Horticulture Diagnostic Laboratory

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Grape Growing in the Home Garden

Introduction

Grapes are a traditional favorite of home gardeners. Whether intended for jams and jellies, wine or ornamental use, there are many varieties of grapes from which to choose. A little research will help you choose the best vines for your goals. The key to grape growing is to remember that like other plants, grapes require conscientious maintenance to be productive.

Grape Varieties

There are three classes or types of grapevines. "Vinifera" refers to varieties in the genus/species Vitis vinifera. The "American" types are varieties native to North America (or whose ancestry is native species). Concord and Niagra are American grapes. "Hybrids" are exactly as the name implies, crosses between vinifera and American types, and are grown, along with vinifera, by many eastern U.S. industries. Most of the grapes grown worldwide, including those in the Long Island wine industry, are vinifera grapes. Locally, the mostly widely planted vinifera winegrapes are Chardonnay, Merlot, Cabernet Franc and Cabernet Sauvignon. Riesling, Sauvignon Blanc, Syrah and many others are grown as well.

Native American grapes such as Concord, Niagra and Norton, are slightly more tolerant of fungal diseases and usually cold hardy, making them somewhat easier to grow than vinifera. Hybrid grapes ideally merge the fine wine qualities of vinifera with the hardiness and productivity of American varieties. Hybrid varieties include Cayuga White, Seyval, Vidal, Traminette, Chambourcin (all winegrapes) as well as many others. Hybrid winegrapes are a good first winegrape for home gardeners.

Additional recommendations for hybrid and American wine and table varieties can be found in Cornell Bulletins 233, *Wine and Juice Grape Varieties for Cool Climates* and 234, *Table Grape Varieties for Cool Climates*: Copies of these publications are available for a small fee – contact Cornell Cooperative Extension – Suffolk County for information on ordering copies. The internet is a great source of information on varieties suitable for the northeast. Also, many nurseries can provide recommendations for appropriate varieties.

Ordering Vines

Commercial growers order from nurseries, including a few in upstate NY that specialize in grafting of grapevines. Many of the eastern grape nurseries will sell small quantities to homeowners; larger businesses in the western U.S. tend to require purchase of a minimum number of vines. There are a few nurseries that propagate all types of fruit and cater to home growers. All of these businesses have websites. Vines can also be purchased from a garden center, though selection may be limited.

Vinifera and most hybrid varieties should be purchased as grafted plants, thus a rootstock must be specified. There are rootstocks adapted to many different growing conditions. The stocks C3309 and MG101-14 are the most common on Long Island. Riparia Gloire would be appropriate for a closely spaced vineyard as it tends to grow smaller vines. 5C and SO4 grow slightly larger vines and are therefore usually appropriate for sandier sites. The nursery may recommend a stock as well.

Site Selection

The climate of the East End is strongly moderated by water. This slightly delays budbreak in the spring relative to areas west of Riverhead. More western and many interior sites on Long Island are slightly warmer in spring, thus vines may break bud sooner, perhaps in April. This is problematic if a hard frost subsequently occurs. Unfortunately, this may be a limiting factor for some sites.

Choose a site that receives full sun. If vines are shaded, growth may be weak and spindly. Avoid low spots where cold air collects. In spring, this could result in frost injury to swollen buds and young shoots. In winter, low-lying spots on a

property will have lower temperatures, making the vines more susceptible to winter injury. Due to erosion, topsoil tends to collect in low areas, resulting in a deep, heavy topsoil layer. This will grow rank vines that are large, shaded and unproductive.

In addition to full sun, soils must be well-drained. Poorly drained soils hold more water and will grow large, shaded vines with small amounts of poor quality fruit. In addition, good airflow within a grapevine canopy is absolutely essential for minimizing humidity and hence fungal disease pressure. Vines planted next to woods or a structure may suffer if airflow is restricted. These are central themes in commercial viticulture – full sun, well-drained soils and good air drainage.

Preparing the Site

Long Island soils are naturally acidic, usually pH 4.5-5.0. If growing vinifera winegrapes (Chardonnay, Merlot, Cabernet etc.), the topsoil pH must be 6.0-6.5; therefore acidic soils must be limed to increase the soil pH. American and some hybrid grape varieties are more tolerant of slightly acidic soils. If lime is required for your site, it is very important to do it the year prior to planting your grapevines. It takes time for lime to react with the soil. Planting grapevines immediately after a heavy lime application can lead to significant nutrient imbalances.

The Soil Testing Laboratory, located at 423 Griffing Ave., Riverhead, will test soil pH for a small fee. The Lab is open to drop off samples from 8:30 am to 4:30 pm M-F (phone: 631.727.4126 or 631.581.4223). For more serious growers, a complete soil nutrient test may be useful. For example, the nutrient potassium (the 'K' in NPK fertilizers) must be applied to vineyards every few years. A complete soil test would provide specific recommendations.

Other preplant jobs include breaking up compacted soils and incorporation of organic matter. Loosen the soil with a rototiller before planting. Commercially, vineyards subsoil with a chisel plow 18-24" to break up hardpans. If the site is sandy, incorporation of organic matter, compost and/or growing of a cover crop will be helpful. Organic matter helps with soil nutrient retention and soil water holding capacity. Control weeds before they set seed to reduce weed pressure. Young grapevines do not compete well with weeds.

Young Vineyards

Plant vines in May after the danger of frost. If planting a row of vines, try to orient the row in a north-south direction to maximize sunlight interception. Plant vines at the same depth used by the nursery. If using a grafted vine, make sure the graft is 3-5" above the soil line. It is undesirable to have the scion (the above ground variety) portion of the vine develop roots. Water vines occasionally if the weather is dry. Lightly fertilize young vines. Control weeds to minimize competition for water and nutrients. Several fungicide sprays may be necessary the first year to keep mildews at a minimum.

The biggest mistakes in young vineyards are a lack of site preparation and inattention after planting. Check the vines weekly, more often if weather conditions are less than optimal or if a pest problem has occurred. If questions remain, follow up on pest problems with the Insect & Plant Disease Diagnostic Lab at CCE – Suffolk County. Grapevines require a lot of maintenance and follow up.

Use stakes or install the trellis the first year—do not let vines lay on the ground. Good light interception is necessary to maximize photosynthesis. Good airflow will reduce humidity and allow the foliage to dry more quickly after a rain. These are important steps for production of quality fruit and to minimize fungal disease pressure. Remove the fruit in year one to allow the vines to develop their root system and the framework of the vine. Allow a small crop in year two only on vigorous vines that are filling the trellis. The first year or two is reserved for developing the root system and framework for the training system. Refer to the work schedule table below for more information.

Month	Work Schedule
Mar	Prune dormant vines, tie canes to trellis.
Apr	Till up emerging weeds around vines, easier to do when they are small. Continue periodic shallow cultivation through the season to keep weed growth in check.
May	Budbreak in most areas. Rub any excess shoots off of the trunk of mature vines. Most training systems follow the ± 4 shoots per foot of row rule, therefore, excess shoots along the trellis wire can easily be removed while shoots are < 6". For disease prone varieties, fungicide applications should start in May. Lightly fertilize.
June	Bloom and then berry set will take place. Young berries are highly susceptible to fungal diseases though this is somewhat variety dependent. Monitor vines for diseases and insects such as leafhoppers and beetles. Apply fungicide to susceptible varieties; apply insecticide only as necessary. Continue to control weeds. Fertilize again if necessary.

Month	**Work Schedule *(continued from previous page)***
July	Berry size will increase. For vines with a large number of clusters, thin off excess fruit. General rule of thumb in winegrapes – 12 to 14 leaves are necessary to ripen one cluster. Continue monitoring for pests. Arrange shoots on trellis to maximize light and air interception. Canopy management practices such as hedging (trimming of excess growth esp. from the top of the canopy) and leaf pulling (selective pulling of leaves around clusters to improve air flow) are done at this time of year.
Aug	Berries will start to color and soften. Acid levels gradually decline while sugars, flavors and aromas will increase. This stage of growth is called veraison. This is the time that berries become more attractive to birds, deer, raccoons and other wildlife.
Sept Oct	Harvest – judge the time for harvest by color, flavor and information in the literature. Poor weather and wildlife pressure can precipitate an early harvest.

General Care

Well-tended, balanced vineyards yield high quality fruit. A comprehensive publication for commercial and advanced home growers is the Wine Grape Production Guide for Eastern North America. Copies may be ordered on line from the Natural Resource, Agricultural and Engineering Service, www.nraes.org. This is the single most relevant guide for eastern viticulture. However, there are many good books on grape growing.

Fertilization

The basis of good nutrition is a healthy soil. Make sure soil pH is appropriate. Address compaction issues. If soil is sandy, apply compost or other organic matter to improve soil water holding capacity and nutrient retention. Do not apply very large amounts of compost; smaller annual or semi-annual applications are better for balanced soils.

Grapevines on Long Island generally require small amounts of fertilizer. Typically, small amounts of nitrogen are required annually. Start in May after budbreak with several ounces per vine of a nitrogen (N) only material or an NPK fertilizer. NPK refers to percent nitrogen-phosphorous-potassium such as 5-10-5, 10-10-10, or 20-20-20). Heavy soils, those with more organic matter, will require less N than sandier soils. Reapply N in June or July if vines appear stunted and pale. Scale back on nitrogen if shoots are vigorous and large (> thumb size) in diameter and/or leaves are excessively large and dark green (called “dinner plate” leaves). Do not fertilize late in the season, it will stimulate shoot growth at a time when vines should be ripening fruit and preparing for dormancy. Pay attention to your vines and read the literature as it is very difficult to provide a one-size-fits-all fertilizer recommendation. It is important to not overuse nitrogen as it causes vines to enter into a wood producing mode at the expense of fruit. Excess nitrogen fertilizer creates large, shaded vines and may contribute to ground and surface water contamination.

In Long Island vineyards, potassium and lime are required every few years. A complete soil analysis from a reputable laboratory will provide recommendations. Commercial growers sometimes apply foliar nutrients as a supplement to ground applied fertilizer. Nitrogen (many different types) and magnesium (epsom salts or magnesium sulfate) are common foliar sprays.

It is possible to fertilize a vineyard organically but it is slightly more difficult as many organic products are slow release. The cost of organic products is usually higher than traditional products. Common organic nitrogen fertilizers include peanut meal, soybean meal and feather meal. Liquid fish products are sometimes used as foliar sprays. There are many proprietary products as well. As with conventional fertilizers, judicious use of compost and/or composted manure will reduce the need for nitrogen fertilizers. Similarly, avoid over application of organic fertilizers as they can cause the same overstimulation of shoot growth.

Spacing, Pruning and Training

On the East End, vines are spaced anywhere from 3-6 ft. apart in the row in rows that are 6-8 ft. apart. Sandy soils will grow smaller vines than soils with more silt. Vines are therefore planted closer together on the sandy soils in order to fill the trellis with foliage (an evenly filled trellis makes the most efficient use of sunlight and space). The height of the trellis should be in a 1: 1 ratio with the row width to avoid shading. For example, if row width is 6 ft., then trellis height should be a maximum of 6 ft. as well. A taller canopy will cast shade on the adjacent row early/late in the day.

Pruning is the removal of up to 90% of the previous season’s growth. It helps to direct the vine energy into fruit production and keeps the vine within its allotted space. Training is the arrangement of the vine on the trellis to facilitate good light interception and good air flow through the canopy. Pruning and training go hand in hand, because as the vines

are pruned, they are shaped into the desired training system. There are many different ways to train vines. It is worthwhile to research this topic and find a system that is commonly used for your grape variety. The most common training system for vinifera on Long Island is Vertical Shoot Positioning (VSP). VSP is well suited to vinifera as they are upright growing vines. In VSP, a permanent wire is located 28-32" high and 2-3 pairs of movable catch wires pin the foliage upright. Visit local vineyards to view this system first-hand. The Guide to Wine Grape Production in Eastern North America has good information on pruning and training. Hybrid and American varieties, which often tend to have procumbent growth (shoots that naturally grow downward), may be better suited to systems other than VSP.

Trellis Materials

The trellis consists of line posts, end posts (larger diameter), anchors and wire. The fixed fruiting wire is attached to the trellis with U-shaped staples. The 2-3 sets of movable catch wires rest on angled nails or on a J-staple (trellis supply companies have other devices as well). Locally, Mudd Vineyards in Southold, 631.765.1248, can supply posts, wire and other trellis supplies. Mail order suppliers for both commercial and home growers include Orchard Valley Supply, 888.755.0098 and Spec Trellising, 800.237.4594. Small quantities of posts may be difficult to obtain through mail order.

Diseases and Insects

In order to ripen fruit, a grapevine must have a certain quantity of healthy, photosynthesizing foliage. It is therefore necessary to control major outbreaks of insects or diseases. A pristine grapevine canopy is not always possible, rather the goal is to keep diseases to a minimum. There are many resources to learn about grape pest problems. The *Compendium of Grape Diseases* is a great reference with excellent photos. Order the compendium from APS Press (www.apsnet.org). Cornell University also produces color fact sheets on grape pests. These can be viewed on the web at www.nysipm.cornell.edu/factsheets/grapes/. If unable to identify a pest or symptoms on fruit or leaves, samples can be taken to the Insect & Plant Diagnostic Lab at CCE –Suffolk County – contact the Lab for instructions at 631.727.4126 or 631.581.4223.

Be aware that most grapevines require periodic fungicide applications as well as an occasional insecticide. There are organic practices for grapevines, but understanding the options can be tricky and there is insufficient room in this publication to cover all the nuances. Examples: Concord leaves can be burned by sulfur and copper sprays; horticultural oils can burn grape foliage if applied >85ºF.

Regardless of your philosophy, please take the time to read and understand pesticide labels and obtain information on safety requirements. Local garden centers and agriculture suppliers stock safety equipment such as coveralls for pesticide application, gloves, boots, respirators and so on. A number of companies (Gempler's for example) sell these supplies on-line.

For most sprays, thorough coverage of the vines and fruit is essential for the application to have maximum affectivity. Because of the large volume of water required to ensure good coverage, a backpack sprayer is suitable only for newly planted vines and a small number of mature vines (<20). A larger, mobile sprayer will be required to spray larger plantings. Typically, full sized vines require 75-100 gallons of water/acre to deliver pesticides.

- On the website of the NYS Grape Integrated Pest Management Program, a link to the *NY & PA Pest Management Guidelines for Grapes* can be found (copies may be ordered from CCE – Suffolk County also). This publication is complex and intended for commercial growers; however, there are very good descriptions of diseases and insects. There is also a good section on selection of sprayers for small operations. Go to http://lergp.cce.cornell.edu/IPM/IPMHome.htm.

Become familiar with potential vineyard pests; try to identify disease and insects that you find in the vineyard. You must understand why you are spraying in the first place; 2) how to use appropriate spray materials; and 3) how to ID any pests that are poorly controlled. It is very common for home vineyards to have disease and insect problems that are less common in commercial settings. Remember also that otherwise healthy, balanced vines can withstand pest problems much better than drought or nutrient stressed vines. Refer to the pest table below for more information.

Common Pests in Long Island Vineyards

Common vineyard pests	**Period of susceptibility to infection**	**Symptoms***
Black rot fungus	May – early Aug	Dimed sized circle of dead tissue on leaves. Berries raisin and harden. There may be as much as 4 weeks between time of infection and the raisining of berries. This is the most common disease problem in home vineyards.

Common vineyard pests	**Period of susceptibility to infection**	**Symptoms* *(continued from previous page)***
Powdery mildew fungus	May - Oct	Whitish gray dusty-looking mold on upper leaf surface. Same on berries, can be darker gray. Berries crack and fail to ripen properly.
Downy mildew fungus	June – Sept	Yellow spot on upper leaf surface with white fluffy growth on leaf underside. As infection worsens, parts of the leaf become necrotic. White fluffy growth on berries. Tends to be more of a problem in wet years. Can defoliate vines in a few weeks, damaging for both baby and mature vines.
Phomopsis cane and leaf spot fungus	May – early July	Pinpoint necrotic lesions with a yellow halo on leaves; the base of green shoots can develop scabby, longitudinal scarring. Berry infections show up later in the season as berries ripen.
Potato leafhoppers	June-Aug	Marginal yellowing of younger leaves, leaves cup downward. Occurs on shoot tips.
Japanese beetles	early July-Aug	Skeletonizing of foliage. Particularly damaging to young vines.

*Photos of symptoms can be found on the following website: http://www.nysipm.cornell.edu/factsheets/grapes/

Birds and Vertebrate Pests

Ripening grapes are a favorite food of birds. Protective netting is necessary to exclude birds from eating fruit. If nets are carefully tacked down and vigilance is maintained, losses to birds can be minimized. Human activity and barking dogs in the vineyard are some of the best deterrents to birds.

Wildlife can be problematic and there are no easy solutions. Deer enjoy nibbling on young grapevine shoots, often eliminating crop for the year by munching tender young shoots to their base. Deer also like ripening fruit and will devastate a crop. Bird netting on vines will not deter hungry deer. Many commercial vineyards use either a multi-strand electric fence or an 8-10 ft. steel mesh fence around the perimeter of the property to exclude deer.

Small animals can be equally challenging to keep out. Groundhogs (woodchucks) tunnel underground, creating a safety hazard for tractors, equipment and ankles. Raccoons have been known to completely destroy the crop of home vineyards. Similarly, opossums and skunks are voracious eaters. Squirrels, chipmunks and turkeys are known to eat grapes. The most effective solution for groundhogs and raccoons is to hire a trapper to remove the animals. A few growers have had some success with electric fences; these require constant maintenance to be effective. Rabbits will nibble on dormant baby vines, setting them back a year or more. This is easily addressed by using grow tubes or cages to protect young vines.

Winemaking Information/Supplies

There is a plethora of information about winemaking on the Internet. Often there are local shops that carry winemaking supplies. Presque Isle Wine Cellars offers a catalog with books and supplies, (800) 488-7492.

Juice for making your own wine can also be obtained from local shops, wine supply catalogs and the green markets in New York City. Some local vineyards may also sell fruit to home winemakers.

For more information …

▪ The Internet has lots of information on both grapegrowing and winemaking.

▪ To diagnose a pest or nutrient problem in a home vineyard, leaf and cluster samples may be submitted for a fee to the Insect & Plant Disease Diagnostic Lab @ CCE – Suffolk County; 631.727.4126 or 631.581.4223.

▪ The best vineyard managers and winemakers read constantly - technical journals, magazines, newsletters, websites – and interact with fellow industry members. Grapevines are a tremendous amount of work but most industry people relish the intellectual challenge of growing quality fruit.

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TK 3/2010 AW 2/2012