

JULIE MANGO  
IN THE EASTERN CARIBBEAN

A comprehensive manual

Caribbean Agricultural Research and Development Institute (CARDI)

The Technical Centre for Agricultural and Rural Cooperation (CTA)

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## Annex 1 Principal findings of CARDI's research programme on Julie mango

### Pathology

- Anthracnose disease inoculum is present throughout the crop cycle i.e. from leaf flushing to bearing.
- Inoculum is found on dead twigs.
- High relative humidity (over 95%) was shown to be highly correlated with disease intensity and incidence.
- Isolates on fruits, leaves and flowers showed different sensitivity to fungicides.
- Pathotypes of *Collectotrichum* isolates were found to be insensitive to copper and only sensitive to benomyl at high concentrations. These factors eliminate two commonly recommended fungicides.
- *In vitro* studies indicated that prochloraz (Sportak ®) at low concentrations is effective in controlling the disease, this needs to be tried in the field.
- Data over five seasons collected on three farms, show consistently lower anthracnose disease severity in Roger, Melville Hall and Grand Savanne which are relatively dry areas of Dominica, when compared with higher severity in Stowe, Salisbury Heights and the North Eastern parts of the Island. These data will allow more accurate determination of appropriate zones for mango production in the region.
- An anthracnose disease severity score procedure was defined as a tool to be used by extension agents to predict accurately potential damage in any season for planning harvest and postharvest activities in mango. This procedure is being validated.

### Entomology

- Caribbean fruit fly, *Anastrepha obliqua* causes losses ranging from 20–100% in Julie mango in Dominica.
- An integrated pest management strategy comprising field sanitation, spraying with malathion, and use of baited McPhail ® traps reduces losses to fruit fly from 60% to 10%.
- This technology is more suited to orchard systems with yields of 200 fruits per tree; fruit losses of 20% justify the use of traps.
- For high yielding single trees, the technology is justified only when the fruit losses are 60%.
- Plastic Liquibator ® traps which are cheaper and more durable, proved to be as effective as glass McPhail ® traps and can therefore result in reduced cost of this technology.
- Gall midge *Erosomyia mangiferae* attacked 23–68% of the inflorescence on Julie mango depending on the state of development of the inflorescences. Higher infestations occurred in wet humid areas.
- Some 55–69% of the gall midge larvae were parasitised by *Platygaster* spp. Parasitism varied with location.
- Inflorescence death was caused primarily by invasion of saprophytic bacterial *Botrydiplodia theobromae* and *Phomopsis mangiferae*.

### Postharvest technology

- The United States Department of Agriculture's requirement of 'probit 9' larval mortality (99.996% mortality) for fruit flies can be achieved through treatments with hot water at 48°C for 35 minutes, during which a pulp temperature of 46°C is achieved.
- Probit 9 is achieved within 24 hours using the above treatment.
- An economic analysis was completed for the hot water treatment facility designed for Dominica Export Import Agency (DEXIA). The income statement gives a deficit of EC\$39,962 in the first year with 70 tonnes of fruit marketed. Income rises to EC\$296,803 in year 5 with 1100 tonnes of fruit marketed. The facility breaks even in Year 2 at 193 tonnes of fruit marketed. Sensitivity analyses show that if 30% of the fruit are culled, or price of fruit delivered to the facility rises to EC\$1.85/kg, or the wholesale price in London falls to EC\$4.56/kg, there are no profits before tax. Profitability is affected most by the London prices.
- When mature Julie mango fruits were treated with a solution of benomyl (1.0g/L a.i.) at 46°C and assessed after seven days, fruit flies and anthracnose incidence were reduced significantly.
- The incidence of shrivelling on ripe fruits increased significantly whether mangoes were stored either in ambient conditions or simulated shipping conditions, though there was no evidence of deterioration of fruit internally.
- Exporters traditional postharvest treatment with sea water and lime juice neither improved pericarp colour nor reduced anthracnose. The incidence of soft rots increased from 20 to 50% and 70 to 80% respectively.
- The most effective time/temperature combination for anthracnose control was treatment with hot water for 5 minutes at 53° C and 15 minutes at 50° C for Julie and Long mango respectively.

### Agronomy

- Potassium nitrate had no significant effect on flower induction in Julie mango. Neither brix percentage, nor acid concentration nor brix/acid ratio were influenced by the treatment.
- A study of the biological cycle of Julie mango at five locations in Dominica provided data on flushing, flowering and intensity of flowering, fruit set and fruit retention. These data are being used to delimit the most appropriate areas for Julie mango production.

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