AGRICULTURAL ALTERNATIVES

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Pumpkin Production

Pumpkins are a crop that lend themselves well to small-scale and part-time farming operations. Many marketing opportunities are available for small-scale growers.

Pumpkins are a member of the cucurbitaceae family, which also includes squash, cantaloupes, cucumbers, watermelons, and gourds. Individual plants produce both male and female flowers. Fruit shape, size, and appearance (smooth or ribbed) vary, ranging from small (less than 5 pounds) to medium (12–24 pounds), and large (typically 40–60 pounds).

Pumpkins originated in America. Fragments of stems, seeds, and fruits have been identified and recovered from cliff dweller ruins in the southwestern United States. Some pumpkin varieties may have originated in Mexico and Central America, while others probably developed in Peru, Colombia, and Ecuador. Some of these pumpkin and squash varieties probably have been cultivated as long as maize (corn), since around 3500 B.C.

Pumpkins are seen as a profitable opportunity by many farmers. Because of this, pumpkin acreage has expanded greatly in recent years and competition in the pumpkin market is increasing. Around 1.5 billion pounds of pumpkins are produced on 75,000 acres in the United States annually. Pumpkin acreage expanded by almost 18 percent nationally between 1992 and 1997, with a similar increase in acreage in Pennsylvania. Many neighboring states (including New York, Ohio, New Jersey, and Michigan) have also expanded their acreage. According to the 1997 Census of Agriculture, the top ten states in pumpkin acreage are

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Illinois, New York, California, Pennsylvania, Michigan, Ohio, New Jersey, Texas, New Mexico, and Wisconsin. Data on production value is sketchy, but it likely exceeds $150 million annually in the United States. In the late 1990s, Pennsylvania farmers produced an average of 95 million pounds of pumpkins on 4,800 acres, generating approximately $9.5 million in gross receipts annually.

Marketing

Pumpkins are grown in most Pennsylvania counties, but production tends to be concentrated near population centers. Most pumpkins are sold in local markets or directly to consumers primarily for ornamental purposes, especially during the Halloween season. Depending on the cultivar grown, pumpkins are available from late August through October (recommended cultivars are listed in Table 1).

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Five basic marketing alternatives are available to the pumpkin grower: wholesale markets, cooperatives, local retailers (grocery stores), roadside stands, and pick-your-own operations. Some farm stands and "U-Pick" operations have developed value-added activities such as hay rides and pumpkin festivals to boost sales. When pumpkins are shipped to the wholesale market, they are shipped in bulk bins or stacked loose in trailers.

In wholesale marketing, either you or a shipper can take your crop to the market. Shippers generally sell and transport pumpkins for a predetermined price. Wholesale marketing is subject to the most price fluctuations. Marketing cooperatives generally use a daily pooled cost and price, which spreads price fluctuations over all participating producers. Local retailers are another possible market, but you must take the time to contact produce managers and provide high-quality pumpkins when stores require them. Roadside stands (either your own or another grower's) and pick-your-own operations provide opportunities to receive higher than wholesale prices for your pumpkins, but you may have some additional expenses for advertising, building and maintaining a facility, and providing service to your customers. With pick-your-own operations, you save on harvest costs, but you must also be willing to accept some waste. Depending on your location, processors may or may not be a marketing option. Processors are less likely to contract with small-acreage growers. For more information on marketing, consult *Agricultural Alternatives: Fruit and Vegetable Marketing for Small-scale and Part-time Growers.*

Table 1. Recommended pumpkin cultivars for Pennsylvania.

Variety	Days to maturity	Fruit size (lb)
Spooktacular[a]	85	3–5
Merlin (PMT)	95	12–18
Magic Lantern (PMT)	95	12–16
Casper (white fruit)	90	10–20
Jack-B-Little (small, orange fruit)	95	0.25
Spirit[a]	98	10–12
Baby Boo (PVP, small, white fruit)	100	0.25
Baby Pam (excellent for pies)	100	3–5
Howden	100	15–24
Small Sugar	100	5–6
Baby Bear (PVP, some disease resistance)	105	1–3
Thomas Halloween	110	15–30
Gold Fever	90	17
Gold Rush (PVP)	120	20–35
Prizewinner[a] (PVP)	120	50–200

[a]hybrid variety, powdery.

PVP—plant variety protection.

PMT—powdery mildew tolerant.

Production Considerations

Pumpkins grow best on soils that hold water well and have good air and water filtration. If you grow pumpkins on sandy soil, irrigation is important to ensure optimum plant growth, uniform fruit set, and robust development. Soil should have a pH of 5.8 to 6.6. Pumpkins require a constant supply of moisture during the growing season. Water deficiency or stress, especially during the blossom-fruit set period, can reduce fruit size or cause blossoms and fruits to drop, resulting in reduced yields. For more information on crop irrigation, consult *Agricultural Alternatives: Irrigation for Fruit and Vegetable Production.*

Pumpkins also are sensitive to cold temperatures and plants can be injured by even a slight frost. The best average temperature range during the growing season is between 65° and 95°F; temperatures above 95°F or below 50°F will slow the growth and maturation of the crop.

Planting and Fertilization

Because they are a warm season crop, pumpkins generally are seeded in the field in early July when soil temperatures 3 inches beneath the soil surface reach 60°F. Pumpkins also can produce a sizable yield when planted without tilling into a harvested grain field.

Growers usually plant as seed approximately 1,600 to 2,800 plants per acre in single rows 6 to 8 feet apart with 30 to 40 inches between plants in the row, depending on the plant type. Fertilizer rates should be based on annual soil test results. Fertilizer can be applied during the growing season when using drip irrigation. N-P-K rates for irrigated pumpkins are 40-50-50 pounds per acre banded at transplanting and 40-50-50 pounds per acre injected through the irrigation system; applying no more than 5 to 7 lbs nitrogen per application.

Pollination

Honeybees are important for complete pollination and fruit set. One hive per acre is recommended for maximum fruit production. Insecticides applied to flowers or weeds in bloom can adversely affect pollinating insect populations, especially honeybees.

Pest Control

Weed control can be achieved with herbicides and a good crop-rotation system. Several preplant and postemergence herbicides are available for pumpkins, depending on the specific weed problem and pumpkin growth stage. If infestation levels are mild, early cultivation (prior to vine running) can help minimize weed problems.

Insects can be a major problem in pumpkin production. Cucumber beetle, aphids, squash vine borer, seed corn maggot, leafminers, and rindworms (cucumber beetle larvae) all can cause crop losses. Monitoring insect populations with traps or by scouting will help you determine when you should use pesticides and how often you should spray.

Several pumpkin diseases can cause crop losses, including bacterial wilt and viruses such as powdery mildew, downy mildew, and scab. These diseases can be controlled by using disease-resistant varieties and by having a good crop-rotation system and soils with good air and water infiltration rates.

Harvest and Storage

Pumpkins are hand harvested at their mature stage. Because individual fruits are pollinated at different times, multiple harvests are quite common. After harvest, growers should check the pumpkins for size, color, and defects to ensure marketing a high-quality product.

Storing pumpkins in a dry, cool, well-ventilated area extends the shelf life of the crop and helps keep the fruit from appearing shrunken. Pumpkins will retain good quality for approximately two to three months if stored at 50 to 70 percent humidity and 50 to 55°F.

Sample Budget

Included in this publication is an annual production budget for irrigated pumpkins. This budget utilizes custom hire for most of the field work, which could be more economical for small-acreage growers. Producers who own equipment should substitute equipment costs for custom-hire costs. This budget summarizes the receipts, costs, and net returns of a pumpkin enterprise. The sample budget should help ensure that all costs and receipts are included in your calculations. Costs and returns are often difficult to estimate in budget preparation because they are numerous and variable. Therefore, you should think of this budget as an approximation and make appropriate adjustments in the "Your Estimate" column to reflect your specific production and resource situation. More information on the use of crop budgets can be found in *Agricultural Alternatives: Enterprise Budget Analysis.*

Prepared by Michael D. Orzolek, professor of horticulture; George L. Greaser, senior research associate in agricultural economics; and Jayson K. Harper, associate professor of agricultural economics.

Initial resource requirements for irrigated pumpkins

- Land: 1 acre
- Labor: 19 hours per acre
- Harvesting costs: $300 per acre
- Capital: $3,000 per acre
- Depreciation on equipment: $300 per acre

For More Information

Brewer, T., J. Harper, and G. Greaser. *Agricultural Alternatives: Fruit and Vegetable Marketing for Small-scale and Part-time Growers.* University Park, Pa.: Penn State Cooperative Extension, 1994.

Greaser, G. and J. Harper. *Agricultural Alternatives: Enterprise Budget Analysis.* University Park, Pa.: Penn State Cooperative Extension, 1994.

Hardenburg, R. E., A. E. Watada, and C. Y. Wang. "The Commercial Storage of Fruits and Nursery Stocks." *Agricultural Handbook Number 66* (USDA-ARS). Washington, D.C.: Superintendent of Documents, Government Printing Office, 1986.

Jarrett, A. R., B. L. Goulart, G. L. Greaser, and J. K. Harper. *Agricultural Alternatives: Irrigation for Fruit and Vegetable Production.* University Park, Pa.: Penn State Cooperative Extension, 1995

Lorenz, O. A. and D. M. Maynard. *Knott's Handbook for Vegetable Growers*. New York, N.Y.: John Wiley & Sons, Inc., 1988.

MacNab, A. A., A. E. Sherf, and J. K. Springer. *Identifying Diseases of Vegetables* (AGRS-21). Penn State College of Agricultural Sciences, 1994.

Pennsylvania Commercial Vegetable Production Guide (AGRS-28). Penn State College of Agricultural Sciences, 2000.

Seelig, R. A. "Pumpkins." *Fruit & Vegetable Facts & Pointers.* Alexandria, Va.: United Fresh Fruit and Vegetable Association, 1970.

Association

Pennsylvania Vegetable Growers Association
RR 1, Box 392
Northumberland, PA 17857-9723

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Pumpkin Budget

Summary of estimated costs and returns per acre.

Item	Quantity or number of operations	Unit	Price	Total	Your Estimate
Variable costs					
Custom					
Applying calcium lime	0.5	ton	$20.00	$10.00	_____
Pest scouting	6	acre	$10.00	$60.00	_____
Pesticide spraying	8	acre	$7.20	$57.60	_____
Bee rental	1	acre	$25.00	$25.00	_____
Herbicide					
Command	0.13	gallon	$83.00	$10.80	_____
Poast	0.1875	gallon	$110.00	$20.63	_____
Fungicides					
Bayleton	0.75	pound	$64.00	$48.00	_____
Bravo weather STIK	2	gallon	$53.50	$107.00	_____
Benlate SP	1	pound	$16.99	$16.99	_____
Insecticide					
Asana XL	0.069	gallon	$111.00	$7.66	_____
Agri-Mek	0.125	gallon	$706.00	$88.25	_____
Admire	0.18	gallon	$561.00	$100.98	_____
Other variable costs					
Moldboard plowing	1	acre	$11.40	$11.40	_____
Disking and harrowing	1	acre	$11.90	$11.90	_____
Cultivation	3	acre	$8.30	$24.90	_____
Preapplied fertilizer (10-10-10)	0.5	tons	$180.00	$90.00	_____
Drip irrigation (tape and labor)	1	acre	$150.00	$150.00	_____
Pumpkin seed	2.5	pound	$60.00	$150.00	_____
Labor	12	hour	$10.00	$120.00	_____
Hand harvest and packing	1	acre	$400.00	$400.00	_____
Hauling	1	acre	$100.00	$100.00	_____
Marketing and advertising	1	acre	$10.00	$10.00	_____
Fuel	8	gallon	$0.93	$7.44	_____
Repair and maintenance					
Tractors and implements	1	acre	$15.00	$15.00	_____
Interest charge	1	acre	$38.80	$38.80	_____
Total variable cost				$1,672.43	_____
Fixed costs					
Tractors	1	acre	$15.86	$15.86	_____
Implements	1	acre	$12.32	$12.32	_____
Drip irrigation	1	acre	$50.00	$50.00	_____
Total fixed cost				$78.18	_____
Total cost				$1,750.61	_____

Net returns for five different yields and prices.

	Yield (tons)				
Price	**8**	**9**	**10**	**11**	**12**
$160.00	-$471	-$311	-$151	$9	$169
$185.00	-$231	-$41	$149	$339	$529
$210.00	-$71	$139	$349	$559	$769
$260.00	$329	$589	$849	$1,109	$1,369
$310.00	$809	$1,129	$1,449	$1,769	$2,089