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Evaluation of bitter gourd (*Momordica charantia* L.) cultivars against thrips

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Abstract
The present studies were conducted to evaluation of bitter gourd (*Momordica charantia* L.) cultivars against thrips during *rabi-summer* season of 2017-18 at Centre of Excellence for Mango, College of Agriculture, Dapoli, Dist. Ratnagiri (M.S).
During present study, six bitter gourd cultivars were screened against thrips. The population of thrips was started from seedling stage of the crop and there was none of any cultivars found to be free from thrips infestation. The maximum mean population of thrips was recorded in cultivar Kokan Tara with 4.00 ± 0.23 thrips/three leaves/plant, while minimum mean population (3.34 ± 0.23) was recorded in cultivar Phule Green Gold.

Keywords: thrips, bitter gourd cultivars, evaluation, screening

Introduction
Bitter gourd is a tropical and subtropical vine of the family Cucurbitaceae widely grown in Asia, Africa, and the Caribbean for its edible fruits. Its many varieties differ substantially in the shape and bitterness of the fruit. Area under the bitter gourd in India is about 93 ha with an annual production of 1063 MT (Anon., 2018) [1].
Sucking insect pests like aphids, whitefly, thrips and leafhoppers attack on the bitter gourd crop throughout the growth period resulting in the reduction of yields. So management interventions are required to save the yield loss. *Thrips tabaci* Lindeman (Thysanoptera: Thripidae) both the nymphs and adults lacerate the tissue and suck the sap from upper and lower surfaces of leaves, flowers and stem. In heavy thrips infestation, the leaves became slivery due to the formation of white patches or streaks which finally caused scarring and distortion of leaves and cup upward (Janu *et al*., 2017) [3].
Pest Management involves several divergent measures to minimize the losses due to insect pests. Insect resistant varieties form an important component of pest management schedule. Thus resistance is a relative property and can be defined only in comparison to other more susceptible varieties. However, the cultivars/genotypes grown or available in particular region need to be screened. Hence, efforts were made to evaluation of bitter gourd (*Momordica charantia* L.) cultivars against thrips during *rabi-summer* season.

Materials and Methods
To study the response of some promising bitter gourd cultivars against thrips infesting bitter gourd, a field experiment was carried out at Centre of Excellence for Mango, College of Agriculture, Dapoli from February 2018 to May 2018. The details of experiment are given below.

Experimental details

1	**Size of plot**	**:**	**7.5 m^2**
2	Total plot size	:	150 m^2
3	Method of planting	:	On small hills
4	Spacing	:	1.50 m × 0.50 m
5	Cultivars		
I	DPL BG 8	IV	Preethi
II	Phule Green Gold	V	Kokan Tara
III	BA 07	VI	Hirkani

Method of recording observations

All the agronomic practices were followed as per the package of practices except the plant protection measures which was not undertaken throughout the crop season. The observations were recorded as soon as the incidence was noticed.

The observations of thrips infesting bitter gourd were recorded at weekly interval (Standard Meteorological Week) in a crop season. Five plants from each cultivar were selected randomly to record the observations. The number of thrips from top, middle and bottom leaf was recorded for damage of these pests. The observations were recorded at weekly interval till the harvesting of crop and the data were analyzed statistically.

Results and Discussion

Screening of some cultivars against thrips infesting bitter gourd

Data regarding screening of six cultivars of bitter gourd against thrips infesting bitter gourd are presented in Table 1 and depicted in Fig. 1.

The data at 13th SMW revealed that the population of thrips per three leaves per plant was in the range of 5.20 to 7.80. The maximum population was observed on cultivar BA 07 which recorded 7.80 ± 0.95 thrips per three leaves per plant. The population recorded in descending order on other cultivars was DPL BG 8 (6.80), Preethi (6.80), Kokan Tara (6.60) and Phule Green Gold (5.50) while, minimum (5.20 ± 0.95) population was recorded in Hirkani.

The data at 14th SMW revealed that the population of thrips per three leaves per plant was in the range of 3.50 to 5.40. The maximum population was observed on cultivar Phule Greeen Gold which recorded 5.40 ± 0.76 thrips per three leaves per plant. The population recorded in descending order on other cultivars was BA 07 (5.2), Preethi (4.7), Kokan Tara (4.2) and Hirkani (3.8) while, minimum (3.50 ± 0.76) population was recorded in DPL BG 8.

The data at 15th SMW indicated that the population of thrips per three leaves per plant was in the range of 2.70 to 5.00. The maximum population (5.00 ± 0.94) was observed in the cultivar Hirkani. The other cultivars in descending order were Phule Green Gold (4.90), Kokan Tara (4.52), DPL BG 8 (4.20) and Hirkani (3.17). The least population of thrips was recorded in cultivar Preethi (2.70 ± 0.94).

The data at 16th SMW showed the maximum population on the cultivar Kokan Tara which recorded (3.81 ± 0.51) thrips per three leaves per plant, while the remaining cultivars Preethi, DPL BG 8, BA 07 and Hirkani recorded 3.80, 3.40, 3.26 and 3.10 thrips per three leaves per plant, respectively. The minimum (2.45 ± 0.51) population was observed in cultivar Phule Green Gold.

The population of thrips at 17th SMW was in the range of 2.98 to 4.40. The data revealed that maximum population was recorded in cultivar Hirkani (4.40± 0.55) followed by Preethi (3.50), Kokan Tara (3.47), BA 07 (3.00) and DPL BG 8 (3.00). The minimum population was recorded in the cultivar Phule Green Gold (2.98 ± 0.55).

The data at 18th SMW indicated that the population of thrips was in the range of 2.20 to 4.10. The maximum population was observed on cultivar Kokan Tara which recorded 4.10 ± 0.65 thrips per three leaves per plant, while the other cultivars *viz.*, DPL BG 8, Preethi, Hirkani, BA 07, Phule Green Gold recorded 3.80, 3.47, 3.20, 3.20 and 2.20, respectively.

The data at 19th SMW showed that the population was noticed in the range of 2.90 to 3.76 thrips per three leaves per plant. The maximum population was observed in the cultivar DPL BG 8 which recorded 3.76 ± 0.36 thrips per three leaves per plant, while the remaining cultivars Kokan Tara, Phule Green Gold, Hirkani, Preethi recorded 3.60, 3.50, 3.10 and 3.00, respectively. The minimum (2.90 ± 0.36) was noticed on cultivar BA 07.

The data at 20th SMW showed that the population of thrips per three leaves per plant was noticed in the range of 2.50 to 3.70. The maximum population (3.70 ± 0.43) was recorded in the cultivar Kokan Tara followed by Preethi (3.50), BA 07 (3.50), Hirkani (3.30) and DPL BG 8 (3.10). The minimum (2.50) population was noticed on cultivar Phule Green Gold.

The data at 21st SMW revealed that the population of thrips per three leaves per plant was in the range of 2.50 to 3.98. The maximum population was observed on cultivar Kokan Tara which recorded 3.98 ± 0.56 thrips per three leaves per plant. The population recorded in descending order on other cultivars was DPL BG 8 (3.23), Preethi (2.95), BA 07 (2.69) and Hirkani (2.55), while minimum (2.50 ± 0.56) population was recorded in Phule Greeen Gold.

The data at 22nd SMW revealed that the population of thrips per three leaves per plant was in the range of 1.97 to 2.99. The maximum population was observed on cultivar Kokan Tara which recorded 2.99 ± 0.35 thrips per three leaves per plant. The population recorded in descending order on other cultivars was Phule Green Gold (2.53), DPL BG 8 (2.50), BA 07 (2.35) and Preethi (2.19), while minimum (1.97 ± 0.35) population was recorded in Hirkani.

The data at 23rd SMW revealed that the population of thrips per three leaves per plant was in the range of 2.00 to 3.35. The maximum population was observed on cultivar BA 07 which recorded 3.35 ± 0.53 thrips per three leaves per plant. The population recorded in descending order on other cultivars was Kokan Tara (3.00), DPL BG 8 (2.54), Phule Green Gold (2.28) and Preethi (2.10), while minimum (2.00 ± 0.53) population was recorded in Hirkani.

The data on overall mean population of thrips indicated that the population was in the range of 3.34 to 4.00. The maximum mean population was recorded in cultivar Kokan Tara with (4.00 ± 0.23) thrips per three leaves per plant. The mean population recorded in remaining cultivars in descending order was BA 07 (3.67), DPL BG 8 (3.62), Preethi (3.52) and Hirkani (3.42), while minimum mean population (3.34 ± 0.23) was recorded in cultivar Phule Green Gold.

The present findings are in more or less conformity with Fayaz and Khan (2015) [2]. They screened four loofah, *Luffa cylindrica* Mill. cultivars, *i.e.* Peshawar local, Chikni (India local), Agro (India hybrid) and Malik sown separately in May, 2014 and replicated three times. Overall mean density of the thrips was significantly higher (1.41 thrips/leaf) on Peshawar local and Malik (1.40 thrips/leaf) and lower (1.26 thrips/leaf) on Agro.

Table 1: Mean population of thrips on some cultivars of bitter gourd

Sr. No.	SMW	Mean population of thrips per three leaves per plant											Overall Mean Population
		13	14	15	16	17	18	19	20	21	22	23	
	Cultivars												
1	DPL BG 8	6.80	3.50	4.20	3.40	3.00	3.80	3.76	3.10	3.23	2.50	2.54	3.62
2	Preethi	6.80	4.70	2.70	3.80	3.50	3.47	3.00	3.50	2.95	2.19	2.10	3.52
3	Phule Green Gold	5.50	5.40	4.90	2.45	2.98	2.20	3.50	2.50	2.50	2.53	2.28	3.34
4	Kokan Tara	6.60	4.20	4.52	3.81	3.47	4.10	3.60	3.70	3.98	2.99	3.00	4.00
5	BA 07	7.80	5.20	3.17	3.26	3.00	3.20	2.90	3.50	2.69	2.35	3.35	3.67
6	Hirkani	5.20	3.80	5.00	3.10	4.40	3.20	3.10	3.30	2.55	1.97	2.00	3.42
	SD (±)	0.95	0.76	0.94	0.51	0.55	0.65	0.36	0.43	0.56	0.35	0.53	0.23

SMW: Standard Meteorological Week

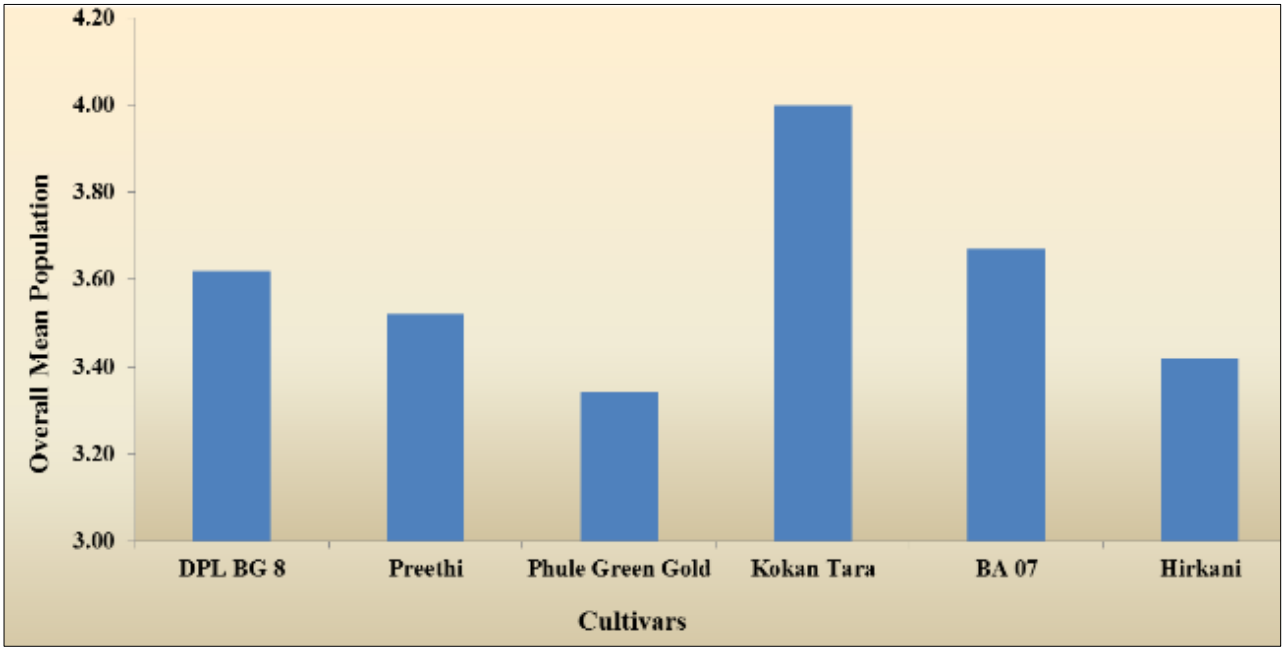

Fig 1: Screening of some cultivars of bitter gourd against thrips

Conclusion

During present study, the population of thrips was started from seedling stage of the crop and there was none of any cultivars found to be free from thrips infestation. The maximum mean population of thrips was recorded in cultivar Kokan Tara while, minimum mean population was recorded in cultivar Phule Green Gold.

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