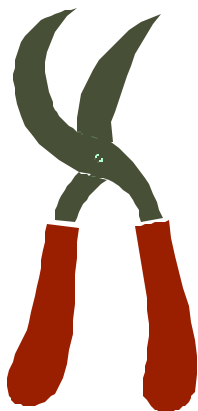




Pruning Almonds After Their First Growing Season



Pruning after the first growing season is critical in determining the shape and performance of an almond tree. At this time you should select three permanent primary scaffolds that will form the framework of the tree. I have seen quite a few first year trees pruned improperly in Madera County, resulting in premature loss of tree vigor, increased susceptibility to disease, and in some extreme cases the eventual removal of orchards; all because these trees were pruned improperly their first dormant season.

The primary goal of the first dormant pruning is to select three primary branches with as much space as possible between them (fig. 1-A). Wide spacing ensures the best chance of a strong branch attachment that will not split as the tree matures. The three primary scaffolds should be oriented 120

degrees apart when viewed from above (fig. 1-B). Such an arrangement reduces the chance of splitting branches, leaning trunks, and crossing limbs. If possible, one of the three primary scaffolds, preferably the strongest, should grow into the prevailing wind, usually northwest. A strong, vigorous limb on the north side helps keep the tree from being dominated by growth on the sunny south side of the tree.

Pruners should also pay attention to the angle of the primary limbs when selecting them; for the scaffold angle determines whether bark will become embedded between limb and trunk. The ideal primary scaffold grows 45 degrees from the vertical and the horizontal (fig. 1-C). If the ideal limb is not present try to find limbs at least 30 degrees from the vertical or at least 30 degrees from the horizontal. Limbs that grow at too flat an angle tend to lose their vigor and upright orientation. Limbs where the bark becomes embedded will be weak and may split with the first heavy crop.

Why only three primary limbs? No tree needs to have more than three primary limbs. A mature tree with more than three limbs will limit access to limb-shaking equipment. I have seen a few prime orchards in Madera County decline prematurely because they were too large to trunk shake, but because they had more

than 3 primary limbs they could not be limb shaken and thus the trees were barked severely while attempting to trunk shake these large trees. Because of tree barking almost every tree had *Ceratocystis* bark canker, so instead of reaching optimal age and production these orchards were being removed.

What if you can't find three acceptable primary scaffolds? Selecting two sound scaffolds is better than keeping four poor ones (somebody will probably argue with me here)! After the primary scaffolds have been selected, the next step is to remove all other major limbs that originate from the trunk, and all growth below the lowest primary limb. Pruners should leave small lateral branches on the primaries; this growth promotes scaffold caliper growth and is the first to develop spurs and produce nuts.

Growers can use three methods for pruning the first growing season: short pruning, long pruning, and intermediate pruning. These tree pruning methods do not affect trunk diameter or limb caliper; but production differences related to tree training occur the first few harvests but disappear after trees mature. In choosing the pruning method a grower must decide which is more important, high early production or ease of training during the early growing years, and the

grower must also consider the growth habit of the variety and the wind conditions in the orchard. I usually prefer the happy medium-intermediate pruning.

Long pruning

Growers who use long pruning make no major heading cuts on primary on primary scaffolds and retain small lateral branches that will provide leaf surface and early fruiting. This type of pruning allows the tree to develop a natural branching habit. Scaffolds and fruit wood develop quickly, and the canopy, because it is relatively uncontrolled, grows rangy. Long-pruned trees usually need roping or tying (fig. 2-B). Even after being properly tied, limbs may break. If ropes are used, they must be placed as high on the primary scaffolds as possible so that the scaffolds do not bend over them. In this system secondary and tertiary branches are selected from the natural branching of the tree. Long pruning takes time and judgement, and if the pruner is uncomfortable with making second and third level framework decisions, another pruning method other than long pruning may be more appropriate. The main advantage of long pruning is heavy early production. Disadvantages include the need for more work and care the second growing season and greater difficulty in achieving an ideally shaped tree. Willowy growing varieties such as Monterey may be unsuitable for this system of training.

Short Pruning

This type of pruning involves heading each of the three primaries back to 18 -24 inches. Unfortunately I have seen some

pruners in Madera County head their primaries back to 12 inches or less--this is much to severe and will lead to "elbow" growths and sharp secondary angle branching. Short pruning done properly (18-24 inches) stimulates vigorous secondary growth that is largely removed later with thinning cuts. This type of pruning allows growers a large role in shaping trees, because the vigorous regrowth provides many choices for secondary limb selection where you want it. Because short-pruned trees are short in stature, they rarely require roping or tying (fig. 2-D). Keeping trees short is particularly advantageous during the second growing season in areas with strong wind in April and May. Also, in the case of weak trees, short pruning can be a desirable way to stimulate vigorous shoots the next growing season. Although this is an easy pruning method, growers must consider the trade-offs. Heading cuts on vigorous trees can encourage vegetative growth at the expense of early nut production. On short-pruned trees, developing a primary scaffold long enough to limb-shake can be difficult.

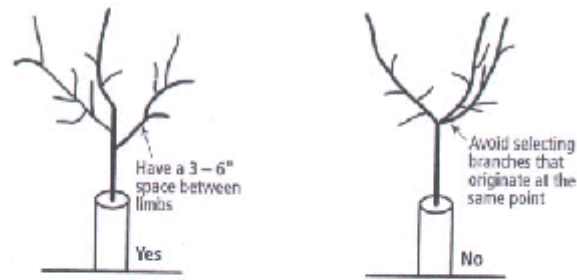
Intermediate pruning

A compromise between short and long pruning, intermediate pruning contains elements of both. Growers make heading cuts high on the primary scaffolds. These cuts are at 42-48 inches from the trunk, usually at a point just below the closely spaced buds that are common in the last 6 to 12 inches of shoot growth (fig. 2-C). Heading at this distance greatly reduces the number of new shoots that originate near the end of the branch in the second leaf. This

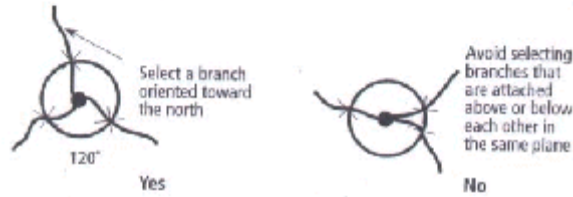
reduces the shoot weight at the end of the primary scaffold and makes it less likely to bend in spring winds. As with long pruning, orchardists who practice intermediate pruning keep small lateral branches for their leaf surface and to promote early fruiting. This system of pruning generates fewer undesirable water sprouts than short pruning, but it requires thought when selecting among the relatively few secondary branches in the second dormant season. If intermediate pruned trees are especially vigorous or if the variety is willowy, branches may require roping prior to the second leaf. Overall, this is a successful training system that avoids the worse problems of long pruning but offers advantages in terms of early production.

Second Dormant Pruning

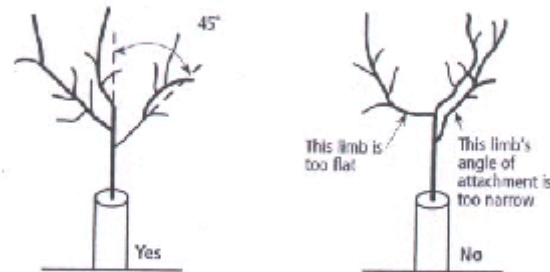
After the second growing season the grower selects the secondary scaffolds--two per each primary limb. A secondary scaffold is a vigorous, upright lateral that forms a "Y" off a primary limb. The secondary branches should be evenly spaced around the canopy (6 branches, 60 degrees apart) and have an upward and outward orientation. The secondaries do not need to be headed unless excessively long, since most almond trees branch sufficiently without heading cuts. Other than pruning limbs that compete with the selected secondaries, removing badly crossing branches, and cutting an excess of internal water sprouts, additional limb removal is usually unnecessary.



A. Try to select limbs that have vertical spacing up and down the trunk.



B. Looking downward, select primary scaffolds equally spaced around the tree to provide balance and symmetry.



C. Ideally, the angle of branch attachment to the trunk should be close to 45° to be strong and to maintain vigor.

Figure 1 The three considerations in selecting primary scaffolds are limb spacing (A), orientation (B), and angle of attachment (C).

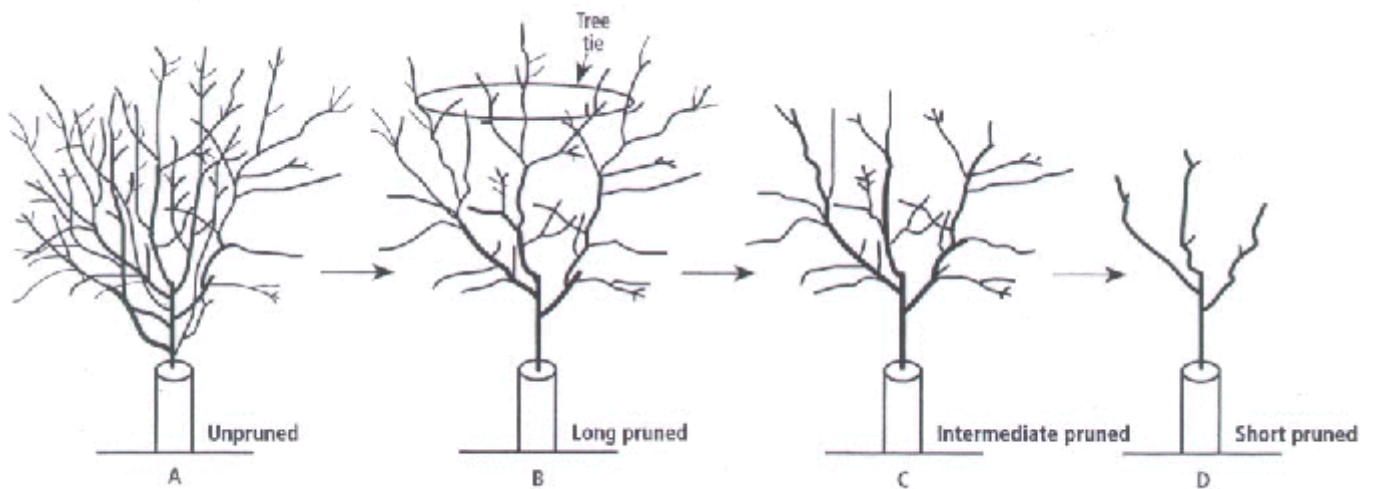
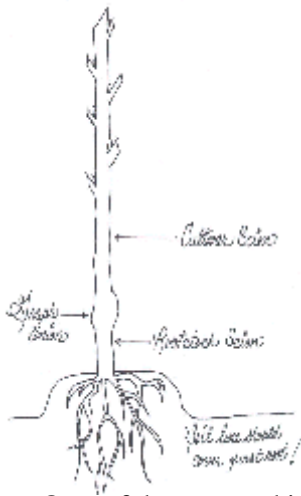


Figure 2 The same tree (A) before pruning and after first dormant pruning according to different training systems: (B) long pruning, (C) intermediate pruning, and (D) short pruning.

Plant New Trees High



One of the worst things that can happen to young trees from nurseries is that they are often planted too deep. Sometimes though they are initially planted at the right height, but then a berm is thrown up around the trees and their crown (the graft union between the scion and rootstock) is covered with the soil from the berm. I saw many diseased trees last spring that had *Phytophthora* root and crown infections and every one of them had their graft union below the soil line; sometimes the union was more than six inches below. If you are planting or replanting, trees should be planted high on small mounds as shallowly as possible. Planting depth after settling should be no deeper than in the nursery, and the graft union should always be well above the soil line.

Try to follow some of these planting tips: 1) dig a hole deep enough so the roots are spread out and not cramped, 2) plant the trees so that the nursery soil line is above the current soil line, 3) plant the highest root a little above the soil line and then cover it with extra dirt, and 4) when planting allow for 3-6 inches of settling in the planting hole. I have

never seen trees die from being planted too high, but I have seen many trees killed by being planted too low.

Most soils in Madera County are heavy with a high clay content. These soils have slow water percolation, drain slowly, and remain saturated longer than well drained sandy soils. The mound around the tree trunk forces excess water to drain away from the tree, thus reducing the length of time the crown is exposed to excess surface moisture. Saturated soil conditions can occur at planting if the trees are irrigated too heavily, or when a high rainfall winter and spring occur. Some orchards survive years before a wet spring kills trees that settled too deep or had their crown covered with a berm. Plant the tree right the first time!

After making a strong case for planting the trees high, there is one exception. If you are planting on Marianna 2624 plum rootstock you should plant your trees the same depth they were planted in the nursery. With this rootstock, planting trees too high will cause them to sucker from the roots. Marianna 2624 is fairly resistant to *Phytophthora* and it can also tolerate excess soil moisture better than other rootstocks.

Be Careful Irrigating Trees at Planting Time

It is often recommended to "tank" or irrigate new trees in following planting. The purpose is to settle and firm soil around the new root system

and eliminate air pockets which may dry delicate root hairs. This is sound advice in those soils which are dry, sandy, or cloddy, etc. In many situations irrigation is not needed and may be quite detrimental to those fruit trees that are sensitive to excess water. Poor growth of many new orchards can be attributed to excess water at planting time. Consider the following: 1) in most cases we are planting new trees into wet soil--and adequate soil moisture is present, 2) tamping soil firmly with your foot is sufficient to firm most alluvial soils around new roots to eliminate air pockets. I like to just add about a gallon of water to the root ball in order to fill in small air pockets that could dry roots 3) actual irrigation at planting could over saturate the soil around the young root system, and as new, tender feeder roots grow into saturated soils, conditions are excellent for their death due to lack of aeration and/or *Phytophthora* infection. Once this occurs, poor growth or tree death usually follow.

Use good judgement. Tank or irrigate trees at planting under the following conditions: 1) if you are planting late and the weather is warm, 2) if the soil is dry, and 3) if the soil can not be tamped firmly around roots due to clods etc. If you do not have these conditions, you may be able to delay the first irrigation until trees are growing well (8-10 inches of new growth). Remember, new trees are not using much water because they have few leaves, spring temperatures are cool, and there is usually a good residual supply of soil moisture that new roots can grow into.

2004 Regional Almond Meeting

Wednesday, February 4, 2004

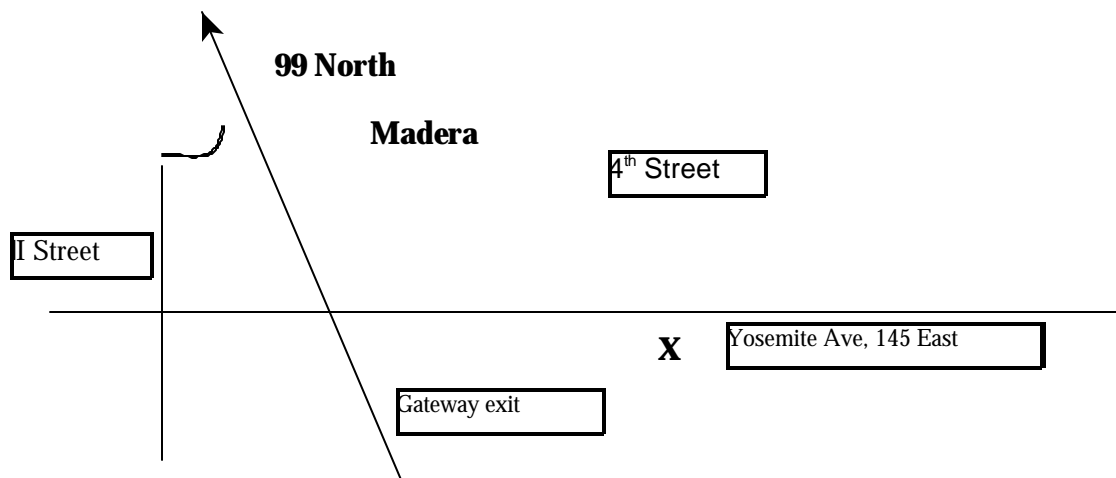
Madera County Conference Center, 700 E. Yosemite Ave, Madera

8:00 AM-12:30 PM

- 8:00 a.m. PCA and continuing education credits sign-up
- 8:30 a.m. **Almond leaf scorch disease diagnosis**
Dr. Brent Holtz, UCCE Farm Advisor, Madera County
- 9:00 a.m. **Weed control in almond orchards**
Ron Vargas, University of Calif. Farm Advisor, Madera County
- 9:30 a.m. **Hull rot control in the San Joaquin Valley**
Dr. Brent Holtz, University of Calif. Farm Advisor, Madera County
- 10:00 a.m. **Pre-plant fumigation for nematode control**
Dr. Mike McKenry, Nematology Extension Specialist, UC Riverside/KAC
- 10:30 a.m. **Break**
- 11:00 a.m. **Phytophthora canker and almond replant disorder**
Dr. Greg Browne, USDA-ARS Plant Pathologist
- 11:30 a.m. **Controlling brown rot, shot hole, scab, and anthracnose**
Dr. Jim Adaskaveg, Plant Pathologist, UC Riverside
- 12:00 a.m. **Wood chipping almond brush and its effect on the nematodes, soil aggregation, and soil nutrients**
Dr. Brent Holtz, UCCE farm advisor, Madera County
- 12:30 PM **Adjourn**

3.0 hours of PCA, CCA and Private Applicators Credit have been requested. A **free lunch** will be served by the Madera County 4-H, sponsored by the University of California, BASF, Bayer, Dow Agro Sciences, and Syngenta.

Please RSVP to Sandra at 559-675-7879 ext 201



From the north take 4th street exit, go south on I st., and east on Yosemite, 145 East
From the south, take Gateway exit, go north until Yosemite 145, then go east.

Sincerely,

Brent A. Holtz, Ph.D.
Pomology Farm Advisor

~ Reprint freely with credit to: **Brent A. Holtz, Ph.D., Pomology Farm Advisor, University of California Cooperative Extension, Madera, CA.**

The Pomology Post



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