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Varietal performance of ridge gourd on the incidence of flea beetle (Coleoptera: Chrysomelidae)

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Abstract

The field study was carried out on the varietal performance of ridge gourd on the incidence of flea beetle (Coleoptera: Chrysomelidae) during *kharif* season of 2017 at Central Experimental Station, Wakawali, Dist. Ratnagiri. During the present investigation, fifteen ridge gourd cultivars were screened against flea beetle infesting ridge gourd. The infestation of flea beetle was started from seedling stage of ridge gourd. The results revealed that the highest mean infestation of flea beetle was recorded in cultivar RG-2 with 9.69 ± 1.69 shot holes/three leaves/plant followed by NRG-9 (7.75) and RGH-1 (7.72). Lowest mean infestation (2.91 ± 1.69) was recorded in cultivar JRGL-13.

Keywords: Varietal performance, screening, flea beetle, ridge gourd

Introduction

In Maharashtra, Konkan region is situated in between the Arabian Sea and the Western Ghats and the climatic conditions of Konkan are warm and humid. Due to moderate climatic and red lateritic soil with high annual rainfall, there is great scope for cultivation of various types of vegetables in different season. In rice based cropping system, one can commercially grow important crops like brinjal, chilli, okra, snake gourd, bitter gourd, ridge gourd, little gourd, yard long bean etc. (Singh, 2014) [4].

Ridge gourd (*Luffa acutangula* L.) is considered to be old species with its native to the tropical Africa and South East Asian region including India. It is widely grown in tropical and subtropical parts of the country. It belongs to family Cucurbitaceae and genus *Luffa*. It is one of the important crops belonging to cucurbits and locally called as *Shiral*, *Dodka* (Marathi), *Turai* (Gujrat) and *Koshataki* (Sanskrit).

Cucurbits are attacked by several pests which affect the quality and quantity of produce adversely. Most of the insect-pests cause damage at any stage of plant growth, but some of them is serious at seedling stage *viz.*, red pumpkin beetle, leaf miner, flea beetle, while fruit fly appears at fruiting stage (Ram *et al.* 2009) [3]. Flea beetles are minor pests but due to favourable climate and it makes loss of the crop. The adult beetles initially attack tender leaves of crop by making number of shot hole injuries, which later on widen significantly during advanced stage of the crop growth. The activity of this pest is start from germination up to growing stage of crop. The grubs are found in soil feeding on root system of crop causing relatively low damage. Due to overall infestation of flea beetle, reduction in vigour of crop, loss of functional leaf area and poor yield of crop have been reported by many farmers and extension agencies working in the area (www.infonet-biovision.org) [5].

Development of varieties resistant to cucurbit pests is an important component for an integrated pest management. The development and cultivation of pests resistant cucurbit cultivars have been limited, because of the lack of adequate information on the genetic variability and sources of resistance in the available genotypes and influence of these sources on the pest multiplication. Therefore, it becomes imperative to identify sources of resistance (Gogi *et al.* 2009) [1]. Therefore keeping in view the above facts, the present investigation was carried out on the varietal performance of ridge gourd on the incidence of flea beetle (Coleoptera: Chrysomelidae).

Materials and Methods

To study the response of some promising ridge gourd cultivars against flea beetle infesting ridge gourd, a field experiment was carried out at Central Experiment Station, Wakawali, from June 2017 to September 2017.

Experimental details

- | | | |
|------------------------|------|-----------------------------|
| 1) Number of cultivars | : | Fifteen |
| 2) Size of the plot | : | 135.00 m ² |
| 3) Spacing | : | 1.50 m × 0.50 m |
| 4) Method of planting | : | On small hills |
| 5) Date of sowing | : | 12 th June, 2017 |
| 6) Cultivars | : | |
| i Konkan Harita | ix | Pusa Nasdar |
| ii JRGH-22 | x | RGH-3 |
| iii Utkal Trupti | xi | MHRG-7 |
| iv NRG-9 | xii | JRGL-13 |
| v JRGH-28 | xiii | Satputiya |
| vi RG-2 | xiv | RGH-1 |
| vii RG-1 | xv | BSS-405 |
| viii KRG-5 | | |

Method of recording observations

All the cultivars were kept unsprayed throughout the crop season. The observations were recorded when incidence was noticed. Five plants from each cultivar were selected randomly and marked permanently to record the observations. The shot holes made by flea beetle were counted from top, middle and bottom leaf of vine for flea beetle damage. The observations were recorded at weekly interval throughout the crop season. The mean infestation of flea beetle was taken and standard deviation was worked out.

Results and Discussion**Screening of some cultivars against flea beetle infesting ridge gourd**

Data regarding screening of cultivars against flea beetle infesting ridge gourd are presented in Table 1 and graphically illustrated in Fig. 1.

The data of 15 days after sowing revealed that the cultivars *viz.*, NRG-9, RGH-3, Konkan Harita, MHRG-7, JRGL-13, Satputiya and JRGH-28 were free from infestation of flea beetle while, in other cultivars the infestation was observed in the range of 0.50 to 2.50 shot holes per three leaves per plant. The highest infestation was observed in cultivar JRGH-22 which recorded 2.50 ± 0.76 shot holes per three leaves per plant while, the remaining cultivars *viz.*, RG-2, Pusa Nasdar, KRG-5, BSS-405, Utkal Trupti, RG-1 and RGH-1 recorded 1.50, 1.50, 1.00, 1.00, 0.50, 0.50 and 0.50 shot hole per three leaves per plant, respectively.

The data at 30 days after sowing indicated that the infestation of flea beetle per three leaves per plant was in the range of 0.25 to 9.00. The maximum infestation was observed in cultivar NRG-9 which recorded 9.00 ± 2.36 shot holes per three leaves per plant. The infestation of flea beetle recorded in descending order in other cultivars was Utkal Trupti (6.25), Satputiya (5.75), Pusa Nasdar (5.00), RGH-1 (4.50), RGH-3 (3.75), KRG-5 (3.25), Konkan Harita (3.25), RG-1 (2.75), MHRG-7 (2.25), BSS-405 (2.25), JRGH-22 (2.25) and RG-2 (1.25). Lowest infestation (0.25 ± 2.36) was recorded in cultivars JRGL-13 and JRGH-28.

The data at 45 days after sowing revealed that the infestation of flea beetle per three leaves per plant was in the range of 3.25 to 24.75. The highest infestation (24.75 ± 5.80) was observed in cultivar RG-2. The other cultivars in descending order were MHRG-7 (15.25), JRGH-22 (11.75), NRG-9 (11.50), KRG-5 (11.25), BSS-405 (10.25), RGH-1 (7.50), Pusa Nasdar (7.25), RGH-3 (6.00), RG-1 (5.75), Konkan Harita (4.25), JRGL-13 (4.00), Utkal Trupti (3.50) and JRGH-28 (3.50). The least infestation of flea beetle was recorded in

cultivar Satputiya (3.25 ± 5.80).

The data at 60 days after sowing revealed that the infestation of flea beetle shot holes per three leaves were in the range of 1.50 to 17.00. The maximum infestation was observed on cultivar Satputiya which recorded 17.00 ± 4.22 shot holes per three leaves per plant while, the remaining cultivars in descending order were RGH-1 (13.50), RG-2 (12.00), Konkan Harita (10.25), JRGL-13 (8.00), KRG-5 (6.75), Pusa Nasdar (6.75), RGH-3 (6.75), MHRG-7 (5.50), BSS-405 (5.50), JRGH-22 (5.25), NRG-9 (5.00), Utkal Trupti (4.75), and RG-1 (2.00). The lowest infestation (1.50 ± 4.22) was recorded in cultivar JRGH-28.

The infestation of flea beetle at 75 days after sowing was in the range of 1.50 to 13.00. The data revealed that maximum infestation was recorded in cultivar KRG-5 (13.00 ± 3.43) followed by RG-2 (12.00), Utkal Trupti (9.50), Pusa Nasdar (7.75), Konkan Harita (6.75), NRG-9 (6.50), RGH-1 (6.25), JRGH-22 (6.25), RGH-3 (5.00), JRGH-28 (5.00), RG-1 (4.25), Satputiya (3.50), MHRG-7 (2.00) and BSS-405 (2.00). The lowest infestation was recorded in cultivar JRGL-13 (1.50 ± 3.43).

The data at 90 days after sowing indicated that the infestation of flea beetle was in the range of 5.00 to 15.25. The maximum infestation was noticed in cultivar RGH-3 which recorded 15.25 ± 2.65 shot holes per three leaves per plant. The other cultivars in descending order were *viz.*, RGH-1, BSS-405, Satputiya, Konkan Harita, NRG-9, RG-2, Utkal Trupti, RG-1, Pusa Nasdar, JRGH-22, KRG-5, MHRG-7 and RGH-28 which recorded 12.25, 11.75, 10.75, 10.25, 10.00, 9.75, 9.50, 8.00, 8.00, 8.00, 7.00, 6.50 and 6.50 shot holes, respectively. The least infestation (5.00 ± 2.65) was recorded in cultivar JRGL-13.

The data at 105 days after sowing showed that the infestation of flea beetle was in the range of 2.00 to 15.00. The maximum infestation was noticed in cultivar Konkan Harita which recorded 15.00 ± 3.53 shot holes per three leaves per plant. The other cultivars *viz.*, RGH-3, RGH-1, JRGH-28, KRG-5, RG-1, Pusa Nasdar, Satputiya, BSS-405, NRG-9, RG-2, Utkal Trupti, JRGH-22 and MHRG-7 recorded 13.75, 12.25, 11.50, 10.50, 9.75, 9.25, 9.25, 9.25, 9.00, 8.25, 8.00, 7.00, 2.50, shot holes, respectively. The least infestation (2.00 ± 3.53) was recorded in cultivar JRGL-13.

The data at 120 days after sowing revealed that the infestation of flea beetle shot holes per three leaves was in the range of 1.00 to 12.00. The maximum infestation was observed on cultivar MHRG-7 which recorded 12.00 ± 3.41 shot holes per three leaves per plant while, the remaining cultivars in descending order were NRG-9 (11.00), RG-2 (8.00), RGH-1 (5.00), RGH-3 (4.25), Pusa Nasdar (4.00), Konkan Harita (3.50), Satputiya (3.50), KRG-5 (2.75), JRGL-13 (2.50), RG-1 (2.00), BSS-405 (2.00) and JRGH-22 (2.00). The lowest infestation (1.00 ± 3.41) was recorded in cultivars Utkal Trupti and JRGH-22.

The data on the overall mean infestation of flea beetle indicated that the infestation was in the range of 2.91 to 9.69. The highest mean infestation was recorded in cultivar RG-2 (9.69 ± 1.69) shot holes/three leaves/plant). The mean infestation recorded in remaining cultivars in descending order was NRG-9 (7.75), RGH-1 (7.72), KRG-5 (6.94), RGH-3 (6.84), Konkan Harita (6.66), Satputiya (6.63), Pusa Nasdar (6.19), MHRG-7 (5.75), BSS-405 (5.50), JRGH-22 (5.50), Utkal Trupti (5.38), RG-1 (4.38) and JRGH-28 (3.78). Lowest mean infestation (2.91 ± 1.69) was recorded in cultivar JRGL-13.

The present findings are in conformity with Islam *et al.* (2015) [2]. They conducted the experiment to screen seven promising cultivars of cucumber against flea beetle indicated

that all cultivars under test were found relatively more or less susceptible to flea beetle. The mean infestation was recorded in the range of 0.62 to 10.85.

Table 1: Mean infestation of flea beetle on some cultivars of ridge gourd

Cultivars	15 DAS*	30 DAS	45 DAS	60 DAS	75 DAS	90 DAS	105 DAS	120 DAS	Overall mean infestation
Utkal Trupti	0.50	6.25	3.50	4.75	9.50	9.50	8.00	1.00	5.38
NRG-9	0.00	9.00	11.50	5.00	6.50	10.00	9.00	11.00	7.75
RG-2	1.50	1.25	24.75	12.00	12.00	9.75	8.25	8.00	9.69
RG-1	0.50	2.75	5.75	2.00	4.25	8.00	9.75	2.00	4.38
KRG-5	1.00	3.25	11.25	6.75	13.00	7.00	10.50	2.75	6.94
Pusa Nasdar	1.50	5.00	7.25	6.75	7.75	8.00	9.25	4.00	6.19
RGH-3	0.00	3.75	6.00	6.75	5.00	15.25	13.75	4.25	6.84
Konkan Harita	0.00	3.25	4.25	10.25	6.75	10.25	15.00	3.50	6.66
MHRG-7	0.00	2.25	15.25	5.50	2.00	6.50	2.50	12.00	5.75
JRGL-13	0.00	0.25	4.00	8.00	1.50	5.00	2.00	2.50	2.91
Satputiya	0.00	5.75	3.25	17.00	3.50	10.75	9.25	3.50	6.63
RGH-1	0.50	4.50	7.50	13.50	6.25	12.25	12.25	5.00	7.72
BSS-405	1.00	2.25	10.25	5.50	2.00	11.75	9.25	2.00	5.50
JRGH-28	0.00	0.25	3.50	1.50	5.00	6.50	11.50	2.00	3.78
JRGH-22	2.50	2.25	11.75	5.25	6.25	8.00	7.00	1.00	5.50
SD	± 0.76	± 2.36	± 5.80	± 4.22	± 3.43	± 2.65	± 3.53	± 3.41	± 1.69

*DAS: Days After Sowing

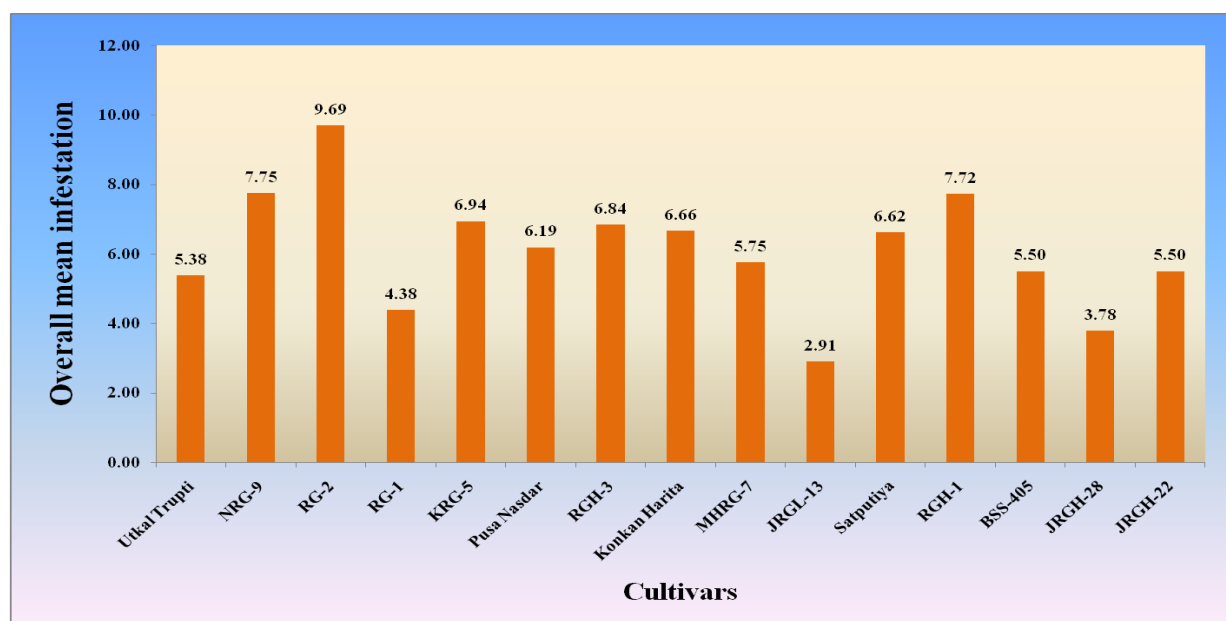


Fig 1: Screening of some cultivars of ridge gourd against flea beetle

Conclusion

During the present study, fifteen ridge gourd cultivars were screened against flea beetle infesting ridge gourd. The infestation of flea beetle was started from seedling stage of ridge gourd. The results revealed that the highest mean infestation of flea beetle was recorded in cultivar RG-2 with 9.69 ± 1.69 shot holes/three leaves/plant followed by NRG-9 (7.75) and RGH-1 (7.72). Lowest mean infestation (2.91 ± 1.69) was recorded in cultivar JRGL-13. There was none of cultivar found to be resistant against flea beetle.

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