

Phagostimulant Property of a Weed, *Euphorbia elegans* L. Against *Helicoverpa armigera* (Hubner) on Chickpea

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During the course of investigation on evaluation of a weed, *Euphorbia elegans* L. (Family : Euphorbiaceae) for its insecticidal properties against *Helicoverpa armigera* (Hubner), it was found that the chickpea leaves treated with seed oil of this weed exhibited more feeding of the test insect. With this phenomenon, an attempt has been made to study the phagostimulatory behaviour of *H. armigera* to leaf extract and seed oil of this spurge. This plant is a prominent weed in the chickpea fields of Ghed area of West-South Saurashtra region of Gujarat State. It grows up abundantly in winter alongwith the chickpea crop and remains upto summer season.

TABLE 1

Incremental rate feeding and excretal weight of *H. armigera* fed on chickpea larvae treated with *Euphorbia* leaf extract (5%) and seed oil (0.5%).

Larval instar	Incremental rate over the check							
	Leaf feeding after hours						Excretal weight after 72 hrs of feeding (gms)	
	Seed oil			Leaf extract			Seed oil	Leaf extract
	24	48	72	24	48	72		
I	5.0	26.7	1.8	1.1	2.0	0.9	2.0	1.6
II	2.2	15.0	3.6	1.8	7.9	1.4	2.5	3.75
III	4.8	13.0	20.7	2.5	5.1	6.4	1.25	2.5
Av.	4.0	18.2	8.7	1.8	5.0	2.9	1.92	2.62

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The *Euphorbia* seed oil extracted by acetone was used to determine its phagostimulant property against *H. armigera* in laboratory during February 1997. For this purpose, chickpea leaves were sprayed with solution prepared from *Euphorbia* oil 0.5%, dried and exposed to *Helicoverpa* larvae for their feeding for three days. Five larvae of each instar were kept individually in petridishes (9 x 2.5 cm) for each set and repeated thrice. The chickpea leaves sprayed with only water served as control. Observations on leaf area consumed in the leaf was assessed by visual gradations following 0 to 10 scales. The excreta produced by individual larvae was also collected daily and subsequently it was weighed after three days of larval feeding. The leaf extract prepared by crushing and pressing the weed of leaves was also tested at 5 per cent following the same procedure. Data thus obtained were converted into the proportional rate of increase compared to the control as the incremental rate.

Data (Table -1) indicated that the incremental rate of leaf feeding by first, second and third

Helicoverpa larvae was higher on next day of feeding and it was 26.7, 15.0 and 13.0 in the respective larval instars. First instar larvae fed comparatively faster than second and third instar larvae. The third instar larvae increased their feeding rate with their development i.e. 4.8, 13.0, and 20.7 in 24, 48 and 72 hrs of feeding respectively. In leaf extract, larvae also fed more on next day of feeding, while third instar larvae fed more leaf on the third day of feeding compared to first and second instar larvae, and they increased feeding rate with development e.g. 2.5, 5.1 and 6.4 in 24, 48 and 72 hrs of feeding, respectively. Overall data also indicated that the *Helicoverpa* larvae fed more on leaves treated with seed oil than those treated with leaf extract.

The excretal weight of second and third instar larvae was higher (3.75 and 2.50 gm, respectively) when they fed on the chickpea leaves treated with leaf extract as compared to those fed on the chickpea leaves treated with seed oil i.e. 2.50 and 1.25 gm, respectively. This clearly indicated that the *Euphorbia* leaf extract 5% had increased the food consumption as compared to the leaves treated with *Euphorbia* seed oil 0.5%. The second instar larva had consumed more food in comparison to third instar larva.

The results showed that the *Helicoverpa* larvae exhibited more phagostimulatory behaviour on the seed oil than on leaf extract treated leaves. Later instar larvae responded more than early instar larvae. It was evident that the *Euphorbia* oil stimulated *Helicoverpa* larvae for more feeding, though feeding on leaf extract treated

leaves produced more excretal weight than those feeding on oil treated leaves. It meant that the *Helicoverpa* larvae digested comparatively more food when they fed on seed oil treated leaves compared to feeding on leaf extract treated leaves. The study showed that *Euphorbia elegans* acted as a phagostimulant to this pest. This is the first record of *H. armigera* as phagostimulant.

Biochemically *Euphorbia* spp. contain a quinone-euphorbol and its seeds contain fats as a conjugated polythenoid acid mainly rich in oleostearic acid (Florkin and Manson, 1962). Feeding of insect on plant is enhanced by carbohydrates, amino acids, sterols, vitamins as well as specific phagostimulant (Schoonhoven, 1972). The commercial phagostimulant has previously been studied against *Spodoptera litura* and *H. armigera* (Meisner *et al.* 1984, Korat and Lingappa, 1996). Parrott *et al.* (1968) reported a feeding stimulant for pink bollworm in water extract of cotton. The present finding revealed that the leaf extract and seed oil of *Euphorbia elegans* contains a phagostimulant of *H. armigera* larvae. Its practical utility can, however, be enhanced after overcoming its irritant nature. The phagostimulants enhanced the activity of biopesticides (Bt and NPV) and have a synergistic effect on toxicity of some synthetic insecticides (Meisner *et al.*, 1984) and thus the present finding can become useful to obtain effective control of *H. armigera*.

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