



STUDIES ON SPECIES COMPOSITION OF MANGO FRUIT FLIES IN KONKAN REGION

A. C. PARAB*, S. D. DESAI, V. S. DESAI, S. K. MEHENDALE AND G. M. GOLVANKAR

Department of Agril. Entomology, College of Agriculture, Dapoli

Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli. Dist. Ratnagiri- 415712 Email*: amolparab150@gmail.com

ABSTRACT

The research was carried out on species composition of mango fruit flies in Konkan region at Horticulture Nursery, Department of Horticulture, College of Agriculture, Dapoli during May to July 2017. In the species composition study of fruit flies trapped in fruit fly traps, five different species of fruit flies viz., *Bactrocera dorsalis*, *Bactrocera zonata*, *Bactrocera cucurbitae*, *Bactrocera correcta* and *Bactrocera tau* were trapped. Among these species, *Bactrocera dorsalis* almost accounted 3810 (52.31 %) fruit flies of the total population indicating dominant species of this region, which was followed by *Bactrocera zonata* with 2007 (27.56 %) of fruit flies population and *Bactrocera cucurbitae* with 939 (12.89 %) fruit flies population and occupied rank second and third in composition, respectively. *Bactrocera correcta* accounted 498 (6.84 %) fruit flies population and occupied position fourth. Whereas *Bactrocera tau* accounted only 29 (0.40 %) fruit flies population.

Key words: Species composition, *Bactrocera* spp., Fruit flies, mango etc.

INTRODUCTION

Mango (*Mangifera indica* L.) is the oldest and choicest fruit of the world. It is designated as 'National fruit of India' and known as 'King of fruits' owing to its nutritional richness, unique taste, pleasant aroma and its religious and medicinal importance. Due to its good qualities and high medicinal values, it is enjoyed by masses and classes from all corner of the world.

The total world production of mango is 43,300,000 tonnes (Anon., 2015b). It is commercially grown in more than 111 countries but nowhere it is as greatly valued as in India where 40 per cent of area under fruit crops is only under mango. India is the major mango producer in the world, with an area of 2.218 million hectares and the annual production of 18.832 million tonnes with productivity of 8.49 MT/ha. (Anon., 2015a). India contributes about 64 per cent of the world mango production. In Maharashtra, mango occupying an area of 4.82 lakh ha with annual production of 6.33 MT with productivity of 1.3 MT/ha (Anon., 2014).

In Konkan, 1, 82,000 ha area is under mango cultivation with annual production of 3.25 lakh MT. The productivity of mango in Konkan is about 2.5 t/ha, which is about three times less than the average productivity of the country (Anon., 2014). In Konkan, about 90 per cent area of mango is occupied by single cultivar "Alphonso", which is locally called as "Hapus".

In spite of all good points, mango crop suffers a regular colossal loss due to ravages of pest. Among the insect-pests, fruit fly is the serious and destructive pest of mango. Eight species of fruit fly infest mango in India. The fruit fly species infesting mango in India are *Bactrocera zonata* Saunders, *Bactrocera diversa* Coquillett, *Bactrocera hageni* de Meijere, *Bactrocera cucurbitae* Coquillett, *Bactrocera tau* Walker, *Dacus correctus* Bezzi and *Dacus incisus* Walker (Kapoor, 1970).

Fruit fly belongs to family Tephritidae that represents one of the biggest families of the order Diptera. The family includes more than 4000 species in 500 genera (White and Harris, 1992). The family is divided into 3 sub families and of them, Dacinae has a number of pest species of economic importance. These flies are widespread over the entire world, except the Arctic and Antarctic regions and richly predominant in the tropical and subtropical areas. Oriental region is rich in Dacinae family with nearly 1000 species so far recorded.

Also the correct identification of species has immense value to promote sound biological evidence for the specific status of sibling species which ultimately helps in developing and adopting effective control strategies. Though the crop is economically important, the information on the fruit flies and their species damaging on mango crop are very much lacking

particularly in Konkan region in Maharashtra. Hence, the present investigation was undertaken for the studies on species composition of mango fruit flies in Konkan region.

MATERIAL AND METHODS

Experimental detail:

1. Crop : Mango
2. Variety : Alphonso
3. Statistical Design : Randomized Block Design
4. No. of replications : 3
5. No. of Treatments : 13
6. Period of study : May to July 2017
7. Treatment details :
 - T₁ : Green *Ocimum* (leaf extract) (3ml) + Malathion (2ml)
 - T₂ : Black *Ocimum* (leaf extract) (3ml) + Malathion (2ml)
 - T₃ : Black Jaggery solution (3ml) + Malathion (2ml)
 - T₄ : Common Jaggery solution (3ml) + Malathion (2ml)
 - T₅ : Cinnamon (leaf extract) (3ml) + Malathion (2ml)

- T₆ : Molasses (3ml) + Malathion (2ml)
- T₇ : Green *Ocimum* (leaf extract) (3ml) + Spinosad (2ml)
- T₈ : Black *Ocimum* (leaf extract) (3ml) + Spinosad (2ml)
- T₉ : Black Jaggery solution (3ml) + Spinosad (2ml)
- T₁₀ : Common Jaggery solution (3ml) + Spinosad (2ml)
- T₁₁ : Cinnamon (leaf extract) (3ml) + Spinosad (2ml)
- T₁₂ : Molasses (3ml) + Spinosad (2ml)
- T₁₃ : Control (Without Attractant)

Methods of recording observations:

The fruit flies trapped in all the treatments and replications at five days interval were collected and brought to the laboratory. The collected fruit flies were mixed and separated morphologically species wise with the help of Binocular microscope using Tephritid key. The species wise fruit flies were counted on number basis and converted into percentage basis. Similarly, the fruit flies trapped in traps were identified by using Tephritid key.



Bactrocera dorsalis



Bactrocera zonata



Bactrocera cucurbitae



Bactrocera correcta



Bactrocera tau

RESULTS AND DISCUSSION

To study the species composition of fruit flies infesting mango

During the present investigation the fruit flies trapped in the traps from all the treatments along with three replications of the experiment effect of baiting material for trapping fruit flies were collected and separated species wise. The observations were taken at five days interval. The number wise and percentage based species composition is presented in Table 6 and 7 and depicted in Fig.6 and 7. Similarly the species of the fruit flies trapped in the experiment were got identified by using Tephritid key.

Species composition of fruit flies from traps on number basis

Data on fruit fly species trapped from the experiment at different dates on number basis are presented in Table 1. During the present investigation, five species of fruit flies viz., *Bactrocera dorsalis*, *Bactrocera zonata*, *Bactrocera cucurbitae*, *Bactrocera correcta* and *Bactrocera tau* were trapped in fruit fly traps with different baiting material. Among these species, *Bactrocera dorsalis* almost accounted maximum number of 3810 indicating dominant species of this region, which was followed by *Bactrocera zonata* with 2007 and *Bactrocera cucurbitae* with 939 and ranked second and third in composition, respectively. *Bactrocera correcta*

accounted 498 and occupied position forth, whereas *Bactrocera tau* accounted only 40 number during the study period of May to July 2017 in mango orchard with different baiting material.

Species composition of fruit flies from traps on per cent basis

Data on per cent composition of fruit fly species trapped are presented in Table 2. Data revealed that *Bactrocera dorsalis* almost accounted 52.31 per cent of the total population indicating dominant species of this region, which was followed by *Bactrocera zonata* with 27.56 per cent of fruit fly population and *Bactrocera cucurbitae* with 12.89 per cent population occupied ranked second and third in composition, respectively. *Bactrocera correcta* accounted 6.84 per cent population and occupied position forth. Whereas *Bactrocera tau* accounted only 0.40 per cent population.

Singh (1997) recorded *B. dorsalis*, *B. caryeae*, *B. correcta* *B. zonata* on mango, *B. dorsalis* being most dominant. Out of several hosts of *B. dorsalis*, mango and guava were noticed the choicest hosts of fruit flies.

Mulik Deepa (2004) observed six different species of fruit flies belonging to family Tephritidae, subfamily Dacinae and tribe Dacini from south Konkan region of Maharashtra. Out of these six species, four species i.e. *dorsalis*, *zonata*, *correcta* and *caryeae* belonged to genus and subgenus *Bactrocera* and remaining two species i.e.

Table 1. Species composition of fruit flies from traps on number basis

Period of trapping (5 days interval)	Composition of fruit fly species				
	<i>B. dorsalis</i>	<i>B. zonata</i>	<i>B. cucurbitae</i>	<i>B. correcta</i>	<i>B. tau</i>
17/05/2017	560	262	105	65	8
22/05/2017	526	274	126	84	7
27/05/2017	498	268	143	83	2
01/06/2017	476	263	125	73	4
06/06/2017	445	238	123	49	2
11/06/2017	254	148	70	33	2
16/06/2017	363	208	73	40	2
21/06/2017	268	138	64	32	0
26/06/2017	138	76	37	16	0
01/07/2017	104	54	28	13	1
06/07/2017	50	28	14	3	1
11/07/2017	54	22	14	3	0
16/07/2017	57	23	15	4	0
21/07/2017	17	5	2	0	0
Total	3810	2007	939	498	29

Table 2. Species composition of fruit flies from traps on per cent basis

Period of trapping (5 days interval)	Composition of fruit fly species				
	<i>B. dorsalis</i>	<i>B. zonata</i>	<i>B. cucurbitae</i>	<i>B. correcta</i>	<i>B. tau</i>
17/05/2017	56.00	26.20	10.50	6.50	0.80
22/05/2017	51.72	26.94	12.39	8.26	0.69
27/05/2017	50.10	26.96	14.39	8.35	0.20
01/06/2017	50.58	27.95	13.28	7.76	0.43
06/06/2017	51.93	27.77	14.35	5.72	0.23
11/06/2017	50.10	29.19	13.81	6.51	0.39
16/06/2017	52.92	30.32	10.64	5.83	0.29
21/06/2017	53.39	27.49	12.75	6.37	0.00
26/06/2017	51.69	28.46	13.86	5.99	0.00
01/07/2017	52.00	27.00	14.00	6.50	0.50
06/07/2017	52.08	29.17	14.58	3.13	1.04
11/07/2017	58.06	23.66	15.05	3.23	0.00
16/07/2017	57.58	23.23	15.15	4.04	0.00
21/07/2017	70.83	20.83	8.33	0.00	0.00
Percentage	52.31	27.56	12.89	6.84	0.40

cucurbitae and *tau* belonged to genus *Bactrocera* and subgenus *zeugodacus*.

Morphological description of different species trapped during the experiment

The morphological description of five species recorded during present investigation is given below;

Bactrocera dorsalis (Hendel)

Medium sized flies, face yellowish with medium sized circular black spots. Scutum generally black ground colour, sometimes reddish brown with yellow post pronotal lobes, notopleural, mesopleural stripe, lateral post sutural vittae broad and end beyond intralars. Scutellum yellow with a narrow black basal band. Legs fulvous with rows of long setae on fore femora. Costal band of wings extends from cell sc to apex beyond R_{4+5} , continuous with R_{2+3} in cell r_1 and slightly broadened beyond R_{2+3} . Abdomen orange to dark brown in colour with a medial longitudinal black band, transverse band on anterior margin of the tergum 3 and narrow black lateral margins on terga 4 and 5, and pecten on third abdominal tergum.

Bactrocera zonata (Saunders)

Adults are pale orange brown with small circular to oval shaped spots in antennal furrow. Scutum orange to reddish brown with yellow post pronotal lobes,

notopleura, mesopleural stripe. Post sutural vittae narrow (semicircular in appearance and just reaching the posterior intra-alar setae) anterior supra-alar and prescutellar setae were present. Scutellum entirely yellow with narrow black basal band and two apical scutellar setae. Legs generally yellow with dark fuscous hind tibiae. Wings hyaline with a discontinuous costal band present only in cell sc and as an apical spot at the end of vein R_{4+5} covering half of apical margin of cell r_{2+3} and r_{4+5} . Abdomen orange brown with dark terga 4 and 5, reddish brown spots on tergum 5 Male pecten on third abdominal tergum.

Bactrocera cucurbitae (Coquillet)

Adults are orange brown in colour. Face yellow with oval spots on antennal furrow. Scutum orange brown with yellow medial and lateral yellow stripes, medial vitta pear shaped, pointed anteriorly, broadly rounded posteriorly and ending well before prescutellar setae, lateral vittae broad, parallel sided up to posterior intra alar setae, supra-alar setae present anteriorly. Wing pattern with costal band from cell sc to wing apex, apically broadened into a large apical wing spot, anal streak prominent and extending up to hind margin and a prominent brown infuscation on the cross vein $dm-cu$ and a slight infuscation along cross vein $r-m$. Abdomen with a yellow band at posterior margin of tergum 2, black band at anterior margin of tergum 3, a medium black band on terga 3-5.

***Bactrocera correcta* (Bezzi)**

Adults are small sized, face fulvous having transverse marking on antennal furrow towards the lower facial margin. Scutum predominantly black with anterior supra-alar setae, two yellow post sutural vittae ending beyond intra-alar setae, prescutellar setae present. Scutellum predominantly yellowish with a narrow black basal band and pair of setae in the apex. Legs fulvous, hind tibiae with a keel like process on poster dorsal surface near surface closer to apex. Wing pattern reduced, costal band discontinuous breaking at cell r_{2+3} costal band from cell Sc to r_1 , continuous with R_{2+3} and broken in cell, leaving an apical dark spot in cells r_{2+3} and r_{4+5} , cubital streak contained within cell cup, base of the cell without any microtrichia. Abdomen dark brown, a medial longitudinal band on terga 3-5. Male pecten on third abdominal tergum.

***Bactrocera tau* (Walker)**

Large, orange brown to yellow species. Face with large oval spots in antenna furrows. Frons fulvous with three pairs of frontal and one pair of orbital setae. Scutum brown, and marked with black medial line from front which continues as the medial post sutural yellow vittae ending before or at a line across prescutellar setae; post sutural yellow vittae parallel sided and slightly curved and extending beyond posterior intra-alar setae; posterior supra-alar and prescutellar bristles present. Scutellum yellow with a narrow black basal band and 4 scutellar setae. Legs with fore and middle femora having

a lateral sub-apical spot. Wings with a clear costal band from cell sc to wing apex, confluent with R_{1+3} and expanded apically into a large apical spot. Abdomen with black tergum, broad basal band in terga 2 and 3. Pecten on third abdominal tergum of males.

REFERENCES

- Anonymous, 2014. NHB, Indian Horticulture Database published by National Horticulture Board, New Delhi, pp 95-96.
- Anonymous, 2015a. Area, production and productivity of mango in India. *Indian Horticulture Database*, pp 12-13.
- Anonymous, 2015b. The fruit king is back, almost. *Hindu business line*. pp 17-18.
- Kapoor, V. C., 1970. Indian Tephritidae with their recorded hosts. *Oriental Ins.*, **4**(2): 220-241.
- Mulik Deepa, 2004. Studies on species composition of fruit flies in south Konkan region. M.Sc. (Agri) thesis submitted to Konkan Krishi Vidyapeeth, Dapoli (India). pp 18-48.
- Singh, S. P., 1997. Fruit flies and management. *Indian Horticulture*, **42**(1): 35-37.
- White, I. M. and Harris, E., 1992. Fruit flies of economic significance: their identification and bionomics. CAB international Walling ford U.K. pp. 601.

Received: 02.08.2017

Accepted: 21.12.2017