

## INFESTATION STUDIES ON LYCHEES AND LONGANS TO DETERMINE THEIR HOST STATUS IN RELATION TO THE CARIBBEAN FRUIT FLY

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**Abstract.** California recently reevaluated the host status of lychees, *Litchi chinensis* Sonn., and longans, *Euphoria longana* (Lour.), grown in Florida, to the Caribbean fruit fly, *Anastrepha suspensa* Loew. Florida lychee growers would not be able to ship to California unless non-host status is proved. Fruits were collected from three 'Brewster', and three 'Mauritius' lychee groves, and three 'Kohala' longan groves. One third of the fruits was held to determine if a natural infestation exists, one third was exposed to fruit flies, and one third was cut open and exposed to fruit flies. A guava control was used to ensure that the flies were reproductively mature. None of the field collected lychees (1589) or longans (900) had any naturally occurring infestations. None of the laboratory caged lychees and longans, either cut (1614 and 900 respectively) or whole (1663 and 900 respectively) had any infestation of Caribbean fruit flies. The control guavas all had infestations. 'Brewster' and 'Mauritius' lychees and 'Kohala' longans grown in Florida are not hosts to the Caribbean fruit fly.

The Caribbean fruit fly, *Anastrepha suspensa* Loew, has become established as a pest of some fruit crops since its accidental introduction to Miami, FL in 1966. Swanson and Baranowski (1972) listed over 80 host fruit species for this fly. The California Department of Food and Agriculture had allowed Florida lychees and longans from commercial groves to be shipped to California without quarantine treatment. In May 1996 California gave notice to the State of Florida that California was reexamining the status of lychees and longans; without further information the Department would not allow Florida lychees and longans into California after December 1996.

The goal of this research was to determine if commercially grown lychees and longans are hosts of the Caribbean fruit fly in the laboratory, and the level of natural infestation.

The methodology for determination of host status is not universally agreed upon, but Cowley et al. (1992) gave a pathway for determining host status. Parts or all of this pathway are found in most non-host studies. Laboratory cage trials are a key first step in this pathway. The lack of development of fruit fly larvae in fruit exposed in laboratory cage trials gives non-host status under this protocol.

### Materials and Methods

'Mauritius' lychees were collected from three groves (D. Cartano, R. Olzack, and J. Gordon) on each of three dates (5-23-96, 5-30-96, and 6-6-96) in Dade County, FL. The fruits collected from each grove on each date were divided randomly into treatment and control. Each treatment and control contained 100 fruits except from J. Gordon grove on 6-6-96 (control - 50 fruits, cut treatment - 76 fruits) from which fewer fruits were obtained. For each date one cage was prepared with 20 heat-disinfested guavas as a positive control.

'Brewster' lychees were collected from three groves on three dates in Dade County, FL. Fruits were collected from the N. Hendrix grove on 6-12-96, 6-24-96, and 7-1-96, from the M. McCann grove on 6-12-96, 6-17-96, and 6-20-96 and from the H. Miller grove on 6-6-96, 6-12-96, and 6-20-96. Fruits were randomly divided into treatments and controls which contained 100 fruits except: M. McCann grove from which fewer fruits were collected (treatments had 78 fruits from 6-12-96, 90 fruits from 6-17-96, and 70 fruits from 6-2-96), and H. Miller grove which had been completely picked before the 6-20-96 sample was collected. On each date that samples were collected, one cage was prepared with 20 heat-disinfested guavas as a positive control.

'Kohala' longans were collected from three groves (M. Elenby groves 1 & 2, and E. Castlebury), on three dates in Dade County, FL (7-25-96, 8-1-96, and 8-8-96). Fruits from each replicate were randomly divided into treatments and controls which contained 100 fruits. For each date one cage was prepared with 20 heat-disinfested guavas as a positive control.

For each group of fruits from a grove, one group of 100 fruits was held without treatment to determine if any natural infestations were present. The other two groups of 100 fruits were placed in cages (approximately one meter cubes) with 10 female and 10 male 10-day-old Caribbean fruit flies. One of the treatments of 100 fruits was to slice open each fruit before placement into the fly cage.

After exposure to fruit flies for 24 hours (under 14/10 hours of light/dark conditions) the fruits were removed from the cages and held in towers over vermiculite. Any larvae emerging were collected and counted. Fruits were held three to four weeks, then each fruit was opened, and the pulp inspected for presence of immature fruit flies before disposal.

Four McPhail-type traps were placed at each sampled grove (one on each side) and monitored weekly for the presence of adult flies.

A sample of fruits fallen on the ground was collected from each grove on each date if they were available. These fruits were held for emergence of any fruit fly larvae at about 25°C.

### Results and Discussion

The collections of fruits covered the dates for the commercial seasons for lychees and longans. Most of these fruits ripen at the same time resulting in a very short harvesting season. A total of 900 fruits was to be collected for each cultivar. Table 1 shows actual numbers which were slightly lower in the case of lychees, primarily due to harvesting of this high-value

Table 1. Total numbers of fruits used and larvae recovered.

'Mauritius' Lychees		
Treatment	Number of Fruits	Larvae Recovered
Control*	850	0
Whole fruits	900	0
Cut fruits	876	0
Guava Control	60	50
'Brewster' Lychees		
Treatment	Number of Fruits	Larvae Recovered
Control*	739	0
Whole fruits	763	0
Cut fruits	738	0
Guava Control	180	182
'Kohala' Longans		
Treatment	Number of Fruits	Larvae Recovered
Control*	900	0
Whole fruits	900	0
Cut fruits	900	0
Guava Control	60	92

\*Fruits from the field not exposed to fruit flies in the laboratory.

fruit, but also because of bird damage as the fruits reached peak ripeness. Larval infestations in the positive control guavas averaged 21 larvae per group of 20 guavas, or about one larva per fruit. As Table 1 clearly shows, no infestations of any of the lychees or longans occurred, either in the field naturally, or from forced infestation in the laboratory.

A total of 229 lychees and 727 longans from the ground were collected from all of the cultivars and all of the groves. The numbers of fallen fruit available varied due to different management practices. Some growers picked trees clean, others pruned branches and left immature fruits on the ground, some left fruits unpicked on trees which subsequently fell after becoming overripe. No larvae were recovered from any of these fallen fruits.

Adult Caribbean fruit flies were trapped in all of the groves except the Castlebury longan grove. Trap catches ranged from 0 to 142 with an average of 6.2 flies per trap per date sampled (Fig. 1). Trap catches started out high and declined, with the lower number of flies caught from late June

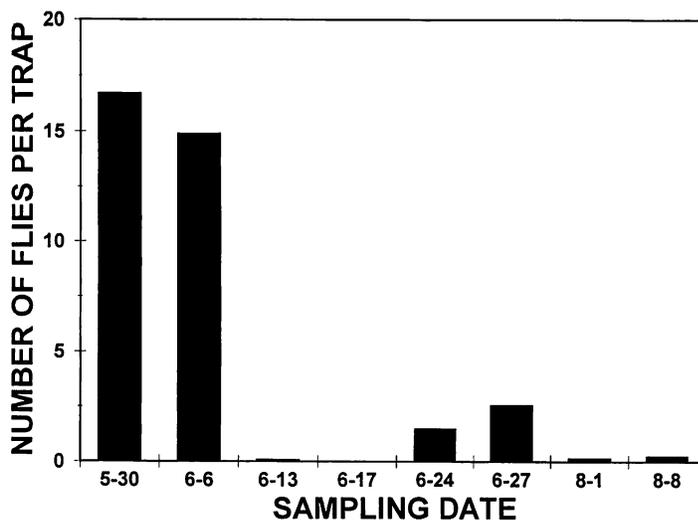


Figure 1. Average number of adult fruit flies captured in each of four McPhail traps placed at the perimeter of each Lychee and Longan grove.

None of the lychees or longans harvested from the groves produced Caribbean fruit fly larvae from natural infestations (1,589 lychees, 900 longans) even though adult fly populations were high in some groves. None of the forced infestations in the laboratory with either cut or whole lychees and longans produced Caribbean fruit fly larvae (1,663 uncut lychees, 1,614 cut lychees, 900 uncut longans, 900 cut longans). Guava control infestations from identical groups of flies averaged about 21 larvae or about 1 larva per guava. We conclude that 'Mauritius' and 'Brewster' lychees and 'Kohala' longans are not hosts to the Caribbean fruit fly and present no risk of spreading the fly to California from Florida.

#### Literature Cited

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