

GRAFTING IN VEGETABLE CROPS: A SUSTAINABLE ALTERNATIVE FOR CROPS PROTECTION

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Abstract: Vegetable crops such as tomato, eggplant, melon and watermelon face numerous challenges, including soil-borne diseases, nematode infestation and environment stresses. Grafting has become a valuable technique in modern horticulture. By combining a diseases resistant rootstock with a high performing scion, grafting offers a sustainable solution that enhances plant vigor, reduces reliance on chemical pesticides, and improves overall crops productivity. A comparative study between 1 hectare of grafted watermelon and 1 hectare of ungrafted watermelon reveals a big difference in the biological development and number, volume and quality of fruit. This study is followed by an economic evaluation of the yields. The grafted plants have a yield 30 to 40% higher than the ungrafted. Despite the higher initial cost of grafted watermelon due to the cost of the plants, the yield and resistance of the plants to the various stresses gives them a better yield than ungrafted plants, which are more sensitive to biotic and abiotic stresses. the profitability at hectare is more than double that of non-grafted plants. Also, in arid regions, grafted water melon farms demonstrate higher technical efficiency 60 % compared to non-grafted farms 30 % As a result, grafting plays a key role in integrated crop protection and resilient vegetable production systems.

Keywords : Vegetable crops, grafting, production, yield, precocity.

Introduction

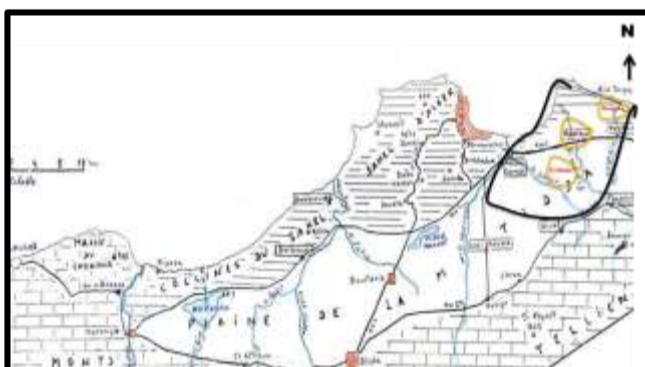
Grafting is a widely used horticultural technique in modern vegetable production to enhance plant vigor, tolerance to stress, and overall productivity . In crops such as tomato (*Solanum lycopersicum* L.) and water melon (*Citrullus lanatus*), grafting consists of joining a scion: Commercial cultivar with desirable fruit traits to a rootstock that provides resistance to biotic (diseases, nematodes) or abiotic (Salinity, drought, temperatue fluctuations) steresses Lee et al., 2010.

Materials ad methods



To monitor the difference between grafted and ungrafted plants, weekly visits were made to the nursery to see the production itinerary and their cost. Plants delivered and transplanted to farmers were also monitored to measure the differences in yields of each type of plant.

► Two kinds of plants were tested: tomato plants and watermelon plants.

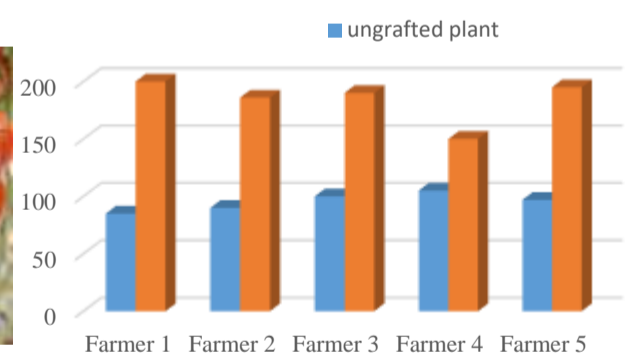


Results and discussions

For both tomato and watermelon crops, grafting have a same results, grafted plants have a good result compared to ungrafted ones.

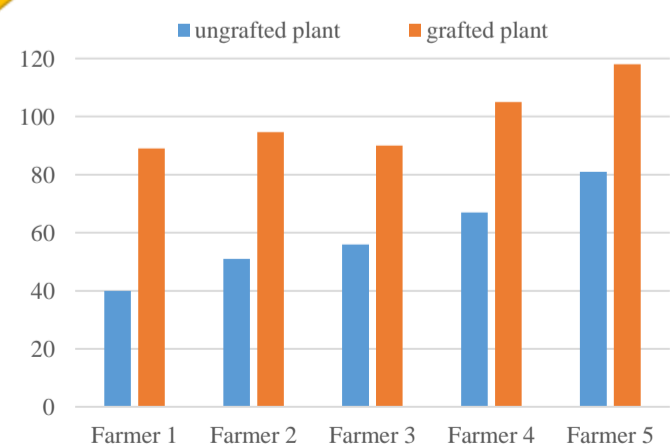
In the monitored plots,

- ❑ Grafted plants developed well,
- ❑ Good regrowth after transplanting and good tolerance to powdery mildew and fusarium, (Savvas et al., 2017, Kyriacou et al., 2017).
- ❑ Yield of a grafted plant is double to triple (4-6) than that of an ungrafted plant (2-4),
- ❑ Grafting increases the number and weight of fruits per plant. (Lee et al., 2010).



Analysis of variance Anova shows a highly significant effect on yield and type of grafts and ungrafts plants $P \leq 0.01$. The average yield of grafted plants is 184.2 T/ha. and significantly higher than that of ungrafted plants.

Farmer's production yield in grafted and ungrafted tomatoes plants



Farmer's production yield in grafted and ungrafted water melon plants

Bibliographic references

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Conclusion

Grafting is an essential operation in agronomy. It combines the physiological advantages of the rootstock with the varietal qualities of the scion, thus ensuring the sustainability, health, and productivity of vegetables. Currently, grafting remains a solution of choice for market gardening, making it possible to overcome climatic hazards and combat the scarcity of water in the arable layers of the soil.