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Small Fruits

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Needs introductory paragraph

HORTICULTURAL CLASSIFICATION OF SMALL FRUITS

| Common Name | Family | Scientific Name | Type of Fruit |
|----------------------|-----------------|------------------------|----------------------|
| Blackberry | Rosaceae | <i>Rubus sp.</i> | aggregate |
| Blueberry | Vaccineaceae | <i>Vaccinium sp.</i> | berry |
| Currant & Gooseberry | Grossulariaceae | <i>Ribes sp.</i> | berry |

| | | | |
|------------|---------------------------|---------------------|-----------|
| Elderberry | Adoxaceae | <i>Sambucus</i> | berry |
| Grape | Vitaceae | <i>Vitis spp.</i> | berry |
| Raspberry | Rosacea | <i>Rubus spp.</i> | aggregate |
| Strawberry | Saxifragaceae | <i>Fragaria sp.</i> | aggregate |

Raspberries and blackberries are the two major bramble fruits grown in Utah. Brambles are members of the rose family and of the genus *Rubus*. Most plants in this genus are called brambles because of the thorns on the stems but there are some thornless cultivars.

The fruit is an aggregate fruit made up of many small drupelets. The raspberry fruit is made up of several rows of drupelets that grow around the receptacle. When ripe, the raspberry fruit easily separates from the receptacle tissue. Blackberry fruit grows around the receptacle tissue but when ripe blackberry fruit is harvested, the receptacle tissue stays inside the fruit.

General Botany

All brambles have a perennial root system. Bramble canes are normally biennial, and the first year, plants produce vegetative canes (primocanes). During the first year the primocanes form flower buds, which flower and produce fruit the following summer.

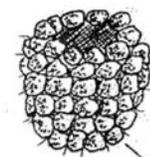
The second year's growth is a fruiting cane (or floricanes). The cane typically dies after fruiting the second year. New primocanes grow every year from the plant crown. Each year a plant has primocanes and floricanes.

Site Selection

Location

Brambles require full sun. If planted next to a fence, choose a southern exposure and keep plants in a narrow row to allow good light to all canes. They prefer protection from strong winds but need air movement around the plants.

Aggregate Fruit



Drupelet

Soil Preparation

Brambles need good drainage. Most roots grow in the top 20 inches of soil and are easily damaged by overwatering. Before planting brambles, add organic matter to increase soil drainage, tilth and productivity. Growing a cover crop for a year also improves the soil. Plant the cover crop in the spring, till it into the soil in the fall, and plant the brambles.

Use raised beds to improve drainage and help control weeds. Make the beds 10 to 12 inches high. Raised beds are not needed in sandy soil.

Plant Selection

Purchase certified virus-free plants from reputable nurseries. Place catalog orders or reserve plants at local nurseries early in the season to get the best varieties. Specify a shipping date to allow planting at the right time.

Planting bare-root starts in the spring is better than using potted plants later in the season. Potted starts are more expensive and the quality is often inferior. Select the best cultivars for the location.

Establishment

Spacing

Plant rows that are a maximum of 3 feet wide to allow good light penetration through the canes and make harvesting easier. More narrow rows give higher yields and larger berries. Determine the distance between the rows by the equipment width. Allow sufficient space for hand cultivation or tilling between the rows.

Space the plants 2-3 feet apart. Closer spacing establishes the beds faster if cost is not important.

Planting

Never let bare-root plants dry out. Keep them moist before planting and cover them so the plant crown is just below the soil level.

Early Care

Water management is critical the first 6 weeks after planting. Keep the soil moist but not waterlogged. Most soils need water every 5-7 days during establishment. Avoid adding fertilizer when planting as excess fertilization damages the roots or can stimulate excessive top growth before the roots develop.

Weeds damage bramble plantings. Mulching helps control annual weed problems. Avoid excessive cultivation around young plants to protect developing roots. Herbicides can help control weeds, but take extreme care to avoid damaging the new shoots.

Pruning and Trellising

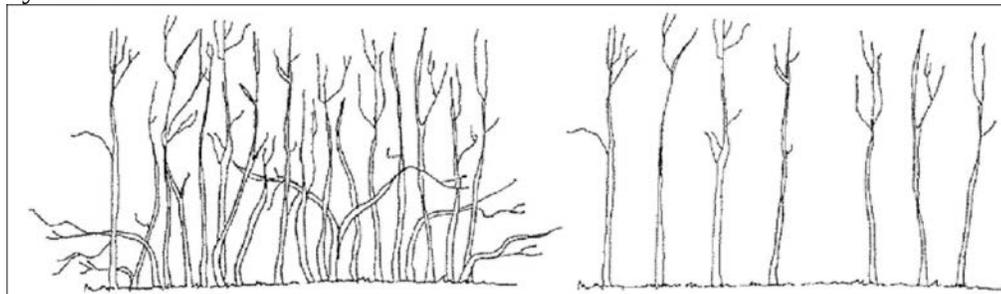
Trellising

Growing brambles on trellises helps reduce cane breakage, keep fruit off the ground and makes harvesting easier. There are many different trellising systems, so it is important to build them to fit the needs and the budget.

Pruning June-Bearing Raspberries

Prune June-bearing berries before they start growing in the spring. Remove all dead wood near the ground level. Avoid topping most varieties unless winter damage has killed the ends of the canes. If canes need topping for training or harvesting, keep them as long as possible to promote maximum production.

If the canes are too numerous, remove the weaker ones. Thin them out to not more than seven large canes for every foot of row.

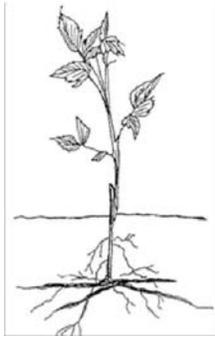


Before After

Pruning Ever-bearing Raspberries

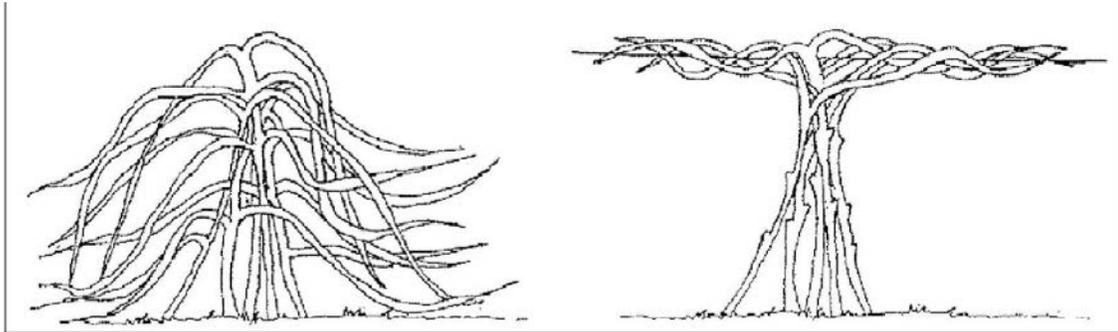
Ever-bearing raspberries have two acceptable pruning methods. For summer and fall crops, use the previous pruning techniques for June-bearing plants. Ever-bearers can be topped more severely in the spring to promote branching and larger yields, and this method provides two smaller harvests.

To produce one heavier crop in the fall, prune ever-bearers by cutting all the canes to 2-4 inches, just as growth begins in the spring. The new canes will grow that summer and produce in the fall until a hard, killing frost.



Pruning Blackberries

Prune blackberries like June-bearing raspberries but top the canes at 2-4 feet to promote branching and reduce excessive cane growth. Encourage new cane growth by removing older, larger canes every spring. Blackberries can be pruned to the ground every other year. This method only produces crops every other year but reduces the difficulty of pruning thorny plants. Thornless berries are easier to manage but are less hardy and often have lower yields.



Before After

General Care

Fertilization

Nitrogen is the most critical nutrient for brambles. Sandy soil needs more nitrogen than clay soil. Use soil tests to determine nutrient needs on large areas but a general recommendation is to apply 30 pounds of actual nitrogen per acre which equates to one cup of ammonium sulfate per 10 feet of row.

Apply fertilizer in the early spring. Add other nutrients if soil tests indicate a need or if deficiencies become visible.

Irrigation

Brambles are very sensitive to excess soil moisture and develop root rot, iron chlorosis and other problems if over-watered. Apply 1-2 inches of water per week throughout the growing season as infrequently as possible, depending upon the soil type. During fruiting, plants may need additional

water to promote larger berries.

Mulches

Apply organic mulch after the soil has warmed in the spring to conserve moisture, reduce weed growth and improve the soil. When using undecomposed mulches, add extra nitrogen help decompose the material. Common mulches include straw, grass clippings, sawdust, bark chips, paper and compost. Plastic mulches or weed barrier fabrics are not recommended because they prevent new primocane growth.

Raspberries

Raspberries have fibrous root systems that produce shoot buds where canes develop. Cultivated raspberries are red, black, yellow, and purple. Raspberries are self-fruitful and are pollinated by insects or wind.

Two different types of raspberries grow in Utah. June bearing raspberries have true biennial canes, and produce primocanes the first year and floricanes the second. Ever-bearing raspberries produce primocanes the first year that flower and fruit in the fall so they are sometimes called fall-bearing raspberries.

June-bearing Raspberries

Canes begin growing in the fall or early spring and continue throughout the summer. The canes grow 4-12 feet the first year under ideal conditions. Second-year canes do not grow taller but may produce branches.

The canes flower and produce fruit in the second year. The middle three-fifths of the canes usually produce the largest quantity of fruit. Fruit production starts in June and continues to the end of July, depending upon the cultivar and weather conditions. After producing fruit, the canes die.

| (Summer) JUNE-BEARING RASPBERRIES | | | | |
|-----------------------------------|------------|-----------|------------|-----------|
| VARIETY | SIZE | FLAVOR | PROCESSING | YIELD |
| Chilliwack | Large | Excellent | Good | Good |
| Latham | Medium | Good | Good | Good |
| Newburg | Large | Excellent | Good | Excellent |
| Titan | Very large | Fair | Good | Excellent |
| Tulameen (50 days) | Large | Good | Good | Excellent |
| Royalty | Large | Good | Excellent | Excellent |
| Canby (thornless) | Medium | Excellent | Excellent | Good |

Ever-bearing Raspberries

Canes begin growing in the fall or early spring and continue throughout the summer. Ever-bearing canes can bear fruit on the tips of primocanes in the fall. As the cane reaches a certain height (determined number of nodes) the top bud turns from a vegetative to a floral bud. This continues down the cane, producing flowers from the top down. This process continues until hard frosts stop growth.

Ever-bearers also produce a spring crop from the buds that do not produce in the fall. This crop is produced in the lower part of the cane, usually from June through July.

| EVER-BEARING RASPBERRIES | | | | |
|--------------------------|--------------|-----------|------------|-----------|
| VARIETY | SIZE | FLAVOR | PROCESSING | YIELD |
| Heritage | Medium | Excellent | Good | Excellent |
| Ruby | Large | Good | Good | Excellent |
| Redwing | Medium | Good | Good | Good |
| Summit | Small-medium | Good | Excellent | Excellent |
| Amity | Medium | Good | Excellent | Good |

Blackberries

Blackberries are very similar to raspberries. They are perennial plants that produce their fruit on biennial canes. Some blackberries produce later in the season and the canes can survive and produce new vegetative growth after fruiting, but will not produce fruit a second time. Grow blackberries similar to June-bearing raspberries. As the floricanes (second year's canes) produce fruit, remove them and new canes will grow from the roots.

There are three types of blackberries: trailing, erect, and semi-erect. Trailing types are the most common, and take the most room and time to grow. Although most blackberries have thorns, many thornless varieties are now being cultivated. Most thornless blackberries are not as hardy and may need winter protection in Northern Utah. Hybrid blackberries, such as Boysen and Logan are trailing types and are often referred to as Boysenberry or Loganberry. The thornless varieties of these hybrids are tender and require some protection in most winters.

Protect the canes by laying them on the ground and covering them with mulch. As soon as the weather begins to warm in the spring, remove the mulch and tie the canes back on the trellis.

| BLACKBERRY VARIETIES | | | | |
|----------------------|---------------------|--------|------------|--------|
| VARIETY | THORNLESS AVAILABLE | FLAVOR | TYPE | SIZE |
| Hull | X | Good | Trailing | Large |
| Chester | X | Good | Trailing | Large |
| Black Satin | X | Good | Semi-erect | Medium |

| | | | | |
|---------|---|-----------|----------|--------------|
| Navajo | X | Good | Erect | Small |
| Arapaho | X | Excellent | Erect | Medium |
| Boysen | X | Excellent | Trailing | Large |
| Apache | X | Good | Erect | Large-medium |

STRAWBERRIES

General Botany

Strawberries are the most popular berries raised in Utah home gardens. They can be grown in containers, in small gardens, or used as ornamental plants. They are short-lived perennials, and the best production for most strawberry varieties comes in the first through fifth year.

There are hundreds of strawberry cultivars but not all are adapted to Utah's growing conditions. Each cultivar has advantages and disadvantages. Selecting the right variety insures the desired results. The three types of strawberries are June-bearing, ever-bearing, and day-neutral. All three types grow and produce abundantly in Utah.

June-bearing strawberries need the short fall days to initiate (set) flower buds. All the flowers that are going to blossom the following summer are set in the fall. They produce one abundant crop in the early summer, usually beginning production in early June.

Plant these types for a larger but more concentrated harvest because they produce more in a shorter time period.

Because the flower buds are produced in the fall, some cultivars need extra protection during the winter to protect the set flower buds. Cover the plants with organic mulch, such as straw. Once the weather warms in the spring and growth begins, remove the mulch.

| JUNE-BEARING STRAWBERRIES | | | | |
|---------------------------|-----------|--------|-----------|--|
| VARIETY | FLAVOR | SIZE | YIELD | COMMENTS |
| Tioga | Good | Large | Good | Firm berries; grown in moist soil conditions |
| Hood | Excellent | Medium | Fair | From Oregon |
| Shuksan | Tart | Medium | Good | Excellent for preserves |
| Guardian | Excellent | Large | Excellent | Does very well in Utah |
| All-star | Excellent | Large | Good | Very good flavor |

Ever-bearing strawberries initiate flowers in the fall that produce the following summer. They also initiate flowers during the summer months. This allows them to produce a second crop in late summer. During cooler periods in the summer, they also produce occasional berries. Most true ever-bearing plants are being replaced with day-neutral varieties.

| EVER-BEARING STRAWBERRIES | | | | |
|---------------------------|-----------|--------|-------|--------------------------------------|
| VARIETY | FLAVOR | SIZE | YIELD | COMMENTS |
| Ft. Laramie | Excellent | Medium | Good | An ever-bearer with excellent flavor |

Day-neutral strawberries do not require a short day (long night) to initiate flowers and fruit production. They start to produce once they reach a determined maturity level, normally during the late summer of their first year. They produce a larger crop in the early summer and late fall and a sporadic crop throughout the summer. Cooler temperatures increase production during the summer months.

| DAY-NEUTRAL STRAWBERRIES | | | | |
|--------------------------|-----------|--------|-----------|---|
| VARIETY | FLAVOR | SIZE | YIELD | COMMENTS |
| Hacker | Good | Medium | Good | Several flushes of production each summer |
| Brighton | Fair | Large | Fair | California release |
| Tribute | Excellent | Large | Good | Firm berries |
| Tri-Star | Excellent | Large | Excellent | Great tasting with high yields |

Site Selection

Location

Strawberries require a minimum of 8 hours of sunlight to produce a good crop. They grow in shady locations but fruit production and plant vigor are reduced. Strawberries prefer well-drained soil with abundant organic matter. They are susceptible to root rot in heavy, wet soils but grow in most well-drained soils.

Soil Preparation

Incorporate 2-6 inches of organic material in the soil 2-4 weeks before planting. Apply nitrogen fertilizer to insure organic matter decomposition.

Raised beds improve drainage, raise soil temperatures in the spring making picking easier. Raise the soil 8-12 inches and keep the beds 18 to 36 inches wide. Determine the distance between the rows by the cultivating equipment and desired working space, but keep a minimum of 18 inches between rows.

Plant Selection

Buy strawberries as bare-root plants in the spring. Purchase them at reputable garden centers or from catalogs. They are normally sold in bundles of 25. Make sure the plants have been kept moist and the roots are still healthy.

Strawberries are available later in the season as potted plants. These are more expensive and are not any more productive than less expensive bare root plants.

Establishment

Planting and Spacing

Strawberry plants need space to produce the most berries. Plant them a minimum of 8 inches apart in a

single row or offset by 6 inches in an off-set row. This gives each plant room to grow and still have sufficient light, water, and nutrients.

Single Row X 8" X X X X X

Depth Single Row

Plant six to 10 inches apart, placing rows 1 1/2 to 3 feet apart.

Multiple Row

Offset plants to put two to three rows together at six- to eight-inch spacing.



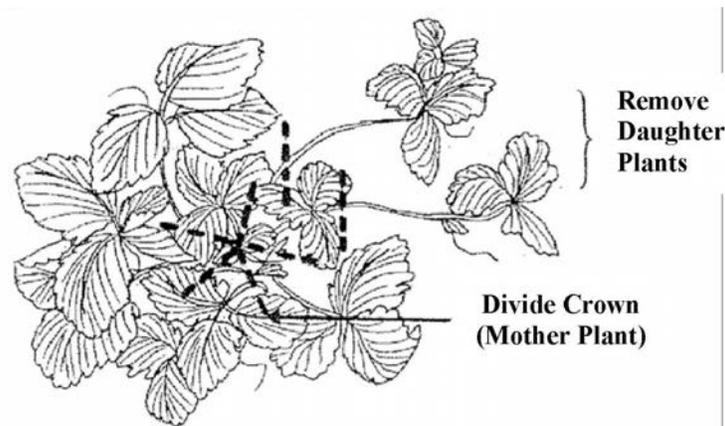
| Multiple Row | |
|---------------------|----------|
| X 6" X | X |
| X X | |
| X X | X |
| X X | |
| X X | X |

The planting depth can be very critical to a young plant. The soil level should be in the area between the crown and roots. If too deep, the crown will rot. If too shallow, the roots will dry.

Plant Characteristics

The original bare root plant is called the mother, or first generation plant. It has one crown, roots, and top growth. Once the mother plant is established it sends out runners that can root at every other node. Once the runners root, they are called daughter plants. Daughter plants are one generation removed from mother plants and are generally less productive. These daughter plants propagate new plants, but the further removed from the mother plant (in generations) daughter plants are, the less productive the plants will be.

Strawberry plants also reproduce by growing additional crowns. Propagate these dividing the mother plant every couple of years. The original crown multiplies and produces 4 to 20 new mother plants annually. Divisions are more desirable than daughter plants and generally yield better. Dividing the crowns every spring reduces competition and develops healthier, more productive plants.



As the mother plants divide and increase the number of crowns, they compete for water, light and nutrients. This reduces production and reduces plant health. Thin the crowns to 5 to 10 crowns per plant.

Early Care

Remove runners and developing daughter plants that take energy away from the mother plant during the first year. This encourages strong crown and root growth that will yield better in the future. Plants do not need fertilizer the first year. Keep them evenly moist but not too wet.

Annual Maintenance

Fertilization

Strawberries normally require minimal amounts of nitrogen. Add 1 cup ammonium sulfate per 10 feet of row after fruiting is finished. Add a complete fertilizer every three to four years if soil tests or symptoms indicate a need.

Irrigation

Strawberries are sensitive to over-watering but they have a shallow root system and require up to two inches of water per week during fruiting. Strawberries are somewhat drought tolerant, but production drops with insufficient water.

Mulches

Strawberries are not very competitive and yields drop if weeds infest the planting. The best weed control method is using organic or synthetic mulches. Apply organic mulches in the late spring after the soil warms up. These mulches break down and improve the soil. Add extra nitrogen if needed to break down the mulch.

Plastic or weed barriers also help control weeds. These mulches warm the soil in the spring, conserve moisture, and keep daughter plants from developing and crowding the patch.

Plant Rotation

Remove and replace strawberry plantings every 4-6 years. Older plants yield less and have often developed disease and insect problems. When possible, rotate to a new spot when replanting a bed to reduce these problems. Remove the existing patch in the fall and prepare the new location for spring planting.

GRAPES

General Botany

Grapes are one of the most important and widely grown fruit crops in the world. They have many uses including fresh eating, juice or wine preserves, and as landscape plants. Most grapes are temperate-zone fruits that require cool winters and warm growing seasons to ripen the fruit. Grapes prefer low summer humidity and rainfall with a long growing season. Grapes grow in most areas of Utah.

The three best types of grapes for Utah are American, European and Euro-American hybrids.

European grapes have firm fruits with a skin that remains attached to the flesh. These grapes have many uses including fresh eating, wine and raisins. Common cultivars include Black Monukka, Flame, Thompson Seedless, Zinfandel, and White Riesling. European grapes grow well in warmer areas of the state but often winterkill or fail to produce a crop in Northern Utah.

American grapes are softer and their skin separates from the flesh when eaten. They tolerate cooler climates and shorter growing seasons than European grapes. Most grapes grown in Utah are American. The most famous American grape is Concord, but other cultivars are Buffalo, Fredonia, Himrod, Interlaken, and Niagara.

Euro-American hybrids have the foliage and the non-slip skins of the European grape, but their strong flavor is more like American cultivars. They are very adaptable and can withstand colder temperatures than most European types. Varieties include Suffolk Red, Canadice, Interlaken and Himrod.

| COMMON GRAPE CULTIVARS | | | |
|------------------------|--------|-------------|----------|
| CULTIVAR | SEASON | FRUIT COLOR | COMMENTS |
| JUICE GRAPES | | | |

| | | | |
|--------------------------------|-------------|------------|--|
| Concord | Mid-season | Red | Excellent for wine; high sugar, good keeping quality. Most popular juice and jelly standard. |
| Buffalo | Mid-season | Blue-black | Earlier than Concord; same uses; juice must age. |
| Fredonia | Mid-season | Blue-black | Later than Buffalo; ahead of Concord; same uses. |
| Canada Muscat | Early | White | Mild, foxy flavor; early ripening |
| Niagara | Late season | White | Excellent for wine; good flavor. |
| TABLE GRAPES (Seedless) | | | |
| Suffolk | Mid-season | Red | Large table grape with excellent flavor. |
| Canadice | Early | Red | Productive; flavor similar to Delaware and seedless; high quality. |
| Interlaken | Early | White | Makes good raisins; very early; fruit tends to drop early; birds enjoy. |
| Himrod | Mid-season | White | Early with less clusters; makes good raisins |
| Lakemont | Late | White | Later than Himrod; makes good raisins. |
| Venus | Late | Black | Large, early, excellent quality. |
| Glenora | Late | Black | Semi-hardy. |
| Reliance | Mid-season | Red | Excellent quality; productive, seedless and very hardy. |

Site Selection

Location

Grapes need full sun for maximum production. They produce best when rows are oriented north to south to allow light to the plant. Grow them along a south-facing fence in areas where they can be trellised.

Soil Preparation

Grapes prefer well-drained, high organic soils but are more tolerant of poor quality soils than other small fruits. They can be grown in heavier soils if they are not over-watered, but most American type grapes are very sensitive to iron chlorosis and the problem is aggravated by overwatering in alkaline soils.

Plant selection

Purchase bare root grapes in the spring or potted plants throughout growing season. Bare root plants are less expensive but require extra care. Check cultivars carefully and make certain they mature where planted. Many grapes grow in Utah, but the length of the growing season and their winter hardiness prevents production on some cultivars.

Spacing

Grapes require adequate growing room. They need a minimum of 6 feet between plants with 8-10 feet

between plants preferred for best growth. Leave enough space between rows for good light penetration and to work equipment.

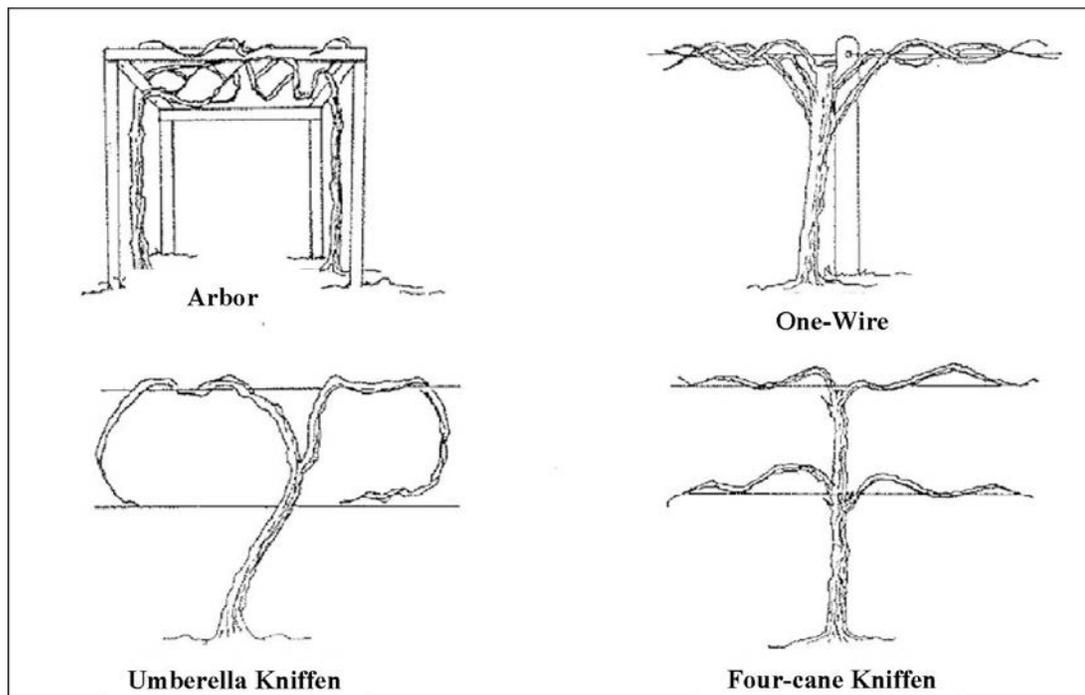
Trellising and Pruning

Grapes need to grow on some kind of support. There are many trellising systems, but if none are provided, grapes grow up trees, telephone poles, or other structures.

The most popular and easiest garden trellis is a rail fence, or a two- or three-strand wire trellis. Arbors are also good for growing grapes and they also provide shade. Avoid chain-link fences because the vines entwine into the fence making them difficult to prune and maintain.

Trellises must support the fruit and plant weight and withstand strong winds and snow. Build them out of sturdy weather-resistant materials.

The following are trellising ideas for home landscapes.

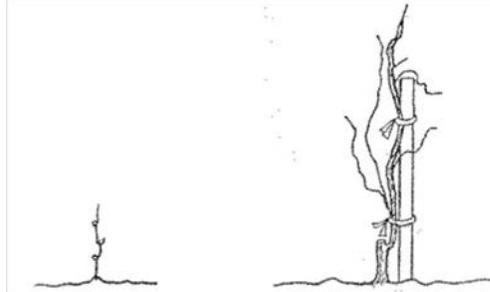


Pruning

In Northern Utah, prune grapes using the cane pruning system. Other pruning methods are used for European grapes in southern Utah but cane pruning works well for American and Euro-American hybrids. Grapes bear on short vines growing from wood that grew the previous season. Once a cane produces, it does not produce again. Grapes are pruned more severely than any other fruit and up to 90 % of the previous season's growth might be cut away. Unpruned grapes have small clusters that are scattered among wild growth and are difficult to find. The vines get longer and more crowded each season and soon become unproductive and very difficult to manage.

Pruning First Year: After planting the grapevine in the spring, cut it back to 2 healthy buds on one trunk. This allows for 2-3 canes to grow and develop the first year, allowing a choice of canes to

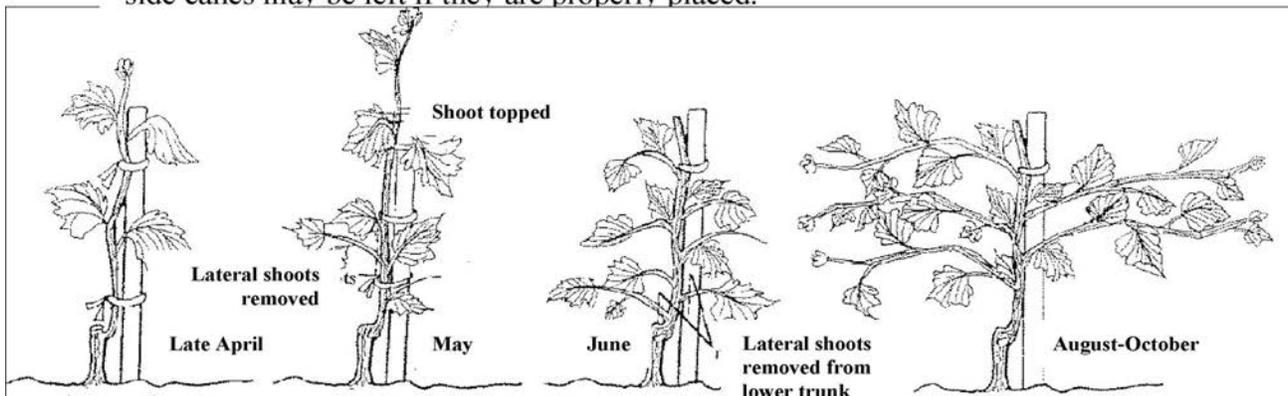
develop into the best trunk the following winter.



at planting after 1 years growth

Pruning Second Year: In second winter, leave one cane and train it into the main trunk. The trellis system determines the trunk height. Leave side canes if they are in the right place.

side canes may be left if they are properly placed.



Pruning Third Year: The third winter, prune the vine leaving 4-6 canes along the trellis. Head each cane back to 10-15 buds. Create four renewal spurs by pruning 4 longer canes located near the trellis wires back to 2 buds each.

Annual Pruning: Prune the mature vine each year, leaving 40 to 60 good buds on 4-6 four to six canes (10 to 15 buds per cane). The remaining wood should be a little thicker than a pencil, bright-brown colored, and pliable. Leave renewal spurs, each containing two buds. Next year's canes will arise from the renewal spurs left this year. The canes should be loosely secured to the trellis using plastic ties or tape.

Maintenance

Fertilization

Grapes require little, if any supplemental fertilizer. If the vines are not growing well, add a small amount of nitrogen in late winter. Excess nitrogen stimulates vegetative growth at the expense of good fruit production.

Irrigation

Grapes require between 1-2 inches of water weekly. They are more drought tolerant than most other berries and have deeper root systems. Water them as deeply and infrequently as possible. Over-watering aggravates iron chlorosis and other problems.

Mulches

Organic mulch reduces weeds and conserves moisture. Spread it around the trunk so it covers at least a 2-foot radius and spreads at least 2 feet

OTHER SMALL FRUITS

Currants

Currants grow well in Utah and are ornamental and productive. Currant cultivars are red, white and black and the most common native currant is yellow. Popular varieties include Red Lake, Cascade, White Grape, and Wilder.

Currants grow best in light, well-drained soil. Plant them in the spring, and space the plants 3-5 feet apart. They do not need fertilization at planting time. Currants have shallow root systems that are damaged by deep cultivation. Weed competition reduces plant growth and production, so apply mulch to reduce the weeds and the need to cultivate. Established plants need 1-2 inches of water a week for best production. Currants are drought resistant, but production declines without enough water.

Currants are not heavy feeders, so only add fertilizer if the plants did not grow well the previous year. Currants fruit on 1, 2, and 3 year-old wood. Remove wood older than 3 years to promote new bearing wood and keep the plant tidy.

Gooseberries

Gooseberries grow much like currants and are pruned and cared for much the same way. Varieties include Pixwell, Poorman, and Clark.

Blueberries

Blueberries are acid-loving plants and typically do poorly in Utah. Soil and water here are both very alkaline and blueberry plants deteriorate quickly. Growing the plants in pots or highly amended soils is

expensive and labor intensive. The soil and water must be constantly amended for the plants to grow and produce fruit. For more information consult Blueberries in Utah at http://extension.usu.edu/files/publications/publication/Horticulture_Furit_2009-01pr.pdf .

Review questions

1. What are the three types of raspberries?
2. What is the most obvious difference between black raspberries and blackberries?
3. What species of grapes are most commonly grown for juice production in Utah?
4. What age of vines or canes produce grapes?
5. Define fruiting cane and renewal spur in grape pruning.
6. Name the three types of strawberries that commonly grow in Utah.
7. What are three difficulties when growing strawberries in home gardens?
8. Name two other small fruits that grow well in Utah.