ripe fruit (firmness 2). Percent infested fruit for hard immature-green 'Tommy Atkins' and 'Keitt' mangos was 83 and 100%, respectively.

Discussion

A. suspensa naturally oviposits into 84 cultivars of fruits and oviposits most frequently in rose apple, *Syzgium jambos* (L.) Alst.; cattley guava, *Psidium cattleianum* Sab.; Surinam cherry, *Eugenia uniflora* L.; tropical almond, *Terminalia catappa* L.; common guava, *P. guajava* L.; and loquat, *Eriobotrya japonica* (Thunb.) Lindl. (5). Mangos, although not a preferred host for *A. suspensa* (5, 6), were artificially infested by laboratory-reared females when the fruit was presented in outdoor screened cages. Both 'Tommy Atkins' and 'Keitt' mangos were infested regardless of fruit hardness ranging from immature-green to soft-overripe fruit. Although larger 'Keitt' mangos (size 6-8) were more heavily infested by *A. suspensa* than fruit of size 12, the hot water treatment of 115°F for 65 min apparently was effective in killing early instar larvae in fruit of both sizes. This suggests that the heat penetrated deeply enough to kill eggs and early instar larvae. However, submersion in 115°F water for a time less than 65 min could result in mortality less than 100% and indicate a size effect. The hot water treatment of 115°F for 65 min also reduced the incidence of mango stem-end rot and anthracnose without significantly affecting fruit quality. A single hot water treatment of 115°F for 45 min might prove to be a useful technique to both kill eggs and early instar larvae in fruit and reduce the incidence of mango diseases such as stem-end rot and anthracnose.

Conclusion

Because *A. suspensa* produce viable offspring from mangos in natural conditions (5, 6), a threat exists for potential movement of the fly from Florida to Texas, Arizona, California, and Hawaii. Therefore, the fruit must be treated and certified free of the tephritid to permit interstate fruit movement. The hot water treatment appears promising as a needed alternative treatment to EDB. The recommended hot water treatment to submerge fruit in water heated to 115°F for 65 min for *D. dorsalis* probably can be reduced to 45 min at 115°F for *A. suspensa.*

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JUVENILE INTERSTOCKS FOR TOPWORKING MAMEY SAPOTE (COLOCARPUM SAPOTA (JACQ.) MERN.)[1]

M. A. H. Ogden
University of Florida, Gainesville, FL 32611

C. W. Campbell and S. P. Lara
Tropical Research and Education Center, IFAS, University of Florida, Homestead, FL 33031

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Abstract. **Topworking mamey sapote trees in the field is extremely difficult once they have flowered and fruited. It would be advantageous to be able to topwork mature seedling trees if they have undesirable characteristics of quality, yield, or pest and disease resistance. If grafted trees are frozen below the graft union, topworking would put bearing groves back into production. Seedling tops prepared for use as interstocks permitted the use of mature scionwood which reverted to a "juvenile-like" condition for topworking mamey sapote. The experiments were successful during the season when grafting generally is not possible.**

The mamey sapote has been grown in Florida since the mid-1800s, but for a long time the fruit was considered a novelty because only a few trees existed in dooryard plantings or fruit collections. These trees were seedlings and they varied in flavor, yield and pest resistance. Grafted trees of 'Cuban No. 1' were introduced in the 1950s and 'Magana' was introduced in 1960. Other cultivars have been selected or introduced in subsequent years (1).

Mamey sapote was a relatively unknown fruit to the local population in South Florida until interest was sparked by the large numbers of Latin immigrants beginning in 1959-60. At that time most of the trees were still seedlings because the tree is difficult to graft. Today hundreds of ungrafted trees exist in dooryard plantings.

In the late 1970s new grafting techniques permitted production of grafted trees of improved cultivars on a limited scale. At this time there were only a few acres of grafted trees in commercial production. Presently there are around 300 acres of grafted trees planted in commercial groves but now all have come into bearing. More orchards are being planted in the southern coastal areas of Florida.

It would be a great advantage to be able to topwork seedling trees or trees of inferior cultivars with scions of superior cultivars. Topworking mature trees in the field is difficult and there is usually a low percentage of graft take. Trees to be topworked are usually cut back to major limbs and the new sprouts are veneer grafted much in the manner of topworking lychee trees (*Litchi chinensis* Sonn.) (2). Previous work by Ogden (3, 5) has shown that juvenile scions collected from seedling terminals can be grafted more readily than scions from mature trees that have flowered

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and fruited. Scions from mature trees that have been reverted to a "juvenile-like" condition by severe pruning also graft more readily than scions from mature trees.

These experiments were conducted to determine if seedling terminals from young nursery stocks used as interstocks would permit the use of mature and "juvenile-like" scions for topworking mamey sapote.

Materials and Methods

Three large grafted trees were cut back below the graft to stumps at a height of approximately 1 m in June, 1982. The trunks were painted with white latex paint to prevent sunscald. Sprouts from the stump were permitted to grow until they obtained a size suitable for grafting.

A modified veneer graft with a shallow cut on both the stock and scion was used (3, 4, 5). Scionwood was selected from terminal shoots that were relatively short without fully expanded leaves. If the wood is too hard or too gelatinous, it is not suitable for graftwood. Scions were collected and used the same day and not stored overnight.

On 25 March 1983, 45 sprouts were grafted with seedling tops and wrapped with polyethylene tape. When the seedlings had sprouted and obtained a stem diameter of 2 to 3 cm, they were grafted with the mature and "juvenile-like" scions of 'No. 2' and 'Magana' on 8 August 1983. Ten replications of each treatment were used for a total of 40 grafts.

Results and Discussion

Young seedling terminals used as interstocks were evaluated on 8 May and had a 92% graft take (Table 1). The second set of grafts using mature and "juvenile-like" scions were evaluated on 13 September 1983. The surviving grafts had sprouted and were growing vigorously. The "juvenile-like" scions had 100% success for 'No. 2' and 80% success for 'Magana' with an overall average of 90%. The mature scions had 80% graft take for both 'No. 2' and 'Magana'.

Table 1. Juvenile interstocks for topworking mamey sapote.

Date	Stage[z]	Cultivar	Gfts[y]	Take (%)
Mar	Seedling	—	45	92
Aug	"juv"	'No. 2'	10	100
	"juv"	'Magana'	10	80
	Mature	'No. 2'	10	80
	Mature	'Magana'	10	80

[z]"juv" ("juvenile-like").
[y]gfts (number of grafts per scion maturity).

Juvenile interstocks using terminals from young seedling plants as scions are the best material to use as interstock for topworking mamey sapote. Both mature and "juvenile-like" scions can be grafted successfully on juvenile interstocks even during August, when graft take is usually poorest.

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INCIDENCE OF "SOFT-NOSE" ON MANGOES IN THE CANARY ISLANDS

VICTOR GALÁN SAÚCO, DOMINGO FERNANDEZ GALVÁN
Department of Fruit Culture, Instituto Nacional de Investigaciones Agrarias. P.O.B. 60—La Laguna, Tenerife Canary Islands—Spain
AND
ROSA CALVO
Data Processing Section, Instituto Nacional de Investigaciones Agrarias. P. O. B. 8111—Madrid, Spain

Abstract. **In the last 5 yr, an internal breakdown of mango fruit—described as "soft-nose" in Florida—has appeared in most mango plantings in the Canary Islands. This paper discusses the influence of harvesting at the green-ripe stage and date of harvesting on the incidence of affected fruits, as well as cultivar sensitivity. The main conclusions are: a) harvesting at the green-ripe stage considerably reduces the incidence of "soft-nose"; b) no clear difference in "soft-nose" incidence seems to be connected with the harvesting date; c) the incidence of "soft-nose" varies among cultivars, some (especially 'Kent' and 'Ameeri') being very sensitive.**

Although the mango (*Mangifera indica* L.) was probably introduced into the Canary Islands at the end of the 18th Century (5), it is at present a minor fruit crop in the Islands. The relatively low water and soil requirements of this species as compared with bananas—the main crop of the Islands—and the excellent market possibilities (4) are the main causes of the great interest for the development of this crop in the Archipelago.

The mango, like many other tropical fruits, exhibits several problems in its adaptation to the subtropical climate of the Islands, the main one being the production of many small, embryo-aborted fruits (4). Over the past 5 yr, there has been an incidence on most locations in the Islands and on most cultivars, of an internal breakdown of the fruit with symptoms apparently identical to those described by Young in Florida (9). Several pathological analyses have been conducted at the INIA's (Instituto Nacional de Investigaciones Agrarias) Regional Centers in the Canary Islands and the Levant region of Mainland Spain (CRIDA-11 and CRIDA-07, respectively)—but to date no pathogenic cause has been detected. Although this agrees with the observations in Florida by Young and Miner (10), more analyses should be carried out before stating a definite negative assessment, as other researchers claim breakdown of the fruit is also induced by bacterial injections (2).

In 1982 several preliminary trials were made, both at the CRIDA-11 and on other farms, using different concentra-