Storing Fruits and Vegetables

Visit www.therootcellarbook.com for a printable wall chart showing optimal storage conditions for more than two dozen of the most popular produce items.

This chapter provides you with a quick guide to the ideal storage conditions for cellarable fruits and vegetables. It's not essential that all these conditions be met perfectly all the time, just that you get as close to them as you can. Seasonal variations in cellar temperature and humidity are inevitable.

You'll also want to take a look at Harvesting or Purchasing Produce (page 104) for advice on how to choose the best fruits and vegetables for long-term storage, and at Outdoor Root Cellaring (page 61) and Crop-Specific Storage Containers (page 93) for information on the different storage options mentioned in this guide.

How to Achieve Ideal Cellar Conditions

Cold and Very Moist

Avoid raising overall cellar humidity higher than 95%; otherwise, water may condense on interior surfaces.

To achieve temperatures this cold, an underground cellar must be protected by a high soil level on the exterior walls and high insulation values on exposed exterior wall surfaces, interior walls and the ceiling. Electric cooling assistance may also be necessary in warm climates (see Technology to Make Things Cold, page 72). To raise humidity levels this high, you may need to scatter damp burlap sacks or sprinkle water on the floor. You can also create high-humidity microclimates within sealed or semi-sealed containers (see page 98 and 99). The coldest, moistest conditions are found at floor level.

Cold and Moist

The same insulation levels and soil conditions discussed above will be required to achieve cold temperatures, but you will need less added water to maintain the lower humidity. In a cold, very moist cellar, a storage position just above floor level will provide these conditions.

Use an accurate hygrometer to guide humidity control.

Cool and Moist

Most well-constructed underground cellars offer these conditions year-round with little or no intervention. In a cold, very moist cellar, a storage position 3 to 4 feet (1 to 1.2 m) above the floor will provide these conditions. A small supplemental heat source, such as a shaded 40- or 60-watt incandescent light bulb, can be useful for maintaining these temperatures in regions with cold winters.

In the summer, increased ventilation helps increase humidity, but don't open the vents so much that the temperature of the cellar rises.

Cool and Dry

Locations in the top 25% of the cellar are the most likely to offer these conditions. In cold climates, a small supplemental heat source, such as a shaded 40- or 60-watt incandescent light bulb, can help keep temperatures this high during the winter. However, to achieve both higher temperatures and lower humidity, you may need to build a separate cellar area and use hydrated lime (see page 92) to reduce humidity in this area.

If you're using a light bulb to raise cellar temperatures, cover it with a metal bucket to prevent it from illuminating the cellar. Produce, especially potatoes, keeps better in complete darkness.

Warm and Dry

To achieve temperatures this high, a separate cellar area is almost certainly required, especially during cold seasons. You may need to use hydrated lime (see page 92) to reduce humidity in this area of the cellar. Alternatively, an area near the ceiling of an unheated basement often delivers these conditions in both summer and winter.

Cool It

With the exceptions of garlic, onions, potatoes, sweet potatoes and winter squash, which benefit from a period of drying out in warm temperatures (see Curing Vegetables for Storage on page 106), all produce needs to be cooled as quickly as possible after harvest for maximum storage life. The quality of leafy produce begins to decline noticeably after just 2 hours at 70°F (21°C), and even hard, tough produce is the worse for wear after a couple of days of room temperature storage. So get your produce into the cellar as quickly as possible. If you are storing large quantities of produce in big bins, consider using a fan to speed up the cooling process. It's not the temperature of the air that counts, but the temperature of the produce itself.

COLD / VERY MOIST	COLD / MOIST	COOL / MOIST	COOL / DRY	WARM / DRY
Cold and very moist 33°F to 40°F (0.5°C to 4.5°C) and 90% to 95% relative humidity	**Cold and moist** 33°F to 40°F (0.5°C to 4.5°C) and 80% to 90% relative humidity	**Cool and moist** 40°F to 50°F (4.5°C to 10°C) and 80% to 90% relative humidity	**Cool and dry** 40°F to 50°F (4.5°C to 10°C) and 60% to 70% relative humidity	**Warm and dry** 50°F to 60°F (10°C to 15.5°C) and 60% to 70% relative humidity

Optimal Storage Conditions

Apples

COLD / MOIST

Outdoor storage: straw-lined hole-in-the-ground cellar pit or garbage can cellar (for long-keeping varieties)
Indoor storage: portable bin, perforated plastic bags
Special instructions: store away from vegetables; wrap individually in dry newsprint to maximize cellar life
Storage life in cellar: 4 to 6 months

Asparagus

COLD / VERY MOIST

Indoor storage: tub of soil (roots only)
Special instructions: in the fall, replant large, mature roots in containers of soil; store in the root cellar, then bring to room temperature to force growth for winter harvest
Storage life in cellar: 3 to 5 months

Avocados

COOL / DRY

Indoor storage: on shelves or in shallow containers
Storage life in cellar: up to 10 days

To ripen avocados before use, place them in a paper bag with a ripe banana. To test for ripeness, gently squeeze the avocado; once ripe, it will yield slightly to the pressure.

Bananas

COOL / DRY

Indoor storage: on shelves or in shallow containers
Special instructions: store away from vegetables and ripe fruits
Storage life in cellar: up to 7 days

Beans, Green

COOL / MOIST

Indoor storage: salted in a ceramic crock (see page 105)
Storage life in cellar: 4 to 6 months

Beans, Shell

WARM / DRY

Indoor storage: hang plants until beans are hard and dry
Special instructions: once beans are completely dry through the center, separate from the husks by hand, then store in a jar in a dry location
Drying time in cellar: 1 to 2 weeks, depending on variety and conditions

Beets

COLD / VERY MOIST

Outdoor storage: organic blanket, trench silo, hole-in-the-ground cellar pit, garbage can cellar or root clamp
Indoor storage: portable bin, permanent bin, sand can or wooden box with lid
Special instructions: sort beets and store in groups according to size; use the smallest first, as they deteriorate more quickly
Storage life in cellar: 4 to 6 months

Beets that have gone soft during storage are still good to eat after they are boiled.

Belgian Endive

COOL / MOIST

Outdoor storage: organic blanket
Indoor storage: tub of soil (roots only)
Special instructions: in the fall, replant roots in containers of soil; store in the root cellar, then bring to temperatures above 50°F (10°C) to force leafy growth for winter harvest
Storage life in cellar: 4 to 6 months

Broccoli

COLD / VERY MOIST

Indoor storage: sealed plastic bags
Storage life in cellar: 1 to 2 weeks

Brussels Sprouts

COLD / VERY MOIST

Outdoor storage: organic blanket
Indoor storage: perforated plastic bags
Special instructions: leave sprouts on the stalk, if space allows
Storage life in cellar: 3 to 5 weeks

Cabbage

COLD / VERY MOIST

Outdoor storage: organic blanket
Indoor storage: individually on shelves or hanging by the roots
Special instructions: if stored in a basement cellar, lots of ventilation required to prevent odor from spreading to building above
Storage life in cellar: 4 to 6 months

The cellar is the perfect location for making sauerkraut (see recipe, page 236).

Carrots

COLD / VERY MOIST

Outdoor storage: organic blanket, trench silo, hole-in-the-ground cellar pit, garbage can cellar or root clamp
Indoor storage: portable bin, permanent bin, sand can or wooden box with lid
Special instructions: sort carrots and store in groups according to size; use the smallest first, as they deteriorate more quickly
Storage life in cellar: 4 to 6 months

Cauliflower

COLD / VERY MOIST

Indoor storage: individually on shelves, hanging by the roots or planted in tub of soil
Storage life in cellar: 2 to 4 weeks

Celery

COLD / VERY MOIST

Outdoor storage: trench silo
Indoor storage: planted in tub of soil
Storage life in cellar: 5 to 8 weeks

Celery Root (Celeriac)

COLD / VERY MOIST

Outdoor storage: hole-in-the-ground cellar pit
Indoor storage: portable bin, sand can or wooden box with lid or, in a very moist cellar, on open shelves
Storage life in cellar: 3 to 6 months

Chinese Cabbage

COLD / VERY MOIST

Indoor storage: planted in tub of soil
Storage life in cellar: 3 to 5 months

> Chinese cabbage does not emit the same pungent odor as common cabbage, but it has a shorter cellar life.

Cucumbers

COOL / MOIST

Indoor storage: individually on shelves
Storage life in cellar: 1 to 3 weeks

Eggplant

COLD / VERY MOIST

Indoor storage: individually on shelves
Storage life in cellar: 1 to 2 weeks

Fennel Bulb

COLD / MOIST

Indoor storage: portable bin, sand can or wooden box with lid
Storage life in cellar: up to 6 months

Figs (Fresh)

COLD / MOIST

Indoor storage: shallow baskets
Special instructions: figs have thin skin that requires gentle handling; store them in a single layer in baskets
Storage life in cellar: 5 to 7 days

Garlic

COOL / DRY

Indoor storage: portable bin, baskets or hanging from ceiling
Special instructions: cure before storing (see page 106)
Storage life in cellar: 2 to 3 months for hard-neck varieties; 4 to 5 months for soft-neck

Gingerroot

COOL / MOIST

Indoor storage: sand can, wooden box with lid or baskets
Storage life in cellar: up to 6 months

Grapefruit

COLD / MOIST

Indoor storage: portable bin
Storage life in cellar: 4 to 6 weeks

Grapes

COOL / MOIST

Indoor storage: hanging by individual bunches
Storage life in cellar: 4 to 6 weeks

Horseradish

COLD / VERY MOIST

Indoor storage: sand can or wooden box with lid
Storage life in cellar: 4 to 6 months

Jerusalem Artichokes

COLD
VERY MOIST

Outdoor storage: organic blanket
Indoor storage: portable bin
Storage life in cellar: 2 to 4 weeks

Jerusalem artichokes keep best in garden soil; once harvested, their thin skin makes them dry up and shrivel quickly. Dig them up as needed in early winter or spring.

Kale

COLD
VERY MOIST

Outdoor storage: organic blanket
Indoor storage: individually on shelves
Special instructions: leafy produce remains edible right out of the garden, even during hard winters, so best harvested as needed
Storage life in cellar: 5 to 10 days

Kohlrabi

COLD
VERY MOIST

Indoor storage: sand can, wooden box with lid or layered with straw in portable bin
Storage life in cellar: 3 to 4 months

Leeks

COLD
MOIST

Outdoor storage: organic blanket
Indoor storage: tub of soil
Special instructions: in the fall, transplant leeks into containers of soil; harvest throughout the winter, moistening the soil every 3 or 4 weeks
Storage life in cellar: 2 to 3 months

Lemons and Limes

Indoor storage: portable bin
Storage life in cellar: 1 to 3 weeks

Growing Mushrooms in Your Cellar

It has always been possible to grow your own mushrooms, but the current availability of mushroom kits makes it easier than ever. Many mushroom plants will produce abundantly in a section of your cellar that is 50°F to 60°F (10°C to 15.5°C) and 70% to 80% relative humidity, or in an unfinished basement area immediately outside the cellar. Light may be an issue, though. Shiitake mushrooms, for instance, require a daily cycle of light and dark; other species grow better if given a small amount of light.

Melons (Honeydew or Cantaloupe)

COLD
MOIST

Indoor storage: individually on shelves
Storage life in cellar: 1 to 2 weeks

Handle melons gently when you're placing them on shelves.

Onions

COOL
DRY

Indoor storage: portable bin or hanging from ceiling
Special instructions: cure before storing (see page 106)
Storage life in cellar: 4 to 6 months

Oranges

COLD
MOIST

Indoor storage: portable bin
Storage life in cellar: 4 to 6 weeks

Parsnips

COLD
VERY MOIST

Outdoor storage: organic blanket, trench silo, hole-in-the-ground cellar pit, garbage can cellar or root clamp
Indoor storage: portable bin, permanent bin, sand can or wooden box with lid
Special instructions: sort parsnips and store in groups according to size; use the smallest first, as they deteriorate more quickly
Storage life in cellar: 4 to 6 months

Pears

COLD
MOIST

Indoor storage: portable bin
Special instructions: store away from vegetables
Storage life in cellar: 2 to 3 months

About 3 days before you plan to use pears, bring them into a cool room to ripen fully. Pears ripen from the inside out, so test by squeezing gently; in a perfectly ripe pear, the flesh at the top of the neck should yield slightly to gentle pressure. If you let your pears ripen to the point where the widest part is soft on the outside, the inside is likely overripe and mushy.

Peas, Shell

WARM
DRY

Indoor storage: hang plants until peas are hard and dry
Special instructions: once peas are completely dry through the center, separate from the husks by hand, then store in a jar in a dry location
Drying time in cellar: 1 to 2 weeks, depending on variety and conditions

Peppers, Bell (Sweet)

COOL / MOIST

Indoor storage: shallow baskets
Special instructions: temperatures below 45°F (7°C) speed spoiling
Storage life in cellar: 1 to 3 weeks

Peppers, Hot

WARM / DRY

Indoor storage: hanging from ceiling (see page 100)
Storage life in cellar: 4 to 6 months once dry

Plums

COLD / VERY MOIST

Indoor storage: wooden box with lid
Special instructions: store in a single layer in a box no deeper than 4 inches (100 mm)
Storage life in cellar: 2 to 4 weeks

Potatoes

COLD / MOIST

Outdoor storage: trench silo, hole-in-the-ground cellar pit, garbage can cellar or root clamp
Indoor storage: portable bin, permanent bin, sand can, wooden box with lid or paper bag
Special instructions: store in complete darkness
Storage life in cellar: 4 to 6 months

Store potatoes at least 6 feet (1.8 m) away from apples to prevent premature sprouting.

Pumpkins

WARM / DRY

Indoor storage: individually on shelves or hanging in mesh bags
Storage life in cellar: 5 to 6 months

Quinces

COLD / MOIST

Indoor storage: portable bin
Storage life in cellar: 4 to 6 months

Radishes, Winter

COLD / VERY MOIST

Indoor storage: sand can or wooden box with lid
Storage life in cellar: 5 to 8 weeks

Winter radishes will shrivel unless they are packed in damp sand, sawdust or peat moss.

Rhubarb

COLD / MOIST

Indoor storage: tub of soil
Special instructions: see page 101 for instructions on how to store and force rhubarb
Storage life in cellar: 3 to 4 months

Rutabagas

COLD / VERY MOIST

Outdoor storage: organic blanket, trench silo, hole-in-the-ground cellar pit, garbage can cellar or root clamp
Indoor storage: sand can or wooden box with lid
Storage life in cellar: 5 to 6 months

Dipping rutabagas in melted food-grade wax greatly reduces moisture loss, thereby extending their storage life. Beeswax is the safest type to use.

Salsify

COLD / VERY MOIST

Outdoor storage: organic blanket
Indoor storage: sand can or wooden box with lid
Special instructions: sort roots and store in groups according to size; use the smallest first, as they deteriorate more quickly
Storage life in cellar: 3 to 5 months

Squash, Acorn

COOL / DRY

Indoor storage: portable bin or individually on shelves
Special instructions: do *not* cure before storing
Storage life in cellar: 2 to 4 months

Squash, Winter

WARM / DRY

Indoor storage: individually on shelves or hanging in mesh bags (or in portable bins if squash are small)
Special instructions: cure before storing (see page 106); leave space between each squash and its neighbor
Storage life in cellar: 4 to 6 months

Rubbing vegetable oil on the outside of pumpkins and squash extends their storage life.

Sweet Potatoes

WARM / DRY

Indoor storage: individually wrapped in paper and placed on shelves or in shallow crates
Special instructions: cure before storing (see page 106); temperatures below 50°F (10°C) promote rot; avoid handling before use — movement promotes decay
Storage life in cellar: 2 to 3 months

Tomatoes, Green

WARM / DRY

Indoor storage: hang vines from ceiling
Cellar ripening season: 20 to 30 days

Green tomatoes should be kept at temperatures above 55°F (13°C); lower temperatures destroy the enzymes necessary for them to ripen properly. Once tomatoes are ripe, a storage temperature of 40°F (5°C) is ideal.

Tomatoes, Ripe

COOL / DRY

Indoor storage: individually on shelves
Storage life in cellar: 5 to 10 days

Turnips

COLD / VERY MOIST

Outdoor storage: organic blanket, trench silo, hole-in-the-ground cellar pit, garbage can cellar or root clamp
Indoor storage: portable bin, sand can or wooden box with lid
Storage life in cellar: 4 to 5 months

Zucchini

COOL / MOIST

Indoor storage: portable bin or individually on shelves
Storage life in cellar: 1 to 2 weeks for small zucchini; up to 3 months for large zucchini

Storing Nuts in the Root Cellar

Fresh nuts in the shell must be dried before storage. Spread them out in a single layer on mesh trays or newspaper-lined shelf racks, with as much space between nuts as possible. Leave them in a dry, well-ventilated spot (such as shelves in an attic, a warm, dry shed or any dry room) for 3 to 6 weeks. To check for dryness, shake the nuts near your ear — you should hear the nut meat rattling inside the shell. Crack a few shells open and break the nuts to make sure they are dry throughout. If nuts aren't completely dry before storage, they will mold, and any moldy nuts must be discarded. Transfer dry nuts to a jar with several holes poked in the lid for ventilation. Store in a cool, dry area of the cellar for up to 1 year.

Pest Contol

While it's true that money makes most of the human world go around, food is the universal currency of the animal kingdom. Creatures everywhere spend most of their time seeking out food and eating it, and a root cellar will certainly attract the attention of rodents and insects if you let it. The key to keeping pests at bay begins with an understanding of which creatures are likely to be interested in your cellar and how to design and manage your installation so pests are a non-issue.

People are sometimes reluctant to make a root cellar part of their home because they fear an invasion of pests, but in reality pests are rarely a big problem in cellars, especially those that have been built tightly and are managed well.

Rodents

You're not the only one who likes cellared foods. Rodents do too, and they have an uncanny ability to get what they want. No matter where you live and where you have your root cellar, rodents will test the integrity of your installation. They can crawl through tiny gaps and chew small spaces to make them wider, and if they do get into your cellar, they'll leave behind chewed food and droppings that will take all the appeal out of cellaring.

Traditional cellar structures offered virtually no impediment to rodents. Sharing food with them was part of the deal in years gone by. These days, we're pickier about such things, and we can afford to be because we have building materials and strategies that make rodent infiltration much less likely.

The first step is to do everything you can when building your cellar to make it rodent-proof. They may be sneaky, but rodents aren't ghosts. They can't pass through walls. Gap-free construction is what it's all about, especially around the door. Fortunately, energy-efficient construction techniques also yield rodent-resistant results. The weatherstripping and sweep on an insulated steel door, for instance, keep mice out. SIP construction and spray foam insulation strategies virtually eliminate the risk of rodents getting in through walls or ceilings.

There's no way to prevent mice from snacking on produce stored in a root clamp or an unlined root pit, but rodent prevention measures are definitely worth the effort for any kind of structure-based cellar you're building from scratch.

Hantavirus Facts

Rodents in various parts of the world are carriers for hantaviruses. Fortunately, although these viruses can be transmitted directly to humans, hantavirus infections in people are rare. Humans contract the disease by inhaling microscopic particles from rodent droppings and urine, and its symptoms include fever, aches, cough and headache. If you find rodent droppings, you can remove them safely by airing out the space for 30 minutes, soaking the droppings with a solution of 1 part bleach to 9 parts water for 5 minutes, then picking them up with paper towels, using gloved hands. Mop down the area with the bleach solution, then allow it to dry before closing the room again.