

Girdling Trees

R. SCOTT JOHNSON AND JAMES H. LARUE

A wide variety of fruit species are girdled to increase their yields, improve set, enlarge fruit size, and advance maturity. Apples, grapes, olives, oranges, grapefruits, and peaches have responded in at least one (but not necessarily all) of these areas. However, numerous examples of no response or even of negative effects exist. Girdling, therefore, must be used cautiously under conditions where the effects are well understood.

Girdling is performed by removing a strip of bark from around the trunk or base of each scaffold limb with a grape girdling knife (fig. 11.1). The cut is usually made $\frac{1}{8}$ or $\frac{3}{16}$ inch wide and only as deep as the cambium layer (the area between the bark and wood). This temporarily disrupts the downward flow of carbohydrates in the phloem and apparently makes them more available for fruit growth and development. If the cut is not deep enough, the uninterrupted downward flow continues and the fruit will not respond. Deeper cuts that penetrate past the cambium into the xylem tissue disrupt the upward flow of water and nutrients, leading to severe stress and even death of the limb or tree. To be effective, the girdle must extend all the way around the limb with the two ends meeting or overlapping in a spiral pattern. Even if only a small section of bark is left, enough phloem may remain to continue the downward flow of carbohydrates and the girdle will be ineffective.

The practice is generally carried out on early maturing peach and nectarine trees from early to late April, corresponding to 4 to 6 weeks before harvest.

This time also corresponds to the period just before pit hardening. Girdling, done too early, may result in increased split pits. If, however, it is carried out too late, there will be little or no response. The cut generally heals over within 6 to 8 weeks; in California, it does not need to be protected with grafting wax or fungicides. Usually gum is secreted from the girdle. If done correctly, the callus tissue formed during healing will just fill the wound (fig. 11.2). If cut too deep, regrowth of callus tissue tends to be excessive.

In California, girdling is common on peaches and nectarines ripening before mid-June. Typically, the benefits include increased fruit size, advanced maturity of 1 to 4 days, and reduced number of harvests necessary to pick all the fruit. Varietal response to this practice, however, is quite variable. Almost all early varieties show some response, substantial in some and almost unnoticeable in others.

Mid- and late-season varieties are typically not girdled for several reasons. First, the economic advantages of increased size and advanced maturity are not nearly as great during this time of the season. Furthermore, with more time on the tree, these fruit generally size adequately anyway. Finally, many of these varieties are adversely affected by girdling, exhibiting fruit cracks and poor coloration. Generally, plums do not respond to girdling.

Among the negative results possible is an increase in split pits. Some older and newer varieties are particularly sensitive to this. For the most part, standard varieties have much less tendency to split (splitting



Fig. 11.1. A strip of scaffold limb bark being removed with a grape-girdling knife.



Fig. 11.2. A new girdle directly above a healed girdle from the previous year. Note the callus tissue formed during healing.

may be internal and not extend to the surface). Therefore, even though girdling increases the occurrence of this phenomenon, the percentage is low and not a big problem.

Growers have observed a decrease in fruit quality of some nectarine varieties on girdled trees. The red color can be duller and not as glossy and surface russeting may increase. Fruit shape, taste, and firmness can also be adversely affected under certain environmental conditions.

Girdling may be stressful to the tree. Nutrient deficiency symptoms often appear on leaves shortly after girdling, and many growers believe the life of the tree is shortened. To minimize these detrimental effects, treat trees carefully. Water, nutrient, disease, and insect stresses should all be avoided, before and after harvest. Trees younger than 4 years old should not be girdled and care should be taken that the cut does not go deeper than the cambium. Tree death can occur if the tree is too young or if the cut is too deep.