



Grape Vine Management

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Introduction

Grapes are the most widely planted fruit crop in the world. They are used for wine, juice, raisins, table fruit, jam and jellies. With careful management, grape plants are long-lived, productive and an excellent addition to home gardens. This fact sheet introduces grape planting and management. The companion factsheets, [Grape Varieties for Utah](#), [Grape Training and Trellising Basics](#) and [Grape Irrigation](#) provide additional information.

Plants

Grapes are vining, woody, long-lived perennial plants. Grape vines are trained to have a permanent “trunk” that, depending on the training style and trellis system used, may also have permanent side branches known as arms or cordons that run along a trellis wire. New growth originates from compound buds and is the main form of vine growth. The new growth, known as the cane, is made up of tendrils for attachment, leaves, and fruit. Grape flowers form on the current year’s new growth (canes) and have non-showy light green/yellow flowers. In order to keep the plant productive, grape vines must be pruned heavily each year to remove excess canes, focus growth in the appropriate number of new canes, and to balance vegetative growth with fruit growth. Grapes are self-fruitful and pollinated by wind. In Utah, fruit harvest of the earliest varieties starts in late summer with later varieties extending the season until a killing frost occurs.

Variety selection is critical for success. There are four types of grapes (listed here from most to least cold tolerant): American, French/American hybrids, European, and Muscadine. Each type has many

different varieties to select from that are adapted for various uses, such as wine or table grapes. For more detailed information on variety selection, see [Grape Varieties for Utah](#). American types are best adapted to colder regions of the state. French/American hybrids and some European types are suitable for warmer areas of the state. Muscadines are typically not hardy enough and require a longer growing season than is available in Utah.

Site Selection

Deciding where to plant grapes in the home garden is an important first step. Most likely, no one spot will be perfect and some compromises will be necessary. Grapes need full sunlight to produce the highest yield possible. They are susceptible to late spring freeze damage and benefit from protective measures. If possible, choose a protected spot in the yard. Planting on a slope that allows for cold air drainage can help reduce the risk of freeze damage. Northeastern, and Eastern facing slopes are preferable as they stay cooler and delay spring bud break, which minimizes late spring freeze damage. They also do not get as hot in the summer. However, for many home growers, planting on a slope is not possible.

Planting grapes in a lawn should be avoided if possible. Turfgrass will compete with the grape vines for available water and nutrients, and lawn irrigation frequency is not typically appropriate for grapes. Additionally, grapes are very sensitive to selective herbicides used to control broadleaf weeds in lawns, and application near the vines should be avoided.

Soil

While grapes are forgiving of many soils, soil type strongly affects vine productivity and fruit quality. Productivity is increased on a sandy loam soil, and most limited in a heavy clay soil. If planting into clay soil, incorporate copious amounts of organic matter before planting. Raised beds can also improve drainage and aeration. Many Utah soils benefit from amendment.

Grape plants do best in soil with a pH between 6 and 7, but can still grow in Utah's more alkaline soils with appropriate fertilizer application. Grapes grown in soils with higher pH levels often struggle with iron chlorosis. Before planting grapes, it is a good idea to have your soil tested. Soil samples can be submitted to Utah State University Analytical Labs (USUAL). Visit the frequently asked questions section of their website <http://usual.usu.edu/> for detailed information on how to collect a soil sample and for pricing.

Site Preparation

Properly preparing the soil will help ensure success. Remove all weeds and other plants from the planting area to reduce competition for water and nutrients. Grapes are extremely sensitive to some of the herbicides used to control broadleaf weeds in the lawn such as 2,4-D. If hard to kill perennial weeds are in the area, application of some of the most effective herbicides after planting without damaging the grapevines will be much more difficult, if not impossible. Planting cover crops and incorporating green manure is a great option for both controlling weeds and improving soil health prior to planting grape vines. Incorporating organic matter, such as compost or weed-free manure the previous fall, will help to loosen heavy clay soils. If your soil test indicated low phosphorus, it is best to incorporate phosphorus fertilizer during site preparation since it is quite immobile in the soil and surface applications post-planting will not reach the roots quickly. Many composts are good sources of phosphorus.

Planting and Spacing

Rows should be 10 to 12 feet apart. The distance between plants in a row depends on variety and trellising method, and can range from 6 to 12 feet. See the companion fact sheet, Grape Training and Trellising Basics for different options. Photo 1 shows a commonly used trellis system. An area at

least 4 feet wide that is free of weeds and turf should be maintained around the base of each plant. Mulching around the new planting will help control weeds. Grapes can be planted in the spring or fall, but local nurseries and online sources will have a better selection of plants in the spring of the year. Do not allow young vines to dry out, particularly if planting bare-root stock. For best results, dig a hole twice as wide and as deep as the roots of the grape plant. If planting a bare-root plant, carefully spread the roots out in the hole and cover with soil to the previous soil line that should still be visible on the trunk. For container-grown plants, plant at the same depth as in the nursery pot. It is important to immediately water the plants in after planting to settle the soil around the roots of the plant and add more soil if needed, to bring it up to the correct soil level.



Photo 1. One-year-old grape planting trained to 2-wire Kniffen trellis system.

Irrigation

Grapes are somewhat drought tolerant once established. However, vines receiving full irrigation are typically more productive. In commercial wine grape production, it is common to drought stress the vines between fruit set and the onset of ripening. Although this stress reduces fruit size, it improves the quality of the fruit for wine making. However, improper timing or excessive drought stress can compromise the health of the plant, and is not recommended for a beginning hobbyist. Vines should be fully irrigated each year for best production and maximum fruit size. In most cases, applying 2 inches of water per week is sufficient. Irrigation frequency should be increased on sandy soils and decreased in heavy clay, and adjusted for

weather conditions. Reduce irrigation in the late summer and early fall to help the plant harden off for winter. Drip irrigation (Photo 2), or furrow irrigation should be used if possible. Using sprinklers to irrigate will wet the leaves and increase the risk of diseases. If late summer and fall precipitation is minimal and soils become dry, irrigate grapes just before the ground freezes to minimize winter injury from drying of the roots. See the companion fact sheet, “Grape Irrigation,” for an in-depth explanation of irrigation amount and timing.



Photo 2. Grape vine irrigated by drip irrigation system. The line is attached to the trellising wire.

Fertilization

Do not fertilize in the hole/furrow during planting, as doing so can cause injury to the roots. Fertilization is recommended starting in the second season to obtain the highest yield and fruit quality possible. A soil test is helpful in determining what nutrients need to be applied. Visually observing the vines will also help in determining what fertilizer applications may be needed. If the vines are stunted and have reduced canopy vigor they may be nitrogen deficient (Photo 3). This leads to a decrease in overall production. If nitrogen is over-abundant, however, excess vegetative growth will occur which can decrease fruit development and quality. Apply fertilizer, particularly nitrogen, in early spring before the buds start to swell and break dormancy. Application when the plant is actively growing will encourage the plant to grow excess vines with very little fruit. Apply in a 2-foot circle around the trunk of the plant. For established vines, a general recommendation is to apply 4.5 ounces (3/4 cup) of 21-0-0 fertilizer per year. If fertilizer is needed during years 2 and 3, only apply 2 ounces (6 tablespoons) of 34-0-0 per plant.

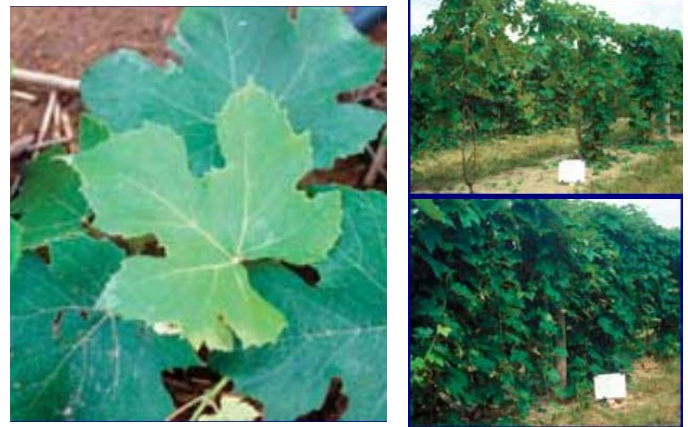


Photo 3. Left: Nitrogen deficiency in grape characterized by light yellowing of the entire leaf. Right: Top photo is grape vine with N deficiency, bottom photo has no N deficiency. Note the vigor in the top photo. Photos used with permission from Dr. Keven Ker, Brock University, Canada.

In Utah’s alkaline soils, grapes are prone to iron deficiency, especially in heavy clay soils or in plants that are being over-irrigated. This is recognized by leaves that have turned yellow but the veins remain green (Photo 4). If left untreated, the leaves may turn completely yellow and eventually brown along the edges. To combat iron deficiency, apply a spring application of iron chelate to the soil around the plant. Spraying a solution of iron chelate on the leaves can be a short-term remedy in severe situations. Excessive irrigation, particularly in the spring, increases the plants risk of iron deficiency. For more information reference [USU’s Iron Chlorosis in Berry Crops](#) fact sheet.



Photo 4. Iron deficiency in grape leaves with interveinal yellowing while veins remain green. Photo used with permission from Dr. Keven Ker, Brock University, Canada.

Training and Trellising

Proper training and trellising is critical for successful grape production. This can be done on a trellis, arbor, or possibly a fence. However, do not use a chain-link or similar style fence as the canes intertwined within the fence will be very difficult to remove during pruning. There are many ways to trellis grapes. Choose the type of trellis you plan to use before planting, as this will influence appropriate plant spacing. Trellis posts should be treated wood (metal poles can work as well but wire attachment is more difficult) and need to be long enough to be firmly anchored and still leave around 6 feet above the ground. The training and trellising grape fact sheet provides more detailed information.

Cluster Thinning

Do not over-crop the vines as this monopolizes nutrients needed for vine hardening and also results in small fruit size and poor fruit quality. Crop load is controlled through proper pruning and through post bloom cluster thinning. Thin fruit clusters just after bloom to limit the number of developing clusters to one or sometimes two clusters per cane. Cane numbers per vine are limited through pruning, which is discussed in the companion factsheet “Grape Training and Trellising Basics.”

Propagation

Grapevines are easily propagated from cuttings. Cuttings can be taken from 1-year-old dormant wood after all the leaves have fallen off and before bud swell in the spring. Choose a cane that is at least pencil sized or larger and cut it into sections with three to four buds each. It is important to keep track of which end of the plant is the bottom (closest to the trunk) and which is the top (closest to the tip). Cuttings can be rooted by burying the bottom two nodes in moist soilless media, loose sawdust or peat moss. Keep them in warm area and check to make sure the medium stays moist. Roots should form in about 1 month. Once a good root system has established, they can be planted into the garden. It is critical that plant material is healthy and disease-free. Unless you know that the source plant is free of any disease, including latent viruses, it is a good idea to purchase plants from a reputable nursery. Additionally, some of the recently released grape varieties are protected by patent law and cannot be propagated.

Problems

Winter Injury

The risk of winter injury to grape is high, particularly for European and French/American hybrid types. Even the hardiest American varieties may experience some winter die back in certain conditions. Canes need time to harden before cold temperatures. Only apply nitrogen fertilizers before fruit set and reduce irrigation frequency late in the growing season to minimize late-season vegetative growth and allow vines to go dormant. As discussed above, thin grape clusters as needed to maintain balance between nutrients used for fruit production and for vine hardening. One option for protecting cold sensitive vines from winter injury is to place straw bales around the trunk and base of the vines during the winter. This needs to be done prior to experiencing mid-winter cold temperatures but after a killing fall freeze. Another method used in cold climates is to train the vines low to the ground and then mulch the canes with sawdust or straw through the coldest part of the winter.

Weeds

Weeds compete with grapevines for nutrients and water. To obtain maximum production, weeds must be controlled. Eradicating hard to kill perennial weeds such as dandelions, crabgrass and field bindweed before planting will greatly reduce weed issues in the coming years. Grapes are very susceptible to systemic broadleaf herbicides used in lawns, such as 2,4-D and dicamba. Exposure to herbicides results in stunted cane growth, deformed leaves and non-uniform fruit development (Photo 5). 2,4-D damage may occur from spray applied



Photo 5. Herbicide damage on grape. Note the stunted, twisted growth of the leaves.

on your, or your neighbor's lawn if used at the wrong time of the year or from drift and volatilization at some distance. To minimize this risk, avoid using 2,4-D in areas surrounding the grape planting. Use extreme caution when using any systemic herbicides, including Roundup around grapes. Shield the trunk and lower leaves of the grapevine from any spray, and only apply when the wind is very calm, when the daytime high

temperatures will not exceed 85°F. For weed control surrounding the planting area, growing a cover crop in the alley way can outcompete weeds. It is important to read and follow the chemical label for mixing and application directions as the label is the law for using the chemical. Contact your local USU Extension office for more weed control advice.

Insect and Diseases

PEST/DISEASE	IDENTIFICATION	CONTROL
GRAPE LEAFHOPPER	The adult is narrow and is yellow with red and black markings. Adults lay eggs on grape leaves in the spring. Light yellow, wingless nymphs feed on the bottom of leaves.	Minimize weedy and grassy areas around the vines as they are alternative hosts.
GRAPE-LEAF SKELETONIZER	Black and yellow banded larva line up and feed side by side on the underside of the leaf. The larvae have long black spines that are poisonous. Adults are metallic bluish green moths that lay yellow eggs in clusters on the leaves.	Monitor closely for their presence. <i>Bacillus thuringiensis</i> (BT) and spinosad can be used for control.
EUROPEAN PAPER WASP	Yellow and black banded wasp with a long body and narrow waist. Feed on ripe fruit but are also a predator of caterpillars in the spring and early summer.	Treat nests with aerosol wasp sprays. Trap with fruit juice/yeast in a pop bottle.
SPIDER MITE	Very small arthropod that feeds on the underside of leaves. Like hot, dry, dusty conditions. Look for stippling (small spots on leaf) that may indicate their presence.	Natural predators are the best option for control. Encourage natural predators (lady beetles, predatory spider mites and others) by minimizing pesticide applications that would kill these desirable insects. If the infestation becomes severe, miticide application may be necessary.
POWDERY MILDEW	A fungus that causes white, powdery patches on the leaves. If young berries are infected they may harden or drop to the ground.	If you know powdery mildew will be a problem (high infection the previous year), apply systemic fungicides at bud break.

Harvest, Storage, and Use

Harvest timing is an important step in producing quality grapes. Grapes steadily increase in size as they ripen. If left on the vine too long, fruit will crack and mold. However, if harvested too early, overall yield is decreased and sugar accumulation and quality are decreased. Grapes will change color well before they are ready for harvest, so color

alone is not a reliable harvest indicator. As harvest time nears, monitor your grapes closely. For the home grower, taste is one of the easiest methods of knowing when to harvest. Wait until the berry is sweet and well sized. The fruit should still have some tartness (acid) in the flavor as well. Harvest grapes in a full cluster and use pruning shears to cut the cluster from the cane.

Grapes do not continue to ripen after they are picked, and quality begins to decline quickly after harvest. Expect to harvest around 8 to 12 pounds of grapes per vine. Yield varies by variety with some yielding up to 25 pounds. For wine and juice processing, have your equipment and ingredients prepared before harvest so you can begin processing as soon as possible. When processing grapes, it is critical to strictly adhere to food safety recommendations and tested recipes.



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