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# AGRICULTURAL ALTERNATIVES

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## Cantaloupe Production

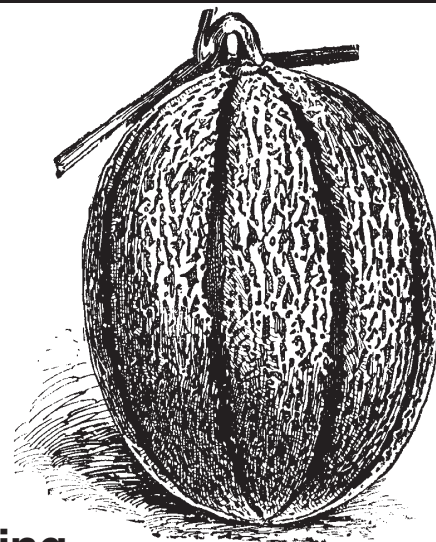
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Cantaloupes (a common American name for muskmelons) are a crop that lends itself well to small-scale and part-time farming operations. There are multiple markets for growers with 5 acres or less, and many field operations, such as land preparation, planting, and harvesting, can be custom hired. Custom labor and cultivation, however, are only available in areas where there are other producers that use plastic laying, raised-bed, and mechanical transplanting equipment. Should you need to purchase the necessary equipment, start-up expenses will be higher.

Cantaloupes are a member of the cucurbitaceae family, which includes squash, pumpkins, cucumbers, watermelons, and gourds. Individual plants produce both male and female flowers, and fruit size varies from 3 to 7 pounds. Fruit shape and appearance are quite varied, ranging from smooth or partially netted to sutured and heavily netted.

Cantaloupes were first cultivated in the Near East and were found growing in areas from Turkey to China, including northwest India, Afghanistan, and Uzbekistan. Several cantaloupe varieties were reportedly grown in the West Indies as early as 1494. Cantaloupes were also cultivated by Native Americans near the present city of Montreal in 1535 and in the vicinity of Philadelphia prior to 1748. Commercial cantaloupe production did not begin in the United States until the 1870s and was initially centered in Maryland, Delaware, and New Jersey.

Around 2.0–2.2 billion pounds of cantaloupes are produced in the United States annually on over 90,000 acres, generating \$300–\$400 million in farm receipts. Pennsylvania farmers produce over 10 million pounds on 1,300 acres, generating more than \$2.3 million in gross receipts.



## Marketing

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Fresh market cantaloupes are produced in Pennsylvania from the end of June to the end of September. Cantaloupe cultivars recommended for Pennsylvania are listed in Table 1. Fresh market cantaloupes usually are sold loose in bulk containers or in 40-pound cardboard boxes. Boxes generally contain 9 to 23 cantaloupes, depending on individual fruit size. Five basic marketing alternatives are available to the cantaloupe grower: wholesale markets, cooperatives, local retailers (grocery stores), roadside stands, and pick-your-own operations.

In wholesale marketing, producers often contract with shippers to market and ship cantaloupes for a predetermined price. If you do not use a contractor and ship your crop to the wholesale market yourself, your product will be subject to the greatest price fluctuations. Marketing possibilities also include produce auctions which may be located in your area. These auctions provide an alternative to direct

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marketing and wholesale marketing by combining many aspects of both of these types of marketing avenues. Marketing cooperatives generally use a daily pooled cost and price, which spreads price fluctuations over all participating producers (for more information on cooperatives, see *Agricultural Alternatives: Cooperatives*). Retailers are another possible market, but you must take the time to contact produce managers and provide high quality cantaloupes 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 cantaloupes, 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 be willing to accept some waste. For more information on marketing, consult *Agricultural Alternatives: Fruit and Vegetable Marketing for Small-scale and Part-time Growers*.

**Table 1. Recommended cantaloupe cultivars for Pennsylvania.**

VARIETY	DAYS TO MATURITY	FRUIT SIZE (LB)
Ambrosia* (flesh softens rapidly at maturity; roadside market only)	86	4.0
Aphrodite* (FR, PMR)	72	6.5
Athena* (FR, PMR)	80	6.0
Earligold* (early season only, PMR)	75	4.5
Eclipse*	85	5.5
Primo	79	6.0
Fastbreak* (FR, PMR)	69	4.5
Minerva* (FR, PMR)	78	7.5

\*Indicates hybrid variety.

FR—resistant to fusarium.

PMR—resistant to powdery mildew.

## Production Considerations

Cantaloupes grow best on soils that hold water well and have good air and water infiltration rates. Soil should have a pH of 5.8 to 6.6. Cantaloupes are very sensitive to cold temperatures, and even a mild frost can injure the crop. The best average temperature range for cantaloupe production 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. Cantaloupes require a constant supply of moisture during the growing season. However, excess water at any time during crop growth, especially as fruit reaches maturity, can cause the fruit to crack, which will reduce crop yields and fruit quality.

## Planting and Fertilization

Commercially produced cantaloupes generally are started as transplants in the greenhouse 18 to 24 days prior to planting in the field. Because cantaloupes are a warm-season crop, they should not be transplanted until the soil temperature 3 inches beneath the soil surface reaches 60°F. Growers generally plant between 2,200 and 4,200 plants per acre in single rows 5 to 6 feet apart, on mulched beds with 24 to 30 inches between plants in the row. The rows are usually mulched with black, green IRT (infrared transmitting), or blue plastic and are set up to use drip irrigation. Providing the plants with drip irrigation ensures optimum plant growth and yields and allows growers to apply fertilizer during the growing season. Fertilizer rates should be based on annual soil test results; if you are unable to conduct a test, the recommended N-P-K application rates are 40-50-50 pounds per acre banded at planting and 40-50-50 pounds per acre injected during irrigation. For more information on crop irrigation, consult *Agricultural Alternatives: Irrigation for Fruit and Vegetable Production* and *Agricultural Alternatives: Drip Irrigation for Vegetable Production*.

## Pollination

A large, active honeybee population is essential 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. With some insect pests infecting cantaloupes during bloom, extreme care must be taken in the choice of insecticides during this crucial period.

## Pest Control

Pest control is critical in cantaloupe production in order to insure high-quality produce. If you plan on using pesticides, it is necessary for you to obtain the proper license in order to purchase and use them on your farm. Contact your local Penn State Cooperative Extension office or the regional office of the Pennsylvania Dept. of Agriculture for more information on pesticide licensing and application of restricted use pesticides.

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

Insects are a major problem in cantaloupe production. Early feeding by striped or spotted cucumber beetles on young transplants can result in the plants being infected with bacterial wilt. Because these beetles carry this disease, insect control is an important part of disease management. Cucumber beetle, aphids, squash vine borer, seed corn maggot, leafminers, and rindworms (cucumber beetle larvae)

also 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 cantaloupe diseases can cause crop losses, including bacterial wilt, fusarium wilt, and viruses such as cucumber mosaic (CMV), squash mosaic (SqMV), and watermelon mosaic (WMV-1,2) as well as powdery mildew, downy mildew, and gummy stem blight. These diseases can be controlled by using disease-resistant varieties, having a good crop-rotation system, growing on soils with good air and water drainage, and judicious use of fungicides.

## Harvest and Storage

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Cantaloupes are hand harvested at the full-slip stage of maturity for best taste and texture. At full-slip, the stem pulls away from the fruit, leaving a scar at the stem end. Because individual fruits are pollinated at different times, multiple harvests are quite common. After harvest, growers should check cantaloupes for size, maturity, and pest damage to ensure marketing a high-quality product.

You should refrigerate the cantaloupes immediately after harvest to maintain quality. Cooling the cantaloupes will remove field heat, which improves their shelf life. Cantaloupes will retain good quality for approximately 14 to 21 days if stored at 90 to 95 percent humidity and 47° to 55°F. Harvesting cantaloupes into bins and moving them to a shady area as quickly as possible will begin the cooling process. Marketing cantaloupes at harvest or renting cold storage space will eliminate the need for building and maintaining cold storage equipment.

## Risk Management

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There are several risk management strategies you should consider for your operation including liability, property, and crop insurance. Discuss the types of coverage you may need with your insurance agent or broker. If you are engaged in direct marketing (especially roadside stands or pick-your-own) or agritainment activities, you need adequate liability protection. You may also want to purchase crop insurance either as a traditional crop-based policy or as whole-farm revenue protection (AGR-Lite coverage). To apply for traditional crop insurance you will need yield records and for AGR-Lite you will need your last five years of Internal Revenue Service (IRS), Schedule F forms. For more information on agricultural business insurance, please see *Agricultural Alternatives: Agricultural Business Insurance*. For more information on crop insurance, contact a crop insurance agent or check the Penn State Crop Insurance Education Web site at <http://cropins.aers.psu.edu/>.

## Budgeting

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Included in this publication is an annual fresh market cantaloupe production budget. This budget utilizes custom hire for most of the field work, which could be more economical for small-acreage growers. Farmers who own equipment should substitute equipment costs for custom hire costs. The budget summarizes the receipts, costs, and net returns of a cantaloupe enterprise. This 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 these budgets 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*.

## Sample Fresh Market Cantaloupe Budget

Summary of estimated costs and returns per acre.

Items	Quantity or Number of Operations	Units	Price	Total	Your Estimate
<b>Variable costs</b>					
Custom					
Apply calcium lime	1	ton	\$25.00	\$25.00	_____
Hand harvesting	1	acre	\$450.00	\$450.00	_____
Lay plastic mulch	1	acre	\$40.00	\$40.00	_____
Pest Scouting	6	trip	\$10.00	\$60.00	_____
Fertilizer					
Nitrogen	80	pound	\$0.38	\$30.40	_____
Phosphorus	100	pound	\$0.32	\$32.00	_____
Potassium	100	pound	\$0.23	\$23.00	_____
Herbicides					
Sandea	0.3	ounce	\$37.74	\$11.32	_____
Curbit	0.187	gallon	\$52.00	\$9.75	_____
Fungicides					
Ridomil MZ58	5	pound	\$12.45	\$62.25	_____
Bravo weather STIK	2.75	gallon	\$46.50	\$127.88	_____
Quadris	5	ounce	\$2.18	\$10.90	_____
Insecticides					
Asana XL	0.069	gallon	\$87.00	\$6.00	_____
Agri-Mek	16	ounce	\$5.13	\$82.08	_____
Admire	0.1875	gallon	\$639.00	\$119.81	_____
Other variable costs					
Bee rental	1	hive	\$25.00	\$25.00	_____
Plastic mulch	1	acre	\$250.00	\$250.00	_____
Drip irrigation (tape and labor)	1	acre	\$330.00	\$330.00	_____
Cantaloupe transplants	4.2	thsd	\$210.00	\$882.00	_____
Operator Labor	8.03	hour	\$12.00	\$96.36	_____
Marketing and advertising	1	acre	\$50.00	\$50.00	_____
Packing and grading	1	acre	\$135.00	\$135.00	_____
Cartons	640	cartons	\$1.10	\$704.00	_____
Fuel	20.3	gallon	\$2.25	\$45.68	_____
Repair and maintenance					
Tractors	1	acre	\$11.12	\$11.12	_____
Implements	1	acre	\$19.88	\$19.88	_____
Interest on operating capital	1	acre	\$45.51	\$26.58	_____
<i>Total variable costs</i>				<i>\$3,666.01</i>	_____
<b>Fixed costs</b>					
Tractors	1	acre	\$21.32	\$21.32	_____
Implements	1	acre	\$36.28	\$36.28	_____
Drip irrigation system	1	acre	\$500.00	\$500.00	_____
Land charge	1	acre	\$150.00	\$150.00	_____
<i>Total fixed costs</i>				<i>\$707.60</i>	_____
<b>Total Costs</b>				<b>\$4,373.61</b>	_____

Values based on production of 8,000 lbs of melons per acre.

### Net returns for five different yields and prices of melons

Price (\$/melon)	Yield (melons/A)				
	4,000	6,000	8,000	10,000	12,000
\$0.25	-\$2,729	-\$2,551	-\$2,374	-\$2,196	-\$2,018
\$0.50	-\$1,729	-\$1,051	-\$374	\$304	\$982
\$0.75	-\$729	\$449	\$1,626	\$2,804	\$3,982
\$1.00	\$271	\$1,949	\$3,626	\$5,304	\$6,982
\$1.25	\$1,271	\$3,449	\$5,626	\$7,804	\$9,982

#### Initial Resource Requirements

- Land: 1 arce
- Labor: 19 hours
- Harvesting and grading costs: \$635 per acre
- Capital: \$4,400.00
- Equipment needed:
  - Tractor (45 hp or larger) with loader
  - Tillage equipment, plastic mulch layer
  - Pesticide application equipment for herbicide and fungicides

## For More Information

Dunn, J.W., J.K. Harper, and G.L. Greaser. *Agricultural Alternatives: Fruit and Vegetable Marketing for Small-scale and Part-time Growers*. University Park, PA: Penn State Cooperative Extension, 2000.

Greaser, G.L. and J.K. 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, DC: Superintendent of Documents, Government Printing Office, 1986.

Hochmuth, G.J. and D. M. Maynard. *Knott's Handbook for Vegetable Growers*. New York, NY: John Wiley & Sons, Inc., 1997.

Lamont, W.J., Jr., J.K. Harper, A.R. Jarrett, M.D. Orzolek, R.M. Crassweller, K. Demchak, and G. L. Greaser. *Agricultural Alternatives: Irrigation for Fruit and Vegetable Production*. University Park, PA: Penn State Cooperative Extension, 2001.

Lamont, W.J., Jr., M.D. Orzolek, J.K. Harper, A.R. Jarrett, and G.L. Greaser. *Agricultural Alternatives: Drip Irrigation for Vegetable Production*. University Park, PA: Penn State Cooperative Extension, 2002.

MacNab, A. A., A. E. Sherf, and J. K. Springer. *Identifying Diseases of Vegetables* (AGRS-21). Penn State College of Agricultural Sciences, 2002.

*Commercial Vegetable Production Recommendations* (AGRS-28). Penn State College of Agricultural Sciences, 2003.

### Producer Association

Pennsylvania Vegetable Growers Association  
RR 1, Box 947  
Richfield, PA 17086  
<http://www.pvga.org>

### Web Sites

Pennsylvania Vegetable Growers Association, Snyder County, Pennsylvania  
<http://agmap.psu.edu/business/961>

Pennsylvania Vegetable Marketing and Research Program, Pennsylvania Vegetable Growers Association.  
<http://www.maes.msu.edu/rfp/PaRFP.pdf>

The Vegetable Growers News  
<http://www.vegetablegrowersnews.com>

Muskmelons (Cantaloupes)  
<http://www.ces.ncsu.edu/depts/hort/hil/hil-8.html>

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