

## Backyard Cane Fruit Production at Elevations 4000 to 6000 Feet

### INTRODUCTION

Arizona's mid-elevations, 4000 to 6000 feet, offer some of the best conditions for growing temperate zone fruits. Climatic conditions at Willcox in the southeastern part of the state, 4100 feet and Oak Creek Canyon in the central part, 5000 to 6000 feet, are excellent for the production of small fruits as well as apples, pears, plums and peaches.



Small fruits can be desirable not only for the joy of eating but because they can be very productive on good sites and require less management than fruit trees. Small fruit will require more frequent watering than tree fruit but will use similar amounts over the course of the growing season, with the exception of raspberry which often requires significantly more water.

This publication covers blueberry, currant, gooseberry, kiwi-fruit, raspberry and blackberry. Backyard grape production in Arizona at the mid-elevations is covered in other Extension publications.

### SITE SELECTION

#### Soil

Small fruit crops do best in well drained soil that is high in organic matter. Soils high in clay content should be avoided. Sandy soil will require frequent watering and fertilizing. Sandy loams can be successfully used for raspberry production if irrigated and mulched to conserve soil moisture.

When preparing the soil for a new planting, till-in 2 to 6 inches of compost, well rotted manure, peat moss, etc; use the higher amounts for sandy soils. Use 10-10-10 fertilizer at a rate of 5 lbs. per 100 feet of row 3 - 4 weeks after plantings. In subsequent years apply 10-10-10 at a rate of 10 lbs. per 100 feet of row. Broadcast over row in early spring before growth starts. Regular additions of organic matter throughout the life of the planting are beneficial.

Soils in the higher elevations of northern Arizona have a pH range of between 6.7 and 7.3. All but blueberries will grow in these ranges. Blueberries require a soil pH of 4.3 to 5.0. Finely ground sulfur may be worked into the top 6-8 inches of soil to lower the pH. A nitrogen fertilizer containing sulfur will also lower the soil pH over time. Soils with a pH above 7.5 have high buffering capacity and it is difficult to maintain sufficiently low pH, so they would not be suitable for blueberry production. Conduct a soil pH test before planting blueberries.

Soil pH Modification Table for Blueberries			
Current pH	Amount of Sulfur Needed (pounds per 100 sq ft)		
	Loamy Soil	Sandy Soil	Clay Soil
4.5	0	0	0
5.0	1.2	0.4	1.8
5.5	2.4	0.8	3.6
6.0	3.5	1.2	5.0
6.5	4.6	1.5	6.9
7.0	5.8	1.9	8.8
7.5	6.9	2.3	10.0

*Adapted from: Barney, D.L. 1990. Highbush Blueberry Crop Recommendations. University of Idaho Cooperative Extension System.*

#### Location

Microclimates occur all around us; the front yard may be warmer than the backyard; close to the house is warmer than near the street. Cold air travels downhill and flows much like water, settling in the lowest area. It can dam up behind houses, fences and groves of trees. Rock outcroppings and bare ground retain heat and radiate that heat during the night. Site selection is the single most important factor in fruit production and can make a pronounced difference on how well small fruits grow and produce.

The planting location can significantly affect potential production. Sloping sites provide the best protection against frost. North sloping land is best because it warms up less quickly in the spring and will delay flowering.

Delayed flowering can help prevent damage from late spring frosts. An exception to this rule are fall-fruiting raspberries, which flower in late summer; these plants perform better on south slopes.

Protecting plants from frost during flowering and fruit development can help prevent damage. To protect plants from frost:

1. Cover plants during freezing temperatures with plastic, floating row covers, sheets, etc.
2. Add heat to the air around the plants with electric lights or smudge pots.
3. Flood the planting with water.
4. If temperature inversions occur, fans may be used to mix cold air near the ground with warmer air aloft.

## VARIETIES

Variety selection can be one of the most important decisions in growing small fruit. Many varieties have been selected to withstand cold winter temperatures, others for disease resistance, and others for their superior flavor. However, when selecting varieties for mid-elevations one needs to also consider varieties that are resistant to sunburn and can tolerate higher than neutral pH (of particular concern with blueberry and somewhat with kiwifruit). Buy only federally- and/or state-inspected and tagged plants from a reputable nursery. The best plants to get are those marked as "registered" or "certified".

### Blueberry

Blueberries will not produce reliable crops without cross-pollination. At least 2 varieties need to be planted. There has been very little experience with blueberries in Arizona. However, the varieties listed should be suited to the range of temperatures at the mid-elevations. As a general rule soil pH needs to be lowered to 4.3 to 5.0 prior to planting. After planting, closely monitor pH levels and apply sulfur as needed.



- Bluecrop - Medium to large fruit, approximately 65 per cup; bright blue; flavor is considered good and tart. Bears mid-season.
- Blueray - Large size fruit, approximately 60 per cup; bright blue. Also makes an excellent ornamental. Bears mid-season.
- Northland - Small size fruit, approximately 136 per cup; medium blue; fair flavor. Bears early mid-season.
- Patriot - Large size fruit, approximately 55 per cup; medium blue; excellent flavor. Bears early mid-season.
- \*Bluegold - Medium size fruit, approximately 70 per cup. Bears late.
- \*Duke - Medium size fruit. Bears early.
- \*Sierra - Medium size fruit, approximately 75 per cup. Bears early mid-season.

- \*Toro - Medium size fruit, approximately 75 per cup. Bears mid-season.

\*These varieties were released in the late 1980's and have not had extensive trial in commercial plantings but may be worthy of trial.

### Currant

No pollinizer is required.

- Consort - Medium fruit; black; borne in medium-length cluster. Bears mid-late season.
- Perfection - Medium fruit; red; borne in loose cluster. Very productive.
- Red Lake - Medium fruit; light red; high quality berries borne in loose clusters. Very productive. Considered by many as the best red currant.

### Gooseberry

No pollinizer is required.

- Captivator - Medium to large fruit; dull red; good quality, moderately sweet. Almost thornless, easy to harvest.
- Oregon Champion - Medium to large fruit; light green to yellow. Thornless and vigorous.
- Pixwell - Medium fruit; pink to red; borne in cluster with long pedicels; fair to good quality. Has few thorns.

### Kiwifruit (*Actinidia arguta*)

Kiwifruit are dioecious, producing female and male flowers on different plants. One male plant is needed for every eight females.

- 74-55 - Vigorous vine, medium to large smooth-skinned fruits. Use 74-46 to pollinate.
- Anna - Average to above average size fruit. Knits pineapple aroma and taste.
- Issai - Bears long, sweet fruit (1 3/4" in diameter). May bear fruit after only one year. Use 1971 as a male pollinator.
- Geneva HH I - A vigorous vine that is very winter hardy. Delicious, smooth-skinned, medium size fruit. Use 1971 as a male pollinator.
- Geneva HH II - A vigorous vine that is very winter hardy. Use 1971 as a male pollinator.

### Raspberry

No pollinizer is required. There are two types of red raspberry, summer- and fall-bearing. Varieties that produce fruit in a biennial manner (flowers on the overwintered cane) are referred to as summer-bearing or floricanes. Varieties that produce flowers the first year, when cane elongation ceases, are the fall-bearing type, also referred to as primocane fruiting, fall fruiting or ever-bearing. Refer to the section below on pruning for more information on raspberry life cycle.



**Summer-Bearing Raspberry**

All these varieties should be able to withstand temperatures of 20° F without excessive bud damage; however, late spring frosts may damage early blossoms.

- Boyne - Medium sized deep red fruit that is tender and juicy. Medium sweet flavor used for processing and freezing. Late-early bearing. Very hardy.
- Canby - Medium to large light red fruit, excellent fresh or for processing
- Festival - Medium red fruit. Bears in mid-summer; very good productivity, good firmness and flavor, fair freezing quality.
- Haida - Medium red fruit, mid- to late summer, very good productivity and firmness; good flavor, very good freezing quality, superb attractiveness.
- Killarney - Medium red fruit, early to mid-summer, extremely sweet and hardy, good quality fresh or frozen.
- Nordic - Medium red, firm fruit. Early summer, very good flavor and freezing quality.
- Nova - Medium red fruit, ever-bearing. Tart flavor, almost thornless.

**Fall-Bearing Raspberry**

Low winter temperatures are not a significant factor since the canes are pruned to the ground in the winter.

- Autumn Bliss - Large dark red fruit, medium firm, mild flavor. Good processed or fresh. High yielding. Bears early.
- Heritage - Medium-large fruit, firm and of good quality. Vigorous canes that sucker well and stand erect. Latest ripening of the fall varieties. Best choice for warmer sites. #1 fall variety in the U.S.
- Redwing - Medium-large sized fruit, firm, good flavor and excellent quality. Bears early.
- Summit - Small-medium sized fruit, medium red color, firm. High yielding. Bears early.
- Amity - Medium red fruit, early to mid-season. Very good productivity and flavor.

**Blackberry**

Blackberries are biennials and begin bearing the year after planting. Plants may produce 15 years, but best production is during years 3 through 8.

- Brazos - High-yield, large, acid-flavored fruit, better for cooking than for fresh market.
- Rosborough - Large fruit, higher yields and sweeter than Brazos, early bearing.
- Shawnee - Large fruit late in the season. Fruit is soft; does not ship or store well.
- Choctaw - Medium to large soft fruit, early season, small seeds.
- Arapaho - Medium, firm, high-quality fruit over a four-week season. Very productive and resistant to double blossom and rust.
- Hull - Medium fruit is acid-flavored if not fully ripened to a dull, black color.

**PLANTING**

Most small fruit plants are sold as bare-root stock. Plant as soon as the ground can be worked and while the plants are still dormant. Plants purchased in containers can be planted any time the ground is workable.

Organic matter should be worked into the soil prior to planting. Adding 2 to 6 inches of compost or rotten manure will greatly improve soil structure. Using organic matter high in carbon, such as saw dust or wood chips, may render nitrogen unavailable in the soil.

The hole should be dug-loosened five times wider and as deep as the root ball. Removing soil deeper than the root ball is not necessary, however loosening the soil in the bottom of the hole with a spade or fork may improve deep root growth. The deeper the soil is prepared the greater chance of deep root growth, but settling may also occur. Be sure that soil in the bottom of the hole is well settled before planting.

Set plants in land previously prepared by a thorough cultivation and weed-control program. Set the plants about 2 inches deeper than they grew in the nursery. Firm the soil around the plant, then cut off the "handle" about 2 to 3 inches above the soil line.

**SPACING**

**Blueberry** - Highbush blueberries require 4 feet between plants and 6 to 8 feet between rows if grown as a hedge-row. Allow approximately 25 square feet per plant when used in a landscape .

**Currant and Gooseberry** - Space the same asighbush blueberry.

**Kiwifruit** - Plant 15 to 20 feet apart in rows that are 10 to 12 feet apart. Each plant requires 150 to 200 square feet of space.

**Raspberry** - Plant 24 to 30 inches apart in rows that are 8 to 10 feet apart.

**Blackberry** - Plant root cuttings horizontally in the ground 2 to 4 inches deep and 2 to 3 feet apart in rows that are 8 to 12 feet apart.

**IRRIGATING**

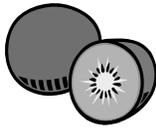
Irrigation is essential for new plantings and mature bearing plants. Begin irrigating in March or April and reduce watering in September to slow new growth and allow hardening of the canes. Infrequent winter irrigations may be needed during drought years. Raspberries need additional water between bloom and harvest. A thorough soaking to 20 inches is preferred to more frequent, shallow sprinkling.

**PRUNING and TRAINING**

**Blueberry**—Blueberry is a perennial plant that will live a very long time. Pruning is necessary to keep the plant vigorous and healthy. Blueberries have multiple stems arising from an above ground crown or below ground rhizome system. New stems are produced every year if the plant is vigorous. The ideal plant will have 10 stems of varying age. Removing five year old stems and the smallest new stems will insure a good balance. When removing stems cut them at the crown or at ground level, depending on where they originate. Half-high varieties, if stems arise from rhizomes, will best be pruned by cutting the entire plant at ground level every 2 or 3 years. Otherwise, prune as you would a high-bush plant.

**Currant and Gooseberry** - Currant and gooseberry are perennial plants. Pruning is necessary to keep the plant vigorous and healthy. These berry bushes have multiple stems arising from a below-ground crown. New stems are produced every year if the plant is vigorous. Removing five-year-old stems and the smallest new stems will insure a good balance. When removing stems cut them at ground level.

**Kiwifruit** - Kiwifruit grows similar to grape, supported by a trellis system. The trellis consists of six-foot high sturdy T-bar supports with 3 to 5 parallel wires to support the trunk, cordon, one-year-old fruiting arms and the current year's growth that will bear fruit.



Pruning and training are done to manage the shoots and for ease of harvesting. Fruit is produced near the base of current season's growth. Newly established plants are managed similarly to grape; the young plant is trained straight up to form a trunk. However, with kiwifruit the trunk needs to grow up as high as the trellis, six feet.

**Blackberry and Raspberry** - Blackberry and raspberry are members of the Rose Family, and are often called brambles. Both blackberry and raspberry have perennial roots and biennial tops, that is, the roots live for many years and the stems, sometimes referred to as canes, live for two years. First year canes are called primocanes; second year canes are floricanes.

**Blackberry** - Primocanes (first year) only produce rapid vegetative growth. Cut primocanes back when they reach 36 to 48 inches to encourage branching. Flori-

canes (second year) bloom and produce fruit in spring. After fruiting the floricanes die and should be cut to the ground. Long handled loppers are best for pruning blackberries.

**Summer-Bearing Raspberry** - Like blackberries, summer-bearing raspberries produce crops on the floricanes only. Cut the floricanes at ground level immediately following harvest. At this time it is best to thin the primocanes to 3 to 4 per square foot. Save only the strongest, straightest primocanes to become the floricanes for next year's crop. The row should be roto-tilled to 16 inches wide in the spring.

Raspberry varieties Nova and Nordic are summer-bearing but exhibit some fall-bearing characteristics. If a fall crop occurs on the primocanes, cut just below where fruiting occurred immediately following harvest. After the summer crop is produced on the floricanes the following year, cut the floricanes at ground level. Thin primocanes to 3 to 4 per square foot.

**Fall-Bearing or Ever-Bearing Raspberry** - Some raspberry varieties produce flowers the first year when cane elongation ceases in mid- to late summer. These types are referred to as primocane-fruiting, fall- fruiting, fall-bearing or ever-bearing.

The degree to which a variety flowers in the fall determines the potential flowering in the second year. Once a node on the primocane has produced flowers it will not produce at the same node the next year. Every node on the cane has the potential to produce flowers, if not in the first year then in the second year. A true "ever-bearing" variety produces a harvestable fall crop on the primocane and a harvestable summer crop on the overwintered floricanes. Generally, strong fall-fruiting varieties do not make good summer bearers. Fruiting on the raspberry starts at the tips of the cane and progresses down the cane as the season continues.

Fall-bearing varieties bear fruit on the current year's growth. The best fall bearers will flower on a high percentage of the nodes. If the cane is overwintered, there is very little potential for a spring crop. Since that cane does not have a desirable crop potential, it is best to remove it to make room for new primocanes. Cut primocanes at ground level following harvest. Prune raspberries with hand pruners or with a sharp rotary lawn mower. The row should be roto-tilled to 8 inches wide in the spring.

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