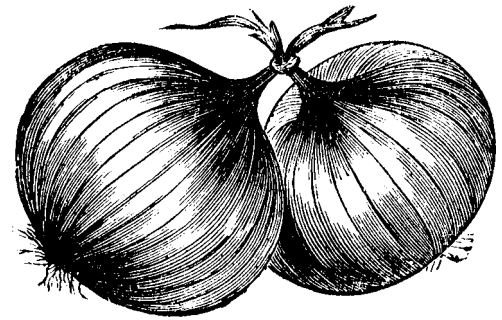

AGRICULTURAL ALTERNATIVES

Onion Production

Dry onions are a crop that lend themselves well to small-scale and part-time farming operations. Multiple markets exist for growers with small acreage (0.5 to 5), and the various colors and types of mature bulbs (red, yellow, and white) allow growers to find their market niche. The term dry onion is used to distinguish them from green onions, which are pulled while the tops are still green and usually before a large bulb has formed. Many field operations, such as land preparation, planting, and harvesting, can be custom hired, and most of the equipment can be used for other purposes.

The common dry onion (*Allium cepa*), a member of the Amaryllidaceae family, originated in mid-Asia in what is now northwestern India, Afghanistan, Tajik, and Uzbek. It was reported in the 16th century that onions were the most common vegetables. They occurred in red and white varieties and were sweet, strong, or intermediate in flavor. The onion was introduced by the Spanish into the West Indies soon after their discovery. From there, onions were spread to all parts of the Americas and grown by the earliest colonists and soon afterward by native Americans. Relatives of onions include garlic, leek, chives, Welsh onion, and shallots.

Most of the onions harvested in the U.S. are sold as fresh produce. In 1998, the U.S. produced 166,000 acres of onions with a value of \$826 million. (USDA Statistical Services bases value of production on total acres harvested times average price.) Pennsylvania produced 600 acres, valued at \$6 million.



Marketing

Fresh market onions are available in Pennsylvania from the first of July to the end of October. They are traditionally sold loose in bulk containers. Four basic marketing alternatives are available to the onion grower: wholesale markets, cooperatives, local retailers, and roadside stands.

In wholesale marketing, producers often contract with shippers to market and ship the onions for a predetermined price. If you do not use a contractor and ship your onions to a wholesale market yourself, your product will be subject to the greatest 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 good-quality onions 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 onions, 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. Depending on your location, processors may or may not be a marketing option. Processors are less likely to contract with small-acreage growers

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(those with less than 5 acres). For more information on marketing, consult *Agricultural Alternatives: Fruit and Vegetable Marketing for Small-Scale and Part-Time Growers*.

Site Selection

Onions should be grown on friable soils, which contain high amounts of organic matter, have good water-infiltration rates, and good moisture-holding capacity. The soil should not be compacted, and the pH should be 5.8 to 6.6. Sandy loams and muck soils are often used for onion production.

Variety Selection

Bulbing of onions is primarily induced by photoperiod or daylength. Both long day and intermediate day onion varieties are recommended for Pennsylvania (Table 1). In addition, onions are classified by skin color (red, white, brown, or yellow), taste (sweet or pungent), and shape of the bulb (round, flat, or globe).

Planting and Fertilization

Onions can be started as transplants or sets. Transplants are seeded in the greenhouse ten to twelve weeks prior to planting in the field. Because onions are a cool season crop, they can be transplanted as early as mid-March in Pennsylvania. When producing transplants in the greenhouse, the plant tops should be trimmed to a 4-inch height to produce a stout, sturdy transplant. Sets are small dry onion bulbs produced the previous year. They can be planted later in the year than transplants and still produce a marketable crop.

Growers generally plant 75,000 to 120,000 onions per acre in single rows with 2 inches between plants in the row and 24 inches between rows. For large sweet or Spanish onions, the in-row spacing would be 4 to 6 inches between plants. If you are not limited by equipment space restrictions, multiple rows of onions can be planted on beds for easier production operations.

Fertilizer rates should be based on an annual soil test results. If you are unable to conduct a test (including a test for calcium), the recommended N-P-K application rates are 60-80-80 pounds per acre banded at planting. For sweet onions, a spring application (early May) of ammonium sulfate should be sidedressed at 100 pounds per acre.

Pest Control

Weed control can be achieved with herbicides, cultivation, and a good crop-rotation system. There are several preplant and postemergence herbicides available for onions, depending on the specific weed problem and the stage of onion growth. If infestation levels are mild, early cultivation can minimize weed problems.

Table 1. Recommended onion varieties for Pennsylvania.

VARIETY	DAYS TO MATURITY
Sets	
Early Yellow Globe	90
Ebenezer	90
Southport Red Globe	90
Seeds	
Fortress (storage)	110
Spartan Banner 80 ^a (storage)	115
Candy ^a	105
Vega ^a	125
Celebrity ^a	125
Alisa Craig	106
Riverside	125
Keepsweet II ^a	110
Cache ^a	100
Mambo (red bulb)	120
Mercury ^a (red bulb)	115

^aIndicates hybrid variety.

Insects can be a major problem in onion production. Onion maggots and thrips have the potential to reduce or destroy crops in any given year. Monitoring insect populations will help you determine when you should use pesticides and how often you should spray.

Several onion diseases can cause crop losses, especially downy mildew, purple blotch, and white rot. Many of these diseases can be prevented by using a good crop-rotation system, high-quality soil with good air drainage, and disease resistant onion varieties.

Harvest and Storage

Most dry onions are usually harvested when one-quarter to one-third of the tops have fallen over. Bulbs are generally pulled from the soil after being loosened with a disk. They are then topped, approximately 1 inch above the bulb, and placed into bulk bins or sacks for curing or left in windrows prior to being taken out of the field and graded. Typically, onions are removed from the field for curing in Pennsylvania. To ensure marketing a high-quality product, you should grade onions by size and color and check them for insect damage.

To prevent rot organisms from entering the bulb, onions should be adequately cured (drying of the cut top or neck area) in the field, in open shade, or by artificial means before being placed in storage. Curing may require two to four weeks, depending on weather conditions. Onions that are maintained at 32°F and 65 to 70 percent relative humidity can be stored for approximately one to eight months, depending on variety.

Sample Budget

Included in this publication is a sample fresh-market onion production budget. This budget utilizes custom hire for most of the field work, which could be more economical for a smaller acreage. If farmers have their own equipment, they should substitute their costs for the custom hire. The budget summarizes the receipts, costs, and net returns of an onion 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 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.

For More Information

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Seelig, R. A. *Onions: Fruit and Vegetable Facts and Pointers*. Alexandria, Va.: United Fresh Fruit and Vegetable Association, 1974.

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Initial resource requirements

- Land: 1 acre
- Labor: 20 hours
- Harvesting: \$700.00
- Capital: \$361.80
- Depreciation on equipment: \$36.18

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Onion 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	\$25.00	\$12.50	_____
Pest scouting	8	acre	\$10.00	\$80.00	_____
Pesticide spraying	8	acre	\$7.20	\$57.60	_____
Fertilizer (pre-plant)					
Nitrogen	40	pound	\$0.22	\$8.80	_____
Phosphorus	80	pound	\$0.28	\$22.40	_____
Potassium	80	pound	\$0.15	\$12.00	_____
Fungicide					
Bravo weather STIK	0.75	gallon	\$53.50	\$40.13	_____
Herbicide					
Fusilade	0.0625	gallon	\$121.50	\$7.60	_____
Goal 2XL	0.03	gallon	\$96.00	\$3.00	_____
Insecticide					
Lorsban 50W	4.00	pound	\$8.37	\$33.48	_____
Diazinon	0.25	gallon	\$31.00	\$7.75	_____
Fertilizer (postsidedress)					
Nitrogen	80	pound	\$0.22	\$17.60	_____
Other variable costs					
Disking	1	acre	\$9.40	\$9.40	_____
Disking and harrowing	1	acre	\$11.90	\$11.90	_____
Cultivation	3	acre	\$8.30	\$24.90	_____
Onion transplants	84	thsd	\$40.00	\$3,360.00	_____
Sacks	1500	sacks	\$0.40	\$600.00	_____
Hand harvesting	1	acre	\$700.00	\$700.00	_____
Packing and grading	1	acre	\$180.00	\$180.00	_____
Labor	15	hour	\$10.00	\$150.00	_____
Fuel	10.21	gallon	\$0.93	\$9.50	_____
Repair and maintenance					
Tractors and implements	1	acre	\$15.00	\$15.00	_____
Irrigation labor	1	acre	\$60.00	\$60.00	_____
Interest charge	1	acre	9.5%	\$127.38	_____
<i>Total variable cost</i>				\$5,550.93	_____
Fixed costs					
Tractors	1	acre	\$15.86	\$15.86	_____
Implements	1	acre	\$12.32	\$12.32	_____
Overhead irrigation	1	acre	\$800.00	\$800.00	_____
<i>Total fixed cost</i>				\$828.18	_____
Total cost				\$6,379.11	_____

Net returns for five different yields and prices.

Price	Yield (50 lb sacks)				
	1,100	1,300	1,500	1,700	1,900
\$5.00	-\$879	\$121	\$1,121	\$2,121	\$3,121
\$6.00	\$221	\$1,421	\$2,621	\$3,821	\$5,021
\$7.00	\$1,321	\$2,721	\$4,121	\$5,521	\$6,921
\$8.00	\$2,421	\$4,021	\$5,621	\$7,221	\$8,821
\$9.00	\$3,521	\$5,321	\$7,121	\$8,921	\$10,721