



Field efficacy of medicinal plants against *Sitona lineatus* on *Pisum sativum*

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ABSTRACT

Pea leaf weevil is also scientifically known as *Sitona lineatus*. The pest feeds on peas, beans and other plants of family Fabaceae. Adults are approximately 3-5mm in length with coloured scales series in striae on elytra. Fine pointed setae amongst the scales are present at the pronotum and head region. Antennae are preceded by seven segments and are generally clubbed and pointed in appearance. Tibia and tarsi are red coloured whereas the femur appears dark. They hibernate in winter. Breeding occurs in spring. Adults feed on leaf margins making it notch edged whereas larvae feed on root nodules. Yield loss is approx. 30-40%. Although chemical-pesticides protect the yield but they are harmful for the environment. So for the sake of environment, bio-pesticides should be used. The present study has the following extracts that may be used as bio-pesticide, i.e. *Curcuma longa*, *Zingiber officinale* and *Barleria prionitis*. At an interval of 5 days these extracts were used for 3 days for checking their efficacy against *Sitona lineatus*. When results were observed it showed that *Barleria prionitis* was most effective with highest mortality of about 85.74% and *Zingiber officinale* was least effective with only 60.45% of mortality. However *Curcuma longa* showed fewer efficacies than *Barleria prionitis* but was still more effective than *Zingiber officinale* with 72.38% of mortality. Damage % on *Pisum sativum* after application of 1st, 2nd, 3rd and 4th round of *Curcuma longa* was 3.02, 3.45, 3.57 and 3.60 whereas for *Barleria prionitis* it was 2.84, 2.99, 3.07 and 3.15 and as for *Zingiber officinale* it was 3.17, 3.40, 3.85 and 4.26. Percent infestation reduced when *Barleria prionitis* was used.

INTRODUCTION

Leguminous plants are one of the most important plant species for sustaining life on earth as they have symbiotic association with nitrogen fixing bacteria. However some pests like *Sitona lineatus* are most harmful for these plants as their larvae feed on these plants. These pests affect the quantity and quality of the plants and their products. Chemical pesticides are used to deal with these pests but these chemical pesticides are a major stress for the environment, as they develop pest resistance and may kill the non-targeted organisms too. So it's the need of the hour to save these plants with such methods that could be as effective as the chemical pesticide and would be environment friendly too. Bio-pesticides are the best alternative to tackle them. Bio-pesticides are the secondary metabolites that the plants produce for safety against nematodes, viruses, pests etc. These secondary metabolites can be readily used as bio-pesticides.

MATERIAL AND METHOD:

Plant specimens were collected from different parts of Uttar Pradesh (India) on the basis of their insecticidal properties and their availability. The plant material then underwent shed-dry. After that process, ethyl acetate was used to make homogenous spray solution of the following materials.

- **REARING OF PEST:** Eggs of *Sitona lineatus* were collected from CSA University Kanpur U.P. Rearing was done on *Pisum sativum* leaf. Neonate larvae were kept individually in a plastic box with ample amount of *Pisum sativum* leaves as their food. As soon as the larvae turned into the adults they underwent the process of mating by keeping them paired.
- **TREATMENTS:** T1-Curcuma longa, T2-Zingiber officinale and T3-Barleria prionitis T5- Control.
- **PROCEDURE OF TREATMENT APPLICATION:** The homogenous spray solutions were sprayed at the time of first symptom of infestation. Then after that these extracts were sprayed after an interval of 5 days for about four times to see their effectiveness against the pest *Sitona lineatus*.
- **DATA COLLECTION:** Data was collected from the plots that went under treatment after every 5 days.
- **STATISTICAL ANALYSIS:** The correction of the experimental data was done by Abbott's formula and after that the analysis was done using the ANOVA method.

TABLE-1: % damage in *Pisum sativum* after multiple rounds of treatment:

Treatment	After 1 st treatment	After 2 nd treatment	After 3 rd treatment	After 4 th treatment
Curcuma longa	3.02	3.45	3.57	3.60
Zingiber officinale	3.17	3.40	3.85	4.26
Control	8.15	8.83	9.64	11.08

CHART-1: % damage in *Pisum sativum* after multiple rounds of treatment:

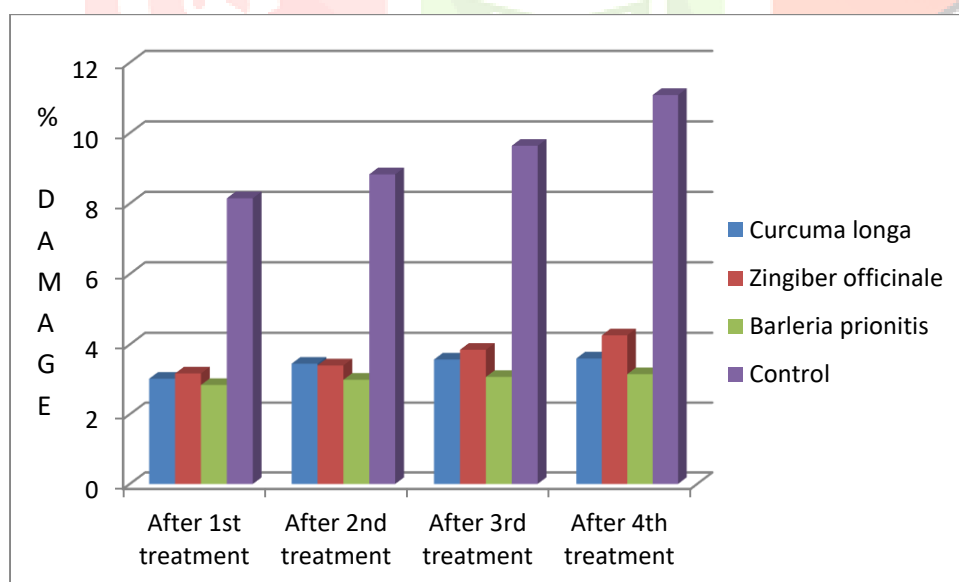
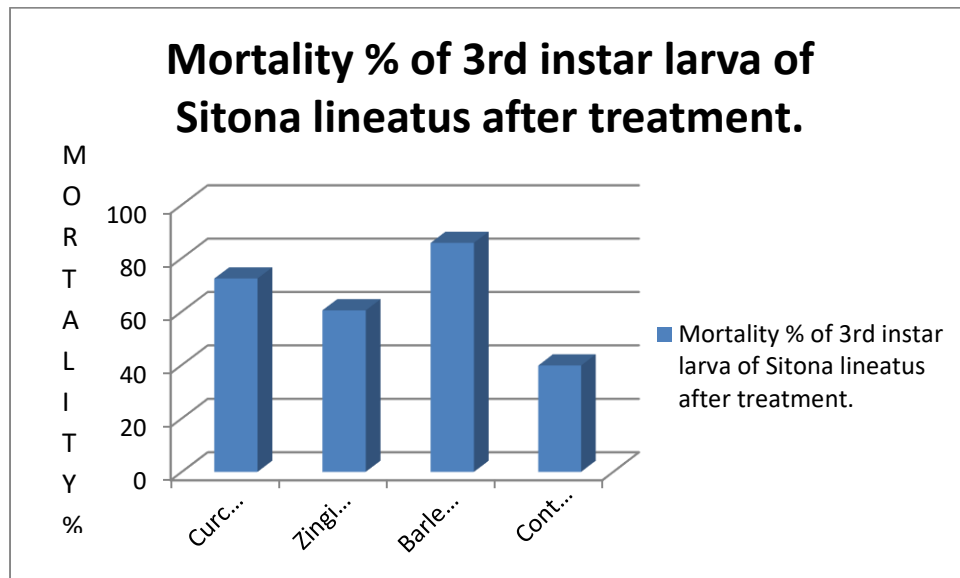


TABLE-2: Mortality % of 3rd instar larva of *Sitona lineatus* after treatment.

Treatment	Mortality % of 3 rd instar larva of <i>Sitona lineatus</i> after treatment.
Curcuma longa	72.38
Zingiber officinale	60.45
Barleria prionitis	85.74
Control	39.81

CHART-2: % of 3rd instar larva of *Sitona lineatus* after treatment.

RESULT AND DISCUSSION: The control of *Sitona lineatus* was done by bio-pesticides, i.e. extracts of *Curcuma longa*, *Zingiber officinale* and *Barleria prionitis*. The results confirmed that *Sitona lineatus* is a serious pest of *Pisum sativum*. The best bio-pesticide screening was done by the comparison of the untreated plot with the treated one. Among the three of them, *Barleria prionitis* was most effective. When results were observed it showed that *Barleria prionitis* was most effective with highest mortality of about 85.74% and *Zingiber officinale* was least effective with only 60.45% of mortality. However *Curcuma longa* showed fewer efficacies than *Barleria prionitis* but was still more effective than *Zingiber officinale* with 72.38% of mortality. Damage % on *Pisum sativum* after application of 1st, 2nd, 3rd and 4th round of *Curcuma longa* was 3.02%, 3.45%, 3.57% and 3.60% whereas for *Barleria prionitis* it was 2.84%, 2.99%, 3.07% and 3.15% and as for *Zingiber officinale* it was 3.17%, 3.40%, 3.85% and 4.26%. Percent infestation reduced when *Barleria prionitis* was used.

CONCLUSION: However all the three botanical extracts performed very well in the experiment but *Sitona lineatus* could be best controlled by *Barleria prionitis*. Bio-pesticides are the sound and effective way control the targeted pest. The best thing about bio-pesticides is that they are environment-friendly.

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