

Efficacy of aqueous leaf extract of *Annona squamosa* as antifeedant against Soybean pest *Diacrisia obliqua* (W.)

ALOKVARMA, GEETA SAXENA, SANJAYTELANG and ALKA VARMA*

Department of Zoology, Government Science and Commerce College,
Benazir, Bhopal - 462 008 (India).

*Department of Botany, S.N. Government, Girls P.G. College,
Shivaji Nagar, Bhopal - 462 016 (India).

(Received: February 12, 2010; Accepted: April 04, 2010)

ABSTRACT

Diacrisia obliqua is a polyphagous insect pest causing serious damage to Soybean Crop. In the present study different concentrations of *Annona squamosa* (Leaves) in water were presented anti antifeedant activity against *Diacrisia obliqua* was noticed. The activity was found to be concentration dependant.

Key words: *Annona squamosa*, *Diacrisia obliqua*, Soybean.

INTRODUCTION

Insect pest management activities depend on chemical insecticides or xenobiotics. These chemicals cause environmental pollution and by their long term use, they can create high toxicity, bioaccumulation in animal tissues and finally biomagnifications in the food chain of ecological system. In order words they are inclined to be ecologically disastrous (Lahir, 2009). In search of safer and effective alternatives, attention has been focussed on herbal biopesticides or plant extracts. Herbal products reveal every imaginable biological activity. They may be repellents, antifeedants (Phagodeterent), ovicidal, and insecticidal to the insects. Thousand of secondary metabolites derived from plants and only few of them have so far been identified. Some of these compounds have already been exploited commercially as insect control agents e.g. Neem elixier, Derisome, Pyrethrum etc. [Khanna 1992, Banerjee 1995, Soni & Kumar 2001 and Hussain 2003].

Annona squamosa is a shrub or small tree common in forest of Madhya Pradesh. The plants are largely cultivated for the roto were reported

(Sabnis, 1990 and Gupta *et al.*, 2005). The seeds and leaves are used to remove lice in head and havign insecticidal property (Cheema *et al.*, 1985). Thus, in the present study, an attempt has been made for it's scientific verification.

MATERIAL AND METHODS

The leaves *Annona squamosa* were collected from the area of Bhopal district. The air dried plant parts (leaves) were grinded to powder about 40-60 mesh size. This powder was extracted with soxhlet apparatus using various solvents and water (Harborne, 1984). The obtained extract was concentrated in rotavapor below 40°C.

Soyabeen pests, *Diacrisia obliqua* were collected from the field and were placed in insectory to maintain their life cycle. The antifeedant activity was measured on the average area of leaves consumed by larval (Cm²) in 48 hrs. duration. To observe the antifeedant activity of crude aqueous extract of *Annona squamosa* (Leaves) against *D. obliqua*, four different concentrations of plant extract were prepared and the soyabeen leaves were treated with. These concentrations in petridishes.

In every petridish 15 larvae were allowed to feed on treated leaves at 48 hrs. The area of leaf measured initially and at the end of experiment that is after 48 hrs. Antifeedant index (%) was applied on the observed values. Antifeedant index was based on consumed area of leaf by larvae in the treatment and control.

$$A.I. = C - T / C + T \times 100$$

C = Area consume in control leaf

T = Area consume in treated leaf

A.I. = Antifeedant index

The obtained values (result) were statistically analysed.

RESULTS

The maximum antifeedant activity was noticed on 1.25% concentration (Table No. 1, graph No 1). At this concentration the consumed average area of Soyabean leaves was 7.10 cm², while the lowest activity observed at 0.25 percent concentration where the consumed leaf area was 20.10 cm². The 1.25 percent concentration of aqueous extract causes significant feeding deterrent activity. The 't' value was calculated 12.65. Thus, show that the result are highly significant (P < 0.05).

Table 1: Showing antifeedant activity of *Diacrisia oblique* from *Annona squamosa* (Aqueous extract of leaves)

Plant part extract	Conc. %	Average area consumed by one larvae (cm ²)	Antifeedant index %	Mean ±SE	"t" Value
Annona squamosa (leaves) in Distilled water (H ₂ O)	0.25	20.10	50.10		
	0.50	12.75	61.00	62.81	
	1.00	9.20	72.16	±5.23	12.65
	1.25	7.10	80.20		
	Control		80.12	-	

Result based on three replicates

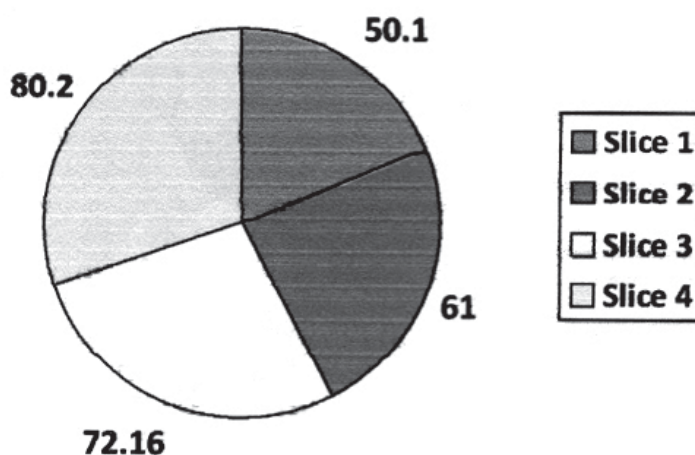


Fig. 1: Showing antifeedant activity of aqueous extract (leaf) of *A. squamosa* against paste

DISCUSSION

Although *A. squamosa* is reported to possess varied medicinal properties such as nutritional, autiovolatory and antitumor activities (Gupta *et al.*, 1985 and Vohora *et al.*, 1975). Insecticidal properteis of the seeds oil of *A. squamosa* have been studied (Cheema *et al.*, 1985) but no one has paid attention on the property of leaf extract as an insecticidal agent. In the present study antifeedant activity of *A. squamosa* (aqueous extract of leaves) have been noticed against pest (*D. oblique*) attacking on Soyabean Crop. During the last few year, various plant products have been evaluated on feeding deterrent (antifeedant) activity against phytophaghous insects (Sundrajan *et al.*, 2001).

CONCLUSIONS

The aqueous leaf extract of *Annona squamosa* found to be an effective antifeedant agent. Since the antifeedant activity was concentration dependent, probably the leaf contains flavinoids thus, it needs to be further explored.

ACKNOLWEDGEMENTS

First author (Dr. Alok Varma) is thankful to University Grants Commission, Regional Office, Bhopal for providing financial assistance to complete this research explored.

REFERENCES

- Banerjee S., Insect - plant interactions, natural products as insect control agents *Proc. Acad. Environ. Biol.* **4**(1): 95-98 (1995).
- Chemma, P.S, Dixit R.S., Koshi T., and Petri, S.L., Insecticidal properties of seed oil of *Annona squamosa* Linn. *Industri Res.* **17c**: 132 (1985).
- Gupta, R.K., Nutritional and Hypoglycemic effect of first pulp of *Annona squamosa* in normal healthy and Alloxan - Induced Diabent Rabbits. *Ann Nutri Metabl* **49**: 407-413 (2005).
- Harbone, J.B., Phytochemical methods - A guide to modern techniques of plant analysis. Champman and Hall publication. Pvt. Ltd. London 288 (1984).
- Hussein, A.K.M., Efficiency of extracts from ornamental plants against *Teranychus urticae* (*Tetranychidae*. Gamaside) in vegetable crops in Egypt. WOCAMP II PP03-62 (2003).
- Khan, A., Neem grains honour as Indian's Down to Earth **1**(10): 5-11 (1992).
- Lahir, Y.K., Bioaccumulation of Toxicants. *Toxicology* 149-155 (2009).
- Soni, V.K., and Kumar S., Plumbagin, A natural occuring insecticide. National Research Seminar on Herbal Conservation Cultivation, Marketing and Utilization with Speical Emphasis on Chhattisgarh. **87**: 13-14 (2001).
- Sundrajan, G. and Kumthakalavalli, R., Antifeedant activity of aqueous extract of *Gnidia glauca* (Gilg) and *Toddalia asiatica* Lam. On the gram pod borer, *Helicoverpa armigera* (Hbn). *Journal of Environmental Biology*, **22**(1): 11-14 (2001).
- Vohra, S.B., Inshwar, K., Nagvi SAH, Phytochemical, Pharmacological antibacterial and anti ovulatory studies on *Annona squamosa*, *Plants Medi* **28**: 97-100 (1975).