

# Other Cultural Practices for Blueberries

## Frost Protection

Early fruiting blueberries have a greater risk of frost in late winter and early spring than main season production. Blueberries for early season markets are ideally grown in frost-free areas but in many of those sites where frost is uncommon there is still a risk of crop loss. Cold fronts can enter the area from the north or radiative frosts on clear nights may be enough to allow cold temperatures to settle around plants long enough to damage flowers or fruit. Low-lying sites in the landscape are the coldest areas as colder air drains to lower areas after sunset. Siting of plantings on south facing hillsides that allow air to drain is an important tool for frost protection. Coastal fog may in some instances help protect against freezes but the occurrence is not predictable.

On clear, calm nights in early spring, radiative frosts allow temperatures to dip below freezing and depending upon the stage of development, the flower or fruit may be damaged or abort from the plant. Low temperatures typically do not harm the plants, but fruit production will be lost from earliest harvests. Then, a new flowering cycle must be initiated and at least an additional 70-80 days are needed before fruit will be available for picking.

Blueberry production in mild winter climates will require low-chill Southern Highbush varieties that remain actively growing or “evergreen” during mild winters. Young blueberry flowers and fruit on evergreen Southern Highbush blueberries are not as hardy as dormant buds on dormant highbush plants. The young flowers and fruit can withstand temperatures below freezing for relatively short periods of time. The exact critical temperature depends upon the stage of development of the flower or fruit. Partially developed flowers of highbush plants for example may tolerate 26-28° F. for short periods but the more susceptible flowers of rabbiteye (*Vaccinium ashei* Read) varieties may be damaged at 30° F. After highbush flowers open fully, they lose additional tolerance to cold and the flowers and young fruit are damaged by temperatures in the high 20s. Damaged flowers and fruit may abort and drop or they may remain on the plant but be readily apparent by discoloration or they may simply be slower to mature and smaller at harvest.

Nevertheless, it is important to plan implementation of frost protection programs anticipating that temperatures will drop below freezing in areas susceptible to frost. Frost protection typically can be accomplished with wind machines or helicopters that mix surface air with warmer air above or also with sprinkler irrigation that protects the tender fruit and flower tissue with heat from freezing ice. Of these, sprinkler irrigation – when properly managed – offers the most frost protection.

Depending on weather patterns, topography, citing in the landform, proximity to large bodies of water, etc., freezes may be rare or frequent and specific conditions will determine if frost protection is possible and cost effective. In colder sites it may be more cost effective to switch to later ripening varieties or alternative crops or enterprises.



Sprinkling for frost protection of blueberries

Sprinkler irrigation typically can provide protection of 3-4° F (1-2° C). To be effective, there must be appropriate application of adequate volume of water that, depending upon circumstances, may vary between 30 and 90 gallons per minute per acre. Specific timing of sprinkler treatment varies with the nature and intensity of freeze conditions, temperatures, relative humidity, wind speed, etc. Typically, sprinklers may be started when ground temperatures are 34-36° F and will need to continue until temperatures rise again to those temperatures in the early AM.

Maintaining high soil moisture prior to freezing temperatures also aids in frost protection. If sufficient water is available and drainage is adequate, high soil moisture provides a mass of moisture that is slower to respond to lowering temperature than air. Excessive soil moisture for extended periods, however can also aggravate Phtophthora root rot and other soil born pathogens.

Flood irrigation can also be used for frost protection in low-lying areas with adequate water available. The frost –free growing areas in California often border the coast where rolling hills are more common and groundwater well supplies are more limited.

Growers planning to implement frost protection programs should carefully design the system of their specific conditions to assure a good chance of success. For more detailed and complete information on frost protection systems useful for blueberries see:

Principles of Frost Protection by Richard L. Snyder  
<http://biomet.ucdavis.edu/frostprotection/Principles%20of%20Frost%20Protection/FPO05.html>

## Bird Protection

Covering fields with bird netting is the only effective way of controlling birds. There are a number of other methods, from cannon fire and noise makers to predatory falcons. Typically, plantings of 10-20 acres or less will use bird netting but as the production area increases, growers are more likely to defer netting and absorb losses to birds among other losses in the higher fruit volumes.

The netting used is polystyrene with mesh sizes of 5/8 to 3/4". Plastic coated 3/8" cable is strong in a grid supported by posts approximately 20 ft apart.



Nets are generally unnecessary when berries are grown in tunnels and the netting cost savings can be deducted from the cost of the tunnels.

## Pollination and Bees

Blueberry flowers are capable of self-fertilization but with many varieties, fruit size and quantity increases when two or more varieties are planted in the same field. Newer varieties tend to be productive even without mixing varieties but overall it often is desirable to mix similarly adapted varieties in the same field. Bees are important to pollination of blueberry flowers and fruit yield improves when active beehives are placed in the field during flowering periods. Pollination of blueberries is performed by honeybees (*Apis mellifera*) and bumblebees (*Bombus occidentalis*)



Hives should be distributed along the edge of the field – roughly 2-3 per acre. Tunneled plantings may benefit from outside and wild hives depending upon the time of year. We must open the sides of the tunnels during the day to allow wild bees to go in and do their job or install bumblebee colonies in tunnels to encourage good pollination. Packaged hives of bumble bees are also offered for sale by commercial insectaries where available.

