Advances in Agricultural Technology & Plant Sciences
ISSN: 2640-6586

Academic Strive
Researcher's perception is our reality

Editorial *Volume 2; Issue 2*

Why Citrus Need Rootstocks?

Waleed Fouad Abobatta*

Department of Citrus, Horticulture Research Institute, Agriculture Research Center, Egypt

***Corresponding author:** Dr. Waleed Fouad Abobatta, Department of Citrus, Horticulture Research Institute, Agriculture Research Center, Egypt, Tel: +2 012 24296948, Email: wabobatta@yahoo.com

Received Date: November 27, 2019; **Published Date:** December 04, 2019

Background

Citrus propagated by seed and grown on own roots for a long time till the middle of the 19 century, from the second half of 19 century there are different threats encountered citrus growers in various countries of the world and affect citrus production which becomes unprofitability, the problems include biotic stress like spreading root rot disease, *Phytophthora spp.*, and different adverse environmental conditions like high water tables, poor drained soils, drought, salinity, and heat waves which affect negatively on tree growth, productivity, and fruit quality.

Therefore, citrus growers try overcoming these problems, and looking for another technique to produce healthy seedlings and improve citrus productivity, grafting technique considered the most popular propagation methods currently use in different citrus cultivation regions by budding onto rootstocks to produce proper seedlings provide maximum productivity and desired fruit quality, citrus rootstocks impact tree vigor, size, fruit yield, and fruit quality.

Role of Rootstocks

Rootstocks have a main role in the scoin performance and consequently affect the growth of the citrus industry worldwide [1], rootstocks affect tree vigor, size, and yield. Rootstocks have vital importance in determining the quality and quantity of fruit production and survival of citrus scion varieties [2].

Some of these roles are following:

- Improve tree vigor and size.
- Enable scions to be grown in different conditions.
- Protected cultivars from major soil diseases like root rot.
- Overcoming environmental stress like salinity and drought.
- Increase tree productivity
- Affect total yield, and fruit quality.

Choosing the Proper Rootstock

It is very important to choosing proper rootstock for each variety to establish health and productivity citrus orchards, there are different factors affect rootstock growth include soil type, pH, salinity, and drainage, also, there are some aspects should be considered during choosing right rootstock like:

- Rootstock/Scion (in) compatibilities
- Tolerance to soil disease, virus, and pests in the scion or soil.
- Rootstock must serve to tolerate abiotic stress like climate, soil type, drought, and salinity.

The major rootstocks used worldwide include rough lemon, Rangpur lime, Volckameriana, Swingle citrumelo, Carrizo citrange, Sour orange, Troyer citranges, Sweet Orange, citrange, citronelle, Cleopatra Mandarin, Emperor mandarin, and Trifoliate orange. Therefore, choose rootstocks should be on the base of their resistance to various diseases or pests present in the cultivation area, like resistance to root fungi, virus diseases, nematodes,

Citation: Waleed Fouad Abobatta. Why Citrus Need Rootstocks?. Adv Agri Tech Plant Sciences 2019, 2(2): 180041.

salinity, drought, and cold tolerance, also, there is a high influence of rootstock on scoin growth, total yield, and fruit quality.

Classified Rootstocks Based on Vigor

Rootstocks play an important role in control tree sizes, the rootstocks are classified to three groups on the basis of growth vigor as follow:

Vigorous rootstocks

Include rough lemon, Volkamer lemon, Rangpur lime.

Intermediate rootstocks

Carrizo citrange (*Citrus sinensis* Osb × *Poncirus trifoliata* L. Raf.), Sour orange (*Citrus aurantium*) *Troyer citranges* (hybrid of the trifoliate orange and the navel orange-rootstock), Sweet Orange **(***Citrus sinensis)* Swingle citrumelo (*Citrus paradisi* × *Poncirus trifoliat*a) and X639.

Non-vigorous rootstocks

Trifoliate orange (*Poncirus trifoliata*), Cleopatra Mandarin (*Citrus reshni* Hort. ex Tan).

Regarding Flooding Stress

The good drainage is the main factor for citrus growth, there are various rootstocks tolerant for flooding include rough lemon and Swingle citrumelo which the most tolerant rootstock, meanwhile, Carrizo/Troyer display the minimum tolerance, while Sour orange and trifoliate orange has intermediate tolerate, while, Rangpur lime and rough lemon considered superior in drought tolerance conditions.

Regarding Salinity

Poncirus trifoliata, Troyer and Carrizo citranges rootstock are highly susceptible to salinity in the soil and irrigation water in the citrus-growing areas.

Regarding Disease

- Sour orange is tolerant of different soil conditions like foot rot, Gummosis disease (*Phytophthora gummosis),* but very susceptible to citrus tristeza virus (CTV).
- Volkameriana is susceptible for Gummosis disease (*Phytophthora gummosis)* [3], therefore, must avoid use in the clay soil particularly under flooding irrigation.
- Rough lemon is tolerant to CTV, but, it's susceptible to citrus nematodes and the root rot.
- We discuss below two rootstocks used widely in different citrus production regions as for example for rootstocks.

Sour orange

Citrus aurantium was the major rootstock in different regions since the 1880s due to its tolerance to various soil conditions, foot rot disease, cold and Excellency fruit quality, after 1990 the citrus tristeza virus (CTV) was the new threat which destroying most orchards grafted on this highly susceptible rootstock [4].

Rough lemon (*C. jambhiri* Lush)

Rough lemon used in the different regions producing countries of the world particularly Brazil and South Africa, Trees on rough lemon have higher growth vigor and tree size in comparison with other rootstocks, with maximum tree production and largest fruit, but with poor fruit quality, trees on rough lemon tolerate cold more than on other rootstocks, also, rough lemon is tolerant to CTV, but the root rot considered the major threat and could damaged tree and eventually die after short period of infection [5].

Inter Stock

In case of incompatibility, citrus growers could use another rootstock compatible with both the main rootstock and the scoin, like in case Swingle which is not compatible with navel oranges and Murcott tangerine, the use of a compatible interstock is required for propagating these varieties on Swingle.

References

1. Broadbent, P (1993) Selecting disease-resistant citrus rootstocks. Australian Journal of Experimental Agriculture 33(6): 775-780.

2. Castle WS (1987) Citrus rootstocks. In: Rom RC, Carlson RF (Eds.) Rootstocks for fruit crops. Wiley, New York pp. 361-399.

3. Abobatta WF (2018) Development Growth and Productivity of Orange Orchards (*Citrus Sinensis* L) in Egypt (Delta Region). Adv Agri Tech Plant Sciences 1(1): 180003.

4. Stover E, Castle W (2002) Citrus rootstock usage, characteristics, and selection in the Florida Indian River Region. HortTechnology 12(1): 143-147.

5. Lalith, DB, Suriyagoda Ryan MH, Renton M, Hans Lambers (2014) Chapter Four -Plant Responses to Limited Moisture and Phosphorus Availability: A Meta-Analysis Advances in Agronomy 12: 143-200.