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Feature Review Open Access

Effects of Grafting on Growth and Yield of Eggplant

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Abstract Eggplant (*Solanum melongena* L.) is an economically important vegetable crop widely cultivated worldwide, but its productivity is often constrained by soil-borne diseases, continuous cropping problems, and environmental stresses. Grafting has emerged as an effective and sustainable horticultural technique to enhance plant growth, improve stress tolerance, and maintain stable yield under intensive production systems. This review summarizes the effects of grafting on eggplant growth and yield formation, with emphasis on the physiological mechanisms and practical applications of different grafting strategies. The influence of grafting on vegetative growth, including plant morphology, root system development, photosynthetic performance, and biomass accumulation, is discussed in detail. Grafted eggplants generally exhibit stronger root activity, improved nutrient uptake capacity, and enhanced resource utilization efficiency due to the functional advantages of selected rootstocks. In addition, grafting contributes to yield improvement by promoting flowering, fruit setting, fruit development, and maintaining favorable fruit quality characteristics. The role of grafting in enhancing resistance against soil-borne pathogens and abiotic stresses, including drought, salinity, and temperature fluctuations, is also highlighted. A case study of grafted eggplant production under protected cultivation demonstrates that appropriate rootstock selection and integrated management practices can significantly improve plant growth performance, yield stability, and production sustainability. Despite these advantages, further research is required to optimize rootstock-scion combinations, clarify graft-induced physiological and molecular regulation mechanisms, and integrate grafting technology with precision agriculture systems. Overall, grafting represents a valuable approach for sustainable eggplant production by improving plant adaptability, productivity, and resilience under diverse cultivation environments.
Keywords Eggplant; Grafting technology; Rootstock; Growth performance; Yield improvement

1 Introduction

Eggplant (*Solanum melongena* L.) is one of the most important solanaceous vegetables grown worldwide and has substantial nutritional, economic, and agronomic value in both tropical and subtropical production systems. Global eggplant production reached about 55 million tons in 2020, reflecting its wide adaptation and strong market demand, while its continued importance in Asia and the Mediterranean has made it a major target for both productivity improvement and sustainable intensification efforts (Kappel et al., 2024). Despite this importance, eggplant productivity remains uneven across regions because production is constrained by a combination of biotic, abiotic, and management-related factors. Low yields are linked to pest pressure, soil-borne and foliar diseases, temperature and water stress, and inadequate agronomic practices, while many cultivated genotypes still lack sufficient resistance to these stresses under field conditions. These constraints are especially serious in intensive and continuous cultivation systems, where repeated cropping increases inoculum pressure and accelerates soil fatigue. In such settings, bacterial wilt and fungal diseases are among the most damaging constraints, with fungal pathogens alone causing severe economic losses and bacterial wilt frequently producing devastating stand losses in long-term production areas. Conventional approaches based on chemicals, biological agents, or host resistance have often provided incomplete control, particularly for persistent soil-borne pathogens. This production context creates a strong need for management strategies that stabilize yield, reduce crop vulnerability, and remain feasible under commercial field and protected-cropping conditions (Sivasankarreddy et al., 2024).

Within this context, grafting has become an important sustainable technology in vegetable production because it combines a desirable scion with a rootstock selected for stress tolerance, disease resistance, and vigorous root