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ANTIFEEDANTACTIVITY OF SOME BOTANICALS AGAINST BLISTER BEETLE, *MYLABRIS PUSTULATA* THUNBERG (COLEOPTERA: MELOIDAE)

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ABSTRACT

The aqueous leaf extracts (10%) of *A. indica* and *E. hirta*, seed kernel extract (5%) of *A. indica* and seed oils (1%) of *A. indica*, *P. pinnata* and *Eucalyptus* sp. were evaluated for anti-feeding activity against the blister beetle *M. pustulata* for two years during 2012-13 in the laboratory of the Department of Entomology, Rajasthan College of Agriculture, Udaipur. On the basis of area (cm^2) and quantum (%) of okra flowers consumed in 24 hours, *Azadirachta indica* seed kernel extract (NSKE 5%) had the maximum anti-feeding activity with significantly minimum area and quantum of okra flowers consumed 1-DAT (4.0cm^2, 13.33%), 3-DAT (8.45cm^2, 28.17%) and 5-DAT (13.00cm^2, 43.33%) in 2012; likewise, 1-DAT (4.08cm^2, 13.58%), 3-DAT (7.80cm^2, 26.00%) and 5-DAT (13.03cm^2, 43.42%) in 2013. In the untreated control, the area consumed ranged from 23.27 to 23.43 sq. cm.; and the quantum consumed ranged from 77.56 to 78.08 per cent during 2012; likewise, the area consumed ranged from 22.38 to 23.83 sq. cm.; and the quantum consumed ranged from 74.58 to 79.42 per cent during 2013. The anti-feeding action of NSKE (5%) resulted in reduction in the area and quantum of the treated flower consumed.

Keywords: Antifeeding activity, botanicals, blister beelte, *Mylabris pustulata*

INTRODUCTION

Blister beetle adults are phytophagous and prefer to feed plants of Amaranthaceae, Compositae, Leguminosae, Malvaceae, Convolvulaceae and Solanaceae. Of late, blister beetles have become serious pests of field and vegetable crops; the adults eat only floral parts, but some, particularly species of *Epicauta* genus eat leaves as well. They are widely distributed pests of polyphagous nature and cause direct damage by feeding on petals, anthers and pollens, thus affecting the yield considerably. Blister beetles (*Mylabris* spp.) are widespread on pulse crops and pigeonpea in particular. Ramamurthy *et al*. (1970) recorded the orange banded blister beetle *Mylabris pustulata* (Thunb) on cumbu, *Pennisetum typhoides* and determined its damage. In cotton fields, *M. pustulata* was recorded as a minor though, sometimes as a major pest (Sahayaraj and Borgio, 2010). *M. pustulata* was observed feeding on flowers of cucurbitaceous vegetables, okra, cotton, mungbean, pigeonpea and other plants (Rolania *et al*., 2012). With a view to study the effect of botanicals for blister beetle management, the antifeeding activity was observed in a laboratory trial.

MATERIALS AND METHODS

The anti-feeding activity of known concentrations of some botanicals *viz*., *Azadirachta indica* A. Juss leaves, *A. indica* seed kernel extract, *A. indica* oil, *Milletia* (Syn. *Pongamia*) *pinnata* (L.) oil, *Eucalyptus* sp. oil, and *Euphorbia hirta* Linnaeus leaf extract were evaluated against the blister beetle (*Mylabris pustulata* Pallas) adults in the laboratory under ambient conditions of temperature and relative humidity. Uniform sized flowers of okra collected from untreated fields were treated with the recommended concentrations of the different botanicals evaluated and provided as food to the blister beetle *M. pustulata* as the test insect for 24h. The aqueous leaf extracts of *A. indica* and *E. hirta* were evaluated at 10 per cent, the seed kernel extract of *A. indica* was evaluated at 5 per cent and the oils of *A. indica*, *M. pinnata* and *Eucalyptus* sp. were evaluated at 1 per cent concentrations.

The field collected blister beetle adults were sexed and maintained in separate wooden cages in the laboratory under ambient conditions of temperature and humidity (mean atmospheric temperature and relative humidity ranging from 20.5 to 26.8°C, 42.9 to 84.8% during 2012; 22.3 to 28.4°C, 55.2 to 87.5% during 2013). Sufficient fresh flowers of *Hibiscus* spp. and *Coccinea indica* Linnaeus

were provided daily to the adult beetles maintained in wooden insect cages with wire gauge sides, glass top and having a double door front for easy handling. The area of petals consumed was calculated by measuring the petal area (cm) on the centimeter graph paper. The percent feeding was computed using the following formula:

$$\text{Feeding } (\%) = \frac{\text{Area fed } (\text{cm}^2)}{\text{Total area } (\text{cm}^2)} \times 100$$

RESULTS AND DISCUSSION

As evident from Tables (1) & (2) on the basis of area of okra flowers consumed in 24h *A. indica* seed kernel extract (NSKE) had the maximum anti-feeding activity with significantly minimum area of okra flowers consumed after one day (4.00cm^2), three days (8.45cm^2) and five days (13.00cm^2) of treatment during 2012; during 2013 the corresponding consumption values were as: after one day (4.08cm^2), three days (7.80cm^2) and 5 days (13.03cm^2). The next best treatment happened to be *A. indica* oil (1%) that was statistically at par with NSKE (5%) during both years. Similarly, the quantum (%) of flower consumed by the blister beetle, *M. pustulata* indicated that the minimum was 13.33, 28.17 and 43.33 per cent 1, 3 and 5 days after treatment with NSKE (5%) during 2012; and during 2013 the values were 13.58, 26.00 and 43.42 per cent flower consumption 1, 3, and 5 days after treatment. Even after replacing the treated flowers with untreated fresh flowers 1-DAT, the anti-feeding action of NSKE (5%) resulted in reduction in the area and quantum of the untreated flower consumed 5-DAT and was almost half the area (13.00 to 13.03 cm^2) and quantum (43.33 to 43.42%) consumed than in the untreated control (area 22.38 to 23.27cm^2, quantum 74.58 to 77.56%) during both years.

Earlier, Oudhia (2000) recorded a mortality of 23-35 per cent against *M. pustulata* with the aqueous leaf extract of *Lantana camara*. Extracts of some plant species exhibited high toxicity while the others did not cause mortality. Aqueous seed extracts of the neem tree *Azadirachta indica* against the blister beetles *M. temporalis* and *M. trifasciata* in the okra caused a

Table 1. Relative anti-feeding efficacy of botanicals on the blister beetle, *Mylabris pustulata* (Thunberg) during 2012

Treatments	Area of okra flowers consumed (cm^2)			Quantum of okra flowers fed (%)		
	1-DAT	3-DAT	5-DAT	1-DAT	3-DAT	5-DAT
NSKE (5%)	4.00	8.45	13.00	13.33	28.17	43.33
NLE (10%)	5.90	13.33	16.10	19.67	44.42	53.67
E. hirta LE (10%)	9.48	18.55	20.90	31.58	61.83	69.67
Neem Oil (1%)	4.18	10.50	14.08	13.92	35.00	46.92
Karanj Oil (1%)	7.15	16.08	17.85	23.83	53.58	59.50
Eucalyptus oil (1%)	8.25	17.90	21.68	27.50	59.67	72.25
Control (untreated)	23.35	23.43	23.27	77.83	78.08	77.56
S. Em. ±	0.344	0.273	0.240	—	—	—
C. D. (5%)	1.021	0.810	0.712	—	—	—

Table 2. Relative anti-feeding efficacy of botanicals on the blister beetle, *Mylabris pustulata* (Thunberg) during 2013

Treatments	Area of okra flowers consumed (cm^2)			Quantum of okra flowers fed (%)		
	1-DAT	3-DAT	5-DAT	1-DAT	3-DAT	5-DAT
NSKE (5%)	4.00	8.45	13.00	13.33	28.17	43.33
NSKE (5%)	4.08	7.80	13.03	13.58	26.00	43.42
NLE (10%)	5.58	13.43	15.95	18.58	44.75	53.17
E. hirta LE (10%)	9.53	18.80	20.98	31.75	62.67	69.92
Neem Oil (1%)	6.03	10.63	14.03	20.08	35.42	46.75
Karanj Oil (1%)	7.35	15.18	18.48	24.50	50.58	61.58
Eucalyptus Oil (1%)	8.18	17.85	21.35	27.25	59.50	71.17
Control (untreated)	23.83	23.25	22.38	79.42	77.50	74.58
S. Em. ±	0.594	0.839	0.563	—	—	—
C. D. (5%)	1.766	2.491	1.673	—	—	—

significant reduction in insect damage to the leaves, flowers and fruits (Obeng-Ofori and Sackey, 2003). The blister beetle (*M. pustulata*) on cowpea was managed with aqueous extracts of *Zanthroxylum zanthroxloides, Allium sativum, Datura metel* and *Annanas senegalensis* in comparison with Decis, as a synthetic insecticide (Degri *et al*., 2010). The ovicidal action of seven plant origin insecticides was studied against eggs of *M. pustulata*. Among the botanical extracts tested, *Caesalpinia crista* (seed-glycosides) was found to be comparatively most toxic against the eggs followed by *Centratherum anthelminticum* (seed-oils) (Johri *et al*., 2004; Johri and Johri, 2011). The results clearly indicate the usefulness of plant extracts to manage blister beetle infestation.

REFERENCES

Johri, P.K. and Johri, R. 2011. Comparative ovicidal action of seven plant origin insecticides against the eggs of *Bagrada cruciferarum* (Kirk.), *Pieris brassicae* (L.) and *Mylabris pustulata* (Thunb.). *Indian Journal of Entomology*, 73**: 204-206.**

Johri, P.K., Singh, D., Mourya, R., Tiwari, D., Bajpai, A. and Johri, R. 2004. Ovicidal action and feeding response of certain plant extracts against *Bagrada cruciferarum* (Kirk), *Pieris brassicae* (Linn.) and *Mylabris pustulata* (Thunb). *Journal of Applied Zoological Researches*, 15**: 37-42.**

Obeng-Ofori, D. and Sackey, J. 2003. Field evaluation of non-synthetic insecticides for the management of insect pests of okra *Abelmoschus esculentus* (L.) Moench in Ghana. *Ethiopian Journal of Science*, 26**: 145-150.**

Oudhia, P. 2000. Evaluation of some botanicals against orange banded blister beetle (*Zonabris pustulata* Thunb.). *Journal of Crop Research* **(Hisar),** 20**: 558-559.**

Ramamurthy, T.G., Selvaraj, S. and Regupathy, A. 1970. Occurrence of blister beetle, *Mylabris pustulata* Thunb. (Meloidae: Coleoptera) on cumbu, *Pennisetum typhoides* Stapf. and Hubb. and its damage. *Madras Agricultural Journal*, 57**: 134-136.**

Rolania, K., Yadav, S.S. and Saini, R.K. 2012. Insecticidal control of *Mylabris pustulata* Thunb., an emerging problem in pulses and *kharif* vegetables. National Seminar on Sustainable Agriculture and Food Security: Challenges in Changing Climate, India, March 27-28, 2012.

Sahayaraj, K. and Borgio, J.F. 2010. Virulence of entomopathogenic fungus *Metarhizium anisopliae* (Metsch.) Sorokin on seven insect pests. *Indian Journal of Agriculture Research*, 44**: 195- 200.**