

concentrated on the outer parts, making them more susceptible to low-temperature damage and sunburn, while yield declines. Renewal pruning usually involves cutting back large upper branches or even main scaffold branches to reduce tree height and stimulate vigorous new shoot growth, thereby rebuilding the fruiting structure over several years. Although this relatively severe pruning reduces yield in the short term, it improves light distribution and canopy manageability. Once a new system of strong fruiting branches is established, it helps increase single fruit weight and enhances long-term yield stability.

3.4 Seasonal pruning methods (dormant period and growing season)

Due to the unique phenological characteristics of loquat (flowering in autumn–winter and maturing in late spring), the seasonal timing of pruning is critical. In many regions, the main pruning operations are carried out after harvest (April–May in subtropical East Asia), where fruiting shoots are headed back to promote summer shoot growth and induce flower bud formation later in the same year (Huang, 2025). This post-harvest pruning belongs to growing-season pruning and directly affects the number and vigor of flowering shoots. In contrast, pruning during the dormant period in late autumn or winter is usually lighter, mainly removing damaged or poorly positioned branches to optimize tree structure while avoiding disturbance to already differentiated inflorescences. In recent years, more intensive growing-season pruning systems have been developed, such as the annual “double heading” system: the first heading is performed after harvest on fruiting shoots, followed by a second heading in late summer or early autumn when small flower clusters just appear at the shoot tips. Although this seasonal pruning combination reduces the number of inflorescences, it promotes thicker shoots, more leaves, and larger inflorescences.

3.5 Structural pruning for canopy training

In the early stage of orchard establishment, structural training mainly involves key parameters such as planting density, trunk height, number and distribution of primary scaffold branches, and branch angles. Studies based on three-dimensional canopy models of loquat indicate that the angle between secondary scaffold branches and the trunk is about 15° , while the angle between adjacent secondary scaffold branches is $60^\circ\sim 90^\circ$ (Tang et al., 2019) (Figure 1). In production practice, corresponding technical systems have been developed. A patented method in China specifies a trunk height of 60 cm and a planting spacing of $4\text{ m} \times 4\text{ m}$; in the first year, every fourth axillary bud is selected as a primary branch; in the second year, ropes are used to pull the primary branches outward; in the third year, the primary branches are fixed to bamboo poles to form an angle of about 77° with the trunk; in the fourth year, after flowering and fruit set, the central leader is removed, and excessive vegetative shoots are thinned at a certain ratio to form a low, open canopy with evenly distributed fruiting branches. Compared with untrained control trees, optimized structures such as the hierarchical central leader or low-canopy system not only advance the bearing period and increase fruit set rate by about 5%–6%, but also increase fruit weight by 35%–61% and improve soluble solid content (Li et al., 2005).

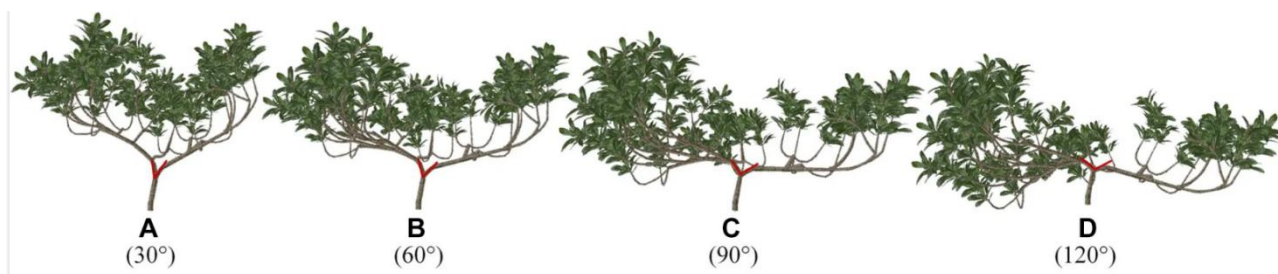


Figure 1 (A–D) Virtual representation of loquat morphology for different angles. The angle of the red line represents the angle below, that is, the angle of the level 2 scaffold branch in the three-dimensional space. The model was generated by the fast shaping and pruning function. The model information is the same for all scenarios, except for the angle (Adopted from Tang et al., 2019)

4 Effects of Pruning Methods on Vegetative Growth

4.1 Effects on shoot growth and branching

At the shoot level, post-harvest heading pruning can promote the sprouting of latent buds and the formation of new summer shoots, increasing the number of branches and leaf area on retained shoots. In recent years, a “double