

INTERSPECIFIC INTERACTIONS AND HOST PREFERENCE
OF *ANASTREPHA OBLIQUA* AND *CERATITIS CAPITATA*
(DIPTERA: TEPHRITIDAE), TWO PESTS OF MANGO IN
CENTRAL AMERICA

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The larvae of *Anastrepha obliqua* L. and *Ceratitis capitata* Wied. (Diptera; Tephritidae) destroy mango fruits (Jirón & Hedström, 1988), while fruit flies of the genus *Anastrepha*, (including *A. obliqua*, *A. ludens*, and *A. striata*) cause extensive damage to a large variety of Neotropical commercial and wild fruit hosts (Norrbom & Kim, 1988). *A. obliqua* has been found on fruits in the Anacardiaceae, frequently in hog plums (*Spondias* spp.) and mangos (Jirón 1995). This species of fly began to attack mango extensively as a host when mangos were introduced into tropical America during the 18th century (Jirón 1995).

In the past, *C. capitata* was found only in Africa and the Mediterranean basin, but in the 1950's, it was accidentally introduced to the Western Hemisphere (Jirón & Salas 1992). In these new areas, it occurs in a wide variety of habitats with a large number of host species (such as *Citrus* and *Terminalia catappa*) (Nishida *et al.* 1985).

A. obliqua oviposits in a few plant species belonging predominantly to the Anacardiaceae, while *C. capitata* attacks numerous fruit species belonging to different families (Jirón *et al.* 1988).

Studies by Salas (1958), Christenson & Foote (1960), and Jirón & Zeledon (1979) suggest that species of *Anastrepha* compete with an opportunistic *C. capitata* for fruits on which to oviposit. Castillo (1987) observed that *Anastrepha striata* adults attacked adult *C. capitata* and displaced them from a guava fruit. On mango, 94% of infested fruit contained *A. obliqua* and 6% contained *C. capitata* (Jirón & Hedström 1988).

Interspecific interactions of adults on mango were examined by placing 30 females of each species, *A. obliqua* and *C. capitata*, in a 30 × 30 × 30 cm screen cage with a nearly ripe mango fruit placed on the middle of the floor. Adults of *A. obliqua* were obtained from colonies maintained in the mass rearing laboratory at the Estacion Experimental Fabio Baudrit, Alajuela, Costa Rica. *C. capitata* adults and their diet were supplied by H. Camacho, Escuela de Biologia, Universidad de Costa Rica.

The following data on the behavior of the flies were taken: 1) incidence of *A. obliqua* displacing *C. capitata* from the fruit, 2) incidence of *C. capitata* displacing *A. obliqua* from the fruit, and 3) incidence of both species occurring on the same fruit with no interaction. The flies were observed for 30 min for each trial. Each trial was replicated four times. The outside of the cage screen was moistened by wiping the screen with a wet sponge. This procedure kept the humidity within the cage relatively high. The flies were observed for four repetitions of 30 min each.

Host fruit preference tests with nearly ripe mangos and ripe oranges were done by placing fifteen females of each species in a 30 × 30 × 30 cm screen cage. Three mangos,

a reportedly preferred host of *A. obliqua* (Jirón *et. al.* 1988), and three oranges, a reportedly preferred host of *C. capitata* (Nishida *et. al.* 1985), were arranged alternately on the floor of the cage. Observations were made on the frequency of visits of each fly species to each host fruit. The flies were observed in four replications, each of 30 min duration. Statistical analysis was performed with a Paired t-test.

A. obliqua displaced *C. capitata* from the mango in 60.4 percent of encounters by charging. In 35.8 percent of the cases, there appeared to be no competitive behavior. In the remaining 3.8 percent of the observations, *C. capitata* appeared to displace *A. obliqua* from the fruit. When both fruits were presented simultaneously to the two species of flies, *C. capitata* landed 49 times on oranges and 29 times on mango, results that were statistically significant (t value = 6.12, p = 0.0088). *A. obliqua* landed 20 times on mangos and the remaining 12 on oranges, results that were not statistically significant (t value = 1.36, p = 0.2674).

The results of the interspecific competition studies suggest that *A. obliqua* is a better competitor than *C. capitata*. This competitive dominance may be attributed to *A. obliqua* being three times as large as *C. capitata*. The difference in size can be a factor since the reaction of *A. obliqua* towards the presence of *C. capitata* is to shift its wings from a horizontal to a vertical plane, then to circle around the smaller fly, and finally to charge directly towards *C. capitata* forcing it off of the fruit. The distribution of these two species of fruit flies in naturally-infested fruit supports our findings. *C. capitata* is present early during the mango fruiting season (Jirón & Hedström 1988). Additionally, *C. capitata* can infest mango before *A. obliqua* because of physiological restrictions in the fruit that do not allow the eggs of *A. obliqua* to develop and hatch once they are laid (Soto-Manitiu & Jirón 1989), therefore allowing an early survival of *C. capitata* on the fruit.

Our results showed that in 35.8 percent of the encounters there were no aggressive interactions. The apparent lack of competition could have been caused by *C. capitata* and *A. obliqua* not noticing each other on the fruit because of the fruit's curvature. The 3.8% of encounters where *C. capitata* displaced *A. obliqua* from the fruit by attacking it, can be attributed to chance.

A. obliqua showed a slight preference for mango as a landing site when both mango and orange were available. This result supports the findings by Jirón *et. al.* (1988) and Eskafi & Cunningham (1987) that *A. obliqua* showed a strong preference for Anacardiaceous host fruits. *C. capitata* showed a preference for orange as a landing site compared to mango.

We wish to thank Daniel Janzen for his valuable comments, Lisa Bradshaw and the faculty at the Center for Sustainable Development Studies/School for Field Studies in Costa Rica for their support and advise throughout this project, and Hernan Camacho at OIRSA for providing us with Mediterranean Fruit Flies and other supplies used. This research was partly supported by CONICIT of Costa Rica.

SUMMARY

Adult aggressive interactions between *Anastrepha obliqua* and *Ceratitis capitata* were examined by exposing adults of both species to each other in laboratory conditions as well as exposing them to natural host fruits such as mangos and oranges. *A. obliqua* successfully displaced *C. capitata* from mango fruit 60.4% of encounters, 35.8% of encounters showed no adult aggressive interactions, and 3.8% of encounters resulted in *C. capitata* displacing *A. obliqua* from the fruit. When adults of both species were exposed to oranges and mangos in the same cage, *C. capitata* preferred oranges 62.8% of the time and mangos 37.2%, while *A. obliqua* preferred mangos 62.5% of the time and oranges 37.5%.

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