

yield per tree, whereas lower doses gave size and yield similar to hand-thinned trees. Response variability within the canopy is another concern, since NAA^m treatment showed variable thinning rates within trees. Mechanical-assisted thinning has not yet been well developed for loquat, but results from other fruit crops suggest why it remains attractive: in plums, mechanical thinning reduced fruit set by about 20% and increased fruit size, especially when integrated with selected chemical programs (Pavanello et al., 2018). That broader evidence suggests a likely future direction for loquat, in which mechanical pre-thinning could lower labor costs while hand or chemical follow-up restores precision.

6.3 Synergistic effects with other practices

Fruit thinning in loquat is rarely an isolated decision, because its effects interact with pruning, bagging, irrigation, and fertilization. Loquat studies explicitly note that fruit enlargement is influenced not only by crop load but also by tree vigor, temperature, and fertilization. Under traditional systems in Fujian, about half of the panicles are thinned for larger fruit, while pruning after harvest promotes strong summer shoots that later bear flower buds. More intensive shoot management can amplify this effect: double-heading pruning produced more vigorous shoots, deeper green leaves, and larger fruit, indicating that thinning and pruning can work together by improving both sink regulation and source capacity. Mechanistic modeling in fruit trees supports this integrated view, showing that the pruning and thinning combinations already used by growers often provide the best compromise between current fruit production and next season's vegetative renewal (Bevacqua et al., 2021).

Bagging is another important complementary practice in loquat because it protects the fruit after crop load has been adjusted. In one loquat study, clusters were bagged immediately after thinning, reflecting the practical pairing of these two operations in orchard management. Independent bagging experiments show why this combination is attractive: bagging improved appearance and fruit health, prevented insect and bird damage, and reduced skin burn, rotting, and black spot. Broader orchard evidence also indicates that thinning responses are modified by water and nutrient supply, with intermediate irrigation and potassium inputs combined with moderate thinning producing better yield and fruit quality than either excessive crop load or excessive input use (Ghazzawy et al., 2023). Similar interaction studies in other perennial systems show that thinning, pruning, and fertilization do not act independently, so the best loquat strategy is likely an integrated program that coordinates crop load with canopy management and resource supply. Overall, manual thinning remains the most precise loquat strategy, chemical thinning offers a labor-saving but less predictable alternative, and mechanical-assisted thinning is a promising but still underexplored option for this crop. The strongest practical conclusion is that fruit thinning works best in loquat when it is integrated with pruning, bagging, and resource management rather than applied as a stand-alone technique.

7 Case Studies: Application Effects of Fruit Thinning Practices in Loquat Production

7.1 Effects of different thinning intensities on loquat yield and fruit quality: case studies

A recent two-season field case study in the Paraíba Valley of southeastern Brazil compared five hand flower-bud thinning intensities in 'Precoce de Itaquera' loquat and showed a clear trade-off between fruit quality and yield. Retaining four buds per cluster gave the best overall improvement in fruit quality, producing greater fruit set per cluster as well as larger and sweeter fruit, whereas retaining 12 buds per cluster produced the highest cluster weight and total yield. This case indicates that stronger thinning benefits market-oriented quality traits, but lighter thinning better preserves output per tree.

Comparable results were reported in another case study covering five loquat cultivars and one selection, in which four fruits per panicle produced superior fruit length, width, and weight. However, that same trial found no clear effect of thinning intensity on pH, titratable acidity, or soluble solids, showing that external size responses are more consistent than internal compositional changes. Work in 'Algerie' loquat under two irrigation regimes reached a similar practical conclusion: heavier thinning slightly improved packout, but the gain did not offset the yield loss caused by removing too many fruits, and four fruits per panicle generated the highest revenue (Stellfeldt et al., 2013).