Behavior of Seedling Lines of Citrus Naturally Infected with Tristeza Virus

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This paper reports results of an examination carried out in three citrus variety collections at Limeira Experimental Station, Limeira, to determine the incidence of tristeza stem pitting.

Varieties were evaluated in relation to their response to tristeza virus since many are potential rootstock or scion material (*1*). Trees were infected naturally with tristeza in the field, where *Toxoptera citricidus* Kirk. was abundant.

Stem pitting in an older variety planting at Limeira was reported by Salibe (*4*). Varieties in our study are different from those studied by Salibe.

MATERIALS, METHODS, AND RESULTS

All trees were propagated from seedlings, and budded on Rangpur lime. The collections examined are six, eight, and 15 years old.

Three trees of each variety were examined by removing the bark from three branches, about 18 months old, on each tree. The peeled branches were rated as not pitted, slightly pitted, moderately pitted, strongly pitted, or very strongly pitted (fig. 1). The average determined the final classification of each variety.

NOT PITTED

Sweet Oranges

Baiana Retiro
Biondo
Bizri
Boa Vista
Caipira
Campista
Corsa Comune
Do Céu
Doppio Sanguigno Acireale
Feijão Crú
Grosse Sanguigno
Imperial
Itaboraí

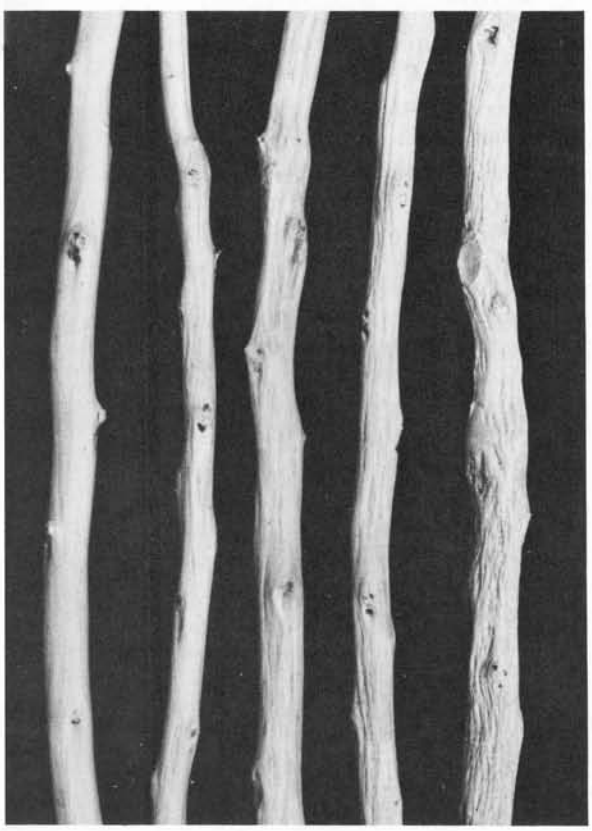

Fig. 1. Left to right: Effect of tristeza on branches of sweet orange varieties Valencia Colorida (not pitted); Moro (slightly pitted); Seleta Branca (moderately pitted); Ovale Sanguigna (strongly pitted); and Sanguinello de Acireale (very strongly pitted).

João Nunes
José Paulino
Kinarti
Lanceta
Lara Campos
Limonada
Lisa Paulista
Mangaratiba
Magnum Bonum
Maracãna
Mimo do Céu
Non Pareil
Paulista
Parnazode Franca
Pingo de Ouro
Santa Lucia
São José
Sanguinea Piracicaba
Sanguinello Commune
Setubal
Serrana
Serra D'Agua
Tarocco Acireale
Valencia Olinda
Valencia Palida
Valencia Colorida
Vaccaro
Vermelha
Zancheta

Tangerines

Avana
Batangas
Big of Sicily
Cape Naartje
Dancy
Emperor
Giant of Sicily
Israel
Improved
Jaragua do Sul
Kara
Kaula
Large Local
Loose Jacket
Mel
Osceola
Rio
Romana
Santa Cruz
Scarlet
Siracusa
Tardivo de Ciaculli
Thomas
Weshart

Lemons

Armstrong
Deodoro
Estes
Flat Branch
Feminello Santa Thereza
Feminello Siracusa
Gênova
Inerme
Indiano
Limone Sanguigno
Lisboa
Meśsina
Meyer
Milan
Monachello
Nostralle
Peretto
Rough lemon
Sicilia
Vicosa

Sour Oranges

Amaro Caldo Pølposo
Bigarade
Corrugada
Iwaikan
Sicilia
Off Type
Willow Branch

Limes

Americana
Da Persia
De Umbigo
Teheran

Shaddocks

Ácida
Doce
Indochina
Siameza
Sunshine

Citrons

Cedrat Robbs el Arsa

Tangelos

São Jacinto
Seminole

Tangors

India
Moreira
Ouro
Tangerona

Rangpur Limes

Borneo
Cravo Limeira
India
Kusaie
Otaheite
Philippine Red lime
Rose lime
Red Ling Mung
Santa Barbara Red
Taquaritinga

Miscellaneous

Baia × Mexirica
Calamondin
Citremon
Citrumelo 4475
Citrus bergamia
C. depressa
C. karna
C. keraji
C. kokhai
C. kimikawa
C. pectinifera
C. volkameriana
C. yatsushiro
Severinia buxifolia
Szibat × Tizon

SLIGHTLY PITTED

Sweet Oranges

Abacaxi
Acoriana
Baia Rosada
Baiana Valente
Baia Monte Parnazo
Baia Tomazelli
Branca
Champagne
Cléopatra
Corôa
Corôa de Rei
Coronel
Cipó
Itacurucá
Macaé
Malta Blood
Melrose
Monjolo
Moro
Parnazo de Goiaz
Pera sem sementes
Portuguaise
Rosa
Rubi Blood
Sanguinello Allungato
Sanguinello Marrocos
Sanguinello Moscato
Sanguinello Polidori
Sanguinea Venturi
Tomango
Washington Florida

Limes

Francana
Sharbutty
Tahiti B. Horizonte

Shaddocks

Periforme
Yau Tau
Zamboa

Citrons

Cedrat de Corse
Diamante
Rosada

Tangelos

Minneola

Tangors

Sabara
Temple
Umatilla

Miscellaneous

C. funadoko
Laranja × Pomelo
Periforme (lemon?)
Sangue de Boi (tangor?)
Sunwuinkon

MODERATELY PITTED

Sweet Oranges

Baia Tremembé
Cacau
Campista
Côco
Demi Sanguigna
Moro Palazelli
Ovale de Siracusa
Seleta Branca

Limes

Galego Taquari

Shaddocks

Singapura

Grapefruit

Pernambuco

Miscellaneous

Camargo (lemon?)
Citrus yukitsu
C. volkameriana de Catania
Mexerica do Pará
Mexerica Paraguaia (tangor?)
Rio Claro (lemon?)

STRONGLY PITTED

Sweet Oranges

Alexandre Pereira
Baia Gigante
Corsa Tardia
Ovale Sanguigna
Pera Caire
Pera de Abril

Limes

Cristal

Grapefruit

Leonardy

Tangors

Maracujá
Reticulata
São Pedro

Shaddocks

Kao Panne

Citrange

Uvalde

Miscellaneous

Acido (lemon?)
Citrus pseudoparadisi
Ingles (lemon?)
Ponderosa
São Matheus (lemon?)

VERY STRONGLY PITTED

Sweet Oranges

Misteriosa de Aquidauana
Ovale San Lio
Pera de Umbigo
Pera Mel
Pera Coroada
Sanguinello de Acireale

Grapefruit

Duncan
Foster
Hart's
Imperial
Marsh seedless
Red Blush
Royal
Retiro
Triumph
Thompson Pink

Limes

Biksi
Mexican lime
Thornless sweet lime

Shaddock

Chinesa

Citrange

Rusk

Miscellaneous

Citrus macrophylla
C. excelsa
C. webberi
Citrumello I-84/67
Meiwa kumquat
Nippon kumquat

DISCUSSION AND CONCLUSIONS

Most orange, tangerine, and lemon varieties showed good tolerance to tristeza. Many of these have some potential commercial interest. Those varieties showing poor tolerance to the tristeza virus were Pera orange, grapefruit, and lime groups (*4*).

Among the grapefruit types only one, Pernambuco, was classified as moderately pitted. Pernambuco has fruits resembling those of an orange hybrid, but tastes like grapefruit. Fruits are very acid and have an average of 20 seeds per fruit. Variation in severity of stem pitting was found among trees of the same variety of grapefruit (*2*). One tree each of McCarthy, Leonardy, and Red Blush grapefruits was moderately pitted but most were very strongly pitted. Cedrat Robbs el Arsa citron was evaluated as not pitted, and trees were developing and producing well. These data suggest a need for preimmunization with mild strains if commercial orchards of susceptible varieties are to be grown (*3*).

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