

EFFICACY OF DIFFERENT PLANT LEAF EXTRACT AGAINST MUSTARD APHID *LIPAPHIS ERYSIMI* (KALT)

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ABSTRACT

The experiment was conducted in the glass house, Department of Entomology, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.), during 2011-12. Five different plant leaf extracts were tested against mustard aphid along with one insecticide. On the basis of overall performance of different treatments in the form of per cent mortality, it can be concluded that Oxymethyl demeton 25 EC, Neem leaf extract and Tobacco leaf extracts were superior over control in terms of killing mustard aphid as compared to Lantana, Bantulsi and Parthenium leaf extract.

INTRODUCTION

Mustard is one of the important oilseed crops which constitute a major source of edible oil for the human consumption and cake for animals. The productivity of mustard in India is only 670 kg/ha as compared to world highest productivity of 2826 kg /ha in West Germany. Mustard cultivation in Chhattisgarh is increasing during recent past. It comes well under rice based cropping system, particularly in tribal zones of Chhattisgarh viz. Northern hilly zone and Bastar Plateau Zone. Major production constraints limiting to the productivity of this crop is pests and diseases. More than three dozen pests are known to be associated with various phenological stages of mustard crop

in India (Singh and Singh 1983; Bakheta & Sekhon, 1989). Mustard crop is attacked by a number of insect pests, among them *Lipaphis erysimi* (Kalt), commonly known as mustard aphid is the most descriptive pest (Singh and Sachan 1997). A wide range of insecticides are being used to control this pest, In recent years chemical control switched to the use of botanicals as well as plant extract. The botanicals are more compatible with the environmental component, ecofriendly with plant health and non-hazardous to human beings. The naturally occurring, biologically active plants appear to have a prominent role for the development of future commercial pesticides not only for increased productivity but for the safety of the environment and public health. (Srivastava and Guleria 2003).

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MATERIAL AND METHODS

The investigation was carried out in the glass house of Entomology department, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.), during 2011-12.

Insect Culture

For preparation of nucleus culture, aphid adults were collected from mustard field of IGKV, Raipur and rearing was done in the laboratory at 26 ± 2 °C and 70-80% RH.

The 25 days old mustard plant raised on pots were used as food for freshly emerged adults. Potted Pusa bold plants were placed inside the rearing cages for nymph laying along with at least 60 pairs of aphid per pot. After 2-3 days the females starts nymph laying on mustard plants. After the emergence of nymphs on plants aphid adults were transferred to another plant with the help of aspirator for nymph laying. When newly emerged nymphs reached to the first and second instars they were used for bioefficacy tests of plant extracts. As aphids are homopteran having ovoviviparous type of reproduction, its multiplication is easy as compare to others.

Plant leaf extract

For preparation of plant leaf extracts, different plant leaves were collected from the forestry fields, farm and nearby areas of IGKV. The fresh leaves were cleaned with tap water. The plant leaf extracts were prepared as per suggestions of Singh (2004). The leaves of different plants were dried in the laboratory under shaded area. Thereafter, to make the fine powder of them, the dried leaves were crushed with the help of mortar and pestle as well as mixer grinder. The 5 per cent concentration was prepared by adding the fine leaf powers in the 100 mL distilled water.

The experiment was laid out in CRD with five replications and seven treatments. Seed of Pusa bold variety of mustard were raised in 35 pots (25 cm high and 20 cm diameter). Each pot maintained with fine single seedling. Each plant was covered with a transparent, hollow plastic tube (40 cm high and 8 cm diameter); the top portion is covered with muslin cloth. Twenty aphid nymphs of first ad second instar were released on 25 days old plants. After one days of inoculation, plant leaf extract alone were applied uniformly by using the hand automiser.

Treatment details

Treatments	Treatments name	Dose/ Solution
T ₁	Lantana leaf extract alone (water extract)	5%
T ₂	Bantulsi leaf extract alone (water extract)	5%
T ₃	Neem leaf extract alone (water extract)	5%
T ₄	Parthenium leaf extract alone (water extract)	5%
T ₅	Tobacco leaf extract alone (water extract)	5%
T ₆	Oxymethyl demeton 25 EC	0.04%
T ₇	Control	Unsprayed

RESULTS AND DISCUSSION

One day after spraying (1 DAS)

All the plant leaf extract and Oxymethyl demeton 25 EC treatments were significantly superior over untreated control at one DAS. Maximum mortality (53.0 %) was recorded with the T6 i.e. Oxymethyl demeton 25 EC and minimum mortality (16.0 %) was recorded with the T2 i.e. Bantulsi leaf extract alone 5 % extract (Table 1).

Three days after spraying (3DAS)

All the treatments differs significantly and shown superiority over untreated control. Cumulative mortality at three DAS was recorded highest for Oxymethyl demeton 25 EC i.e. 87% followed by Neem leaf extract (52.0%) and Tobacco leaf extract 46.0 %.

Seven days after spraying (7DAS)

Cumulative mortality at seven DAS was recorded highest for Oxymethyl demeton 25 EC i.e. 99% followed by Neem leaf extract alone 5% i.e. 66.0 %.

Ten days after spraying (4DAS)

Cumulative mortality at ten DAS was recorded highest for Oxymethyl demeton 25 EC i.e. 100.0% and Neem leaf extract alone 5% was next in order of mortality per cent i.e. 71.0 %.

CONCLUSION

Oxymethyl demeton 25 EC was found highly effective

Table 1. Per cent mortality of aphid caused by different leaf extract.

Treatments	Treatments name	Percent mortality of aphid at the periodical interval			
		1 st DAT	3 rd DAT	7 th DAT	10 th DAT
T ₁	Lantana leaf extract alone 5% water extract	18.0	34.0	41.00	55.0
T ₂	Bantulsi leaf extract alone 5% water extract	16.0	40.0	45.00	54.0
T ₃	Neem leaf extract alone 5% water extract	30.0	52.0	66.0	71.0
T ₄	Parthenium leaf extract alone 5% water extract	17.0	39.0	52.0	59.0
T ₅	Tobacco leaf extract alone 5% water extract	19.0	46.0	55.0	63.0
T ₆	Oxymethyl demeton 25 % EC	53.0	87.0	99.0	100.0
T ₇	Control	0.00	0.00	0.00	0.00
	SEM	1.21	1.32	1.10	0.59
	CD at 5%	3.33	4.02	3.15	1.79

*Average of 5 Replications;

*Data is square root transformed and cumulative

with knock down effect in controlling aphid followed by Neem leaf extract and Tobacco leaf extract. In comparative bioefficacy testing of different plant leaf extract highest mortality per cent was achieved by Oxymethyl demeton 25 EC followed by Neem 72.0%. The earlier work on the use of botanicals has been also carried out by Bhathal *et al.* (1994); Pandey *et al.* (1987). Similarly Gupta, (2005) evaluated Neem leaf extracts and concluded that the incidence of mustard aphid can be safely and successfully managed by adopting 3 or 4 foliar sprays of Neem leaf extract. Further in mortality factor the mode of action of these extracts can be found out by formulating suitable experiments.

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