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SCREENING OF BOTTLE GOURD GENOTYPES AGAINST FRUIT FLIES *BACTROCERA CUCURBITAE* (COQUILLETT)

D S Meena*, V S Acharya, K Mehra, V S Rajput and A K Yadav[1]

Department of Entomology, College of Agriculture,
Swami Keshwanand Rajasthan Agriculture University, Bikaner 334006, Rajasthan, India
[1]Department of Entomology, College of Agriculture, Maharana Pratap University of Agriculture and Technology, Udaipur 313001 Rajasthan, India
*Email: dmdaya0007@gmail.com (corresponding author)

ABSTRACT

The present study with bottle gourd in the zaid season in open field, assessed the infestation of fruit fly *Bactrocera cucurbitae* (Coquillet). The infestation was observed from third week of May, with the peak being in the first week of June. Five varieties and three genotypes were screened and none exhibiting resistance. The incidence assessed by fruit number and weight basis revealed that variety PSPL (28.07and 23.34) and Narendra rashmi (30.32 and 25.14) were least susceptible; Pusa Naveen (34.80 and 30.48), Pant louki -3 (35.85 and 32.03), Thar smridhi (33.66 and 27.68), DBG -5(36.74 and 33.53) and DBG-6 (37.87 and 34.90) were moderately susceptible; while, DBG -10 (39.06 and 36.18) was susceptible.

Key words: Bottle gourd, genotypes, *Bactrocera cucurbitae*, resistance, susceptible, least susceptible, moderately susceptible, germplasm, PSPL, screening

Bottle gourd *Lagenaria siceraria* (Mol.) belongs to the family Cucurbitaceae. Pests like melon fruit fly *Bactrocera cucurbitae* (Coquillett), red pumpkin beetle, *Raphidopalpa foveicollis* (Lucas), hadda beetle *Epilachna dermurili (*Mulsant), jassid *Amrasca biguttula biguttula* (Ishida) and whitefly *Bemisia tabaci (*Gennadius) etc. are its important pests. Of these, *B. cucurbitae* causes serious damage to bottle gourd and losses are serious (Vayssieres and Carel, 1999; Dhillon et al., 2005). Of the 207 species of fruit flies found in India, nine are major and economically important (Sardana et al., 2005). *Bactrocera cucurbitae* and *Bactrocera tau* (Walker), commonly called as melon fruit flies are the two major species. Pesticide use against these leads to residues in fruits, and use of fumigants etc., cause serious problems. It is necessary to find out ecofriendly alternatives in IPM, and host plant resistance can be considered. Screening of genotypes for resistance to fruit fly species, and success in developing high yielding and fruit fly-resistant varieties has been limited (Am et al., 2017). The present study evaluates the incidence of *B. curcurbitae* in bottle gourd during the zaid season (March- June) and explores the resistance, if any in varieties suitable for growing in zaid season.

MATERIALS AND METHODS

The experiment was conducted in simple randomized block design in which five varieties and three genotypes were replicated thrice, with seeds sown on 8th March, 2017 and 13th March, 2018, keeping row to row and plant to plant distance of 2.5 m and 0.75 m, respectively. The extent of damage of fruit fly was estimated on the basis of % fruit infestation, observed on weight and number basis, with picking of fruits done at three days interval. Infested and healthy fruits were weighed and counted separately, and % damage worked out by the following formula (Preetha and Nadarajan, 2006).The evaluated varieties/ genotypes were categorized using standard formula (Panda, 1979).

RESULTS AND DISCUSSION

The incidence of *B. cucurbitae* in five varieties and three genotypes of bottle gourd viz., PSPL (Pusa Summer Prolific Long), Pant lauki-3, Pusa Naveen, Narendra rashmi, Thar Samridhi and genotypes DBG-5 (Durgapura bottle gourd), DBG-6, DBG-10 was evaluated during summer 2017 and 2018. The maximum infestation was observed on DBG-10 (23.05 % on number and 22.72 % on weight basis) followed by DBG-6 (22.38 % on number and 21.15 % on weight basis). The minimum fruit damage (14.23 % on number and 14.77 % on weight basis) was recorded on variety PSPL. The incidence reached its peak on 4thJune, with least being with PSPL (46.10% on number and 29.17% on weight basis) followed by Narendra Rashmi (47.96% on number and 31.72% on weight basis), both differing

Table 1. Infestation of fruit fly, *B. cucurbitae* on different varieties/genotypes of bottle gourd, (Pooled) (number basis)

S. No.	Varieties/ genotype	% infestation of fruits at different picking (three days interval)															
		Number of picking															
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13tn	14tn	15tn	Mean
1.	PSPL	14.80	17.72	22.12	27.60	33.63	40.39	46.10	38.65	35.33	30.35	29.12	25.42	22.17	20.03	17.67	28.07
		(22.63)	(24.90)	(28.06)	(31.70)	(35.44)	(39.46)	(42.76)	(38.44)	(36.47)	(33.43)	(32.66)	(30.28)	(28.09)	(26.59)	(24.86)	(31.71)
2.	Pant Lauki-3	21.12	25.52	28.09	34.67	42.00	47.19	51.70	47.54	41.98	39.37	36.95	34.35	32.11	29.58	25.68	35.85
		(27.36)	(30.35)	(32.01)	(36.08)	(40.40)	(43.39)	(45.97)	(43.59)	(40.39)	(38.87)	(37.44)	(35.88)	(34.52)	(32.95)	(30.45)	(36.64)
3.	Pusa Naveen	19.97	23.57	26.82	33.74	41.15	46.06	50.42	46.66	41.10	38.49	36.29	33.16	31.11	28.44	25.07	34.80
		(26.54)	(29.05)	(31.19)	(35.51)	(39.90)	(42.27)	(45.24)	(43.09)	(39.88)	(38.35)	(37.04)	(35.16)	(33.90)	(32.23)	(30.05)	(35.96)
4.	DBG-5	21.40	26.64	29.81	36.44	42.42	48.27	52.54	48.74	43.09	40.26	36.52	35.08	32.78	30.28	26.97	36.74
		(27.56)	(31.08)	(33.09)	(37.14)	(40.64)	(44.01)	(46.46)	(44.28)	(41.03)	(39.38)	(37.18)	(36.32)	(34.93)	(33.39)	(31.29)	(37.18)
5.	Narendra Rashmi	15.99	19.11	24.10	30.34	36.85	41.49	46.97	41.27	37.75	33.64	29.70	28.34	26.66	23.47	19.21	30.32
		(23.53)	(25.93)	(29.40)	(33.43)	(37.38)	(40.10)	(43.26)	(39.98)	(37.91)	(35.45)	(33.02)	(32.16)	(31.09)	(28.98)	(26.00)	(33.17)
6.	DBG-10	23.37	27.90	31.65	38.35	44.03	51.35	55.61	51.48	45.45	42.37	39.77	37.32	34.85	33.41	29.06	39.06
		(28.91)	(31.89)	(34.24)	(38.26)	(41.57)	(45.78)	(48.22)	(45.85)	(42.39)	(40.61)	(39.10)	(37.65)	(36.18)	(25.31)	(32.62)	(37.90)
7.	DBG-6	23.00	27.06	30.57	37.54	43.44	49.34	54.55	49.71	44.05	41.25	38.75	35.97	33.35	31.22	28.37	37.87
		(28.66)	(31.35)	(33.57)	(37.78)	(41.23)	(44.62)	(47.61)	(44.83)	(41.58)	(39.96)	(38.50)	(36.85)	(35.27)	(33.97)	(31.19)	(37.79)
8.	Thar Samridhi	20.04	22.41	26.54	32.49	40.14	44.45	47.79	43.67	40.50	37.74	35.37	32.29	29.96	27.28	24.31	33.66
		(26.60)	(28.25)	(31.01)	(34.75)	(39.31)	(41.82)	(43.73)	(41.37)	(39.53)	(37.91)	(36.50)	(34.63)	(33.19)	(31.49)	(29.54)	(35.30)
	S.Em±	0.30	0.79	0.59	0.44	0.55	0.53	0.52	0.40	0.34	0.58	0.59	0.40	0.40	0.50	0.60	0.50
	CD at (P=0.05)	0.91	2.39	1.79	1.33	1.69	1.61	1.59	1.22	1.05	1.75	1.79	1.22	1.23	1.51	1.83	1.52

S. No.	Varieties/ genotype	Per cent infestation of fruits at different picking (three days interval)															
		Number of picking															
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13tn	14tn	15tn	Mean
1.	PSPL	15.56	15.88	17.32	21.88	24.80	26.66	32.75	29.31	29.16	27.86	26.35	26.00	23.49	19.55	13.65	23.34
		(23.23)	(23.48)	(24.60)	(27.89)	(29.86)	(31.08)	(34.91)	(32.78)	(32.68)	(31.86)	(30.89)	(30.66)	(28.99)	(26.24)	(21.68)	(28.72)
2.	Pant Lauki-3	19.91	20.90	24.66	30.94	31.87	32.52	45.50	41.29	40.21	38.11	35.99	35.56	34.49	28.97	19.58	32.03
		(26.50)	(27.21)	(29.78)	(33.80)	(34.37)	(34.76)	(42.42)	(39.98)	(39.35)	(38.12)	(36.87)	(36.61)	(35.96)	(32.57)	(26.27)	(34.30)
3.	Pusa Naveen	18.80	19.80	22.91	30.08	30.84	31.13	44.86	40.49	38.91	36.92	33.89	32.78	32.06	24.88	18.92	30.48
		(25.70)	(26.42)	(28.60)	(33.26)	(33.73)	(33.91)	(42.05)	(39.52)	(38.60)	(37.42)	(35.57)	(34.93)	(34.49)	(29.92)	(25.78)	(33.32)
4.	DBG-5	20.76	21.93	25.39	31.44	32.54	33.79	46.38	43.56	41.02	39.53	38.00	37.18	36.15	32.14	23.17	33.53
		(27.11)	(27.92)	(30.26)	(34.11)	(34.78)	(35.54)	(42.92)	(41.30)	(39.83)	(38.96)	(38.06)	(37.57)	(36.96)	(34.54)	(28.77)	(35.24)
5.	Narendra Rashmi	16.48	16.94	19.18	24.36	27.09	29.23	34.37	31.31	30.97	30.60	28.14	26.53	24.79	21.07	16.14	25.14
		(23.95)	(24.30)	(25.98)	(29.57)	(31.36)	(32.73)	(35.90)	(34.03)	(33.82)	(33.59)	(32.04)	(31.01)	(29.86)	(27.33)	(23.69)	(29.94)
6.	DBG-10	23.58	24.13	27.77	33.37	34.81	36.14	46.87	45.76	43.05	40.85	39.83	39.09	38.38	37.31	31.90	36.18
		(29.05)	(29.42)	(31.80)	(35.29)	(36.15)	(36.95)	(43.21)	(42.57)	(41.01)	(39.73)	(39.13)	(39.70)	(38.28)	(37.65)	(34.39)	(36.95)
7.	DBG-6	22.18	23.27	26.28	32.66	33.66	35.14	46.77	45.02	42.29	41.22	39.16	38.50	37.63	33.65	26.17	34.90
		(28.10)	(28.84)	(30.84)	(34.86)	(35.46)	(36.35)	(43.15)	(42.14)	(40.56)	(39.94)	(38.74)	(38.35)	(37.84)	(35.46)	(30.77)	(36.09)
8.	Thar Samridhi	18.06	18.43	23.57	28.12	30.13	31.49	35.98	35.42	35.35	34.16	31.93	29.43	25.52	20.96	16.65	27.68
		(25.15)	(25.43)	(29.04)	(32.03)	(33.29)	(34.13)	(36.86)	(36.52)	(36.48)	(35.77)	(34.41)	(32.82)	(30.35)	(27.25)	(24.08)	(31.57)
	S.Em±	0.35	0.47	0.53	0.50	0.66	0.56	0.69	0.53	0.57	0.65	0.73	0.66	0.60	0.73	0.49	0.58
	CD at (P=0.05)	1.07	1.43	1.60	1.52	1.99	1.69	2.10	1.62	1.75	1.97	2.22	1.99	1.81	2.21	1.50	1.76

significantly. The maximum infestation was recorded on genotype DBG-10 in 2017, with peak being on 2nd June, and the least being with PSPL, which was at par with Narendra Rashmi. Maximum incidence was on cultivar DBG-10, DBG-6 and DBG-5; maximum incidence was in DBG-10 in 2018. The pooled data revealed that no variety/ genotype has resistance for two consecutive seasons, with incidence being at peak in the seventh observation, least being on variety PSPL at par with Narendra Rashmi; and maximum in DBG-10 followed by DBG-6 (Table 1).

Dhillon et al. (2005) screened with 17 bitter gourd genotypes observed significantly least incidence in IC 256185 and IC 248256. Gogi et al. (2009) screened found that the genotypes COL-II and FSD-long can be categorized as resistant. Mallikarjunaro et al. (2020) with 23 genotype of bitter gourd found none as resistant. Nehra et al. (2019) with seven varieties of round gourd observed that varieties with hard rind of fruits were less susceptible. The varieties and genotypes with incidence on number and weight basis <30.80 and 26.01%, respectively can be categorized as less susceptible, between 30.80 to 38.30 and 26.01 to 35.79% as moderately susceptible; and >38.30 and 35.79% as as susceptible. The variety, PSPL and Narendra Rashmi can be considered as less susceptible. Such result were obtained by Dhillon et al. (2005), Gogi et al. (2009) and Mallikarjunoaro et al. (2020). Nehra et al. (2019) observed that the fruits having higher hair density and low softness were less susceptible.

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AUTHOR CONTRIBUTION STATEMENT

Vijay Shankar Acharya has designed the research, Daya Shankar Meena conducted the experiment. Keshav Mehra and Vimal Singh Rajput contributed in the analysis and wrote the manuscript whereas Ajay Kumar Yadav contributed in field and analytical tool.

CONFLICTS OF INTEREST

Authors declare no conflict of interest.

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