AGRICULTURAL ALTERNATIVES

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Red Raspberry Production

Raspberries are a small-fruit crop that lend themselves well to small-scale and part-time farming operations. Initial investment is high, but is primarily related to the cost of land preparation, planting, and installation of a trellis and irrigation system. Also, equipment needs on a small-acreage farm are not very great. Raspberry plantings should fruit for at least six years, and some produce for more than 20 years. Increasing demand for raspberries has kept fresh-market prices relatively stable in recent years. Growing raspberries is not for everyone, however, as they have special production requirements, as well as a very short shelf life and marketing season.

Raspberries come in two basic types: red and black. Yellow raspberries are a mutation of red or black raspberries, and purple raspberries are a cross between red and black raspberries. Red raspberries have chilling requirements that limit their production to cooler regions. It is estimated that about 75 percent of all domestically grown raspberries are of the red variety, and most of these are processed.

The leading red raspberry producing states are Washington and Oregon, with a combined acreage of more than 12,000 acres. Other states with small plantings include Colorado, Michigan, New York, Pennsylvania, Ohio, Minnesota, Wisconsin, Illinois, Indiana, and parts of New England. Canada is a major producer of red raspberries, with most of the production located in British Columbia and Ontario. Red raspberries also are produced in Europe and the Southern Hemisphere.

Marketing

Fresh-market raspberries usually are sold in half-pint cartons covered with plastic lids. Six basic marketing alternatives are available to the raspberry grower: wholesale markets, cooperatives, local retailers, roadside stands, pick-your-own operations, and processing firms. Because they are so perishable, red raspberries are well suited to roadside stands and pick-your-own operations.

With the wholesale option, either you or a shipper can take your crop to the market. Shippers generally sell and transport the raspberries for a predetermined price. This marketing alternative is subject to the greatest price fluctuations. Marketing cooperatives generally use a daily pooled

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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 raspberries 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 fruit, 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, and processing prices are much more volatile then fresh-market prices. For more information on marketing, consult *Agricultural Alternatives: Fruit and Vegetable Marketing for Small-scale and Part-time Growers*.

Prices for fresh-market red raspberries have been relatively stable in recent years because of increasing demand. Wholesale prices for fresh-market raspberries have ranged from $0.80 to $1.10 per pound, generally about half of the retail price. Demand for processed raspberries also has been strong in recent years, but prices in this market are subject to greater fluctuation. Processing prices in Oregon and Washington have ranged from around $0.30 to as much as $0.75 per pound.

Production Considerations

While high prices can be obtained for red raspberries, these delicate fruits are susceptible to numerous diseases, require a great deal of labor if hand harvested, and have a very short shelf life. Therefore, the production of a good crop from year to year requires careful management.

Site Selection

Red raspberries grow best on sunny sites with well-drained soil. The slope of the site should be no greater than 12 percent. The term "well-drained" refers to internal soil drainage. A sloping site is not necessarily well drained internally. Soil pH should be between 5.5 and 6.5. Soil should be tested during the fall before spring planting. Do not use a site that was previously in sod, because it can harbor root-feeding grubs and wireworms that can damage the raspberry roots. Also, red raspberry plantings should not follow *Verticillium*-susceptible crops, such as peppers, eggplant, tomatoes, potatoes, or strawberries. Soil that has been used to grow these crops should be either cropped for five to eight years with a non-*Verticillium* susceptible crop or fumigated before planting. Cover cropping for at least a year with rye or sudangrass is a highly recommended practice that will help control weeds prior to planting the raspberry crop. Also, cover crops can be plowed under to add organic matter to the heavy soils that are prevalent in much of Pennsylvania.

Growth Habit

The red raspberry plant has one of two growth habits: summer bearing or primocane.

• Summer bearing. This growth habit is the most common of the bramble family to which the raspberry plant belongs. The individual canes of summer-bearing brambles are biennial, while the root systems are perennial. In the first year of planting, vegetative canes are produced. After these canes become dormant and overwinter, they flower, fruit, and die. Canes grown during the previous season flower and fruit, while new vegetative canes arise from the root system. These canes then bear the next year's crop. Therefore, a mature raspberry planting has two types of canes: vegetative canes (primocanes) and fruiting canes (floricanes). Fruit usually is harvested in July in Pennsylvania. Summer-bearing plants must be pruned by hand during the dormant season.

• Primocane or everbearing. This type of red raspberry produces primocanes that flower and fruit all in a single year. However, fruiting is later than for summer-bearing raspberries because the cane has to go through more growth processes. Fruiting usually begins in late August and continues until a hard frost or freeze. The canes of everbearing raspberry bushes are mowed to the ground every winter, because the next year's crop does not require the previous season's canes.

A list of recommended summer-bearing and primocane red raspberry cultivars can be found in the *Commercial Berry Production and Pest Management Guide.*

Planting

Both summer-bearing and everbearing cultivars readily produce new shoots from the roots (called "suckering"). New plantings are established by taking advantage of the plants' ability to produce suckers. Red raspberries usually are planted 24 inches apart in rows that are 6 to 12 feet apart. Spacing decisions depend on the size of your equipment. Tissue-cultured plantlets of cultivars appropriate to the site should be purchased from a reputable nursery. Plant in May after the danger of hard frost has passed. Four inches of clean straw mulch (about 2 tons of straw per acre) should be applied immediately after planting. This practice has been shown to greatly increase plant vigor and survival rates. However, straw mulch should be used only during the establishment period, because excessive moisture under the mulch of established plantings can increase disease problems. Plants will produce many suckers in the first year. Rows should be mowed to keep the row width to about 12 inches at the base of the planting.

Irrigation

Irrigation will help ensure a more consistent crop from year to year, but is not essential. Trickle irrigation is the most commonly used method, because it adds water directly to the

root zone and does not wet the fruit. Also, very little water is lost from evaporation. More information on irrigation can be found in *Agricultural Alternatives: Irrigation for Fruit and Vegetable Production.*

Pest Control

Several insects and diseases can injure or destroy a raspberry. Therefore, monitoring and controlling pests is important. Some pests affect the fruit while others attack the plant. Pest management involves many aspects of production, with pesticide application being only one. Try to use all available practices to reduce the potential for disease and insect damage. Many pest problems can be avoided through proper site selection, crop rotation, variety selection, soil treatment, and by planting disease-free plants.

Weeds must be controlled in a raspberry planting. Raspberries have shallow root systems, which puts them at a disadvantage when competing for water and nutrients. Some weeds also harbor insects and disease. The first steps in weed management are to avoid sites with persistent weed problems and eliminate weeds before planting. Mulch and herbicides can be used to control weeds after establishment. Seasonal cover crops rather than a permanent sod should be used between rows to reduce competition and to provide organic matter for established plantings.

Harvest and Storage

With summer-bearing red raspberries, the first significant crop usually is harvested the third year after planting. Primocane-bearing plants usually yield a significant crop in the second year. At maturity (about 4 years old), plants will produce about 5,000 pounds of fruit per acre. Because of the extremely short shelf life of red raspberries, good postharvest practices are essential (unless the crop is to be marketed as pick-your-own).

Red raspberries must be picked and handled very carefully. The fruit must be firm, well-colored, and rot free. If harvested at the proper time and handled carefully, raspberries will remain in good condition for several days. Because the fruit is fragile, it should be picked and packed directly into containers without further sorting. Pickers must be closely supervised and instructed to harvest only high-quality fruit. For fresh-market production, the fruit should be harvested at least once every three days. For processing, the harvest interval can be lengthened to every four to six days, but care must be taken to keep the harvested fruit shaded, and delivery to the processor should take place within two to three hours of harvest.

Proper postharvest handling of raspberries is essential if you are to be a successful marketer. Cooling the berries to remove field heat and improve shelf life is especially important. Harvesting early in the day while temperatures are cool and then precooling the fruit before shipment extends shelf life significantly.

Sample Budgets

Included in this publication are three annual budgets for red raspberry production. The first two summarize the costs of land preparation and establishment of the red raspberry planting. The third summarizes the costs and returns for a mature (5-year-old) red raspberry planting. Intermediate production years (years one to four) are not included. These years would have less receipts and lower harvest costs than a mature planting. 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 an approximation and then make appropriate adjustments in the "Your Estimate" column to reflect your specific production and resource situation. Additional red raspberry budgets can be found in Penn State's *Commercial Berry Production and Pest Management Guide.* More information on the use of crop budgets can be found in *Agricultural Alternatives: Enterprise Budget Analysis.*

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For More Information

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Pritts, M. and D. Handley, eds. *Bramble Production Guide.* Ithaca, New York: Northeast Regional Agricultural Engineering Service, 1989.

Small-scale Fruit Production. AGRS-60. University Park, PA: Penn State College of Agricultural Sciences, 1997.

Associations

American Pomological Society
102 Tyson Building
University Park, PA 16802

North American Bramble Growers Association
13006 Mason Road, NE
Cumberland, MD 21502-9235
e-mail: rfagan@miworld.net

North American Fruit Explorers, Inc.
1716 Apples Road
Chapin, IL 62628
http://www.nafex.org

Pennsylvania Vegetable Growers Association
RR 1, Box 947
Richfield, PA 17086
e-mail: wt.pvga@tricountyi.net

Fresh-market Red Raspberry Production Budget

Per-acre costs for land preparation, establishment, and mature production.

	Land preparation (year -1)	Your estimate	Planting establishment (year 0)	Your estimate	Mature planting (year 4+)	Your estimate
Variable costs						
Custom operations	$26.80	_____	$34.80	_____	$6.00	_____
Fertilizer and lime	$50.00	_____	$6.60	_____	$32.00	_____
Herbicides	$19.25	_____	$0.00	_____	$142.03	_____
Insecticides	$0.00	_____	$22.45	_____	$31.45	_____
Fungicides	$0.00	_____	$0.00	_____	$321.74	_____
Seed	$25.00	_____	$60.00	_____	$0.00	_____
Plants	$0.00	_____	$979.00	_____	$0.00	_____
Irrigation	$0.00	_____	$530.00	_____	$120.00	_____
Mulch	$0.00	_____	$100.00	_____	$0.00	_____
Trellis	$0.00	_____	$1,075.00	_____	$0.00	_____
Leaf test kit	$0.00	_____	$0.00	_____	$18.00	_____
Labor	$8.29	_____	$369.12	_____	$5,483.99	_____
Fuel	$1.39	_____	$1.81	_____	$7.35	_____
Repairs & maintenance	$1.91	_____	$1.48	_____	$8.70	_____
Interest	$4.17	_____	$129.82	_____	$19.00	_____
Total variable costs	$146.82	_____	$3,310.08	_____	$6,164.87	_____
Fixed costs						
Equipment	$3.02	_____	$2.97	_____	$15.15	_____
Land	$100.00	_____	$100.00	_____	$100.00	_____
Total fixed costs	$103.02	_____	$102.97	_____	$115.15	_____
Total costs	**$249.84**	_____	**$3,413.05**	_____	**$6,280.20**	_____

Returns above total costs for various price and yield combinations:

Price received ($/lb)	Yield (lb/A)			
	2,000	**3,500**	**5,000**	**6,500**
$1.45	-$380	$295	$970	$1,645
$1.55	-$180	$645	$1,470	$2,295
$1.65	$20	$995	$1,970	$2,945
$1.75	$220	$1,345	$2,470	$3,595
$1.85	$420	$1,695	$2,970	$4,245
$1.95	$620	$2,045	$3,470	$4,895
$2.05	$820	$2,395	$3,970	$5,545

Minimum price needed to cover total costs at various yields:

$/lb	$1.64	$1.37	$1.26	$1.20

Initial resource requirements

- Land: 1 acre
- Labor
  - Land preparation: 3 hours
  - Establishment: 49 hours
  - Production (year 1): 22 hours
  - Production (year 2): 54 hours
  - Production (mature): 59 hours
  - Custom harvest labor (mature): $5,000
- Capital
  - Land preparation: $250
  - Red raspberry plants: $979
  - Trellis: $1,075
  - Trickle irrigation: $500

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