

capable of recycling nitrogen, excessive fertilization does not consistently improve yield or quality, highlighting the importance of precision nutrient management.



Figure 3 Cultivation and management of peach trees

Pruning primarily affects fruit quality by regulating canopy structure and light conditions. Proper pruning improves light penetration and distribution, increases the proportion of well-exposed fruiting zones, and promotes uniform coloration and sugar accumulation. Conversely, dense canopies lead to shading, poor coloration, lower SSC, and uneven quality. Planting density also plays an important role. Appropriate density improves land use efficiency and yield per unit area while maintaining good light distribution when combined with proper pruning. However, excessive density and uncontrolled vigor increase competition and shading, resulting in poorer fruit quality. Modern high-density systems with small canopies, such as spindle or bush-type training, can achieve both high yield and good quality when light conditions are well managed.

Protected cultivation, including greenhouses and net systems, modifies environmental factors such as temperature, humidity, light, and wind, thereby influencing fruit development and quality formation. These systems often promote earlier maturity, extend the photosynthetic period, and improve external quality (Maatallah et al., 2024). However, insufficient light or excessive temperatures under protected conditions may reduce coloration, aroma, and overall flavor. Therefore, the effectiveness of protected cultivation depends on precise control of environmental and management factors to achieve optimal quality and yield.

3.3 Regulation techniques

In addition to environmental and conventional management practices, fine-tuning techniques such as thinning, plant growth regulator (PGR) application, and harvest timing are essential for improving fruit quality. These practices directly influence source–sink balance, fruit development, and maturation processes. Thinning is one of the most effective methods for regulating crop load and improving fruit quality. By reducing fruit number,