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Controlling Growth of Apple Trees



[1]

Regulation of vegetative growth is one of the most important orchard practices. Often, pruning is used as a way to eliminate unwanted growth, but this approach can lead to the development of vigorous, unproductive wood and an increasing need for pruning in following years. In this factsheet we detail a few cultural and chemical techniques which may help to control growth.

Why Control Growth?

Insufficient space for tree development is the most common reason for using growth-controlling techniques. This situation develops if the soil results in more vigor than anticipated, the wrong rootstock was chosen for the cultivar, the scion vigor was not integrated in the spacing decision, or simply, trees were planted closer than they should have been. Scoring, ringing, root pruning may be helpful in controlling vegetative growth in these types of plantings.

A second important reason for controlling growth is related to crop loss. If the crop was lost due to a spring frost or early-season hail, then it would be appropriate to reduce the potential for a large amount of vegetative growth by the use of growth-controlling techniques. Traditionally, the use of ethephon has been the most effective technique under these circumstances, however, experience in 2001 (in blocks with nearly complete crop loss from a May 7 freeze) showed that Apogee® also is extremely effective. As a non-chemical alternative, scoring, ringing, or root pruning also may provide benefit.

Scoring

Scoring, very simply, is the process of making a single cut with a knife (a linoleum knife works very well) completely around the trunk of the tree somewhere between the soil and the lowest scaffold branches. This process is done when new growth is approximately 4 to 6 inches in length, usually about 10 days after petal fall. More than one time around the tree provides no additional benefit. Scoring later in the season reduces the effectiveness, and likely will provide no benefit if done after June drop. Caution is advised when selecting trees to score. Weak or moderately vigorous trees may be overly devigorated by the scoring treatment, and this effect may last for several years. On vigorous trees, scoring may be performed in successive years, but careful assessment of the previous season's growth should be made each year prior to treatment.

Scoring breaks the flow of nutrients, photosynthates, and growth regulators between the tree canopy and its roots. The score will heal, but prior to healing it will reduce both the length and diameter of the new growth. Additionally, it will enhance fruit set and increase flower bud formation for the next season. Enhanced fruit set will also help reduce growth. In some parts of the country a sensitivity to winter injury of the wood in the scored area has been noted; however, we have never seen this injury in a number of years of using scoring.

Ringing



[2] Ringing is very similar to scoring, except more severe; a ring of

bark is actually removed rather than just cut. Various tools can be used to perform the ringing operation: a pruning saw, a ringing knife, or a chain saw. Which technique you use depends upon the size of the ring that you wish to generate. The mildest treatment would be with a pruning saw; the Wheeler or Orchard saw generates a ring approximately 1/32 to 3/64 inch wide, and the "Turbo-cut" saws generate a ring approximately 1/16 inch wide. Using these saws, the ring should be a complete circle around the trunk. Ringing knives come in various widths, producing rings from 1/8 to 1/4 inch wide. A chain saw will generate a cut approximately 1/4 inch wide. With a ringing knife or a chain saw cut, a complete circle may girdle the tree. A more appropriate method would be to make two opposing cuts about half-way around the tree and 10 inches apart. The ends of the cuts should overlap by about 2 inches. As with scoring, ringing should be done when the new growth is approximately 4 to 6 inches long.

Ringing functions similarly to scoring to slow growth, enhance fruit set, and increase flower bud initiation; however, it is much more potent than scoring. Ringing should be used sparingly and only in situations when you need to have a dramatic reduction in growth.

Root Pruning

A great deal of research on root pruning has been done by Drs. James Schupp (University of Maine) and David Ferree (Ohio State University). Here we will summarize some of their recommendations and observations.

Root pruning is accomplished with a sharpened subsoiling blade attached to a tool bar on your tractor. This blade should be set at a depth of 12 inches and passed through the soil approximately 36 to 40 inches from the trunk on both sides of the tree. The best timing for the treatment is between bloom and approximately 10 days after petal fall. Later pruning will have reduced benefits. Do not root pruning after June drop if there is a crop on the trees, since it will enhance preharvest drop.

When there is no crop on the trees, such as after a severe spring frost, root pruning will not be as effective as when there is a crop. To obtain a reduction in growth it may be necessary to repeat the pruning one month after the first treatment.

Root pruning reduces growth similarly to scoring and ringing but does not have any effect on fruit set. It does, however, enhance flower bud initiation. Additionally, significant delays in drop have been noted with root pruned trees, but the user must also realize that it may reduce fruit size the year of root pruning. Generally, use root pruning carefully and selectively.

Ethephon Treatment

The use of ethephon is another way to control tree growth. It is probably the best way to control growth of trees where the crop has been lost to frost or early-season hail. It is much less useful, however, on bearing trees, because it will thin fruit even at rates that have only a small effect on growth. When new growth is 4 to 6 inches long, apply 1.67 pints ethephon per 100 gallons dilute (500 ppm). Check growth one month after treatment, and if more control is needed, apply 1 pint ethephon per 100 gallons dilute (300 ppm). If your crop was hail damaged and you wish to remove it, add 1 pound of Sevin per 100 gallons and 10 ppm NAA to the ethephon treatment.

Ethephon controls growth by releasing the naturally occurring plant hormone, ethylene. Ethylene has many effects on tree development; therefore, use ethephon carefully, and do not over apply.

Apogee® Treatment

Apogee is a new growth-retarding chemical. Since it requires up to 2 weeks for Apogee to slow growth effectively, it is essential to make the first application when shoots are not longer than 1 to 1.5 inches. This timing usually coincides with late bloom or petal fall. Use between 3 and 6 ounces per 100 gallons dilute in this first application. Monitor growth frequently. When you see the first signs of regrowth, apply Apogee again, this time at a rate of 3 to 6 ounces per 100 gallons. A third application may be necessary when vegetative growth is extremely vigorous. If you do not wish to monitor regrowth closely, two weeks after the first application, apply a second treatment of Apogee at 3 to 6 ounces per 100 gallons dilute. Use a surfactant with Apogee application. If your water is hard and contains greater than 500 ppm calcium, include with the Apogee an equal weight of ammonium sulfate. Alternatively, two pints of either Quest or Choice can replace one pound of ammonium sulfate. Do not tank mix with calcium-containing compounds, such as calcium chloride.

Apogee reduces terminal growth by inhibiting the synthesis of gibberellins, a group of endogenous hormones that are primarily responsible for regulation of terminal growth in apple trees.

Please see the [Apogee factsheet](#) [3] for a more detailed discussion of its use.

Growth control must become a regular practice in many existing orchards. It must be performed carefully and only when needed; however, its benefits may be significant.

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