happen. Thumb spots and consecutive numbering assure easy replacement in the proper sequence, even by those unfamiliar with your presentation. 

Rehearse your presentation before an audience prior to the actual presentation so that changes can be made. Several practice sessions will help assure that you are projecting a good image of yourself and your organization.

Always carry your slides and notes with you personally. Never take a chance of losing these materials by packing them in your luggage.

If possible, briefly check the projection facilities in advance of your presentation. Make sure you are familiar with any controls which may be available to you from the podium such as projector controls, room light switch, microphone, pointer, and podium light. At large conventions, where slide previewing rooms are available, afford yourself the opportunity of one last check of your slides!

Introduce yourself to the projectionist, particularly if you have any specific projection requirements during your presentation.

The presentation

Try to project a calm, confident manner by speaking slowly and clearly. Use your visuals to amplify your thoughts and ideas. Use a pointer or light spot to clarify points on slides.

Never apologize for a poor slide during your presentation. Simply resolve to replace it with a better one the next time you speak before a group.

Don’t read the slide. Assume that your audience is literate and use the slide to illustrate the point you are trying to make. Avoid statements such as..."This slide shows...". Always expect the worst to happen (Murphy’s law) and try to anticipate your reaction to it as you plan your presentation. Any number of things can go wrong before or during the presentation, such as a jammed projector, burned out projector controls, room light switch, microphone, pointer, and podium light.

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Lastly, attempt to end your presentation gracefully. Consider: “This concludes my presentation.” Avoid the deadly: “That’s all I have!”

Selected References

REPORTS & NOTES

Early Performance of ‘Star Ruby’ Grapefruit on 9 Rootstocks in a Fine-textured Calcareous Soil

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Texas A&M University Citrus Center, Weslaco, TX 78596

Abstract. ‘Star Ruby’ grapefruit (Citrus paradisi Macf.) grew well on Texas sour orange and bitter sweet orange (C. aurantium L.), Cleopatra and Sunki mandarin (C. reticulata Blanco), Colombia sweet line (C. limettioides Tan.), and Troyer citrange (Poncirus trifoliata (L.) Raf. x C. sinensis (L.) Osb.) rootstocks. Growth was most vigorous on Texas sour orange and Troyer citrange. Trees on Columbia sweet line and Sunki mandarin developed problems with Phytophthora foot rot. Most of the trees on Christiansen trifoliate orange (P. trifoliate) and Swingle citrumelo (P. trifoliata x C. paradisi) developed severe chlorosis and died. Trees on Morton citrange were slow growing, somewhat chlorotic, and slightly affected by foot rot.

Since previous rootstock studies (8, 9, 10) were conducted on fine sandy loam soils, this experiment was planted on a fine-textured, calcareous soil to determine the adaptability of these stocks to another soil type.

Texas sour orange, bitter sweet orange, Cleopatra and Sunki mandarins, Colombia sweet line, Christiansen trifoliate orange, Swingle citrumelo, and Troyer and Morton citranges were used in the experiment. Seed of all rootstock cultivars were planted in the greenhouse. Most seedlings were transplanted to a field nursery, but those of bitter sweet orange, trifoliate orange, and Morton citrange were transplanted to containers, grown and budded in a shadehouse. All seedlings were budded with ‘Star Ruby’ grapefruit in August 1973 and transplanted to the orchard in November 1974.

Trees on each rootstock were planted in 4-tree plots replicated 4 times in a randomized complete block design. Tree spacing was 7.6 x 7.6 m. Soil at the orchard site varied from Hidalgo sandy clay to clay, pH 7.4, and conductivity less than 1.0 mmhos/cm. The orchard was under drip irrigation and was fertilized with nitrogen only at about 100 g N/tree per year. Herbicides were used for weed control in the row and mowing and discing used between rows. Insecticides and acaricides were applied as needed.

Trunk diameter was measured 15 cm above the budunion in July 1975, 1976, and 1977. Canopy volume (V) in July 1978 was calculated from tree height and the average of the east-west and north-south diameters using the formula V = 0.524 d2h where d = diameter and h = height. The formula is one-half the volume of a prolate spheroid (7). Percentage mycorrhizal infection was determined in September.

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1Present address: University of Florida, IFAS, Agricultural Research and Education Center, P. O. Box 1088, Lake Alfred, FL 33850.

2Thank S. Villarreal and D. Ramos for technical assistance and R. E. Rouse, Texas Agr. Expt. Sta., Weslaco, for soil analysis data.


1976 by compositing feeder root samples from all trees in a plot, staining with acid fuchsin (6) and estimating the percent infection on ten 1-cm root segments from each replication of each rootstock. The severity of foot rot caused by *Phytophthora nicotianae* var. *parasitica* (Dast.) Waterhouse and the severity of chlorosis were rated in September 1978 on the scales indicated in Table 1. Number of fruit per tree were counted in 1977 and 1978.

Differences in trunk diameter which existed in 1975 (Fig. 1) were due primarily to differences in growth in the nursery. Trees on Morton citrange, trifoliate orange, and bittersweet orange, which were grown in containers, were much smaller than those from the field nursery.

Trees on Columbia sweet lime, Texas sour orange, and Troyer citrange had the largest trunk diameters in 1977 followed by those on Cleopatra and Sunki mandarins (Fig. 1). Several of the trees on Columbia sweet lime were affected by foot rot in 1978 and thus had smaller canopy volumes than trees on Troyer citrange or Texas sour orange (Table 1). Trees on bittersweet orange had smaller trunk diameters and canopy volumes than trees on Texas sour orange, but the rate of growth from 1975 to 1977 was about the same for both rootstocks (Fig. 1). Trees on bittersweet orange were grown as container stock which is frequently smaller than field-grown stock and does not develop as rapidly in the early years following transplant to the orchard (3). Trees on Morton citrange grew more slowly than most of the others, were affected by chlorosis and had minor problems with foot rot. Trees on trifoliate orange grew very little, developed severe chlorosis and all died before 1977. Those on Swingle citrumelo grew poorly and only a few stunted, chlorotic trees remained alive in 1978. Average production of trees on all rootstocks was less than 20 fruit per tree in 1977 and 1978. Production was erratic and there were no significant differences between rootstocks.

Significant differences were observed in the % mycorrhizal infection among the different rootstocks (Table 1). Citrus is generally highly dependent on mycorrhizae for mineral uptake, but cultivars vary in their response to infection (4, 5). The importance of the differences in % infection is not known but the failure of trees on Swingle citrumelo and trifoliate orange was not due to lack of mycorrhizal infection.

Most rootstocks did not perform as well as sour orange in the present experiment. Earlier studies (1) indicated that trifoliate orange and many of its hybrids were intolerant of calcareous soils but the poor performance of trees on Swingle citrumelo, Morton citrange and trifoliate orange was not expected. These rootstocks were among the highest yielding in previous tests and have many favorable attributes, such as good fruit quality, cold tolerance, and resistance to many diseases (1, 8, 9, 10). They may be useful in certain locations, but they are not adapted to all Texas citrus soils. Studies are under way to define those soils on which Swingle citrumelo can be used successfully as a rootstock (R. E. Rouse and H. K. Wutscher, unpublished).

Trees on sweet lime and mandarin rootstocks grew reasonably well, but those on Columbia sweet lime and Sunki mandarin suffered foot rot damage. Sweet limes have other disadvantages as rootstocks since fruit is usually of low quality, trees are sensitive to cold damage and susceptible to xylorroposis (1, 6, 8). Trees on Cleopatra mandarin did not suffer from chlorosis in this location, but problems have occurred on other soils.

Of the rootstocks included in this test, only Troyer citrange may have promise as a replacement for sour orange on fine-textured calcareous soil. Trees on Troyer citrange grew well and were free of disease problems. Yields of trees on Troyer citrange in other rootstock trials were relatively high, although fruit quality was slightly lower than that of fruit from trees on sour orange (9). Limited, experimental use of Troyer citrange as a rootstock in commercial orchards is recommended.

**Table 1. Performance of ‘Star Ruby’ grapefruit on 9 rootstocks.**

<table>
<thead>
<tr>
<th>Rootstock</th>
<th>Trunk diam increase (cm) 1975-77</th>
<th>Canopy volume (m³) 1978</th>
<th>Survival of 16 trees in 1978 (%)</th>
<th>Mycorrhizal infection (%) 1976</th>
<th>Foot rot severity 1978</th>
<th>Chlorosis rating 1978</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas sour orange</td>
<td>3.89 a</td>
<td>1.73 a</td>
<td>100</td>
<td>54 a</td>
<td>0.0 b</td>
<td>0.0 d</td>
</tr>
<tr>
<td>Bittersweet sour orange</td>
<td>3.93 a</td>
<td>1.08 c</td>
<td>100</td>
<td>35 cd</td>
<td>0.0 b</td>
<td>0.0 d</td>
</tr>
<tr>
<td>Columbia sweet lime</td>
<td>3.77 a</td>
<td>1.50 b</td>
<td>100</td>
<td>31 a</td>
<td>0.7 a</td>
<td>0.4 c</td>
</tr>
<tr>
<td>Cleopatra mandarin</td>
<td>3.61 a</td>
<td>1.39 b</td>
<td>94</td>
<td>56 a</td>
<td>0.0 b</td>
<td>0.0 d</td>
</tr>
<tr>
<td>Sunki mandarin</td>
<td>3.43 a</td>
<td>1.30 b</td>
<td>100</td>
<td>40 c</td>
<td>0.4 a</td>
<td>0.0 d</td>
</tr>
<tr>
<td>Troyer citrange</td>
<td>4.03 b</td>
<td>1.84 a</td>
<td>100</td>
<td>30 d</td>
<td>0.0 b</td>
<td>0.0 d</td>
</tr>
<tr>
<td>Morton citrange</td>
<td>2.55 b</td>
<td>0.74 d</td>
<td>88</td>
<td>41 bc</td>
<td>0.4 a</td>
<td>0.8 b</td>
</tr>
<tr>
<td>Swingle citrumelo</td>
<td>0.79 c</td>
<td>0.10 e</td>
<td>31</td>
<td>35 cd</td>
<td>0.0 b</td>
<td>2.8 a</td>
</tr>
<tr>
<td>Christiansen trifoliate orange</td>
<td>— —</td>
<td>— —</td>
<td>0</td>
<td>29 d</td>
<td>— —</td>
<td>— —</td>
</tr>
</tbody>
</table>

*Mean separation in columns by Duncan's multiple range test, 5% level.*

**Phytophthora foot rot severity below the budunion rated on percentage of the trunk girdled: 0 = none, 1 = <33%, 2 = 33-67%, 3 = >67%.*

**Mycorrhizae** for mineral uptake, but cultivars vary in their response to infection (4, 5). The importance of differences in % infection is not known but the failure of trees on Swingle citrumelo and trifoliate orange was not due to lack of mycorrhizal infection.

Literature Cited


**Relationship between Midseason Resistance to Chilling Injury and Reducing Sugar Level in Grapefruit Peel**

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Additional index words. Citrus paradisi, cold storage, postharvest disorders

**Abstract.** Resistance of 'Marsh' grapefruit (Citrus paradisi Macf.) to chilling injury (CI) at 4.4°C was highest during February–March, 1978 in Florida. Reducing sugar levels correlated better with resistance to CI than did total soluble carbohydrates or peel color. High levels of reducing sugars in grapefruit peel are considered to indicate greater resistance to CI and reducing sugars possibly play a significant role in promoting CI resistance of grapefruit peel at midseason (February–March in Florida).

Resistance of grapefruit to CI at 4.4°C is seasonal with fruit harvested at midseason (during February–March, 1978 in Florida) being most resistant to CI (2, 3). This resistance to CI is probably related to metabolic events influenced by the field air temperatures several days immediately preceding harvests.

Air temperatures of 10°C cause increases in the sugar content of leaves and stems of 'Valencia' orange (8) and in total and reducing sugar content in the leaves of boxwood and cranberry (7). In these plants, sugars are implicated in frost hardiness. The data of Harvey and Rygg (3) suggest that sugars may be implicated in CI of grapefruit peel. Total sugar and reducing sugar in grapefruit peel were inversely related to the mean air temperature during 5 days immediately before harvest. Observations by Harvey and Rygg (3) indicated that resistance of grapefruit to CI might also be inversely related to air temperature and directly related to sugars in the peel.

Another effect of field temperature on citrus is the enhanced orange color of 'Valencia' orange peel caused by recurring night temperatures below 7°C (9). Grierson (1) reported that yellow grapefruit are more resistant to CI than green grapefruit.

Whether increases in sugar levels and/or enhanced yellow color are causally related to CI resistance in grapefruit cannot be ascertained from previous studies. Therefore, the objective of our study was to determine the degree of association between resistance of grapefruit to CI and sugar levels in the peel, peel color, and minimum air temperatures for the 30 days preceding harvest.

'Marsh' grapefruit on rough lemon (C. jambhiri Lush.) rootstock were harvested biweekly beginning July 7, 1977. The fruit was washed and dried immediately after each harvest. Forty fruit were then stored at 4.4°C (40°F). CI (peel pitting) was rated at weekly intervals using a scale of 0-100 with a value of 10 representing the onset of visible injury as previously described (1). Resistance to CI is expressed as number of storage days at 4.4°C needed to reach a mean injury index of 10. Fruit was discarded at this point.

For carbohydrate analyses, 10 fruit were randomly selected at alternate pickings, the flavedo portion of the peel removed, weighed, and stored in polyethylene bags at -22.2°C (-8°F) until after the last harvest when all samples were analyzed for carbohydrate content. Two subsamples of 5 g each were taken from each harvest and immediately immersed in 50 ml of boiling 80% ethanol. The tissue was then completely homogenized with a Sorvall homogenizer and the ethanol decanted and saved. The residue was extracted twice with 50 ml of boiling 80% ethanol, the ethanol extracts were combined and the volume was recorded before filtering the extract through a glass fiber filter pad. Twenty-five ml of the filtered 80% ethanol extract was washed with an equal volume of petroleum ether followed by the addition of 1 g each of Dowex-50 W and Amberlite-IR45 resins for 2 hr with occasional stirring. The resins were removed by filtration through glass wool plugs. Portions of the treated extracts were then appropriately diluted with distilled water and total and reducing sugars were determined by the methods of Johnson et al. (4) and Nelson (5), respectively, using α-D-glucose as a standard. Preliminary tests had shown that the residual ethanol in the diluted extracts was not sufficient to interfere with sugar determinations by either method.

Since ethanol interferes with invertase activity, 10 ml-samples of the resin-treated extracts were evaporated under vacuum to dryness and the residue was dissolved in 10 ml of distilled water. One-half ml samples were then treated with 10 units of invertase (Sigma Chem. Co.) in 50 mM acetate buffer, pH 4.2 for 30 min. at 55°C. Preliminary tests indicated that this treatment was sufficient to hydrolyze all of the sucrose present in the samples. Control samples were similarly treated with acetate buffer without invertase. All samples were then appropriately diluted, and the reducing sugar concentration was determined by the method of Nelson (5). The amount of sucrose present was cal-

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