

# Kastooree (*Mangifera casturi*) as a Graft Interstock for Wild Mangos

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Following a decade of research into *Mangifera* species at Fairchild Tropical Botanic Garden (FTBG), some conclusions can now be drawn about suitable interstocks for the propagation of wild *Mangifera* species. Fifteen *Mangifera* species have been grafted onto *Mangifera indica* rootstock. These trials have resulted in successful grafts, and in partial and complete incompatibilities. These results led us to identify *Mangifera* species that could serve as interstocks with *Mangifera indica* ‘Turpentine’. *Mangifera casturi*, which is commonly cultivated in Kalimantan on the island of Borneo under the name of kastooree, is a highly successful interstock for *M. griffithii*. Interstock grafts above *M. indica* have a 90% or greater success rate, and subsequent grafts of *M. griffithii* have a 90% success rate. *Mangifera casturi* has also been successful as an interstock for *M. lalijiwa* and *M. merillii*. Trials continue for suitable interstocks for *M. foetida* and *M. pajang*, which have been unsuccessful as scions on *Mangifera indica*.

The mango (*Mangifera indica* L.) is grown as a subsistence and/or export commodity in nearly all countries of tropical and subtropical Africa, America, Asia, and the Pacific, with exports primarily destined for Asia, Europe, or North America. As the mango has increased in importance as an export commodity, the commercial industry has come to rely on a relatively few cultivars that conform to the current demands of the export market. The result has been a narrowing of the genetic diversity and a growing concern about the loss of wild crop relatives and the threat of devastating diseases or pests. There are over 60 *Mangifera* species currently recognized in Southeast Asia (Kostermans and Bompard, 1993), with many species locally rare and/or included on the IUCN Red List of Threatened Species [vulnerable (*M. pajang*, *M. zeylanica*), data deficient (*M. lalijiwa*, *M. odorata*), and extinct in the wild (*M. casturi*)]. These species are not well represented in genetic banks.

At the Center for Tropical Plant Conservation of the Fairchild Tropical Botanic Garden (FTBG) we have a project for the identification, collection, and propagation of wild mangos, including *M. casturi*, *M. griffithii*, *M. lalijiwa*, *M. laurina*, *M. odorata*, *M. pentandra*, *M. pajang*, *M. zeylanica*, *M. foetida*, and *M. caesia*. The objective is the long-term conservation of these species and their use in breeding with *M. indica*. We were unsuccessful in the establishment of *M. caesia*, *M. foetida*, *M. griffithii*, and *M. pajang* using current grafting techniques on *M. indica* rootstocks (Campbell, 2004). The objective of the current study was to identify a suitable interstock for the grafting of these species onto *M. indica* in South Florida.

## Sources of Plant Material

Seeds of *M. indica* ‘Turpentine’ were collected from trees in South Florida. This is the standard rootstock used within the genetic bank of the Center for Tropical Plant Conservation of the FTBG. This rootstock is well suited to the local conditions, forming a thrifty tree with standard maintenance programs for

Florida. *Mangifera casturi* was obtained from three sources: Frankie Sekiya, Waimanalo, HI; Queensland, Australia; and from Gary Zill, Boynton Beach, FL. There were at least two forms of *M. casturi* (purple and green) among the three sources. *Mangifera* species were collected in 2000 on the island of Borneo (Sarawak and Sabah), where there is considerable *Mangifera* genetic diversity.

## Propagation Method

All grafting was conducted at the Center for Tropical Plant Conservation of FTBG in Coral Gables and field planting occurred at the Williams Grove Genetic Facility in Homestead, FL. A modified cleft graft was used for both the interstock and the scion graft. Leaves were left and cut in half on both the interstock and the scion grafts. Following grafting, both the rootstock and the scions were covered with a plastic bag to avoid moisture loss and placed in indirect light under the shade of trees or beneath greenhouse benches. Grafting was conducted when ambient nighttime temperatures were above 60 °F and less than 72 °F. All grafting and maintenance protocols were conducted according to standard procedures for South Florida.

## Results and Discussion

Standard veneer grafts of *M. griffithii*, *M. lalijiwa*, and *M. merillii* on *M. indica* ‘Turpentine’ were successful, but the percentage success rates were less than 50% and *M. griffithii* and *M. merillii* trees did not survive more than 2 years in the field. Failure in the field was not the result of cold damage. Instead, the trees grew poorly, had sparse branching, and eventually began to die back to the graft union. *Mangifera lalijiwa* grafts were successful on *M. indica*; however, trees with interstocks of *M. casturi* grew better in the field. Following more than 6 years of field experience, we can state that *M. casturi* ‘Purple’ is the most suitable interstock for *M. griffithii*, *M. lalijiwa*, and *M. merillii* (Fig. 1). It should also be noted that these three species have survived temperatures of –1 °C with minimal damage.

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Fig. 1. Completed graft of *Mangifera griffithii*/*M. casturi*/*M. indica*.

The identification of kastooree as an interstock for the three species above opens up the possibility of its use as an interstock for other species within the subgenus *Mangifera*, section *Rawa* Kosterm., as described by Kostermans and Bompard (1993). As discussed earlier, among the 15 or more *Mangifera* species tested at FTBG, we have been unsuccessful in the grafting of many on *Mangifera indica* 'Turpentine'. The identification of a suitable interstock for field establishment of trees is critical to the conservation and further use of these wild mangos. Among the 69 *Mangifera* species recognized by Kostermans and Bompard (1993), there is considerable potential for their use as crops, as ornamentals, and also in breeding with *Mangifera indica*. However, without the ability to include these species in field genetic banks, their use will remain quite limited.

#### Literature Cited

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