HOST RANGE OF OLIVE FRUIT FLY, *BACTROCERA OLEAE* IN CALIFORNIA

Mohammad Athar[1] and Syed Mahmood Nasir[2]

Abstract

The results of the trapping survey were analyzed to determine host range of olive fruit fly (*Bactrocera oleae*) in California. Since its first appearance in California in 1998, the olive fruit fly has spread from Los Angeles to 37 counties, including all of the state's commercial olive growing areas. Olive fruit fly was trapped from 19 tree species belonging to nine genera distributed in seven families of angiosperms. Olives (Family Oleaceae) were the preferred host of the olive fruit fly. Family Rosaceae has nine tree species followed by Rutaceae (five tree species) as host of olive fruit fly. Other host tree species were distributed in Anacardiaceae, Fabaceae, Lythraceae and Malpigiaceae. Mostly these hosts comprised of the fruit trees with the exception of Brazilian pepper tree, carob, crape myrtle and ornamental plum.

Keywords: Olive fruit fly, *Bactrocera oleae*, California

Introduction

The olive fruit fly (*Bactrocera oleae* (Gmelin), Syn. *Dacus oleae* is a serious pest of olives in most of the countries around the Mediterranean Sea. The olive fruit fly is found in many olive-producing areas in the world (Economopoulos, 2002; Van Steenwyk, *et al.*, 2002). The larvae are monophagous and feed exclusively on olive fruits. The larvae cause premature fruit drop and yield reduction. Adults feed on nectar, honeydew, and other opportunistic sources of liquid or semi-liquid food. While feeding, they tunnel throughout the fruit, destroying the pulp and allowing entry of secondary infestation of bacteria and fungi that rot the fruit and greatly increase the free fatty acid level (acidity) of the olive oil. Oviposition stings caused by the female laying eggs inside the fruit lower the value of table fruit. The larger, earlier maturing olive varieties such as those grown in California, are preferred for egg laying.

The damage caused by tunneling of larvae in the fruit results in about 30% loss of the olive crop in Mediterranean countries especially in Greece and Italy where large commercial production occurs (Economopoulos *et al.*, 1982; Michelakis, 1990). It was detected in California in October, 1998 in the Los Angeles area, and has since spread to the rest of southern California (1999), the Central Valley (2000), Marin, Napa, Sonoma, Solano (2001), Shasta, El Dorado and Lake (2002) counties (Rice *et al.*, 2003, Van Steenwyk *et al.*, 2002, Vossen and Varela, 2003).

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[1] California Department of Food and Agriculture, Sacramento, CA 95814, USA.
[2] DIGF, MoE, Islamabad.

Materials and Methods

Various traps (Champ, Jackson, McPhail, GWSS traps) were used to capture adult flies from various counties of California following Gill (2001). These traps were baited with two different attractants i.e. a male sex lure (Spiroketal capsule) and a feeding attractant (ammonium bicarbonate). Traps were placed in olive trees at the density of 1 per 16 hectares (40 acres) or 1 per block when planting is less than 16 hectares. Traps were placed in large, well-foliated trees that have an abundance of fruit production. Dusty trees were avoided, when possible. In commercial orchards, traps were placed 2-3 rows in from the edge of the planting. Edges of roads within the orchards were also avoided because vehicles may create dusty conditions during trapping season. Traps were also placed on other selected tree species in similar way to trap the olive fruit fly from these trees. The nomenclature and classification of the host trees was described following Bailey and Bailey (1976). Common names of trees were checked from Sunset Western Garden Book (Brenzel, 2001).

Results and Discussion

Table 1 lists trapping of olive fruit fly from 19 tree species. These trees belonged to nine genera distributed in seven families of angiosperms. Olives (Family Oleaceae) were the preferred host of the olive fruit fly. Family Rosaceae had nine tree species followed by Rutaceae (five tree species) as host of olive fruit fly. Other host tree species were distributed in Anacardiaceae, Leguminosae, Lythraceae and Malpighiaceae (Table 1). Mostly these hosts comprised of the fruit trees with the exception of Brazilian pepper tree, carob, crape myrtle and ornamental plum. The host list reflects common and typical hosts and is not comprehensive. It is unknown if different olive cultivars are more attractive to the fly or more susceptible to fly damage. Olives are the only breeding host plants. The larger table olive varieties are preferred for oviposition by the female. However, smaller oil olive cultivars are excellent hosts. Flies have been also trapped in other plants, or crop orchards where the adults search for food or refuge. It has also been reported by Eskafi (1987); Rice (2000); Vossen and Verala (2003). Infestation in these hosts has allowed the fly to spread along the east coast of Africa to as far as central South Africa where wild olives occur along with a few plantings of commercial olives.

In addition to olives, Rice, (2000) have also reported other hosts like orange, grapefruit, tangerine, calamondin, cherry, plum, lemon, avocado, loquat, nectarine, *Myoporum*, Surinam cherry etc.

Table 1. Host trees of olive fruit fly in California

Tree Species	Common Name	Tree Habit
Anacardiaceae		
Schinus terebinthifolius Raddi	Brazilian pepper tree	Shrub or tree to 7 m tall and wide
Fabaceae (Leguminosae)		
Ceratonia siliqua L.	Carob	Tall tree to 17 m
Lythraceae	Crape myrtle	
Lagerstroemia indica L.		Deciduous shrub or tree to 7 m or more
Malpighiaceae	Fig	
Ficus carica L.		Broad irregular deciduous tree to 10 m
Oleaceae	Olive	
Olea europaea L.		Tree to 8 m or more
Rosaceae	Apple	
Malus sylvestris Mill.	Crabapple	Small tree with dense round crown or shrub to 2-14 m
Maius prunifolia (Willd.). Borkh.	Apricot	Shrub or small tree
Prunus armeniaca L.	Cherry	Small round-crowned tree
Prunus avium (L.) L.	Plum	Large deciduous tree to 10 m or more
Prunus domestica L.	Peach	Coarse shrub or tree
Prunus persica (L.) Batsch.	Ornamental plum	Small glabrous tree
Prunus salicina Lindl.	Pear	Small tree to 8 m
Pyrus communis L.	Asian pear	Broad-crown tree
Pyrus pyrifolia (Burm. f.) Nakai		Tall tree to 8-10 m and about half as wide
Rutaceae		
Citrus aurantium L.	Citrus	Spiny tree to 7-10 m
Citrus limon (L.) Burm.	Lemon	Spiny tree to 6-9 m
Citrus x paradisi Macfady	Grapefruit	Tree to 10-17 m
Citrus reticulata Blanco.	Tangerine	Small spiny tree
Citrus sinensis (L.) Osbeck.	Orange	Compact tree, to 14 m

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