



Fig tree

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Australian butter squash

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Production and Marketing of Specialty or Novel Vegetables

Specialty or novel vegetables

- are available either part of the year or not at all,
- tend to have limited shelf life as a fresh product and will not ship long distances,
- are grown in limited acreage or volume, and
- require greater marketing efforts.

If you intend to produce specialty vegetables, identify the market channels early in the adoption process and test the market to determine customer preferences prior to ramping up production of a specific specialty vegetable. Encouraging product acceptance may require special promotions.

Specialty crops are more labor intensive and have higher costs of production than most mainstream vegetable crops. Because producing specialty vegetables requires more intensive management and marketing,

all successful enterprises have succeeded based on three very important points: (1) researching the production of the crop; (2) researching the market potential and places; and (3) diversifying their crop production to spread out the economic risk. Since specialty vegetable growers do not produce their specialty crops in large volumes, consider selling your specialty vegetable to the consumer in small containers so they will feel comfortable paying a higher per-unit cost for specialty versus conventional vegetables. For roadside and farm markets, display your specialty vegetables on a stand with recipes and how to prepare them. When initially introducing a specialty or novel vegetable to your stand, if appropriate, offer free samples to your customers. The following descriptions of specialty or novel vegetables fit well in the current state and national promotion for vegetables, *Buy Local, Buy Fresh*.

PENNSSTATE



College of Agricultural Sciences
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Bitter melon plant



Bitter melon



Fig tree

Bitter Melon (*Momordica charantia*)

Bitter melon is a member of the Cucurbitaceae (gourd) family and is therefore a relative of squash, watermelon, muskmelon, and cucumber. In the United States varieties are listed as bitter melon, balsam pear, or fu kwa. Breeding programs and variety development for bitter melon have been confined to India, southern China, and other Asian countries. Many cultivars are available and vary in fruit size, shape, color, quality, earliness, yield, and disease resistance, but little is known about their comparative performance in this country. Serious growers of bitter melon should evaluate the varieties available from foreign seed companies and domestic suppliers of oriental vegetable seed to determine which types are best adapted to their specific local environment.

Bitter melon grows extremely well on raised beds with black plastic mulch and drip irrigation tape. The plant is a fast-growing, trailing or climbing vine with thin stems and tendrils. Male and female flowers are borne separately on the same plant and require insects for pollination. Flowers are borne singly in the leaf axils. Male flowers appear first and usually exceed the number of female flowers by about 25 to 1. The flower opens at sunrise and remains open for only 1 day. The fruits are characterized by a pebbly surface of smooth warts and smooth, lengthwise ridges. Harvest fruits 8–10 days after flower opening, while they are still firm and light green. The fruits will be 6–8 inches long, have a diameter of 1.5–2.5 inches, and weigh 4–6 ounces. Immature fruits are light green, oblong, pointed at the blossom end, and have white flesh. As the fruit begins to mature, the surface gradually turns yellow or orange. At maturity, it tends to split open, revealing orange flesh and a bright red placenta to which the seeds are attached. The immature fruits are a good source of vitamin C and provide some

vitamin A, phosphorus, and iron. This subtropical vegetable is claimed to help people with type 2 diabetes control their blood sugar. The bitter flavor in the fruit is due to the alkaloid morodicine, which can be reduced somewhat by parboiling or soaking in salt water. Immature fruits are least bitter; ripe fruits are extremely bitter and are reported to be toxic to people and animals.

Marketing tip: Display the bitter melons with recipes and some nutritional information. Approximate storage life is 2–3 weeks. Handle and package with care to avoid bruises and abrasions.

Figs (*Ficus carica*)

Figs can be successfully grown in high tunnels in Pennsylvania and surrounding states from late April through October. Figs can be eaten fresh, dried, and processed. The fruit do have a short shelf life of 3–5 days. The recommended figs do not need pollination. The fruit is a hollow receptacle with hundreds of small, fleshy flowers on the inside. Several fig varieties can be grown in 3- to 5-gallon containers to help maintain plant size. Since subtropical fig trees grown outside in the soil can reach a height of 15–30 feet, figs grown in pots are maintained as bushes that are 5–6 feet high by 3–5 feet wide. Figs have a shallow root system and develop quite well in 3- to 5-gallon plastic containers in a shallow tank of water and nutrients. They tolerate a pH range of 5.5–7.5.

Rootstocks are propagated from cuttings, and both one- and three-year-old cuttings can be purchased from nurseries. Generally, one-year-old fig cuttings will produce in two years, whereas three-year-old cuttings will produce figs in the same year they are purchased. Several varieties do well in the Mid-Atlantic region and are recommended for trial.

The Brown Turkey fig has small to medium-sized, bell-shaped fruit with bronze-colored skin and amber to pink flesh. Brown Turkey also has good cold tolerance.



Figs

The Celeste fig has small fruit with strawberry-brown-colored skin, strawberry flesh, and is the sweetest of all the figs. Celeste also has good cold tolerance.

Everbearing varieties produce fruit during six months of the year. The Italian Everbearing fig is similar to the Brown Turkey but larger. The Italian Everbearing is a large, reddish brown fig with pink, sweet flesh. It is a very prolific bearer and will set a new crop after the previous one. However, it will handle moderately cold winters if provided warm summers. The Italian Everbearing fig tree grows primarily as a large bush. If figs are grown in pots, be sure to protect the roots so that they are not exposed to below-freezing temperatures. One suggestion is to place the fig trees in cool storage (45°F) during winter months.

Marketing tips: Sell fresh figs at a farm market or provide a pick-your-own opportunity in a high tunnel for kids and adults. Since figs have been traced back to at least 5,000 B.C., use their historical value to promote sales.



Ginger plant

Ginger

(*Zingiber officinale* Roscoe)

Edible ginger is a tropical crop that optimally requires a 10-month growing season in Hawaii to produce mature ginger rhizomes. A shorter growing season results in reduced yields and rhizome size. Baby ginger or young ginger results from early harvesting and is a gourmet quality product with a tender, low-fiber texture and is mostly used for pickling. Although ginger is typically grown in field culture, other growing methods include a clean seed production method in containers of sterile medium, various hydroponic methods, and aeroponic cultivation. Both fresh and prepared ginger have medicinal uses.

Plant ginger rhizome “seed pieces” (50 grams) in 3- to 5-gallon pots in April. Ginger seed pieces can be purchased from Bernie Kratky at 1kratky@gmail.com or 808-969-8216 or Beau-



Ginger root

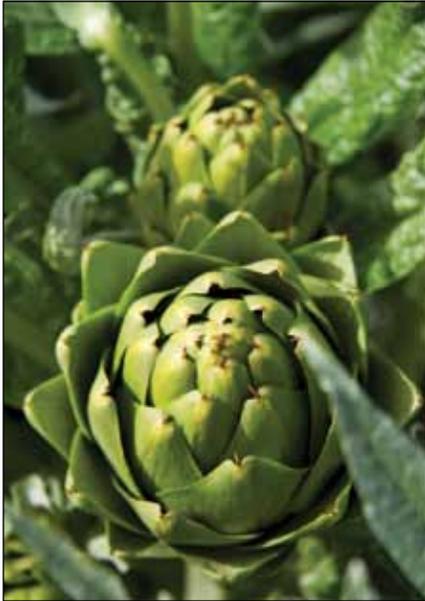
mont Agricultural Research Center, 875 Komohana, Hilo, HI 96720. The 50-gram ginger pieces sell for \$1.25 each plus priority mail postage.

Plant ginger in a soilless growing medium in a heated greenhouse at about April 1 in Pennsylvania, and transfer the sprouted plants to the growing tanks or beds in an unheated high tunnel from about May 15 to May 30. Place the pots in a 4-foot-wide tank that is 6–12 inches deep so that there are two rows of ginger, 24–30 inches apart, with 12 inches between pot centers within rows. The tank should contain about 2–3 inches of water. Add equal amounts of two stock nutrient solutions so that the salt reading is about 1.5–2.0 mS. One nutrient stock solution consists of 1 pound of soluble greenhouse-grade calcium nitrate per gallon of water, and the other stock solution consists of a mixture of 10.0 ounces of magnesium sulfate and 1.0 pound of Hydro-gardens Chem-Gro 8-15-36 per gallon of water. The Chem-Gro 8-15-36 formulation also contains micronutrients. Monitor water and fertility levels on a weekly basis.

Ginger should be ready to harvest in October. Harvest ginger by removing the foliage 1 inch above the surface of the growing medium and empty the pots in a large, plastic tray. Wash and move the rhizomes into a greenhouse to air-dry by placing a single layer of rhizomes on screened racks covered with a polypropylene row cover to prevent sunburning. After 4 days the ginger should be ready for market or storage as seed for next year’s crop.

Ginger can produce a salable crop in a high tunnel in a temperate location, but the yields are lower than those harvested in Hawaii. Starting the ginger seed pieces in a heated greenhouse in April increases the growing season and should greatly increase the yield potential of ginger in Pennsylvania. Certainly, baby ginger is a candidate as a specialty crop for high tunnels.

Marketing tip: Sell fresh ginger at farm markets, restaurants, or for CSA customers. Harvest some ginger in September to market baby ginger.



Artichoke plant



Artichoke



Novelty winter squash

Globe Artichoke (*Cynara scolymus* L.)

Globe artichokes are perennial, frost-sensitive, thistle-like plants with edible flower buds. The plants are 4–5 feet tall with silvery green leaves and spread outward 5–6 feet. The flower buds arise on the terminal portion of the main stem and on lateral stems. Each unopened flower bud resembles a deep green pine cone, 3–4 inches in diameter, round, but slightly elongated. Several pointed, leathery green bracts fold around a purple blue flower. The base of each bract is the fleshy, edible portion, along with the fleshy center of the artichoke on which the flower and bracts are borne. Buds that are left on the plant will open to 6-inch, purple blue flowers, which can be dried and used in floral arrangements. Start seeds of the Green Globe variety in the greenhouse for 8–10 weeks before transplanting them into high tunnels. Space transplants at least 3 feet apart in the row and allow 4–6 feet between rows. An artichoke is ready for harvest when it has reached maximum size, but before the bracts open. Cut the top one first and then the secondary ones as they mature. Store at low temperatures (near 32°F) and high humidity (95 percent relative humidity). In addition to minerals and vitamins, artichokes contain about 3 percent protein and 0.2 percent fat.

Marketing tip: Sell fresh artichokes at farm markets or for CSA (community-supported agriculture) customers.

Novelty Winter Squash (*Cucurbitaceae* Family)

Winter squash are highly nutritious and are an excellent source of vitamins A and C, potassium, and dietary fiber. In addition, the hard-shelled fruit harvested from the various types of winter

squash will store for up to 6 months if properly cured after harvest. Optimum temperatures for active growth of winter squash are 80–90°F during the day and 60–65°F at night.

Winter squash can be grown on bare soil, but it benefits dramatically when grown in a plasticulture system—on raised beds with black plastic mulch and drip irrigation tape placed beneath the soil surface. In addition, applying row covers in the field after seeding or transplanting the various winter squash types will not only maintain a warmer air temperature around the plants but also prevents insects, especially cucumber beetles, from feeding on the young plants. To ensure optimum pollination, take the row cover off the squash crop when the female flowers appear. Quantity and quality of winter squash improve when grown on the plasticulture system because of the increase in soil temperature and moisture in the raised beds and higher night-time air temperatures around the young plants. All squash types can be established by seed or transplants. Use of transplants ensures a higher plant population with no plant mortality from seed corn maggot. Determine spacing of winter squash by size of plant, with bush-type plants spaced 3 feet apart in the row and 5 or 6 feet between rows. Space varieties that produce large vines (vining types) 3–4 feet apart in the row and allow 7 feet between rows. Specific novel winter squash types recommended for the Mid-Atlantic region include the neck pumpkin, Gingko (acorn type), and Australian Butter (buttercup type).

The neck pumpkin, *Cucurbita moschata*, has a 120-day maturity. The plant produces good yields of 24- to 30-inch-long butternut-type squash that weigh 20–40 pounds. The squash has sweet-tasting, orange flesh and is used for pies, processing, and fresh market. This winter squash type is excellent for retail and farm market growers. Neck pumpkin does not have as dry a flesh as butternut squash.



Pumpkin field

Gingko (*Cucurbita pepo*) also has a 120-day maturity. This slightly flat, round squash with slight ribs has yellow green skin and orange flesh. Gingko has strong virus and disease tolerance as well as heat tolerance. Gingko produces high yields of high-quality fruit with good storage potential. It can also be used for rootstock when grafting with other cucurbits. This winter squash type is excellent for retail and farm market growers.

Australian Butter (*Cucurbita maxima*) has a 90- to 100-day maturity. This round, flattened squash with peach/buff-colored skin is sweet and dense with a dry, orange flesh. This old Australian variety is a great keeper, has a very small seed cavity, and a silky smooth quality after roasting or baking.

Marketing tip: After harvest, cure all winter squash fruit that will be stored for 2–5 months at 80–85°F with a relative humidity between 75 and 80 percent for 10 days. After curing, store the squash at 50–55°F and 50–75 percent relative humidity. Squash to be sold within the first 2–4 weeks after harvest will not have to be cured.



Pepper plant

Specialty Peppers (*Capsicum* spp.)

Both sweet and hot peppers are highly nutritious and are an excellent source of vitamins A, C, and K, potassium, manganese, and dietary fiber. Peppers in general are warm-season crops that do well when day temperatures are 80–90°F and night temperatures 60–65°F. When night temperatures fall below 45°F pepper plants will shut down. Colder temperatures between 32 and 40°F can result in frost injury and/or plant mortality. Peppers can be grown on bare soil, but they benefit dramatically when grown using a plasticulture system—on raised beds with black plastic mulch and drip irrigation tape placed beneath the soil surface. Quantity and quality of peppers improve when grown on the plasticulture



Specialty peppers

system because of the increase in soil temperature and moisture in the raised beds and higher night-time air temperatures around the young plants.

All pepper varieties are established from transplants in the Mid-Atlantic region. Depending on the type and size of pepper plant, transplant either single or double rows on the raised beds. Place single rows 12–18 inches apart and 14–18 inches between double rows. Beds are 5–6 feet apart. Specific novel pepper types recommended for the Mid-Atlantic region include Ukraine, Pimento, and Zavory.

Ukraine peppers have a 70- to 75-day maturity. The plants are medium to large with a good canopy and high yield potential. Fruit are cone shaped and light green at immature stage and red, orange, tangerine, or yellow at mature stage. The peppers have a very unique and pleasant taste at immature stage.

Pimento peppers also have a 70- to 75-day maturity and medium to large plants with a good canopy. Fruit are flat round in shape with thick walls. Immature fruit are dark green in color and mature fruit are dark red, orange, or yellow. Plants have high yield potential, especially mature red fruit, with good shelf life.

Zavory peppers have a 90-day maturity. The plants are large and wide with an excellent canopy. Flavor is excellent with just a hint of heat. Fruit are 2.25 by 1.75 inches, with light green fruit turning red at maturity. This variety is subtropical and loves heat, so it must be grown on raised beds with plastic mulch from transplants.

Marketing tip: Display the Ukraine, Pimento, and Zavory peppers with recipes and some nutritional information.



Watercress bed



Watercress plant

Watercress (*Nasturtium officinale*)

Watercress is a hardy, perennial, European herb that grows naturally in wet soil and brooks, ditches, and pond margins and is cultivated under such conditions for use as a garnish and a piquant salad. It must be harvested before flower buds appear or the leaves become too rank in flavor to be edible. The smooth compound leaves have three to a dozen nearly round 1-inch-wide leaflets. Leaves and stems are partially submerged during growth. European immigrants brought watercress to United States, and it now grows wild in running water and flooded places all over the country. Commercially, it is grown in unshaded shallow pools of flowing, clean water.

Most watercress is vegetatively propagated and grown in flooded soil beds. Upland watercress is also vegetatively propagated. Propagating watercress from seed allows growers to use the proven hydroponic lettuce production system. However, watercress seeds are very tiny (over 2 million seeds per pound) and very difficult to plant with conventional seeders. To overcome this problem, suspend germinated watercress in a gel (gel seeding) and extrude it like toothpaste into net pots of peat-perlite growing medium held by 0.75-inch-thick Styrofoam boards floating in a tank of nutrient solution that is 4 feet wide by 12 inches deep by 16 feet long. Growers have also been successful using a salt-shaker type of seeder. Aim to plant 10 to 20 seeds per net pot.

Generally, at least 95 percent of the net pots germinate watercress seedlings within 7 days of seeding. At planting or transplanting time, immerse the lower portion of the net pots in nutrient solution, thus automatically watering the plants by capillary wetting of the growing medium in the net pots. Add equal amounts of two stock nutrient solutions prior to transplanting the watercress so that the EC (electrical

conductivity) of the nutrient solution in the tanks is between 1.5 and 2.0 mS. One nutrient stock solution consists of 1.0 pound of soluble greenhouse-grade calcium nitrate per gallon of water, and the other stock solution consists of a mixture of 10.0 ounces of magnesium sulfate and 1.0 pound of 8-15-36 per gallon of water. The 8-15-36 formula also contains micronutrients. Cover the watercress plants with either a polypropylene cover or a porous, aluminized blanket to help maintain a cooler air temperature for development. In a demonstration tank in the Penn State high tunnel complex 144 plants produced 30 pounds of marketable watercress. Quality was excellent and a more than two-week postharvest life was recorded when the watercress was sprayed with water and immediately refrigerated after harvesting.

Marketing tip: Package watercress in small containers and cool (40–45°F) immediately after harvest to maintain freshness and quality.



Ginger plant

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Specialty peppers

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