



## STORING WINTER SQUASH AND PUMPKINS

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Harvested squash and pumpkins are still very much alive even though they are mature and have been removed from the vine. The objective of curing and storing is to prolong the storage life of the fruit by (1) slowing the rate of respiration and (2) protecting against storage rots.

Respiration rate of fruit is most effectively controlled by lowering the temperature. For each 10°C (18°F) reduction in fruit temperature, the respiration rate is reduced by approximately one-half. Chilling injury can occur, however, to some fruits at temperatures below 50°F.

Even though relative humidity (air relatively high level (70 to 75%) is needed to protect against excess shriveling. Relative humidity greater than 85% can enhance disease development.

**When to Harvest** - Immature squash and pumpkins do not store well; therefore be sure that fruit is mature before harvesting. Mature butternut, acorn and hubbard type squash have very hard skins that cannot be punctured with your thumb nail. Additionally, as squash mature, the fresh, bright, juvenile surface sheen changes to a dull, dry-appearing surface. Most true pumpkins have softer skin than those mentioned above, but will exhibit the same surface appearance alterations.

Dead vines do not necessarily indicate the squash and pumpkins on the vines are mature. When vines die pre-maturely from disease, stress or early frost, fruits are usually immature, of low quality, and

will not store as successfully as those grown on healthy vines which die naturally.

**Guard Against Injury** - Whether in a home, garden or commercial planting, special care should be exercised to protect harvested fruit from excessively high (>95 °F) and cold (<50 °F) temperatures, asphyxiation, and mechanical injuries such as scratches, cuts or bruises. Not only are mechanical injuries unsightly, they also provide an easy entrance for various rot-producing organisms. Packing lines and all conveyances should be padded with old carpeting, foam rubber or similar shock-absorbing material. Ideally, large fruit, like pumpkins, should not be stacked on top of each other. Padding material, such as grain straw, should be used liberally if fruits have to be stacked during harvest. If they must be stacked for shipping, they should never be more than three fruit deep.

**Curing and Storage** - Storage facilities should be equipped with accurate temperature and humidity controls, and a system to provide at least one air exchange per day. A fan to provide air circulation is also recommended to maintain uniform temperature and humidity throughout the storage room. There is limited information on the value of a curing period. Except for Acorn types, which lose their quality during curing, experience tends to support a 10 day curing period with 80 to 85°F and a relative humidity of 80 to 85 percent. After the curing period, maintain temperatures as indicated in the table.

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## Recommended optimum storage conditions for pumpkins and winter squashes.

Type	Relative Humidity	Temperature Conditions	Approx. Length of Storage	Remarks
Pumpkins	50-75 %	50-55°F	2-3 months	Fruit should be mature. Don't store with apples.
Hubbards	70-75 %	50-55°F	5-6 months	Stores well.
Acorn	50-75 %	50°F	5-8 weeks	At temperatures above 55°F surface becomes yellow and flesh becomes stringy.
Butternut or Buttercups	50-75 %	50°F	2-3 months	Degree of maturity not as important as for other types.

When winter squash are removed from storage they should be marketed or consumed immediately as rot can develop quickly. Black rot, dry rot and bacterial soft rot are the principal causes of spoilage in stored winter squash.

**Postharvest Diseases** - Winter squash and pumpkins have hard 'skins' and firm starchy rinds that may rot while still on the vine, after harvest, or in storage. In North Carolina these rots are typically caused by fungi such as *Fusarium*, *Alternaria*, *Pythium*, anthracnose (*Colletotrichum*) and gummy stem blight (*Mycosphaerella*) fungi. On occasion, other fungi and soft rot bacteria (e.g. *Erwinia caratovora*) may cause rots, especially during hot, wet weather. Infection of fruit usually originates from injuries on mature fruit after harvest. The following summarizes key considerations for reducing fruit rot.

### Steps to Minimize Squash and Pumpkin Rots

- Maintain a good fungicide and insecticide spray program during the growing season to minimize foliar diseases (leaf spots and blights and insect problems).
- Avoid blossom-end rot of fruit by fertilizing and liming fields according to recommendations from soil test reports and by irrigating when needed.
- Avoid injuring fruit while on the vine.
- Harvest fruits when they are mature and the rind is hard, but before night temperatures are below 40° F and well before a frost or a hard freeze.
- Do not harvest or handle wet fruit. Do not let harvested fruit get wet.
- Harvest fruit by cutting the peduncle (stem) with pruning shears to leave a 3 to 4 inch handle for pumpkins and about a 1 inch stump for squash.
- HARVEST, PACK, HANDLE, AND STORE FRUIT CAREFULLY TO AVOID INJURIES.**
- Discard all fruit that are immature, injured, or have rot or blemishes. These fruit should not be harvested or stored.
- Do not pick up freshly harvested fruit by the peduncle because it may separate from the fruit and provide easy access for rot organisms.
- Do not stack the fruit higher than 3 ft.
- Do not permit harvested or stored fruit to get wet.
- Washing is usually not desirable, but if washing is necessary, be sure the water is chlorinated (at least 50 ppm, approximately one part 5.25% liquid bleach to 999 parts water). Prepare fresh wash solution when the water becomes cloudy and chlorine cannot be detected. Dry thoroughly.
- For better keeping, some growers cure pumpkins for 10 to 20 days at 80 to 85°F with good ventilation (e.g. four air exchanges per day).
- Harvested fruit should be stored with good ventilation (at least one air exchange per day) at 50 to 55°F and 50 to 75% relative humidity. Standard refrigeration temperatures (35 to 45°F) may cause chilling injuries and shorten shelf life. Storage at high temperature may result in excessive loss of weight, color and culinary qualities while high humidities may promote rots.
- Storage life is typically 2 to 3 months without significant loss in quality.