

North Carolina Crop Profile Grapes



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PRODUCTION FACTS

- North Carolina ranks 12th nationally in production of grapes.
- The North Carolina crop accounts for less than 1 percent of the total U.S. crop.
- In 1996, 500 acres were harvested, producing 900 tons valued at \$681,000, or \$756.67 per ton. However, muscadines grown for the fresh market have realized \$15,200 per acre (\$0.95 per pound multiplied by 8 tons per acre) in annual sales.
- Annual production costs are approximately \$1,650 per acre for bunch grapes (wine), \$1,702 per acre for muscadine grapes (wine), and \$9,289 per acre for muscadines produced and packed for fresh consumption.
- All bunch grapes and most muscadine grapes (60 percent) are processed for wine.

PRODUCTION REGIONS

Grapes are grown throughout the state. Bunch grapes (*Vitis vinifera*, *V. labrusca*) are produced in the piedmont and mountains but do not survive in the coastal plain due to Pierce's disease. Muscadine cultivars (*V. rotundifolia*) are resistant to Pierce's disease and are grown in the piedmont and coastal plain. Muscadines are susceptible to winter injury and for this reason are not grown commercially in the western piedmont and mountains.

PRODUCTION PRACTICES

Well-drained soils in full sun with a pH of 5.5 to 7.0 are required. Trellising is erected before planting and must be maintained for the life of the vineyard. Vines are trained on wires and pruned annually in winter to maintain production and vigor. Grapes are shallow-rooted, and cultivation is avoided once roots begin spreading out. Sod middles are maintained, and herbicides are used to control weeds directly under the canopy. Depending on species, bunch grapes may need to be grown on rootstocks. Some muscadine cultivars are female-flowered and require a perfect-flowered pollinator nearby in order to produce fruit. Bunch grapes are cluster-harvested by hand, while most muscadine grapes are picked singly and may be hand- or machine-harvested. Planting density is higher for bunch grapes (605 plants per acre) than for muscadines (218 plants per acre).

INSECTS AND MITES

Economically significant insect pests include the grape root borer (*Vitacea polistiformis*), Japanese beetle (*Popillia japonica*), green June beetle (*Cotinis nitida*), flea beetles (*Altica chalybea*), grape berry moth (*Paralobesia viteana*), several leafhoppers, aphids (*Aphis illinoisensis*), spider mites, and scale insects. The grape root borer is the larva of a clear-wing moth that bores into roots and can cause reduced vigor and plant death. Both

muscadine and bunch grapes may be affected. Japanese beetles and June beetles swarm vineyards in midsummer and feed on foliage and fruit. These beetles are most numerous in the piedmont. Grape berry moths, flea beetles, aphids, and spider mites damage new foliage and flower clusters and can attack maturing leaves and fruit. Leafhoppers are important as vectors of Pierce's disease bacteria. Stinging insects (wasps, yellow jackets, bumblebees) are attracted to ripe fruit and may pose a hazard for pickers.

The grape root borer is the most serious insect pest of grapes in North Carolina. After vines are eight years old, they often succumb to a combination of borer feeding and hot, dry summers/harsh winter temperatures.

Chemical control.

Superior Oil

A 2 percent solution applied as a dormant spray is used as needed to control scale insects.

Carbaryl (Sevin) 80WP

1 pound active ingredient per acre is used as needed on an estimated 90 percent of the acreage as a short-residual, preharvest spray to control Japanese beetles and nuisance insects (yellow jackets, wasps). It is also used throughout the growing season to control grape berry moths, flea beetles, and leafhoppers. It is not effective on aphids.

Azinphosmethyl (Guthion) 50WP

0.75 pound active ingredient per acre is used as needed on an estimated 50 percent of the acreage for grape berry moths, flea beetles, aphids, Japanese beetles, green June beetles, and leafhoppers. It is limited to three applications per season.

Methomyl (Lannate) 1.8L

0.9 to 1.8 pounds active ingredient per acre are used as needed on an estimated 25 percent of the acreage for grape berry moths, flea beetles, aphids, and leafhoppers.

Phosmet (Imidan) 50WP

1 to 1.5 pounds active ingredient per acre are used as needed on an estimated 25 percent of the acreage for grape berry moths, flea beetles, aphids, and leafhoppers. It is also used at a high rate for Japanese beetles and green June beetles.

Malathion 25WP

1 pound active ingredient per acre is used as needed on an estimated 25 percent of the acreage for grape berry moths, flea beetles, aphids, and leafhoppers.

Chlorpyrifos (Lorsban) 4E

2.25 pounds active ingredient per acre are used on an estimated 40 percent of the acreage to control grape root borers. It is applied as a dilute spray to the soil at the base of the vine approximately 35 days before harvest.

Dicofol (Kelthane) 35WP

0.46 pound active ingredient per acre is used as needed for spider mite control.

Alternatives.

Plastic or soil placed around the base of vines gives some control of grape root borers by providing a physical barrier to adult emergence. Grape root borers can be managed by a soil mound 2 to 4 inches deep out to 39 inches from the base of the plant in early August. Plastic mulches are also effective when well-placed and removed the following spring. Biological controls exist, and studies with the augmentation of *Beauveria* fungus are under investigation. Monitoring and mating disruption using sex pheromones and a trapping system offer some control for the future. Also, the use of foams to prevent adult emergence from the soil may be useful.

Clean cultivation and removal of crop debris from the ground beneath vines can reduce overwintering by some insects.

WEEDS

Weeds between rows are managed through the use of sod middles that are kept mowed. Within rows, herbicides are used. Perennial weeds such as goldenrod, red sorrel, broomsedge, Johnsongrass, and Bermudagrass are common. Without regular weed control efforts, woody vines and trees can quickly become established in the vineyard. Once overgrown by woody perennials, vineyards are very difficult to return to production and are often abandoned. Herbicide usage must be directed to the base of the plant to avoid injury. While contact of a herbicide with older trunks may not injure the plant, care must be taken to avoid or remove new shoots emerging at ground level.

Chemical control.

Preemergence

(Used before emergence of weed seedlings from the soil.)

Oxyfluorfen (Goal) 2XL

0.5 to 2 pounds active ingredient per acre are used on mature dormant vines for annual broadleaf weed control on 20 percent of the acreage.

Dichlobenil (Casoron) 4G

4 to 6 pounds active ingredient per acre are used on annuals and many perennials on less than 5 percent of the acreage.

Simazine (Princep) 90WDG

2 to 4 pounds active ingredient per acre are used on mature vines for preemergence control of annual broadleaf weeds and grasses on 30 percent of the acreage.

Diuron (Karmex) 80DF

1.6 to 2.4 pounds active ingredient per acre are used on 25 percent of the acreage. It should be applied before germination of annual weeds.

Napropamide (Devrinol) 10G

4 pounds active ingredient per acre are used on 5 percent of the acreage. It gives preemergence control

of annual grasses and small-seeded broadleaf weeds.

Oryzalin (Surflan) 4AS

2 to 6 pounds active ingredient per acre are used on 25 percent of the acreage, and use is increasing. It gives preemergence control of annual grasses and small-seeded broadleaf weeds.

Pendimethalin (Prowl) 3.3EC

0.5 to 2 pounds active ingredient per acre are used on 25 percent of the acreage. For dormant, newly planted, and 1-year-old vines, it gives preemergence control of annual grasses and small-seeded broadleaf weeds.

Pronamide (Kerb) 50WP

1 to 4 pounds active ingredient per acre are used on 2-year-old or older vines as a directed spray for control of annual grasses and small-seeded broadleaf weeds. It is used on 25 percent of the acreage.

Norflurazon (Solicam) 80DF

1.25 to 5 pounds active ingredient per acre are used for control of annual grasses and small-seeded broadleaf weeds. It is used on 15 percent of the acreage.

Postemergence.

(Sprayed on weeds after they have emerged from the soil.)

Paraquat (Gramoxone Extra) 2.5L

0.6 to 0.9 pound active ingredient per acre is used as a directed spray for contact-kill of all green foliage. It is used on 80 percent of the acreage.

Glyphosate (Roundup Ultra) 4L

1 to 4 pounds active ingredient per acre are used as a directed spray for systemic-kill of all green foliage. It is used on 95 percent of the acreage.

Glufosinate (Rely) 1L

0.75 to 1.5 pounds active ingredient per acre are used as a directed spray for systemic-kill of all green foliage. It can be used for sucker control. A new material, it is not yet in widespread use.

Sulfonate (Touchdown) 6LC

1.3 to 5.3 pounds active ingredient per acre are used as a directed spray for systemic-kill of all green foliage. It is used on less than 5 percent of the acreage.

Clethodim (Prism) 0.94

0.09 to 0.25 pound active ingredient per acre gives postemergence grass control, though it is not generally used.

Fluazifop (Fusilade DX) 2EC

0.25 to 0.38 pound active ingredient per acre can give postemergence grass control. It is not generally used.

Sethoxydim (Poast) 1.53 EC

0.3 to 0.5 pound active ingredient per acre can give postemergence grass control. It is used on 20 percent of the acreage.

Alternatives.

Organic production is being attempted in at least one new vineyard being established in North Carolina. Weeds are the primary stumbling block to date. Weed barrier fabrics and mulches have been used with some success, but hand-labor expense for hoeing and pulling weeds has been excessive. Plastic growth tubes 3 inches in diameter and 24 to 36 inches long have been used experimentally to protect vines and accelerate growth.

DISEASES

Grape disease control is accomplished through the use of resistant cultivars or species, through pruning and field sanitation, and by the use of fungicides. Bunch grapes are far more susceptible to fungal diseases and require a much more rigorous spray schedule. Downy mildew (*Plasmopara viticola*), powdery mildew (*Uncinula necator*), and black rot (*Guignardia bidwellii*) often cause extensive defoliation by harvest and can affect fruit as well. Bitter rot (*Greeneria uvicola*, syn. *Melanconium fuligineum*), ripe rot (*Glomerella cingulata*; imp. st. *Colletotrichum* spp.), and Macrophoma rot (*Botryosphaeria dothidea*) commonly cause fruit rots on muscadine and bunch grapes. Bunch grape anthracnose (*Elsinoe ampelina*) affects stems, fruit, and leaves. Angular leaf spot (*Mycosphaerella angulata*) is common on muscadine grapes. Pierce's disease (*Xylella fastidiosa*) is the primary disease limiting production of bunch grape species (*V. labrusca*, *V. vinifera*) in the southern U.S. This bacterial pathogen is endemic in wild muscadine grapes; most muscadine cultivars are resistant to it. Chemical control is not available. Crown gall (*Agrobacterium tumefaciens*) is a disease caused by a bacterium that has frequently been associated with gall formation on grape vines. Symptoms of crown gall are far less severe on muscadine grapes than on bunch grapes. Phomopsis cane and leaf spot (*Phomopsis viticola*) also occurs on bunch grapes.

Chemical control.

Liquid lime-sulfur

10 gallons per acre are used as a dormant spray for anthracnose on bunch grapes.

Captan 50WP

2 pounds active ingredient per acre are used on 90 percent of the acreage to control fruit rots and to help control leaf diseases.

Benomyl (Benlate) 50WP

0.75 pound active ingredient per acre is used on 90 percent of the acreage for mildew and fruit rot control.

Wettable sulfur 80WP

2.4 to 8 pounds active ingredient per acre are used as needed for powdery mildew control.

Myclobutanil (Nova) 40WP

2 ounces active ingredient per acre are used on 50 percent of the acreage to control bunch grape anthracnose, powdery mildew, and black rot.

Bayleton 50WP

1 to 2 ounces active ingredient per acre are used for powdery mildew and black rot control on bunch grapes on an estimated 20 percent of the acreage.

Azoxystrobin (Abound) 2.08F

0.18 to 0.25 pound active ingredient per acre is labeled for broad-spectrum control of grape diseases. However, the product has not yet been made readily available, and very little has been used.

Carbamate (Ferbam) 76WP

1.5 pounds active ingredient per acre are used on 20 percent of the acreage to control black rot, anthracnose, and dead arm.

Mancozeb (Penncozeb) 75DF

1.2 to 3 pounds active ingredient per acre are used for black rot, bunch rot, phomopsis, and downy mildew. This product has a 66-day preharvest interval (phi).

Maneb 80WP

1.2 to 3.2 pounds active ingredient per acre are used for black rot, bunch rot, phomopsis, and downy mildew. This product has a 66-day phi.

Alternatives.

Resistance to some diseases is available. Mowing or otherwise reducing undergrowth near vines will improve air movement through the vineyard. Timely harvesting along with removal of leftover fruit at the end of the season should also help reduce fruit rots. Avoiding excessive late-season fertilizing can reduce both disease and the likelihood of winter injury to cordons and trunks of vines.

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