Basics of Growing Small Fruit Crops in *Mississippi*

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General Cultural Practices

Fruit production requires considerable effort, and some fruits require much more care than others. Fresh fruits can be available throughout the growing season with the proper selection of sites and varieties (cultivars). This publication provides hobbyists and homeowners with the basics of growing fruit and nut crops in Mississippi. In addition, the Mississippi State University Extension Service website features numerous publications with detailed information on several crops mentioned in this primer.

Soil Characteristics

Deep, well-drained soil of good fertility should be selected. A fertile, sandy loam or sandy clay loam is suitable for most fruit crops. Adequate drainage is the most important soil characteristic. Proper fertilizer applications and other cultural practices can easily improve poor soils, but improving soil with poor internal drainage is difficult and expensive. Fertile soil is desirable, and deep, well-drained soil is vital. A soil's internal drainage rate can be determined by digging a post hole 8 inches in diameter and 2.5 feet deep. Then, fill it with water. If the hole drains in 24 hours, the soil has excellent drainage and is suitable for all fruit crops.

Certain fruit plants should only be planted on sites with excellent drainage. If the hole drains in 36 hours, the internal drainage is adequate for more tolerant crops. If a soil is more poorly drained, few fruit plants can tolerate these conditions. If the hole hasn't drained in 48 hours, the site is unsuitable for fruit production. In this case, crops could be planted on raised beds or in containers. In areas with heavy rainfall, hillside plantings provide good surface drainage.

Air Movement

Good air drainage is essential. Cold air, like water, flows downhill. For this reason, fruit buds on plants set in a low spot are more likely to be killed than those on a slope. Frost pockets, low wet spots, and locations exposed to strong prevailing winds should be avoided. South-facing slopes encourage early bud development but can sometimes result in frost damage. For this exposure type, select late-maturing varieties.

Sunlight

Plant fruits in areas that receive full sunlight. Avoid areas shaded by taller trees, houses, or buildings. Most fruiting plant buds require 30 percent sunlight to produce high-quality fruit. Although the plant's exterior may receive full sun, sunlight can be reduced by one-half, just 12 inches inside the canopy. Eighteen inches into the canopy, light may be reduced by nearly 75 percent, which is below the level needed for successful fruit production. Partially shaded plants may also have increased disease problems; thus, proper pruning is essential.

Planting Considerations

Match plant sizes to the available space. For novice growers, choose fruiting plants that bear early and produce well in most areas. Small fruit plants can be grown in containers and moved into the orchard as they mature. Fruiting plants will grow more vigorously and bear better if they have adequate space to develop their root systems. Do not plant where the roots of forest or shade trees will compete with them. To reduce competition from weeds or grass, cultivate, mulch, or apply an appropriate weed killer. Some small fruit plants may require pruning to train them to systems suitable for the species.

Develop a plan well in advance of the planting season. Determine the kinds of fruits, varieties, and quantities of each that are needed. Locate a source of plants and arrange for them to be available at the desired time. Perennial weeds such as bermudagrass and johnsongrass compete heavily with young plants and should be eliminated before planting. This can be done by spraying with a postemergence herbicide in late summer the year before planting. Supplemental water should be provided in the summer for best survival and production. Be sure to locate fruit plantings near a water source.

If possible, set the plants in the planting site immediately after arrival. If roots are dry, completely immerse them in water for a few minutes or overnight before planting. Always water plants immediately after putting them into the soil. Never allow the roots to dry out or freeze. When planting is delayed several days, plants should be heeled in by forming a mound of loose soil or mulching material. Place the roots into this mound, cover them, and moisten. The plants may be vertical or horizontal so long as the roots are covered. This protects them from drying or freezing.

Alternatively, small plants can be enclosed in plastic and stored in a refrigerator. Check them periodically to ensure they are not drying out or staying too wet. At planting, set the plants about the same depth that they grew in the nursery. Trim off broken and dried roots. Place topsoil around the roots, and firm the soil to exclude air. Settle the soil with water and make sure the roots are spread in a natural outward position. Leave a small basin 1 or 2 inches deep around the tree to aid in water retention. Prune back the top by one-fourth to one-third to reduce transplant shock.

Fruit Selection

The first step is selecting the type of fruit to grow. A region's climate determines the fruit one can grow successfully. The climate must be compatible with the growing requirements of the selected fruit crop. Climatic conditions vary greatly from one region to another in Mississippi, so make sure that your fruit of choice can grow successfully in your area. Note also that different crops require different levels of management. Low-management crops require less attention to training, soil fertility, or insect and disease control.

On the other hand, some fruits require intensive management. After evaluating a planting site, select fruit varieties adapted to the area. Consult the many MSU Extension publications online for specific recommendations as well as experienced fruit producers in your area. Select different varieties to extend the harvest of ripe fruit during the growing season. Several fruit crops require that at least two varieties be planted together for cross-pollination.

Pollination

Flowers of fruiting plants must be pollinated to produce fruit. Without sufficient pollination, they may blossom abundantly but not bear fruit. Varieties that bear fruit from pollination among their own flowers are said to be "self-fruitful" or "self-fertile." However, some varieties cannot produce fruit from their own pollen and require pollen from a different variety of the same species. Most fruiting plants are pollinated by insects; however, some (e.g., muscadines) are at least partially wind pollinated.

Chilling Requirements

The chilling requirements (hours below 45°F) of fruiting plants vary. These thresholds must be considered when selecting varieties for specific geographic regions. Generally, varieties with as few as 300 to 400 chilling hours may be grown south of Hattiesburg, while varieties having requirements of 500 hours or more may be grown throughout most of the state. For more information on chilling hours, refer to MSU Extension Publication 3067 Chilling-Hour Requirements of Fruit Crops. The web-based app Chill Hours is also available to track chill hours during the dormant season.

Plant Maintenance

During the first summer after planting, control weeds and mulch around the fruit plants to reduce competition from other plants and to conserve moisture and nutrients. Irrigation is especially important in the first few years while the planting becomes established. Success with a fruit planting depends on how well the orchard or garden is planned and how the plans are carried out.

Unfortunately, in most cases, it is not possible for fruit crops to be planted and produce quality fruit with little to no effort. Proper attention must be given to all phases of production: variety selection, soil preparation, plant nutrition, pruning, and pest control. Plant only what can be properly cared for. It is better to have a small, well-tended planting than a large, neglected one..

Weed Control

Weed control during the first two years is one of the most difficult and critically important parts of establishing a fruit planting. Weeds compete with fruit plants for water, nutrients, and sunlight. Weeds also decrease harvesting efficiency and interfere with maintenance operations. Additionally, they can harbor insect pests and diseases. Effective weed control begins 6 to 12 months before planting by combining herbicide application and cultivation. Planting rows should be thoroughly prepared and weed free at the time of planting. A 4-foot-wide, weed-free strip should be maintained, centered on the plant row, throughout the life of the planting.

Sod should be established in the middles between the rows and maintained by mowing. Some native grasses are better choices than bahiagrass, bermudagrass, or centipedegrass, which grow much faster and require more maintenance. Several herbicides are labeled for use in fruit production. Always follow label instructions carefully when using any herbicide. Preemergence herbicides act by forming a protective layer on bare soil that prevents seedling emergence. They are not effective if applied over organic mulches or heavy leaf litter. Postemergence herbicides control weeds that have emerged and are actively growing. Most growers apply postemergence herbicides to the weed-free zone, using a shielded sprayer, to prevent the herbicide from getting on the plants. For the latest information, visit the Southern Region Small Fruit Consortium Integrated Pest Management (IPM)/Production Guides page.

Mulching

Mulching with organic materials, such as pine bark, pine needles, leaves, hay, or other organic materials, is very beneficial. Mulch helps control weeds and keep soil cool, loose, and uniformly moist. Mulch should be 4 to 6 inches deep and cover a 4-foot band centered on the plant row. Replenish the mulch as it deteriorates. Deteriorating mulch adds organic matter to the soil and creates a favorable environment for root growth, but it can cause root exposure if not replenished.

Plant Nutrition

Fertilizer is usually applied to fruiting plants in the spring when growth begins and immediately after harvest. The exception is when fertilizer is injected into the irrigation system, in which case it is done on a weekly basis during the growing season (except during harvest). Some fruit plants, such as strawberries, are very sensitive to readily soluble fertilizers, and excessive amounts can cause plant injury or death. Using higher than the recommended rates can cause brown necrotic leaf margins or pale-yellow chlorosis of leaves and low vigor, particularly where too little water is applied. Do not concentrate fertilizer in a small area around plants.

Many forms of fertilizer are available, so choose one that best fits the crop of interest. Mature plants should receive the peak fertilizer rate. If fertilizer is being applied with a spreader, try to place most of the material in the row area (not between rows) to reduce weed growth and maximize fertilizer use by the plant. Consult the Southern Region Small Fruit Consortium Integrated Pest Management (IPM)/Production Guides page for more detailed information.

Irrigation

For optimum plant performance, many fruiting plants require 1 to 2 inches of water per week. Upland soils in the Gulf States region are well drained but have low water-holding capacity. Short periods without rain can severely stress plants. Applying water through irrigation is essential to maintain good plant health. Adding organic matter to the planting bed at the time of planting and applying surface mulch will help maintain a uniformly moist soil in the root zone. The rapid decrease in soil moisture during dry periods on non-irrigated plantings increases the concentration of fertilizer nutrients, which may damage plants. Irrigation lowers the concentration of nutrients in the soil solution and reduces the risk of fertilizer damage.

The most efficient method of irrigation is a drip (trickle) system. A well, pond, or lake may be used as a water source. If using water from a lake or pond, a filtration system must be used to prevent debris from plugging the drip emitters. Well water may need to be filtered if it contains sand or grit that could plug the system. The drip system operates on low water pressure and consists of polyethylene tubing laid down the row, buried in the soil or under the mulch layer, with emitters formed into the tubing or plugged into it at specific intervals. A calculated amount of water is discharged on the soil surface beneath each plant. Water requirements increase as plants increase in size and age. Water requirements also change during the growing season, with higher demand when fruit is present on the plant and during hot, dry conditions.

Pest Control

Effective management of pests depends on several factors, including correctly identifying insects and diseases. Recognizing common insects and diseases by their symptoms and selecting appropriate management practices for the specific situation are essential. One place to do this is through the Extension Plant Diagnostic Lab at Mississippi State University. Samples may be submitted to the laboratory through any county Extension office. If you are unsure about identification, take a sample to your local Extension office for assistance. Integrated pest management (IPM) includes good management practices, pest identification, variety selection, and biological, mechanical, and chemical controls. Scouting for pests in the field is an essential part of IPM.

To fully implement IPM principles, one must know the primary pests that attack the crop, understand their life cycles, and make decisions based on economic impacts. Sometimes the best option is to do nothing when levels of impact are minor. For complete information on implementing an effective IPM program, consult your local Extension specialist. For the latest information, visit the Southern Region Small Fruit Consortium IPM/Production Guides page.

Pruning and Training

Pruning and training are two of the most important cultural practices for managing fruiting plants. Pruning is simply the removal of parts of the plant. Training is directing the growth of the plant into the desired form through pruning. There are many reasons for pruning, probably the most obvious one being to reduce plant size to keep it within its allotted space. It is important to keep aisles open for equipment and to reduce the plant height for easier harvesting. Pruning and training can be used to form a strong framework that will support a heavy fruit load. Broken, dead, or diseased branches should always be removed, but probably the most important reason for pruning is to thin out the branches to allow light and air to penetrate throughout the tree.

The leaves of a fruiting plant use light to manufacture the sugars needed for growth and maintenance. If water and nutrients are in good supply, the amount of sugar a leaf can produce depends on the amount of light it receives. The leaves on shaded interior branches do not produce enough sugars for normal function, and any fruit produced on these branches will be small, poorly colored, and low in quality. Bloom and fruit set will be poor on shaded branches. The branches will weaken and eventually die.

Proper color development also depends on light, so increasing the light exposure of the fruit will improve color development. Fruiting and vegetative growth compete for the sugars produced by the leaves. If the plant is allowed to fruit too soon, vegetative growth will slow, and the tree will take longer to come into full production.

Some small fruit crops can be allowed to fruit in the first year, but some (e.g., blueberry) should wait until the second or third year to fully establish a good root system. The best time for pruning small fruit plants is usually during the dormant season (January, February, or early March), but some pruning can be done after harvest. The closer to bud break the better to minimize the chance of freeze damage.

Delaying pruning also allows for an assessment of winter damage to the flower buds and to leave more flower buds when pruning, if necessary. Most small fruit plants will benefit from annual pruning to maintain vigor and improve canopy light penetration. Growing quality fruit requires work, and proper pruning is only one of the needed components. Leaf and soil analysis, coupled with balanced plant nutrition, selection of adapted varieties, weed control, fruit thinning, avoiding water stress, pest and disease control, and careful harvesting and handling at the proper picking time are needed to optimize yield and fruit quality.

Caneberries

Caneberries include both blackberries (*Rubus* subgenus *Rubus*) and raspberries (*Rubus idaeus*, but also other species). Both fruits have perennial root systems but biennial canes. They are usually floricane (late spring/early summer) fruiting, but some types may be primocane (fall) fruiting. One of the issues with primocane-fruiting caneberries is that temperatures are often too hot when they begin to flower in Mississippi. This greatly diminishes fruit quality; therefore, floricane-fruiting varieties are preferred today. Blackberries are the recommended caneberries in Mississippi due to their ability to tolerate the climate.

Blackberries

Varieties (Cultivars)

Erect thorny and thornless blackberries do not require trellis support but may benefit from it. Varieties released from the University of Arkansas are well-adapted to Mississippi conditions, although many other varieties exist. Some common erect thorny varieties are Chickasaw, Kiowa, and Shawnee. Thornless erect floricane-fruiting varieties include Apache, Arapaho, Caddo, Natchez, Navaho, Osage, Ouachita, and Ponca. Trailing thornless blackberries have smooth, arching canes and require support on a trellis.

Primocane-fruiting varieties are becoming more available, although the fall crop is usually poor or non-existent in Mississippi due to high temperatures during flowering. However, the spring crops are equal to floricane-fruiting varieties. The varieties mentioned may be patented and should not be propagated without a contract, so verify the patent status before propagation.

Soil and Site Conditions

Blackberries can tolerate a wide range of soils but prefer a well-drained, loamy soil. Raised beds may be necessary if drainage is poor. Soil pH should be slightly acidic, between 6.0 and 6.5, but up to 7.5 is tolerable. Good air and water drainage is necessary, as blackberries can be susceptible to frost and root rot diseases.

Plant Establishment

Establishing a blackberry planting is relatively easy. Most often, rooted cuttings or whole plants are dug and transplanted. You can also use root cuttings, although this takes longer to establish a planting. Plants should be planted after the frost-free date in spring if they are actively growing. If they are dormant, they can be planted

earlier in the spring. Rows should be about 8 feet apart and plants 2 to 3 feet apart within the row. Sucker plants that come up between the rows may be removed as soon as they emerge. Harvesting can be a problem if rows get too thick, so yearly thinning of canes is necessary.

Plant Nutrition

Like all fruit crops, blackberries require fertilizer. Application rates should be based on an initial soil test. Apply fertilizer by using a split application at bloom and again after harvest. In most cases, a complete fertilizer (N-P-K) at 20 pounds per acre in the initial planting year will be sufficient to get the plants off to a good start. After the first year, nitrogen can be applied in a split application with 30 pounds per acre and another 10–20 pounds per acre after harvest depending on plant vigor. Phosphorous and potassium should be applied if the initial soil test indicates a need.

Irrigation

One of the most effective ways to conserve soil moisture is the use of mulch. Mulching with hardwood mulch will conserve soil moisture, reduce weed populations, and lower soil temperatures. However, an irrigation system will be necessary if maximum productivity is desired. Drip irrigation is most effective, as water is delivered directly to the root system. The most important time for irrigation is during flowering and fruiting, but dry conditions in mid-summer will also dictate the need for supplemental water. The amount of water to apply is difficult to recommend, as it is actually determined by weather and soil conditions, but one plant can need up to 48 gallons of water per week in extremely dry conditions.

Pruning and Training

Canes do not need to be pruned in the first year except to keep them in the desired area. All major pruning and thinning will be done in the winter when all dead and diseased canes are removed, as well as poorly growing canes and those that take up too much space. There should be only three to five canes per linear foot of row for sunlight penetration and proper air flow. Laterals should also be pruned back to about 15 inches long at this time.

Summer tipping is a procedure that encourages lateral growth and an increase in fruiting area. This is only done on new canes (primocanes), usually in June, for erect cane types. A trellis will be necessary for trailing varieties, but also may be necessary for erect varieties. A simple trellis system will help keep fruit off the ground and make it easier to harvest. The trellis can be as basic as one wire on either side of the row, about 2.5 to 3 feet tall.

Pest Management

Blackberries do not have many major disease or insect problems but dismissing them entirely would be a mistake. Major diseases include:

- Botrytis fruit rot (*Botrytis cinerea*)
- Phytophthora root rot (*Phytophthora* spp.)
- Rosette/Double blossom (*Cercosporella rubi*)
- Anthracnose (*Elsinoe veneta*)
- Orange rust (*Gymnoconia nitens*)
- Crown gall (*Agrobacterium tumefaciens*)

Insect pests on blackberries may be even more important to manage than diseases on the plants. The major insects include:

- Green June beetle (*Cotinis nitida*)
- Japanese beetle (*Popillia japonica*)
- Rednecked cane borer (*Agrilus ruficollis*)
- Raspberry crown borer (*Pennisetia marginata*)
- Spotted-wing drosophila (*Drosophila suzukii*)

Your local county Extension agent and the Southern Region Small Fruit Consortium IPM/Production Guides page are helpful resources for current and recommended pest control options.

Harvest and Post-harvest

Harvest generally begins in late spring or early summer of the second year. The harvest date depends on the variety; some bear fruit as early as late May and some not until July or even through fall until frost. The first large harvest can be expected in the third year with full production achieved by year five. Fruit will need to be hand-harvested by removing the fruit from the pedicel. The fruit should be harvested in the morning to reduce field heat and placed in shade immediately.

Harvesting of fruit will need to be done daily or every other day, as fruit is susceptible to depredation. Ripe fruit will be slightly soft, have fully enlarged drupelets, and be deep black in color. Additionally, the calyx often loses some green color, and the fruits should release easily from the plant. Once fruit is harvested from the field, it should be refrigerated immediately. When held in correct conditions, blackberries can last for several days. Refrigerator conditions should be 34 to 36°F and 95 percent relative humidity.

Raspberries

Varieties (Cultivars)

Raspberries, generally, are not extremely productive in Mississippi because of the fluctuating temperatures during winter and high temperatures during the summer. There are few thornless raspberries, but overall, the thorns are less intrusive than those of thorned blackberries. Raspberries come in both trailing and erect types. Trailing types must be trellised, while it's optional for erect types. There are several different colors of raspberries, including red, black, peach, purple, and yellow. Most red and yellow raspberries come from a European species (*Rubus idaeus*). These raspberries are cold hardy but do not tolerate fluctuating winter temperatures and high summer temperatures well. Therefore, they are not recommended for large-scale production in Mississippi. Areas under partial shade may be able to produce reduced amounts of raspberries.

Some common red erect summer fruiting varieties are Nova, Reveille, and Titan. There are many others. A trailing red summer fruiting raspberry that handles summer heat well is Dormanred, but it generally has poor fruit quality. Red erect fall fruiting varieties include Autumn Bliss, Caroline, and Heritage. Yellow-fruited fall fruiting types with erect canes include Anne, Fall Gold, and Kiwi Gold. The varieties mentioned may be patented and may not be propagated without a contract. Therefore, verify the status before propagating them.

Soil and Site Conditions

Raspberries prefer well-drained, loamy soils that are in the 6 to 7 pH range. Low spots should be avoided because flowers and fruit can be damaged by frosts and freezes. Raised beds may be necessary if drainage is poor in the planting area. For best growth in Mississippi, raspberries may benefit from partial shade to reduce being affected by hot afternoon temperatures.

Establishment

Most often, rooted cuttings or whole plants are dug and transplanted. You can also use root cuttings, although this takes longer to establish a planting. Raspberries should be planted after the frost-free date in spring if they are actively growing. If they are dormant, they can be planted earlier in the spring. Rows should be at least 8 feet apart and plants 2 to 3 feet apart within the row. Sucker plants that come up between the rows may be dug and moved into the row or merely removed as soon as they emerge. Harvesting the entire plant can be a problem if rows get too thick, so yearly thinning of canes is necessary.

Plant Nutrition

Application rates should be based on an initial soil test. When fertilizing, use a split application by fertilizing at bloom and again after harvest. In most cases, a complete fertilizer (N-P-K) at 20 pounds per acre in the initial planting year will be sufficient to get the plants off to a good start. After the first year, nitrogen can be applied in a split application with 30 pounds per acre and another 10–20 pounds per acre after harvest depending on plant vigor. Phosphorous and potassium only need to be applied if the initial soil test indicates insufficient amounts.

Irrigation

One of the most effective ways to conserve soil moisture is the use of mulch. Mulching with hardwood mulch will conserve soil moisture, reduce weed populations, and lower soil temperatures. However, an irrigation system is necessary for maximum productivity. Drip irrigation is most effective, as water is delivered directly to the root system. The most important time for irrigation is during flowering and fruiting, but dry conditions in mid-summer will also dictate the need for supplemental water. The amount of water to apply is difficult to recommend, as it is determined by weather and soil conditions, but one plant can need up to 48 gallons of water per week in extremely hot, dry conditions.

Pruning and Training

Canes do not need to be pruned in the first year except to keep them in the desired area. All major pruning and thinning will be done in the winter when all dead and diseased canes are removed as well as poorly growing canes and those that take up too much space. There should be only three to five canes per linear foot of row for sunlight penetration and proper air flow. Laterals

should also be pruned back to about 15 inches long at this time.

Summer tipping is a procedure that encourages lateral growth and an increase in the fruiting area. This is usually done in June on new canes (primocanes) for erect growing types. If primocane (fall)-fruiting varieties are being grown and two crops are desired, prune canes back below the fruiting area after harvest. The remaining cane will fruit again in the following spring before dying back to ground level.

If only a fall crop is desired (not recommended), then all canes can be mowed to the ground after harvest in the fall. A trellis will be necessary for trailing varieties, but also may be necessary for erect varieties. A simple trellis system will help keep fruit off the ground and make it easier to harvest. The trellis can be as basic as one wire on either side of the row about 2.5 to 3 feet tall.

Pest Management

Raspberries are somewhat more susceptible to disease than blackberries, so control measures need to be taken to ensure harvestable fruit. Major diseases include:

- Gray mold (*Botrytis cinerea*)
- Phytophthora root rot (*Phytophthora* spp.)
- Anthracnose (*Elsinoe veneta*)
- Cane blight (*Leptosphaeria coniothyrium*)
- Verticillium wilt (*Verticillium* spp.)
- Orange rust (*Gymnoconia nitens*; affects black raspberries only)

Many insects that plague blackberries will also be a problem on raspberries. Major insect pests include:

- Green June beetle (*Cotinis nitida*)
- Japanese beetle (*Popillia japonica*)
- Rednecked cane borer (*Agrilus ruficollis*)
- Raspberry crown borer (*Pennisetia marginata*)
- Strawberry clipper (*Anthonomus signatus*)
- Spider mites (*Tetranychus urticae*)
- Spotted-wing drosophila (*Drosophila suzukii*)

For current and recommended options for pest control, consult with your local county Extension agent and the Southern Region Small Fruit Consortium IPM/Production Guides page.

Harvest and Post-harvest

Harvest generally begins in late spring or early summer of the second year. The harvest date depends on the variety being grown; some varieties bear as early as late May and some not until July or even through fall until frost. The first large harvest can be expected in the third year with full production achieved by year five. Fruit will need to be hand harvested. The fruit should be harvested in the morning to reduce field heat and placed in shade immediately. Harvesting of fruit will need to be done daily, as fruit is extremely fragile and susceptible to depredation. Fruit should be slightly soft and release freely from the torus (core). Unlike blackberries, where black fruits may not be ready for harvest, fruit color is generally much more helpful in determining ripeness in raspberries. Once fruit is harvested from the field, it should be refrigerated immediately. When held in correct conditions, raspberries can last for several days. Refrigerator conditions should be 32°F and 90 percent or greater relative humidity.

Blueberries

Varieties (Cultivars)

Rabbiteye blueberries (*Vaccinium virgatum*) do best in Mississippi. They are hardy plants and easier to grow than other types. Some varieties include Alapaha, Austin, Climax, Premier, Brightwell, and Tifblue. Southern highbush varieties are grown in locations with adequate soil conditions and supplemental irrigation. Some southern highbush (*Vaccinium* spp.) varieties include Star, Rebel, Legacy, Summit, Ozarkblue, and O'Neal, although many more exist. Southern highbush blueberries are far more difficult to grow than rabbiteyes due to more pest problems, a need for high organic matter soils, and more susceptibility to frost injury. More detailed information on varieties is available in MSU Extension Publication 1758 Establishment and Maintenance of Blueberries.

Soil and Site Conditions

Blueberries require a soil pH of between 4.5 and 5.5. The soil must be well drained, with a sandy loam being the best. In some areas, raised beds will improve water drainage. Blueberries do not tolerate heavy (clay) soils. Blueberries require full sunlight to produce the best crops, and low spots should be avoided to reduce injury from spring frost, which can be a common problem.

Establishment

When buying bushes to establish a blueberry planting, look for two-year-old, nursery-container-grown plants between 12 and 16 inches tall. Two or more varieties are preferred to improve fruit set and lengthen the fruiting season. Bushes should be set 5 to 6 feet apart in the row, with rows 8 to 10 feet apart. When planting, never let the root system dry out. To help with this, place one-half gallon of moist peat moss in the bottom of the planting hole. Remove any air pockets around the root system by firming soil around the plant and immediately watering after planting.

Mulching of the bushes is a common and recommended practice. The mulch, applied to a depth of 4 to 6 inches, should be acidic in nature, such as pine bark or pine straw, to help keep soil pH low. During the first two years of growth, all flower buds (or resulting fruit) should be removed to allow for root system development.

Plant Nutrition

Do not fertilize blueberry bushes at planting with nitrogen, and never place any fertilizer at the base of the plant. Apply fertilizer 6 and 12 weeks after planting in the first year. For the second year and beyond, fertilize three times at six-week intervals starting at bloom. Blueberries require about 60–80 pounds per acre of nitrogen per year. The type of nitrogen fertilizer depends on the soil pH. If the pH is above 5.2, then use ammonium sulfate. If the pH is less than 5.2, use urea. Phosphorus and potassium are only required if the initial soil test indicates a need. These should be added to the soil well before planting.

Irrigation

Irrigation is essential for southern highbush blueberry and beneficial for rabbiteye blueberry plants. Irrigation water should be acidic; a pH of 5.0 is ideal. Acid injection in the irrigation system may be the best option for proper pH control. Blueberry bushes may require up to 10 gallons of water daily in hot, dry conditions. Drip irrigating during the hottest part of the day may help keep the root system cooler and reduce heat-related stresses on the plant. Additional mulch application, as suggested in the Establishment section, will also help to conserve soil moisture and reduce the amount and frequency of irrigation.

Pruning and Training

Pruning of blueberries will be minimal for the first five years or so. During this time, remove only dead, diseased, or abnormally growing canes. Branches can be tipped to maintain the desired height. Side branches can be thinned or pruned to improve sunlight penetration into the center of the bush. Top pruning (tipping), roughly 25 to 33 percent of the cane, immediately after harvest (June/July) should be done to ensure enough new growth for the following year. Starting in the fifth year, remove the old, less vigorous canes from the middle of the bush to open the center. Older blueberry bushes should retain equal numbers of one- to five-year-old canes. Never prune when the foliage and canes are wet, as this may introduce disease pathogens to the plant.

Pest Management

Blueberries grown in Mississippi do not have a great number of disease pests; however, there are some common diseases that do show up from time to time. The major disease pests include:

- Phytophthora root rot (*Phytophthora cinnamomi*)
- Stem cankers (*Botryosphaeria* spp.)
- Phomopsis blight (*Phomopsis vaccinii*)
- Mummy berry (*Monilina vaccinii-corymbosi*)

Blueberries also have some insect pests, which include the following:

- Plum curculio (*Conotrechelus nenuphar*)
- Fall webworm (*Hyphantria cunea*)
- Aphids (various species)
- Blueberry maggot (*Rhagoletis mendax*)
- Cherry and cranberry fruitworms (*Grapholita packardi* and *Acrobasis vaccinii*)
- Japanese beetle (*Popillia japonica*)
- Spotted-wing drosophila (*Drosophila suzukii*)

Weed control is one of the most important management tasks for any blueberry planting. Blueberries do not compete well with any weeds, especially with highly competitive weeds such as bermudagrass and johnsongrass. All weeds must be eliminated before planting, and proper control must be maintained throughout the life of the planting.

Blueberries have other pests that can negatively impact the bushes. The primary animal pest is birds. For this reason, bushes must be protected from birds when harvest nears. Mulch also creates a habitat for voles and other harmful rodents.

For current and recommended options for pest control, visit the Southern Region Small Fruit Consortium IPM/ Production Guides page.

Harvest and Post-harvest

Blueberries will be ready for harvest, depending on type and variety grown, in the late spring or early summer of their third year. Full production can be expected in the fifth to seventh year with proper management and environment. Berries should always be harvested in the coolest part of the day and refrigerated soon after harvest. Multiple harvests will be necessary, as all fruit does not ripen at the same time. Therefore, several harvests per week may be needed. Ripe fruit should be deep blue and slightly soft before picking. Berries will not continue to ripen after harvest. Once harvested, the fruit should be stored at 32°F and greater than 90 percent relative humidity for best longevity.

Bunch Grapes and Muscadines

There are many species of edible grapes. Bunch grapes (table and wine) include several native (e.g., *Vitis riparia* and many others) and non-native species (e.g., *Vitis vinifera* and others), and many are found in Mississippi. However, fruit production on these is often difficult due to pest issues. Muscadines (*Vitis rotundifolia*) are also native to Mississippi and provide an easier option, although their flavor and texture differ from bunch grapes. Muscadines are less cold hardy than bunch grapes; therefore, growers in the northern part of the state should choose varieties that are less likely to be injured by cold temperatures.

Bunch Grape Varieties (Cultivars)

There are many different varieties of grapes, both for processing and fresh eating. The most popular wine and table grapes are derived from a European grape species called *Vitis vinifera*. There are more than 5,000 varieties of these grapes including Chardonnay, Cabernet Sauvignon, Riesling, Merlot, Thompson's Seedless, and many more. These grapes do not do well in Mississippi and should not be planted. Certain interspecific hybrid grapes grow better in Mississippi because they tolerate disease pressure better than pure European grapes. The most famous of these is Concord; however, Concord is not well-suited for Mississippi growing conditions.

Other varieties such as Cynthiana (also called Norton), Blanc du Bois, Black Spanish, and Villard Blanc are just a few of the more suitable varieties. Rootstocks are often selected because of specific site requirements but are not universally required. For more information, see MSU Extension Information Sheet 1608 Fruit and Nut Review: Bunch Grapes.

Soil and Site Conditions

Grapes can tolerate many different soil types but prefer slightly acid soils (pH between 6.0 and 7.0). A well-drained, loamy soil is best, but even poor soils may help to keep excessive vigor in check. Grapes need full sunlight to induce the highest production. A northeast or east facing slope is best, and the site must have good air and water drainage, as grapes are susceptible to frost and freeze damage and root rot diseases. The ideal conditions for grape production are areas with low humidity, warm summer temperatures, and moderate winter temperatures.

Establishment

Grape plantings should be established using bareroot nursery-grown plants. Even though grapes can be easily propagated from existing vines, movement of plant material can easily introduce diseases and insects, while nursery stock is usually certified to be free from detectable pathogens and insects. Vines should be put in the ground after the frost-free date in the spring if they are growing but can be planted earlier if they are dormant. If plants are grafted onto a rootstock, never place the graft union below the soil line when planting as this will eliminate the benefit of using a rootstock. The vine spacing within the row can vary depending on trellis system and chosen variety. Typical spacing for *V. vinifera* and hybrid grapes is 6 to 8 feet between plants in a row and 10 feet between rows.

Plant Nutrition

As with any fruit crop, a soil test should be done before planting. Any deficiencies in phosphorous, potassium, or pH should be corrected several months before planting. Grapes do not require a lot of nitrogen, but potentially could use between 40 and 80 pounds per acre of nitrogen per year depending on plant vigor. Starting in the third year of growth, petiole analysis (the stem that attaches the leaf blade to the shoot) should be used to determine fertilizer application rates. For more details, refer to MSU Extension Publication 1224 Plant Analysis Sampling Instructions.

Irrigation

Water usage of grapes varies greatly depending on weather conditions. Supplemental irrigation is necessary to keep vines healthy and crop loads full. Irrigation is extremely important during bloom and early growth in the spring. The amount of water to apply will vary with rainfall, but potentially could be as often as three times per week of 8 to 16 gallons daily up to the start of fruit coloring (veraison). Fruit and wine quality may be enhanced with minimal watering in the summer during the ripening period, but weather conditions should be considered to decide if watering is necessary during this timeframe.

Pruning and Training

All grapes need a trellis system for support. Vines need to be trained on trellis wires in the first year to achieve the desired vine form. Many different trellis systems are suitable but are often chosen because of the type of grape being grown. Extensive pruning is required annually, usually in March, just before bud break. Spur or cane pruning will be done depending on variety needs. A typical bunch grape vine will have between 50 and 80 fruiting buds per vine. For a more complete description of trellis systems and pruning, refer to MSU Extension Publication 2290 Establishment and Production of Muscadine Grapes, as grapes and muscadines have similar management needs.

Pest Management

Unfortunately, grapes are susceptible to many diseases. Some of the major disease pathogens include:

- Black rot (*Guignardia bidwellii*)
- Powdery mildew (*Uncinula necator*)
- Downy mildew (*Plasmopara viticola*)
- Botrytis bunch rot (*Botrytis cinerea*)
- Pierce's disease (*Xyllela fastidiosa*)
- Macrophoma rot (*Botryosphaeria dothidea*)
- Anthracnose (*Elsinoe ampelina*)

Grapes also attract many insect pests, which include:

- Rose chafer (*Macrodactylus subspinosus*)
- Grape berry moth (*Endopiza vitana*)
- Grape phylloxera (*Daktulosphaira vitifoliae*)
- Leafhopper (various species)
- Grape rootworm (*Fidia viticida*)
- Grape mealy bug (*Pseudococcus maritimus*)
- Redbanded leafroller (*Argyrotaenia velutinana*)
- Japanese beetle (*Popillia japonica*)
- Mites (various species)
- Green June beetle (*Cotinus notidia*)
- Grasshopper (various species)
- Grape flea beetle (*Altica* spp.)

All weeds, especially invasive grasses, should be removed from the vineyard before planting.

Animal pests like deer and birds can be especially bothersome. Fencing and netting may be necessary to control these pests. Consult your local county Extension agent and the Southern Region Small Fruit Consortium IPM/Production guides page for current and recommended options for pest control.

Harvest and Post-harvest

Grape harvest can occur anywhere from July to October depending on the variety grown, location, and environment. Fruit should be picked early in the morning and removed from field heat soon after picking. Harvested fruit should be stored at 30 to 32°F at a relative humidity between 90 and 95 percent. The first harvest will occur in the second or third year of growth with full production by the fifth year. Table (fresh eating) grape ripeness is determined by color and taste, while wine grape ripeness is often determined by sugar content. Some grape varieties may require crop load thinning to properly ripen the fruit.

Muscadine Varieties (Cultivars)

There are many different varieties of muscadines, both for processing and fresh eating. Muscadine grapes are an entirely different species (*Vitis rotundifolia*) from bunch grapes; they grow best in hot, humid areas. Native muscadine grapes are found throughout Mississippi. There are also many varieties, including Black Beauty, Carlos, Cowart, Fry, Granny Val, Ison, Jumbo, Nesbitt, Southern Home, Summit, and Supreme. Rootstocks are not used in muscadine production. More detailed information on varieties is available in MSU Extension Publication 2290 Establishment and Production of Muscadine Grapes.

Soil and Site Conditions

Muscadines can tolerate many different soil types but prefer a slightly acid soil (pH between 6.0 and 7.0). A well-drained, loamy soil is best, but even poorer soils may help to keep excessive vigor in check. Muscadine vines need full sunlight to induce the highest production. A northeast, east, or south facing slope is best, and the site must have good air and water drainage. The ideal conditions for muscadine production are areas with warm summer temperatures and moderate winter temperatures.

Establishment

Muscadine plantings should be established using bareroot nursery-grown plants if available. Movement of plant material can easily introduce diseases and insects, while nursery stock is usually certified to be free from detectable pathogens and insects. Vines should be put in the ground after the frost-free date in the spring if they are growing but can be planted earlier if they are dormant. Vine spacing within the row can vary depending on the trellis system and chosen variety. Muscadines are large and need adequate space. Typical spacing is 15 to 20 feet between vines in a row and 10 to 12 feet between rows.

Plant Nutrition

A soil test should be done before planting. Any deficiencies in phosphorous, potassium, or pH should be corrected several months before planting. Muscadines do not require a lot of nitrogen, but potentially could use between 40 and 80 pounds per acre of nitrogen per year depending on plant vigor. Starting in the third year of growth, petiole analysis (the stem that attaches the leaf blade to the shoot) should be used to determine fertilizer application rates. Refer to MSU Extension Publication 1224 Plant Analysis Sampling Instructions for more details.

Irrigation

Water usage of muscadines varies greatly depending on weather conditions. Supplemental irrigation is sometimes necessary to keep vines healthy and crop loads full. Irrigation can be important during bloom and early growth in the spring if hot and dry conditions are present. The amount of water to apply will vary with rainfall, but potentially could be as often as three times per week, 8 to 16 gallons per day, up to the start of fruit coloring (veraison). Fruit and wine quality may be enhanced with minimal watering in the summer during ripening, but assess weather conditions to decide if watering is necessary during this time. Often muscadines are grown without supplemental irrigation, especially after establishment. Since they are native to Mississippi, muscadines are adapted to the hot, humid, and wet conditions during the summer and often do not need irrigation once vines are mature.

Pruning and Training

Muscadine vines need a trellis system for support. Vines need to be trained to the trellis wires in the first year to achieve the desired vine form. Many different trellis systems are suitable. Extensive pruning is required annually, usually in February or March, just before bud break. Spur or cane pruning can be done depending on variety needs. For a more detailed description of trellis systems and pruning, refer to MSU Extension Publication 2290 Establishment and Production of Muscadine Grapes.

Pest Management

Muscadines are susceptible to some diseases. A few of the major disease pathogens include:

- Black rot (*Guignardia bidwellii*)
- Powdery mildew (*Uncinula necator*)
- Pierce's disease (*Xyllela fastidiosa*)
- Macrophoma rot (*Botryosphaeria dothidea*)
- Anthracnose (*Elsinoe ampelina*)
- Angular leaf spot (*Mycosphaerella angulata*)

Muscadines may also attract insect pests, which include:

- Rose chafer (*Macrodactylus subspinosus*)
- Grape berry moth (*Endopiza vitana*)
- Grape phylloxera (*Daktulosphaira vitifoliae*)
- Leafhopper (various species)
- Grape rootworm (*Fidia viticida*)
- Grape mealy bug (*Pseudococcus maritimus*)
- Redbanded leafroller (*Argyrotaenia velutinana*)
- Japanese beetle (*Popillia japonica*)
- Mites (various species)
- Green June beetle (*Cotinus notidia*)
- Grasshopper (various species)
- Grape flea beetle (*Altica* spp.)
- Wasps and hornets (various species)

All weeds, especially invasive grasses, should be eliminated from the vineyard before planting.

Animal pests like deer and birds can be especially bothersome. Fencing and netting may be necessary to control these pests. Consult your local county Extension agent and the Southern Region Small Fruit Consortium IPM/Production guides page for current and recommended options for pest control.

Harvest and Post-harvest

Muscadine harvest can occur anywhere from August to October depending on the variety grown, location, and environment. Fruit should be picked early in the morning and removed from field heat soon after picking. Harvested fruit should be stored at 30 to 32°F at a relative

humidity between 90 and 95 percent. The first harvest will occur in the second or third year of growth with full production by the fifth year. Ripeness is determined by color and taste for fresh eating fruit, while ripeness in muscadines for wine is often determined by sugar content.

Elderberries

Varieties (Cultivars)

There are few varieties of American elderberry (*Sambucus canadensis*) currently available. Some more well-known varieties are Adams 1, Adams 2, Bob Gordon, Johns, Nova, Wyldewood, Pocahontas, Hamilton, Ranch, and York. Bob Gordon and Wyldewood originated in Missouri and Oklahoma, so these may be more viable, especially in north Mississippi. There are also native elderberry plants in Mississippi. Most elderberry plants need cross pollination; at least two different varieties are necessary for adequate fruit set. Extensive testing of elderberry varieties has not been done in Mississippi. Varieties have limited demand and may be difficult to find.

Soil Preference

Elderberry plants like sites high in organic matter with well-drained soils. They tolerate poor site conditions but are susceptible to drought due to a shallow root system. Plant on a raised bed if soil conditions are consistently too wet. Soil pH levels are best kept between 5.5 and 6.5. Elderberry plants should be planted in an elevated spot to minimize frost injury. They do best in areas with full sun and good air circulation.

Establishment

Establishing a planting with one-year-old, virus-tested plants is best. However, elderberry plants are easily propagated by hardwood and root cuttings or by layering aboveground portions of the plant. Non-dormant plants should be set out after the frost-free date in the spring. Rows should be 10 feet apart with 4 feet between plants within the row. Any flowers that develop in the first growing season should be removed to allow development of a strong root system. A small crop should occur in the second year with a full crop by the third growing season.

Plant Nutrition

Do a soil test before planting to remedy any shortages. Annual nitrogen applications are necessary to get the best production out of elderberry plants. Do not apply nitrogen at planting, but a small amount (about 10 pounds per acre) can be applied about 6 to 8 weeks later. Nitrogen sources can vary, including ammonium nitrate, ammonium sulfate, urea, compost, or aged manures. Mature plants will need about 80 pounds per acre nitrogen; applications can be made when growth begins in the spring.

Irrigation

Since elderberry plants are not drought-tolerant, they will need irrigation. Drip irrigation works well to provide adequate moisture. Another way to conserve moisture is to use organic mulch such as pine bark, pine straw, or other appropriate material. Elderberry plants require roughly 1 to 2 inches of water per week, especially when conditions are hot and fruit is on the plant.

Pruning and Training

Elderberry plants grow upright and generally do not require a trellis system. Prune out weak and diseased canes in winter, leaving six to eight canes per plant after pruning. Elderberry plants will continue to fruit even with little pruning, although some annual pruning can help reduce less productive canes and selective cane removal will improve sun and air availability.

Pest Management

Disease pests of elderberry are not well understood in Mississippi. Other states where production of this crop is larger report some of the potential pests listed below.

Major diseases include:

- Tomato ringspot virus
- Fungal cankers (various pathogens)
- Powdery mildew (various pathogens)
- Root rots (*Phytophthora* spp.)
- Verticillium wilt (*Verticillium* spp.)

Major insects include:

- Aphids (various species)
- Cecropia moth (*Hyalophora cecropia*)
- Elder shoot borer (*Achatodes zeae*)
- Stink bugs (various species)
- Sawfly larvae (various species)
- Eriophyid mite (various species)
- Fall webworms (*Hyphantria cunea*)
- Spotted-wing drosophila (*Drosophila suzukii*)

Elderberry plants are not competitive with weeds; therefore, any weeds in the proposed planting area should be eliminated before putting plants into the ground. It is especially important to eliminate problematic grasses and broadleaved weeds. Mulching can help control weed populations post-plant. Information on pest control measures is lacking in Mississippi.

Harvest and Post-harvest

A small crop may be produced in the second year after planting. Production in the third year can grow to 12 to 15 pounds per plant. Harvest occurs in mid- to late summer. Clusters of fruit will ripen over a period of 5 to 15 days. The timing of harvest depends on variety. Fruit is high in vitamin C. Roots, stems, leaves, and unripe fruit should not be consumed as they are toxic. For best longevity and quality, fruit should be stored at 32°F at greater than 90 percent relative humidity.

Strawberries

Varieties (Cultivars)

When selecting the best strawberry (*Fragaria* x *ananassa*) varieties, several factors must be considered, including consistently high yields, good flavor, pest resistance, good shelf-life, and pleasant aroma. Varieties should be adapted to the region in which they will be planted. There are essentially three different bearing types of strawberries: June-bearing, everbearing, and day-neutral. June-bearing varieties are best suited for Mississippi. This type produces a single spring crop before the hot summer temperatures occur. This crop also has the largest berry size, yield, and quality. Strawberries are self-fertile, but pollen from other varieties may improve fruit set and quality. Bees and wind are the primary pollinizers. Some appropriate varieties are Chandler, Earliglow, Sweet Charlie, Camarosa, Ventana, Strawberry Festival, and Radiance. Purchase virus-tested plants only if available.

Soil Preference

Strawberries grow in a wide range of soil types, but a well-drained, sandy loam soil is preferred. Very rocky soils or those with high clay content can make bed building difficult. Soils that contain a high amount of sand can require careful irrigation and nutrient management. A favorable root environment is necessary for strawberry plants to succeed. This includes a soil pH of between 6.0 and 6.5. Highly alkaline soils can cause leaf chlorosis, yield loss, and plant die-back. Strawberries have a low tolerance for salt in the soil. Any soil deficiencies should be rectified before planting.

Strawberries should be planted in full sun, with good air drainage and air movement. Plants will not survive well in low areas that are poorly drained and where they are susceptible to frost injury. Air movement is important for reducing disease incidence and improving frost

protection. Too much wind, however, can damage plants and reduce yields.

Establishment

Before establishment, eliminate all existing vegetation that will compete with the strawberry plants. Apply any necessary soil amendments, then construct beds to provide better drainage. The orientation of rows should be north to south, if possible, but soil drainage considerations outweigh orientation.

Plug plants are the most common, and most expensive, way to establish strawberries. It is most common because they are easier to plant, they are less perishable, and they establish quickly. Fresh dug transplants (bareroot) are another way to start a strawberry planting, but they are highly perishable and require hand transplanting. Fresh-dug transplants are almost exclusively available in the late winter and early spring. Nurseries with leftover plants often pot the remaining plants and sell them later in the spring.

Strawberry plants should be planted in late summer if on plastic or in February or March for a matted row system. It is very important that roots do not become dry. The crown of the plant should be set even with the soil line. Planting distance varies by system used, but they can be as close as 12 inches (most common) or as much as 30 inches apart. Beds should be 4 to 5 feet apart.

Plant Nutrition

As with any fruit planting, do a soil test before planting. It is best to amend soils as needed at least six months in advance of planting. A yearly application of 150 pounds per acre nitrogen, phosphorus, and potassium with 10-10-10 is an example of possible fertilizer needs. This may differ based on soil and environmental conditions.

Irrigation

Strawberry roots are usually found in the top 12 to 18 inches of the soil. Most of the root system is in the first 6 to 8 inches of soil. This stresses the importance of supplemental irrigation for this crop. Drip (preferable) or overhead irrigation is necessary and should be in place shortly after planting. Any water used for irrigation should be tested first to determine its quality. As water touches the plant and fruit (especially with overhead irrigation), food safety is a concern; therefore, regular water testing is necessary. The planting site needs to be well drained, as poor drainage can reduce yields and injure plants. Make sure the site has some slope, but not too much (less than 2 percent), to reduce the erosion potential of moving water.

Pest Management

Unfortunately, strawberries are susceptible to many pests. These pests require intensive management. One way to do this is to choose varieties that are resistant to disease. Major diseases include:

- Phytophthora root rot (red stele, *Phytophthora fragariae* var. *fragariae*)
- Botrytis mold complex (*Botrytis cinerea*)
- Anthracnose (*Colletotrichum* spp.)
- Leaf spot (*Mycosphaerella fragariae*)
- Powdery mildew (*Sphaerotheca macularis* f.sp. *fragariae*)
- Neopestalotiopsis fruit rot and leaf spot (*Neopestalotiopsis* spp.)

Some of the major insect pests include:

- Strawberry root weevil (*Otiorhynchus* spp.)
- Aphids (*Aphis* spp.)
- Leafrollers (*Ancylis comptana*)
- Spittle bugs (*Philaenus spumarius*)
- Sow bugs (*Oriscus asellus*)
- Lygus bugs (*Lygus* spp.)
- Mites (*Tetranychus urticae*)
- Slugs (several species)

Strawberries are not competitive with weeds because they have such small root systems; therefore, it is crucial to eliminate grasses and broadleaved weeds before establishment. Consult your local county Extension agent and the Southern Region Small Fruit Consortium IPM/ Production guides page for current and recommended options for pest control.

Harvest and Post-harvest

The timing of harvest will depend on the varieties being grown and their location. Harvest can run from April to June. Fruit is hand harvested by removing ripe fruit from the pedicel. Because ripeness ceases at picking, strawberries should be completely red before harvest to ensure the best quality and flavor. The best time to harvest is in the early morning during the coolest conditions. Harvesting at this time will keep heat loads off the fruit and lead to longer shelf life. Production of 1 to 2 quarts of berries per three-foot section of row should be possible each year. Once harvested, fruit should be moved immediately to a cool or refrigerated area. Any soft, overripe fruit should be consumed immediately. Berries should be stored at around 32°F with 90 to 95 percent relative humidity for best storage length and quality.

Final Notes

This publication is designed to be a starter's primer on growing small fruit crops. Details on certain factors like recommendations of numerous varieties and pesticides can shorten the usable life of the publication; however, most broad management techniques stay constant over many years. References to more detailed publications are in the text. You can also contact state Extension specialists or your local Extension office for answers to specific questions.

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