden frame and cover with a heavy layer of straw or leaves.	A cold, dry room in basement is best for onions and garlic. Store in dark in slatted crates or mesh bags. <i>*Potatoes stored very cold begin to taste sweet. Store closer to 40F.</i>	Store in a dry room on shelves. Do not allow to touch each other.

Adapted from Gross, K.C., C.Y. Wang, and M. Saltveit. 2014. The commercial storage of fruits, vegetables, and florist and nursery stock. USDA Agriculture Handbook #66.

FRUITS

The best way to determine ripeness of tree and small fruits is by TASTE. The color will also change to the color that is typical of ripe fruit.



Figure 9. Apples ready to pick.

Apples: The best way to tell if apples are ripe is to taste them. Commercial growers use a refractometer which measures the sugar content. Only store apples which are mature, firm, and in perfect condition. Ideal storage conditions for apples are 30-32F and 90% humidity. The easiest place to store apples is in a refrigerator in perforated plastic bags. Make 10 to 12 ¼" holes in each bag to permit ventilation and to maintain a desirable humidity. Do not seal or tie the bags—simply fold the end over. Check apples frequently as excess humidity encourages decay and low humidity encourages shriveling. Apples can also be stored in a garage or outside in an insulated container as long as the temperature is above 10F.

Apricots/Nectarines/Peaches: Allow to ripen on the tree. Begin checking for ripeness when fruits develop a light yellow flesh color by pressing softly with your finger on the top of the peach close to the stem. If the fruit yields slightly to pressure, it is ripe. Peaches picked too early will not soften or develop maximum

sweetness. Peaches on a tree ripen at different times, so pick several times over 1-2 weeks. Store peaches in plastic in the refrigerator for 1-2 weeks.

Blackberries: Berries have maximum flavor and sweetness when allowed to ripen on the plant. Most varieties will change from a bright red color to a blackish red color as they ripen. Fruit that are shiny are still immature, while ripe fruit have a more dull appearance. Taste to check for full flavor and ripeness. Berries are fragile and only keep for a few days. Store in a refrigerator or freeze or make jam right after picking.

Cherries: Watch for good color development and then taste to check for sweetness and flavor. Store in a refrigerator for up to a week.



Figure 10. Grapes.

Grapes: Taste to check for ripeness and best flavor. It is not necessary for them to go through a frost to be ripe. Clip the clusters from the vine and hold in a cellar or cool basement for 4-6 weeks and then process or use. Store in boxes or crates with a layer of straw between layers of grapes. Grapes absorb odors from other fruits so store them away from other produce.

Pears, Asian: Taste to check for ripeness. Asian pears should ripen on the tree. Store at room temperature for quick use or place in refrigerator for longer-term storage.

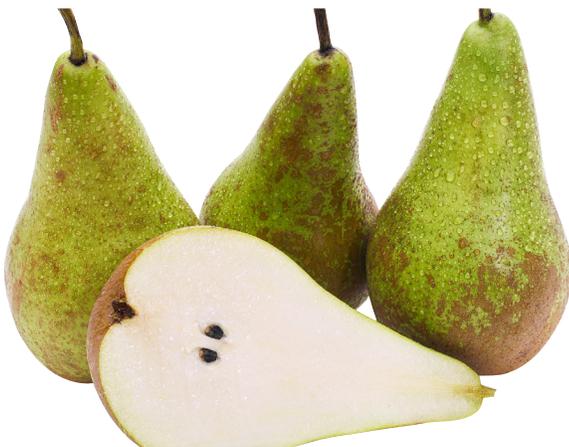


Figure 11. Cross section of cut pear showing brown seeds.

Pears, Bartlett: It is tricky to know when pears are ripe. When mature the fruit color changes from dark green to pale green and the seeds inside will be brown. On the tree, lift a pear up gently and twist. If the pear is ripe, it will easily separate from the stem joint. For immediate use, keep at room temperature. To ripen a large number of pears at the same time for canning, place in a box and cover with a blanket or newspaper. The cover traps ethylene gas given off by the fruit and hastens the ripening process. Pears require quite precise storage conditions to stay good—a refrigerator works best. Wrap individual fruit in newspaper and store in boxes lined with perforated plastic. Keep temperature at 29-31F. When ready to use pears, remove from storage and allow to ripen at room temperature.

Pears, Winter (Anjou, Comice, Bosc): Use the same tests for ripeness as for Bartlett pears. Winter pears do not ripen immediately at room temperature but need storage in a cold refrigerator for 2-3 months immediately after harvest. Cold storage prepares them to complete the ripening process. After cold storage, remove from refrigerator and ripen at room temperature.

Plums, Prunes: Allow to ripen on the tree until firm-ripe. Taste to check for flavor when full size and well-colored. As soon as the first soft fruit appears, pick the ripest fruit. Trees need to be picked 2-3 times per season. Store in a cool, dry place or in refrigerator.



Figure 12. Red raspberry.

Raspberries: Check for ripeness when fruit start developing characteristic variety color—red, yellow, purple, etc. Taste to check for full flavor and ripeness. Berries are fragile and only keep for a few days. Store in a refrigerator, freeze, or make jam right after picking.

Strawberries: Pick strawberries as soon as they reach maturity as indicated by their typical red color. Overripe fruit left on the plants will deteriorate and may attract insects and diseases. After harvest, do not wash as this can increase fruit rot. Store in a refrigerator crisper (higher humidity helps maintain firmness) for up to a week, freeze, or preserve as jam. Wash right before use.

FOOD PRESERVATION

Produce can be preserved by canning, drying, or freezing. For detailed information on food preservation, go to the following:

USU Extension Canning Homepage: canning.usu.edu.

USU Extension Food Preservation Homepage: extension.usu.edu/foodpreservation.

USDA Complete Guide to Home Canning: homefoodpreservation.com or nchfp.uga.edu.

USU Extension Food Storage Homepage: extension.usu.edu/foodstorage.

Food Storage in the Home fact sheet: extension.usu.edu/files/publications/publication/fn_502.pdf.

Ball Blue Book: freshpreserving.com.

REFERENCES

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Various authors. (2012). Vegetables, fruits, & herbs book. Utah State University Extension.

PHOTO CREDITS

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