Journal of Pharmacognosy and Phytochemistry
Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2017; 6(4): 870-872
Received: 12-05-2017
Accepted: 13-06-2017

Shivbhagvan
Department of Entomology, College of Agriculture S.K. Rajasthan Agricultural University, Bikaner Rajasthan, India

VS Acharya
Department of Entomology, College of Agriculture S.K. Rajasthan Agricultural University, Bikaner Rajasthan, India

Raj Kumar Meena
Department of Entomology, College of Agriculture S.K. Rajasthan Agricultural University, Bikaner Rajasthan, India

Correspondence
Shivbhagvan
Department of Entomology, College of Agriculture S.K. Rajasthan Agricultural University, Bikaner Rajasthan, India

Role of physical characters to responsible for infestation of Ber fruit fly, *C. vesuviana*

Shivbhagvan, VS Acharya and Raj Kumar Meena

Abstract
The experiment was carried out at SKRAU, Bikaner (Raj.) in the year 2015-16. According to physical characters the highest per cent infestation of fruit fly on number basis and weight basis was recorded in the 7th SMW (45.33%) followed by 6th SMW (46.66%) and 02nd SMW (52.49%) followed by 01st SMW(49.78%) respectively. The lowest per cent infestation was recorded in the 46th & 47th SMW (5.33 %) followed by 48th SMW (6.66%) on number basis and 46th SMW (6.37%) followed by 47th SMW (6.92%) on weight basis respectively.

Keywords: *Carpomyia vesuviana*, infestation, physical, responsible, highest, lowest, SMW (Standard Meteorological Week)

1. Introduction
The ber (*Ziziphus mauritiana*) is an important fruit crop for arid and semi-arid regions in tropical and sub-tropical regions. It belongs to the family Rhamnaceae. It is mainly grown in India and other countries in central Asia, China and Taiwan. It is more associated with the Indian culture since ancient times. It is cultivated widely for its resistance to grow in drought and other diversified soil and climatic conditions. Its origin is in India. It is a hardy tree that copes with extremes temperature and thrives under rather dry conditions. Fruit quality is best under hot, sunny and dry conditions, but there should be a rainy season to support growth and flowering, leaving enough soil moisture to carry the fruit to maturity. Commercial cultivation usually extends up to 1000 m above sea level. It is known for its ability to withstand adverse conditions, such as salinity, drought and water logging. It has also been mentioned in holy books like Ramayana and Mahabharata. In view of the recent development in production technology of this crop, the cultivation of ber crop is becoming increasing popular in many parts of India. It is an ideal fruit tree for arid and semi-arid regions of the country. It is being cultivated in the state of Rajasthan, Haryana, U.P., Gujarat, M.P., Bihar, Maharashtra, A.P. and T.N. It occupied an area of 8.7 Lac ha with an annual production of 8.9 Lac tones in India (Anonymous 2013-14) [1].

It is a spiny evergreen shrub or tree up to 15m high, with trunk 40 cm or more in diameter, spreading crown, stipule spines and many drooping branches. The leaves are about 2.5 to 3.2 cm long and 1.8 to 3.8cm wide having fine tooth at margin. The flowers are pale white pentamarous. It is a cross pollinated crop. The fruit is berry with single stone. The shape of the fruit may vary from round to oblong, ovate, oval with skin smooth or rough, glossy, thin but tough. Fruits are first green turning yellow as they ripen. The fully mature fruit is entirely red, soft juicy with wrinkled skin and has pleasant aroma. Weight of the fruit varies from 20 to 50g. Although, the Ber is called as poor man's fruit, it is nutritious and delicious and is usually eaten fresh. Chattopadhyay (2007) [2] reported that fruit contain 80-100 mg of ascorbic acid per 100g of pulp, 5.4-10.5g of sugar with TSS of 12-18º brix, protein (0.8 g), energy (24.76 KJ), carbohydrate (17g), thiamine (Vit.B1) (0.02-0.024 mg), riboflavin(Vit.B2) (0.02-0.038 mg), niacin (Vit.B3)(0.7-0.873 mg), calcium (25.6 mg), iron (0.76-1.8 mg), phosphorus (26.8mg). Fruits are also eaten dried, candied. It can be processed to prepare murabba, pulps, jam and beverage. Besides fruit, different parts of plant like root, bark, leaves, flowers, seeds etc. are used in ayurvedic and yunani medicines for treatment of diarrhoea, ulcer, billousness, indigestion, cough, headache, bleeding of gums, asthma etc. It is also blood purifier and appetizer.

Materials and Methods
The present investigation was conducted at the Precision Farming Development Centre (PFDC), Agriculture Research Station, Beechwal, SKRAU, Bikaner, Rajasthan.

The field experiments were conducted during ber season 2015-16. All the ber trees in the orchard were 5 years old and in good bearing condition.

The observations of ber fruit fly infestation physical characters of fruit (length, diameter, weight, colour, shape etc.) were recorded at weekly intervals after the fruit set and continue up to the last picking. Three plants selected randomly and kept under natural infestation. Each plant was considered as one replication. From each ber plant a total of fifty fruits were plucked randomly from different direction at almost similar height of plant and these fruits were taken to the laboratory in separate polythene bags for further studies. The number and weight of infested and healthy fruits were observed and recorded. A fruit was considered infested by presence of external characters such as oviposition punctures on fruit surrounded by small circular area, deformity of fruit shape and larval exit hole. The fruits were cut open to see the infestation of fruits. The percentage of infestation was recorded both on number and weight basis. The length and diameter of fruit was measured by using Vernier caliper in centimeter. The weight of fruits was taken on a physical balance in gram. The color and shape of fruits were also observed and compared with infestation of fruits.

Result and Discussion

To determine the role of physical characters responsible for infestation of Ber fruit fly *C. vesuviana viz.* Fruit size, fruit weight, fruit shape and colour have been studied and results obtained are present below:

Fruit size

The data presented in the table 4.4 indicated that the length and diameter of the fruit in the month of October and first week of November was 1.85 cm and 1.30 cm, respectively. At the time of infestation of fruits by fruit fly started in the third week of November the fruit length was 2.25 cm and diameter was 1.50 cm. further the fruit length and diameter was increased gradually and at the time of peak infestation of fruit fly on weight basis the length and diameter of fruit was 2.80 cm and 2.60 cm, respectively however on number basis the peak was observed in the month of February the length and diameter of fruits were 3.28 and 3.10 cm respectively.

At the time of initial infestation, fruit length was measured 2.25 cm and the fruit diameter of 1.50 cm was recorded, which was in the third week on November. However, at the time of last picking in the first week of March, an average maximum length and diameter was recorded 3.55 and 3.15 cm, respectively. The size of fruit at the time of peak infestation was on average 3.28 cm in length and 3.10 cm in diameter. The present results are in close agreement with the findings of Lakra and Singh (1983) [3] who had reported that the fruit size bigger than 9.0 mm in length and 4.5 mm in diameter was preferred for oviposition by females of fruit fly. Chauhan and Yadav (2000) [4] mentioned that the fruit fly infestation increased with the maturity of fruits.

Fruit weight

It was evident from table 4.4 that the average weight of fifty fruits was168.85g in the 46th standard week i.e. third week of November when infestation of fruit fly started. The weight of fruits increased gradually as the fruits become mature. At the time of peak infestation on number basis recorded in the 7th standard week i.e. second week of February, the average weight of fifty fruit was 730.36 g, however peak infestation on weight basis observed in the 2nd standard week *i.e.* second week of January the weight of fifty fruits was 420.20g. The fruit weight at the time of last picking in the month of March was 663.60g (Table 4.4).

During the present investigation when infestation started in third week of November, an average weight of 50 fruits was 168.85 gram. At the time of peak infestation, an average weight of 50 fruits was 730.36 gram. Fruit weight and size are directly correlated to each other and incidence of the fruit fly as well.

Fruit shape and color

The shape of the fruit before infestation was found to have slightly oval and dark green in color thereafter color changed to green at the time of initial infestation in the third week of November. The fruit shape did not change till ripening. Color of fully ripe fruit was greenish yellow and yellowish green, which was observed from first fortnight of February to March (Table 4.4).

The shape of fruit was observed to be round in the experiment. The colour of young fruits was dark green. In the third week of November, the colour of fruits was become green and fruits were matured. Then the fruits started to ripe in the second week of January and the colour of fruits were observed to be light green. The colour of fully ripe fruit was yellowish green and it was found from first week of February till the first week of March.

Table 1: Physical characters of ber fruits and their relation to infestation of *C. vesuviana* Costa

S.M.W.	Duration		Fruit length (cm)	Fruit diameter (cm)	Fruit weight g/50 fruits	Fruit colour	Fruit shape	%infested fruits (no. basis)	%infested fruits (wt. basis)
	From	To							
44	29.10.2015	04.11.2015	1.85	1.30	118.50	Dark green	Round	0.00	0.00
45	05.11.2015	11.11.2015	2.05	1.40	136.50	Green	Round	0.00	0.00
46	12.11.2015	18.11.2015	2.25	1.50	168.85	Green	Round	5.33	6.37
47	19.11.2015	25.11.2015	2.30	1.72	207.16	Green	Round	5.33	6.92
48	26.11.2015	02.12.2015	2.42	1.81	248.66	Green	Round	6.66	9.07
49	03.12.2015	09.12.2015	2.52	2.10	262.25	Green	Round	10.00	18.35
50	10.12.2015	16.12.2015	2.56	2.16	276.73	Green	Round	14.00	22.00
51	17.12.2015	23.12.2015	2.62	2.22	287.09	Green	Round	19.33	27.96
52	24.12.2015	31.12.2015	2.65	2.28	332.41	Green	Round	24.00	43.78
01	01.01.2016	07.01.2016	2.70	2.32	287.16	Green	Round	30.00	49.78
02	08.01.2016	14.01.2016	2.76	2.45	420.20	Light green	Round	34.00	52.49
03	15.01.2016	21.01.2016	2.80	2.60	433.65	Light green	Round	38.66	48.65
04	22.01.2016	28.01.2106	2.92	2.72	503.91	Light green	Round	42.00	44.82
05	29.01.2106	04.02.2016	3.05	2.92	547.08	Light green	Round	44.00	44.73
06	05.02.2016	11.02.2016	3.15	3.08	683.85	Yellow green	Round	45.33	44.67
07	12.02.2016	18.02.2016	3.28	3.10	730.36	Yellow green	Round	46.66	44.51

08	19.02.2016	25.02.2016	3.42	3.14	730.28	Yellow green	Round	44.66	44.12
09	26.02.2016	03.03.2016	3.50	3.15	708.78	Yellow green	Round	42.66	43.48
10	04.03.2016	10.03.216	3.55	3.15	663.60	Yellow green	Round	42.00	40.71

References

1. Anonymous. Indian Horticulture Database National Horticultural Board, 2013-14.
2. Chattopadhyay TK. A text book on Pomology (Subtropical fruits) Vol Ø. Published by Kalayani Publishers, Ludhiana, 2007.
3. Lakra RK, Singh, Zile. Oviposition behavior of ber fruit fly, *Carpomyia vesuviana* Costa and relationship between its incidence and ruggedness of fruits in Haryana, Indian Journal of Entomology. 1983; 45(1):46-59.
4. Chauhan R, Yadav JL. Incidence of fruit fly on wild and cultivated species of ber. Indian Journal of Applied Zoological Research. 2000; 11(2):90-92.