International Journal of Entomology Research
ISSN: 2455-4758
Impact Factor: RJIF 5.24
www.entomologyjournals.com
Volume 3; Issue 1; January 2018; Page No. 89-91

Larvicidal activity of Kasaundi (*Cassia occidentalis*) against fruit borer *Heliothis armigera* and *Spodoptera litura* on tomato

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Abstract
Heliothis armigera and *Spodoptera litura* are two main economically important, plyphagous pests. They feed on wide range of crops. They are major pest of tobacco, tomato, cauliflower, peas, maize, brinjal, groundnut, soya bean and cotton etc. They affected the quantitative and qualitative fruit production in more than 157 plant species. Damage is caused in larval stage. Larva bore deeply in the fruit and caused severe damage. In the present study, efficacy of *Cassia occidentalis* was evaluated in the laboratory against the third instar larva of *Heliothis armigera* and *Spodoptera litura*. Toxicity was assessed with topical application method. Leaf and seed powder of plant get evaluated in this experiment. Extract of *C. occidentalis* used in three different doses i.e. 5gm, 10gm and 15 gm. Results indicated that percentage of larval mortality was directly related to the dose of powder. 15 gm dose of Kasaundi leaf and seed powder was proved to be most effective against both pests. 15 gm dose of treatment caused 76% mortality in *Heliothis armigera* after 20th day of treatment. Similarly, highest larval mortality (77%) in *Spodoptera litura* recoded after 20th day of 15 gm dose treatment.

Keywords: *Heliothis armigera, Spodoptera litura, Cassia occidentalis*, Biopesticide

1. Introduction
Tomato is a warm season crop and thrives well in those regions that are free from frost. During adverse climatic conditions, monetary return from tomato crop is most fluctuating depending on the season of production and ruling market price because of the genetic potential of the germplasm material. Tomato production is greatly influenced by environmental factors and cultural practices [4]. Qualitative and quantitative production of tomato fruit is affected by several pests. *Spodoptera litura* and *Heliothis armigera* are the two main pests causing damage of tomato fruit [6]. *Spodoptera litura* is particularly problematic on vegetables, ornamentals, and leguminous forage crucifers, legumes, millets, deciduous fruit trees [2, 3]. On newly infested hosts, young larvae feed at numerous small feeding points that eventually spread over the entire leaf. Older instars chew large holes or wholly consume leaves, or mine their way into young shoots or bare sections on young stalks, bolls, and buds [1, 8]. *Heliothis armigera* is a polyphagous pest. It attained the status of most serious pest in recent years in terms of economic damage caused to different agricultural crops. *Helicoverpa armigera* is the most destructive pest causing the loss in tomato yield up to 50%-70% [10]. To control these pests several chemical pesticides were in practice. But continuous and indiscriminate use of these pesticides causes adverse effect to the environment. So, there is a need of ecologically safe pesticides. Secondary metabolites of plants play a crucial role in this case [5]. They pose less threat to the environment and to human health. The potential benefits to agriculture and public health programs through the use of biopesticides are considerable. The interest in biopesticides is based on the advantages associated with such products.

2. Material and Method
2.1 Collection of plant material
Leaf and seed of Kasaundi plant collected from the local area. Fresh plant materials were washed through the distilled water thoroughly and dried on blotting paper. All plant materials shed dried under room temperature (25°C). Plant materials were powdered by using grinder. Powder was extracted by soaking in ethyl acetate for 48 hours [9]. Then it filtered by Whattman filter paper no.-1. Solvent get evaporated to air dryness at room temperature to give crude extract.

2.2 Rearing of pest
Larvae of *Spodoptera litura* were collected from the plots and reared in petridish containing castor leaves [7]. Larvae of *S. litura* were reared in groups of 12-15 in containers on castor leaves. Larvae were allowed to pupate in moist and loose soil. Larvae were separated according to sex. Adult moth enclosed in 7-8 days. 10-12 pairs of moths were held for mating and oviposition in cages with 15-20% honey solution as food.

2.3 Application of treatment
Laboratory experiments were set up with *Cassia occidentalis* against both the pest. Laboratory experiment was set up in three replications with one control. Kasaundi leaf and seed powder sprinkled over *Heliothis armigera* and *Spodoptera litura* fed on tomato. Powder was sprayed in 5gm, 10gm and 15gm doses.

2.4 Data collection

Data of larval mortality and adult emergence was recorded after 5th day, 10th day, 15th day, 20th day, 25th day, 30th day, 35th day, 40th day and 45th day after the treatment.

3. Experimental Findings

It is recorded from the data presented in table 1 that 5gm dose of Kasaundi crude extract caused 4%, 13%, 23% and 37% mortality on 10th day, 15th day, 20th day and 25th day respectively after treatment. the effect. In 10gm dose, 16%, 29%, 44% and 54% mortality were recorded after 5 days, 10 days, 15 days and 20 days respectively. After the use of 15 gm dose, 24%, 43%, 58% and 76% mortality were observed on 5th day, 10th day, 15th day and 20th day.

It is observed from the data presented in table 2 that 5 gm dose of treatment on larva of *Spodoptera litura* caused 12% mortality in 10 days, 18% mortality in 15 days, 28% mortality in 20 days and 42% mortality in 25 days. After the application of 10gm dose, 8%, 19%, 26%, 34% and 48% mortality were recorded on 5th day, 10th day,15th day, 20th day, 25th day, respectively. In 15gm dose, mortality was recorded as 30%, 57%, 72% and 77% on 5th day, 10th day, 15th day and 20th day after the application respectively.

Table 1: Effect of Kasaundi Leaf and Seed Powder on Larval Mortality and Emergence of *Heliothis armigera*

Doses		Duration 2017-2018								
		5th day	10th day	15th day	20th day	25th day	30th day	35th day	40th day	45th day
5 gm	M	00%	4%	13%	23%	37%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	00%	00%	00%
10 gm	M	16%	29%	44%	54%	00%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	00%	00%	00%
15 gm	M	24%	43%	58%	76%	00%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	00%	00%	00%
Control	M	00%	00%	00%	00%	00%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	100%	00%	00%

Table 2: Effect of Kasaundi Leaf and Seed Powder on Larval Mortality and Emergence of *Spodoptera litura*

Doses		Duration 2017-2018								
		5th day	10th day	15th day	20th day	25th day	30th day	35th day	40th day	45th day
5 gm	M	00%	12%	18%	28%	42%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	32%	00%	00%
10 gm	M	8%	19%	26%	34%	48%	00%	00%	18%	00%
	E	00%	00%	00%	00%	00%	00%	00%	00%	00%
15 gm	M	30%	57%	72%	77%	00%	00%	00%	00%	00%
	E	00%	20%	00%	00%	00%	00%	00%	00%	00%
Control	M	00%	00%	00%	00%	00%	00%	00%	00%	00%
	E	00%	00%	00%	00%	00%	00%	100%	00%	00%

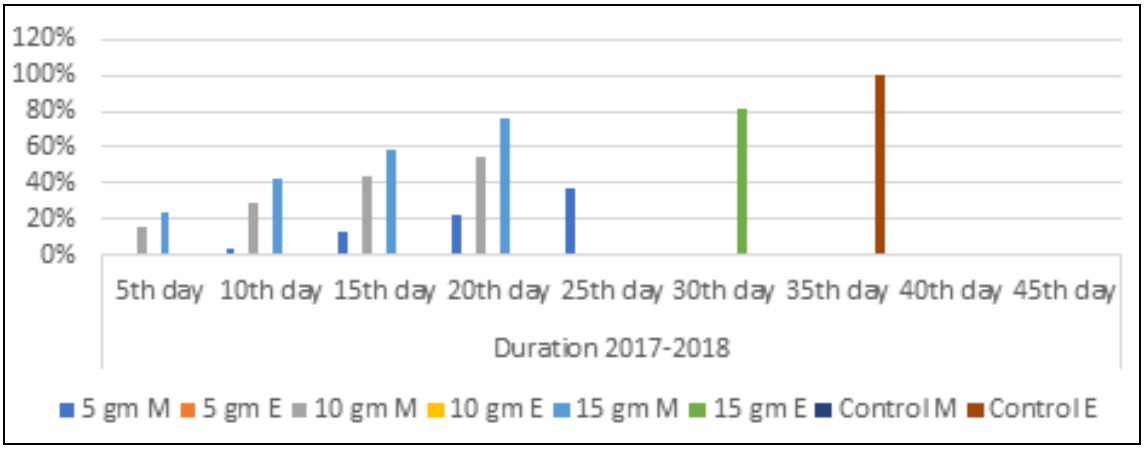

Fig 1: Effect of Kasaundi leaf and seed powder on larval mortality and emergence of *Heliothis armigera*

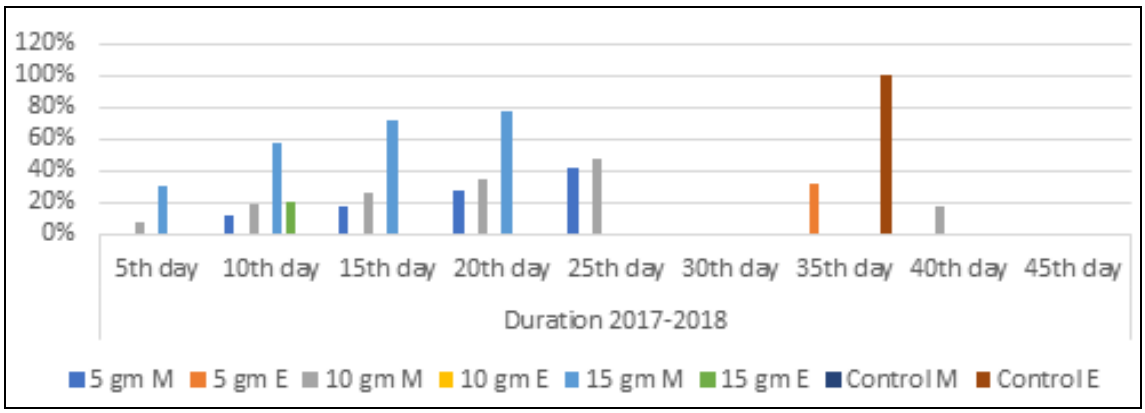

Fig 2: Effect of Kasaundi leaf and seed powder on larval mortality and emergence of *Spodoptera litura*

4. Conclusion

It is concluded from the experiments that highest larval mortality (76%) was recorded during 15gm dose treatment after 20th day in *Heliothis armigera*. While in *Spodoptera litura* highest larval mortality (77%) was observed during 15 gm dose after 20th day of treatment. It is clearly observed that Kasaundi leaf and seed extract shown significant larvicidal effect against both the pests.

5. Acknowledgement

Authors are thankful to the staff of A.N.D. College, Kanpur.

6. References

1. Arivoli S, Tennyson S, Screening of plant extracts for oviposition activity of against *Spodoptera litura* (Fab.) (Lepidoptera: Noctuidae). Interantional journal of Fauna and Biological studies. 2003; 1(1):20-24.
2. Ballesta AMC, Pascual VMJ, Rodriguez B. The antifeedant activity of natural plant products towards the larvae of Spodoptera littoris. Span J. Agr. res, 2008; 1:85-91.
3. Baskar K, Shashikumar S, Muthu C, Kingsley S, Ignachimuthu S. Bioefficacy of *Aristolochia tagala* cham. against *Spodoptera litura*(fab.) Lepidoptera: Noctuidae. Saudi journal of biosciences. 2011; 18(1):23-27.
4. Chauhan MS, Shukla JP, Pandey UK, Bhadauria S. Efficacy of some plant products as repellent to control *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae) fed on Tomato (*Lycopersicon esculentum).* International Journal of Research in Botany. 2013; 3(2):37-43.
5. Deshmukhe PV, Hooli AA, Holihosur SN. Effect of *Lantana camara* (L.) on growth, development and survival of tobacco caterpillar (*Spodoptera litura* Fabricius). Karnataka J Agric. Sci. 2011; 24(2):137-139.
6. Jadhav GS, Devarshi AA, Yankanchi SR. Efficacy of certain *Clerodenrum* leaf crude extracts against cutworm, *Spodoptera litura* Fab and cotton bollworm, *Helicoverpa armigera* Hub. Journal of entomology and entomology studies. 2016; 4(4):466-472.
7. Javar S, Sajap AS, Mohamed R, Hong LW. Suitability of *Centella asiatica* (Pegaga) as a food source for rearing *Spodoptera litura* (F.) (Lepidoptera: Noctuidae) under laboratory conditions. Journal of plant protection research. 2013; 53(2):184-189.
8. Jat GC, Swaminathan R, Yadav PC, Swati, Deshwal HL, Choudhary S, *et al*. Relative efficacy and economics of biopesticides against *Spodoptera litura* (Fab.) on cabbage. Int. J Curr. Microbiol. App. Sci. 2017; 6(6):1853-1866.
9. Matharu KS, Mehta PK. Field efficacy of plant extracts against tomato fruit borer *Helicoverpa armigera.* The Bioscan. 2016; 11(1):155-158.
10. Ma DL, Gordh Gordon, Zalucki MP. Biological effects of azadirachtin on *Helicoverpa armigera* (Hubner) (Lepidoptera: Noctuidae) fed on cotton and artificial diet. Austral Entomology. 2000; 39(4):301-304.