

Rootstocks

Graft Failure / Causes

1. Anatomical Mismatching
2. Poor Craftsmanship
3. Adverse Environmental Conditions
4. Disease
5. Incompatibility

Causes of Incompatibility

1. Adverse Physiological Responses between Grafting Partners
2. Virus or Phytoplasma Transmission
3. Anatomical Abnormalities of Vascular Tissue in Callus Bridge

Type of Incompatibility

1. Localized Incompatibility: at graft union, overcome by interstock, not translocated

2. Translocated Incompatibility : translocated btw scion & rootstock, difficult to overcome

External Symptoms of Incompatibility

- 1. Failure to Form Successful Graft or Bud Union**
- 2. Yellowing Foliage in Later Part of Growing Season, Followed by Early Defoliation**
- 3. Decline in Vegetative Growth, Shoot Die-Back**
- 4. Premature Death of Tree**
- 5. Marked Differences in Growth Rate or Vigor of Scion and Rootstock**

6.Differences in Time when Vegetative Growth Begins or Ends

7.Overgrowths at, above, below Graft Union

8.Suckering of Rootstock

9.Graft Breaking Apart Cleanly at Union

Benefits of Rootstocks

1. Greater Resistance to soil Stress and Diseases
2. Controlling Size of Grafted Plant
Vigor or Dwarfed
3. Fruit of Larger Size or Better Quality
4. Hastening Reproductive Maturity
5. Interstocks—'Double-Working'
to Avoid Certain Kinds of Incompatibility

Genetic Limits of Grafting

- Same Clone Easily Grafted
- Grafts Almost Always Possible within a Species
- Within Same Genus Successful in Some Cases
- Same Family but Different Genera Usually Not Successful
- Grafts among Plants from Different Families Usually Considered Impossible

Effects of Rootstock on Scion

1-Size and Growth Habit

Wide Assortment of Size-Controlling Rootstocks Has Been Developed for Certain Major Tree Fruit Crops, especially Apples

4 Groups Developed at East Malling Research Station in England

- Dwarfing**
- Semi-Dwarfing**
- Vigorous**
- Very Vigorous**

2-Fruiting

Early Fruiting Usually Associated with Dwarfing Rootstocks and Delay in Fruiting with Vigorous Rootstocks, WHY?

Small Trees that Result from Dwarf Stock Intercept More Light and Have Less Internal Shading

3-Size, Quality and Maturity of Fruit

*Variation among Species in Effect of Rootstock in Fruit Characteristics of Scion Cultivar

*No Transmission of Rootstock Fruit Traits to Scion

*However, Certain Rootstocks Can Affect Fruit Quality of Scion

e.g:

Smooth (orange, grapefruit/sour orange), vs. Rough Skin (orange, grapefruit/Rough Lemon (C. Jambhiri))

Larger Fruit Size (navel orange/sour orange *CITRUS AURANTIUM*)

4-Tolerance of Scion to Adverse Conditions

e.g:

- Cold-Hardiness:

- Disease Resistance:

e.g: Nematodes

Effects of Scion on Rootstock

- Strongly Growing Scion onto Weak Rootstock Stimulates Growth of Rootstock
- Weakly Growing Scion onto Strong Rootstock Slows Growth of Rootstock