

Review Article

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Effects of Fruit Thinning on Yield and Quality of Loquat

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Abstract Fruit thinning is an important horticultural practice for regulating fruit load, improving resource allocation, and enhancing fruit yield stability and quality in loquat (*Eriobotrya japonica* Lindl.) production. Excessive fruit setting often leads to intense competition for assimilates, resulting in reduced fruit size, uneven development, and inferior commercial value. This review summarizes recent advances in the effects of fruit thinning on loquat yield formation, fruit quality improvement, and physiological regulation mechanisms. Fruit thinning can optimize the source-sink relationship by reducing fruit competition, increasing individual fruit weight, improving external appearance, and promoting the accumulation of soluble sugars, organic acids, vitamins, and bioactive compounds. Furthermore, thinning regulates photosynthetic performance, hormone metabolism, and carbon-nitrogen balance, thereby facilitating fruit expansion and quality formation. The effects of thinning intensity and timing vary among cultivars and cultivation environments, highlighting the need for precise management strategies. Case studies demonstrate that the integration of fruit thinning with fertilization, irrigation, canopy management, and digital orchard technologies can significantly enhance production efficiency and economic benefits. Future research should focus on developing cultivar-specific thinning models, exploring molecular mechanisms underlying fruit load regulation, and applying precision agriculture technologies to achieve sustainable and high-quality loquat production.

Keywords Fruit thinning; Loquat (*Eriobotrya japonica*); Yield regulation; Fruit quality; Source-sink relationship

1 Introduction

Loquat (*Eriobotrya japonica* Lindl.) is a subtropical evergreen fruit tree native to China and now cultivated commercially in more than 30 countries, including production regions in the Mediterranean, Australia, and Central Europe (Shafiq et al., 2025). Its fruit is valued for attractive flavor, juiciness, and a rich nutritional profile that includes carotenoids, phenolics, vitamins, minerals, and other bioactive compounds, which has increased both consumer interest and research attention. At the same time, the crop remains underexploited relative to its biological and commercial potential, with the fruit still consumed mainly fresh and lacking extensive industrial utilization (Shah et al., 2023). In several producing regions, growers have increasingly recognized the economic importance of loquat and expanded commercial orchards, yet productivity and fruit marketability remain constrained by cultivar characteristics, environmental adaptation, and postharvest fragility. Many traditional loquat cultivars bear relatively small fruit and produce lower yields than major rosaceous fruit crops such as apple, pear, and peach, which has slowed wider industry expansion and intensified demand for practical orchard management strategies that can improve fruit size and output without waiting for long breeding cycles. Market acceptance of loquat depends strongly on visual and eating quality, and fruit with suitable soluble solids, balanced acidity, low firmness, good flesh-to-seed ratio, and attractive size are more competitive in fresh markets. Cultivar evaluations under Mediterranean conditions further show that fruit size, soluble solids, seed traits, and ripening time vary substantially among genotypes, indicating that improving loquat production requires not only varietal selection but also crop-load regulation adapted to local production systems. This need is becoming more urgent because recent reviews note that loquat productivity is also being affected by climatic change and environmental stress, while the fruit's short shelf life and sensitivity to physiological disorders reduce the margin for error in orchard management and harvest quality.

Fruit thinning has long been used in horticultural production to regulate crop load by removing part of the developing reproductive structures so that the remaining fruits receive a greater share of assimilates and mineral