
AGRICULTURAL ALTERNATIVES

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Asparagus Production

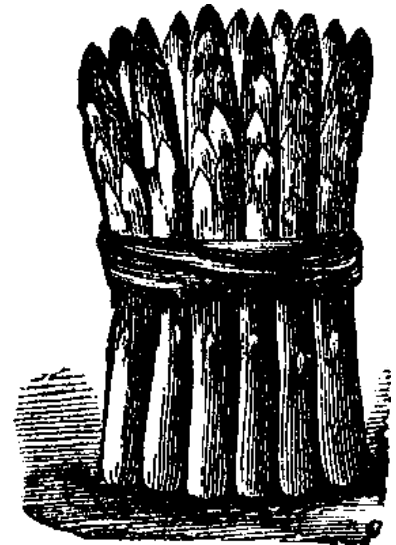
Asparagus is a perennial crop that lends itself well to small-scale and part-time farming operations. Multiple markets exist for growers with five acres or less, and many field operations such as land preparation and planting, which require machinery, can be custom hired.

Asparagus (*Asparagus officinalis*) is a member of the lily family (Liliaceae) and is one of a few vegetables that are monocots (plants having only one cotyledon or seed leaf). Both male and female flowers are produced on the older asparagus varieties, but there are very few to no female flowers produced on the newer all-male hybrid varieties. Spears are generally harvested when they are 7 or 9 inches in length and are generally green in color. A new purple spear variety has been developed by plant breeders. Excluding light when spears are emerging will produce blanched or white spears.

Asparagus is believed to be indigenous to parts of Russia, the Mediterranean region, and the British Isles. It was first cultivated by the early Romans who used the asparagus for food and medicinal purposes. It was cultivated in England at the time of Christ and brought to America by the early colonists. However, asparagus was not extensively planted by commercial growers until after 1850.

Most of the asparagus harvested in the U.S. is sold as fresh produce. In 1998, the U.S. produced 74,930 acres of asparagus with a value of \$167 million. (USDA Statistical Services bases value of production on total acres harvested times average price.) Pennsylvania produced 500 acres, valued at \$2.5 million.

This publication was developed by the Small-Scale and Part-Time Farming Project at Penn State with support from the U.S. Department of Agriculture-Extension Service.



Marketing

Asparagus is available in Pennsylvania annually from late April through June. It is traditionally sold in pyramid crates packed with 1.5 to 2.5 bunches held with a rubber band. Five basic marketing alternatives are available to the asparagus grower: wholesale marketing, cooperatives, local retailers, roadside stands, and pick-your-own operations.

In wholesale marketing, producers often contract with shippers to market and ship asparagus for a predetermined price. If you do not use a contractor and ship your asparagus 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 asparagus when stores require it. Roadside stands (either your own or another grower's) and pick-your-own operations provide opportunities to receive higher than wholesale prices for your asparagus, but you may have some additional expenses for advertising, building and maintaining a facility, and providing service to your customers. With pick-your-

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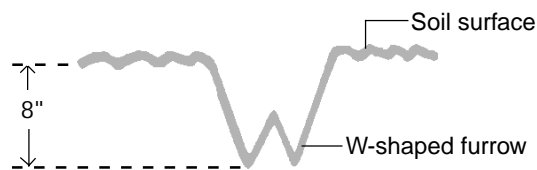
own operations, you save on harvest costs, but you must be willing to accept some waste. Depending on your location, processors may or may not be a marketing option. Processors are less likely to contract with small-acreage growers (those with less than 5 acres). For more information on marketing, consult *Agricultural Alternatives: Fruit and Vegetable Marketing for Small-Scale and Part-Time Growers*.

Site Selection

Asparagus should be grown on well-drained soils that have good water-infiltration rates and good moisture-holding capacity. The soil should not be compacted and the pH should be 6.2 to 7.0. Growers should avoid planting asparagus in fields where it has been grown in previous years. Asparagus is an alleopathic species—it produces and releases toxic chemicals that inhibit and suppress the growth of young asparagus transplants or crowns. In addition, asparagus is extremely susceptible to *Fusarium* root rot, a soil fungus which will weaken the plant. *Fusarium* can survive up to 7 years in infected soil and soil fumigation is not effective in reducing long-term *Fusarium* populations in the soil. Asparagus is extremely salt tolerant.

Planting and Fertilization

Commercially, asparagus can be started in the greenhouse 8 to 10 weeks prior to transplanting in the field or planted as 1 or 2 year old crowns. Crowns are developed root systems with a fairly defined storage organ and growth buds. Growers generally plant approximately 12,000 to 14,000 plants per acre in single rows, with 12 inches between plants in the row and 5 to 6 feet between rows. Whether planting crowns or transplants, the asparagus is planted in an 8-inch deep furrow with a W-shape configuration at the bottom of the furrow. The crown and transplant are planted in the W-shaped furrow beneath the soil surface, and the furrow is gradually filled with soil during the growing season. Asparagus usually is planted in May so that extensive foliage (fern) develops before winter.



Fertilizer recommendations should be based on annual soil test results. In absence of soil test results, the recommended N-P-K application rates are 50-100-150 pounds per acre broadcast in the spring of every year before spear emergence.

Pest Control

Weed control can be achieved with a good crop rotation system, herbicides, and straw mulch. Several preplant and post emergence herbicides are available for asparagus, depending on the specific weed problem and the time of year. If infestation levels are mild, early cultivation (prior to spear emergence) can help minimize weed problems.

Insects can be a major problem in asparagus production. Asparagus beetle, asparagus aphids, cutworms, and Japanese beetles all can cause crop losses. Monitoring insect populations will help you determine when you should use pesticides and how often you should spray.

Several asparagus diseases can reduce crop yields, especially fusarium root rot and rust. These diseases can be prevented by having a good crop rotation system, soil with good water and air drainage, and by using disease-resistant varieties.

Harvest and Storage

The harvesting period for asparagus is increased gradually from planting to full maturity (5 years). Harvesting asparagus when it is greater than 12 inches in length (spear diameter becomes thinner) will reduce the total marketable harvest over the life of the planting. The first year after planting, asparagus can be harvested for about 7 days, the second-year harvest period lasts for about 14 days, the third-year harvest period is about 3 weeks, the fourth-year harvest period is 30 to 36 days, and by year five (when the plants have reached full maturity) the harvest period is approximately 6 to 7 weeks. Asparagus spears can be cut with an asparagus knife or snapped off near the soil line. Spears are harvested when they reach at least 7 inches in height and have a spear diameter of at least 5/16 of an inch. When growing under seasonal temperatures, asparagus should be harvested every day since spears can increase in length as much as 2 inches per day.

Removing field heat from asparagus is critical for extending their shelf life and maintaining a good appearance. Refrigeration immediately after harvest will help guarantee high quality. Asparagus that is maintained at 32 to 36°F and 90 to 95 percent relative humidity will retain good quality for approximately 7 to 14 days.

Table 1. Recommended asparagus varieties for Pennsylvania.

VARIETY
Jersey Jewel ^a
Jersey General ^a (RR, FT)
Jersey Giant ^a (RR, FT)
Jersey King ^a (RR, FT)
Jersey Knight ^a (RR, FT)

^aIndicates hybrid variety.
RR = Resistant to rust
FT = Resistant to fusarium root rot

Sample Budget

Included in this publication are two sample fresh-market asparagus budgets. Both budgets utilize custom hire for most of the field work, which could be more economical for a smaller acreage. Farmers who have their own equipment should substitute their costs for the custom hire. The first budget summarizes the costs of establishing an asparagus enterprise (there is no income during the year of establishment). The second budget summarizes the receipts, costs, and net returns of an asparagus enterprise for the first year after planting, the second year after planting, and a mature crop. These sample budgets 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 approximations 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*.

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For More Information

Cantaluppi Jr., C. J., and R. J. Precheur. *Asparagus Production, Management, and Marketing* (Bulletin 826). Columbus, Ohio: The Ohio State University, 1993.

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

Lorenz, O. A. and D. M. Maynard. *Knott's Handbook for Vegetable Growers*. 3rd ed. New York, N.Y.: John Wiley and Sons, Inc., 1988.

MacNab, A. A., A. E. Sherf, and J. K. Springer. *Identifying Diseases of Vegetables* (AGRS-21). Penn State Cooperative Extension, 1983.

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

Tetrault, R., A. A. MacNab, P. A. Ferretti, and M. D. Orzolek. *Asparagus Production for Small-Scale Growers and Gardeners* (U.Ed. 86-601). University Park, Pa.: The Pennsylvania State University, 1986.

Asparagus Budget for Establishment Year (Asparagus does not yield until the second year.)

Summary of estimated costs and returns per acre.

Item	Quantity or number of operations	Unit	Price	Total	Your Total Estimate
Variable costs					
Custom					
Applying calcium lime	1	ton	\$20.00	\$20.00	_____
Disking	1	acre	\$4.00	\$4.00	_____
Disking and harrowing	1	acre	\$9.40	\$9.40	_____
Tons of manure (incorporated)	5	acre	\$10.00	\$50.00	_____
Bed establishment	1	acre	\$20.00	\$20.00	_____
Pest scouting	2	acre	\$10.00	\$20.00	_____
Pesticide spraying	2	acre	\$7.20	\$14.40	_____
Fertilizer					
Nitrogen	60	pound	\$0.22	\$13.20	_____
Phosphorus	150	pound	\$0.28	\$42.00	_____
Potassium	50	pound	\$0.15	\$7.50	_____
Fungicide					
Ridomil Gold	4	pint	\$89.00	\$356.00	_____
Herbicide					
Gramoxone extra	0.375	gallon	\$29.40	\$11.00	_____
Fusilade	0.09	gallon	\$121.50	\$11.39	_____
Insecticide					
Methoxychlor 2E	0.75	quart	\$16.60	\$12.45	_____
Other variable costs					
Asparagus transplants	8.4	thousand	\$65.00	\$546.00	_____
Non-irrigated labor	11	hour	\$10.00	\$110.00	_____
Fuel	5	gallon	\$0.93	\$4.65	_____
Repair and maintenance					
Tractors and implements	1	acre	\$5.00	\$5.00	_____
Interest charge	1	acre	9.5%	\$29.85	_____
<i>Total variable cost</i>				\$1,286.85	_____
Fixed costs					
Tractors	1	acre	\$15.86	\$15.86	_____
Irrigation (drip)	1	acre	\$500.00	\$500.00	_____
Implements	1	acre	\$12.32	\$12.32	_____
<i>Total fixed cost</i>				\$528.18	_____
Total cost				\$1,815.03	_____

Initial resource requirements

- Land: 1 acre
- Labor: 24 hours
- Harvesting and grading: \$800.00 per acre
- Capital: \$3,000
- Depreciation on equipment: \$300

Sample Budget for Asparagus (costs per acre)

First year after planting, second year after planting, and a mature production.

Item	Second year		Third year		Mature production	
	Total	Your estimate	Total	Your estimate	Total	Your estimate
Variable costs						
Custom hire						
Harrowing	\$5.00	_____	\$5.00	_____	\$5.00	_____
Harrowing and disking	\$10	_____	\$9	_____	\$9	_____
Harvesting	\$250	_____	\$350	_____	\$800	_____
Nitrogen	\$25	_____	\$40	_____	\$70	_____
Pesticides						
Ridomil Gold 4E 1 pt./acre	\$89	_____	\$89	_____	\$89	_____
Karmax 80 DF 2 lbs./acre	\$10	_____	\$10	_____	\$10	_____
Fusilade DX 0.75 pt./acre	\$12	_____	\$12	_____	\$12	_____
2-4,D (Formula 40) 1.5 qt./acre	\$6	_____	\$6	_____	\$6	_____
Devrinol DF 6 lbs./acre	\$56	_____	\$56	_____	\$56	_____
Lannate LV 2 pt./acre	\$13	_____	\$13	_____	\$13	_____
Marketing and advertising	\$50	_____	\$50	_____	\$100	_____
Harvest boxes	\$50	_____	\$75	_____	\$150	_____
Non-irrigation labor	\$80	_____	\$100	_____	\$200	_____
Fuel	\$11	_____	\$11	_____	\$11	_____
Repair and maintenance	\$9	_____	\$10	_____	\$17	_____
Irrigation costs (drip)						
Fuel or electricity (cooling)	\$35	_____	\$47	_____	\$88	_____
Materials for drip system	\$250	_____	\$250	_____	\$250	_____
Irrigation labor (drip)	\$15	_____	\$20	_____	\$38	_____
Interest on operating capital	\$27	_____	\$34	_____	\$61	_____
<i>Total variable costs</i>	\$997	_____	\$1,181	_____	\$1,979	_____
Fixed Costs						
Tractors	\$60	_____	\$60	_____	\$60	_____
Drip irrigation system	\$13	_____	\$13	_____	\$13	_____
Cooling building and equipment	\$200	_____	\$200	_____	\$200	_____
Implements	\$18	_____	\$18	_____	\$18	_____
<i>Total fixed costs</i>	\$290	_____	\$290	_____	\$290	_____
Total Costs	\$1,287	_____	\$1,472	_____	\$2,269	_____

Asparagus (mature crop)—breakeven table

Yield per acre (pounds)	Price (per pound)				
	\$0.50	\$0.75	\$1.00	\$1.25	\$1.50
4,000	-\$269.44	\$730.56	\$1,730.56	\$2,730.56	\$3,730.56
4,500	-\$19.44	\$1,105.56	\$2,230.56	\$3,355.56	\$4,480.56
5,000	\$230.56	\$1,480.56	\$2,730.56	\$3,980.56	\$5,230.56
5,500	\$480.56	\$1,855.56	\$3,230.56	\$4,605.56	\$5,980.56
6,000	\$730.56	\$2,230.56	\$3,730.56	\$5,230.56	\$6,730.56

Years until there is a positive cash flow

	Total	Net ¹	Cash
Establishment year	-\$1,815	\$0	-\$1,906
First year after establishment	-\$1,287	\$213	-\$1,836
Second year after establishment	-\$1,472	\$1,028	-\$945
Mature crop (fourth year)	-\$2,269	\$2,731	\$1,715

¹Net return = Total revenue-Total cost, total cost came from the budget, price received was \$1.00 per pound, and yields were 0, 1,500, 2,500, and 5,000 pounds.

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Issued in furtherance of Cooperative Extension Work, Acts of Congress May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture and the Pennsylvania Legislature. T. R. Alter, Director of Cooperative Extension, The Pennsylvania State University.

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