

FRUIT FLIES ASSOCIATED WITH CITRUS IN PUNJAB PROVINCE OF PAKISTAN

Riaz Mahmood, Abdul Rehman and Muhammad Ashraf Poswal

CABI Regional Bioscience Centre Pakistan

Data Gunj Bakhsh Road, opposite I-A Satellite

Town, P. O. Box 8, Rawalpindi

Abstract

The fruit importing countries impose quarantine restrictions against produce likely to carry new fruit flies species into their countries. It has become necessary to update the knowledge of pests status associated with exportable fruits. Kinnow variety of citrus from Pakistan has great demand in International market and its export can be increased manifold provided fears of fruit contamination by insects and pathogens of their concern are removed on scientific evidence. Present surveys of fruit flies associated with citrus in Punjab indicated that only two species *Bactrocera zonata* and *B. dorsalis* attack sweet lime and Feutrell's Early whereas Kinnow which matures late during winter, the time when fruit flies activity slows down, remains almost free of flies contamination. Thus the export of Kinnow from Punjab province of Pakistan is safe. Some countries showed their fears about the presence of Mediterranean fruit fly and fruit flies of genera *Rhagoletis* and *Anastrepha* in Pakistan. The present survey of fruit flies in citrus and monitoring through pheromone traps confirmed the absence of Mediterranean fruit fly from Pakistan.

1. INTRODUCTION

In Pakistan citrus is grown on about 160,000 hectares with 1.5 MMT productions annually. Hectic efforts are being made by Pakistan Horticultural Export Board (PHDEB) to explore new markets for export of fruits and vegetables. Russia is a new entry in the list of citrus importing countries from Pakistan. This year 2003-04, the increase in Kinnow export over the last year is 49.18% from 53612 tons to 79976 tons (PHDEB news 2004). Pakistani Kinnow variety of citrus is in great demand in international market and there are bright prospects for multifold increase in export of citrus provided the fears of fruit importing countries regarding

insects and diseases are removed on the basis of scientific evidence.

Among multitude of insect pests of quarantine importance, fruit flies are the most important. Indonesia, Philippines, Sri Lanka and Mauritius asked for certification of produce of citrus fruit free from fruit flies of species *Ceratitidis capitata* (Wiedemann), *Bactrocera jarvisi* (Tryon), *Bactrocera musae* (Tryon), *Bactrocera neohumeralis* (Hardy), *Bactrocera papayae* Drew & Hancock, *Bactrocera philippiensis* Drew & Hancock and *Bactrocera tryoni* (Froggatt) and the genera *Anastrepha*, *Rhagolettis*, and *Ceratitidis*. Because of fruit fly issue some countries like Japan, Korea and Jordan have already banned or put conditions on the import of mango from Pakistan. Mauritius is interested in

import of persimmon but needs certification that persimmon is produced in area free of *Bactrocera dorsalis* Hendel.

The fruit importing countries also ask for the data of year round catches of fruit flies in lure traps. To fulfill these requirements and know the present status of fruit flies associated with citrus surveys were carried out in the Punjab province of Pakistan. The results are reported here.

2. MATERIALS AND METHODS

2.1 Certification of presence/ absence of different species of fruit flies in citrus

The survey for certification of presence/absence of fruit flies of quarantine importance in citrus was conducted in the Punjab at Multan, Sharaqpur (District Sheikhpura) and Sargodha by making collections of blemished fruits at monthly intervals. The fruits were kept in laboratory and the flies reared from them were identified to species level. Besides rearing of fruit flies from field samples, traps containing dorsal lure an attractant for genus *Bactrocera* species and trimmed lure a host specific attractant for *Ceratitis capitata* were put separately in orchards and main food markets of the towns mentioned above. The fruit flies of different species caught in traps were identified and counted at monthly intervals and the lure in the traps were replenished.

The samples of infested fruits were taken from Basti Lar Bahawalpur Road, Amir Pur and Bowson Road at Multan; from Sargodha Textile Mills orchard and orchards at Chak 49, Lahore Road, and Bhalwal Road at Sargodha; and from

Taridewali, Sharaqpur and Dhamke, at Sheikhpura.

2.2 Fruit fly infestation in citrus

To record the infestation level by fruit flies in citrus 100 fruits at random each harvested by farmers, and those fallen under trees were examined from different sites at monthly interval. The fruits carrying the signs of fruit fly oviposition punctures or feeding of fruit fly larvae were taken as infested ones out of the total fruit examined.

2.3 Description of fruit crop abundance where sampling of citrus for fruit flies was done was done

Multan

Basti Lar: Mango was the main crop followed by citrus and some plantation but as such no orchards of guava were present

Amir Pur Kabir Wala: Mango was the main crop, followed by citrus and guava

Bowson Road: Mango was the main crop, followed by citrus and guava

Sheikhpura

Taridewali: Guava was the main crop followed by litchi, mango and citrus

Sharaqpur: Guava was the main crop followed by litchi, mango and citrus

Dhamke: Guava was the main crop followed by litchi, mango and citrus

Sargodha

Sargodha Textile Mills orchard: Citrus was the main crop followed by mango, and some plantation of guava, jambolana, jujube, date palm, peach

Chak 49: Citrus was the main crop with some plantation of mango

Lahore Road: Citrus was the only fruit crop

Bhalwal Road: Citrus was the only fruit crop

3. RESULTS

3.1 Fruit flies species attacking citrus

Two species *Bactrocera dorsalis* and *B. zonata* were reared from citrus from all the places surveyed

3.2 Seasonal abundance of *B. zonata* and *B. dorsalis* in citrus

B. zonata

This species widely distributed in Asia and is also reported from Egypt, Mauritius and Reunion in Africa and California in North America (CABI, 2001). It is distributed throughout Pakistan except in high hills. It has a long host range and in Pakistan has been reported attacking mango, guava, peach, citrus, loquat, plum, pomegranate, quince, pear, papaya, date-palm and jujube (Mahmood & Mohyuddin, 1986; Stonehouse et al. 2002).

At Sargodha *B. zonata* was the dominant species and was reared more or less regularly from citrus from August to December. At Sargodha Textile Mills orchard where vegetation along with citrus comprised of mango, guava, peach, date palm (main hosts of fruit flies) it started attacking sweet lime citrus from August and before this month the fruit of all citrus varieties were hard enough to be attacked by the fruit fly. The fruit fly damage started increasing in Feutrell's Early in September and was maximum in October (Table 1). The damage decreased in November probably because of slowing down of flies activity at the advent of winter. In December some damage of fruit flies was recorded in Kinnow and all citrus varieties

remained free of fruit fly attack from January to March (Table 1).

At Chak 49 where vegetation comprised of citrus and mango the population trends of *B. zonata* were the same as at Sargodha Textile Mills but the population levels were comparatively lower. In the orchards at Bhalwal Road and Lahore Road where vegetation comprised of citrus only the infestations levels of fruit flies were much lesser as compared with that at Sargodha Textile Mills and Chak 49 where fruit crops other than citrus were available to support fruit fly breeding for most period of the year (Table 1).

At Multan and Sheikhpura *B. zonata* was reared from Feutrell's Early in October and November and their infestation was extremely low.

B. dorsalis

It is wide spread in Asia, Australasian and Pacific Islands and in California in North America (CABI, 1986). In Pakistan it is abundant in northern foothills and Peshawar valley and is rare in the plains of Punjab and Sindh (Mahmood & Mohyuddin, 1986). In Pakistan it has been reported attacking citrus, loquat, mango, peach, plum, guava, apricot, pomegranate and date palm (Mahmood & Mohyuddin, 1986).

In the present studies it was recorded only occasionally in negligible numbers from Feutrell's Early in October and November at all the places surveyed.

3.3 Fruit flies species caught in lure traps put in citrus orchards and in fruit markets:

Dorsa lure traps

In traps which contained *dorsa* lure two species *Bactrocera dorsalis* and *B. zonata* were caught. Their numbers

B. dorsalis was caught in traps in small numbers more or less regularly from August to November at Sargodha Textile Mills, August to October at Chak49, September to November at Lahore Road and September to October at Bhalwal Road and only once in August in the food market.

Trimedlure traps

Ceratitis capitata is highly polyphagous and serious pest of citrus in most of the citrus growing areas of the world. The countries importing citrus from Pakistan put queries about the presence of this fly in Pakistan. Trimedlure is host specific to this species therefore traps containing this

lure were put in orchards and in food markets at Multan, Sargodha and Sheikhpura. Observations on catches of flies in these traps were taken round the year. No fly adult of *Ceratitis capitata* was caught in traps nor any individual was reared from citrus. This species has also not been reported from any where in Pakistan.

3. 4 Fruit fly parasitoids

Two species of parasitoids *Diachasmimorpha longicaudata* (Ashmead) and *Trybliographa daci* Weld were reared from *Bactrocera zonata* infesting citrus from Sargodha Textile Mills orchard but were rare at Sargodha. At other places no parasitoids were reared.

Table 2: Numbers of *Bactrocera zonata* (B.Z.) and *B. dorsalis* (B.D.) caught in dorsa lure traps put in citrus orchards at different sites and in fruit market in 2002-03 at Sargodha

Month	Sargodha Textile Mills		Chak 49		Lahore Rd		Bhalwal Rd		Fruit market	
	B.Z.	B.D.	B.Z.	B.D.	B.Z.	B.D.	B.Z.	B.D.	B.Z.	B.D.
May - 02	0	0	0	0	0	0	0	0	0	0
Jun.	2	0	0	0	0	0	0	0	1	0
Jul.	479	0	233	0	0	0	18	0	5	0
Aug.	663	17	437	2	2	0	122	0	15	3
Sep.	956	63	775	22	22	2	267	22	11	0
Oct.	781	48	223	12	12	2	135	12	22	0
Nov.	532	31	229	0	2	2	111	8	10	0
Dec.	32	10	5	0	0	0	15	0	15	0
Jan.-03	0	0	0	0	0	0	0	0	0	0
Feb.	1	0	0	0	2	0	0	0	0	0
Mar.	25	0	0	0	2	0	18	0	0	0
Apr.	175	0	15	0	5	0	22	0	0	0

3.5 Conclusions

The present survey indicates that fruit flies are not serious pests of citrus in Punjab. Some of the varieties like sweet lime and Feutrell's Early are damaged at sites where preferred host fruits of flies were also grown together with citrus whereas they were not serious where only citrus was grown.

Kinnow matures late during winter and at this time fruit flies activity slows down therefore this variety remains almost completely free of flies attack. Thus the export of Kinnow from Punjab province of Pakistan is safe.

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