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Short Communication

Efficacy of methamidophos, fenpropathrin and metasystox against aphid population within the response of *Brassica campestris* at Multan

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Abstract
In the present study, three insecticides viz. methamidophos @ 1.0lha, fenpropathrin @ 1.2l/ha and metasystox @ 1.4l/ha were tested for the control of aphid population on Brassica campestris. The experiment was conducted during October 2013 to April 2014. Crop season following a randomized complete block design (RCBD) with four replications and six treatments in the research farm of Babar Agricultural Farm at Old Shuja Abad Road, Multan. Different insecticides showed different mortality of aphid population. Of the three insecticides tested, methamidophos resulted in more than 80% mortality in the aphid population and more than 30% increase in the yield, whereas fenpropathrin and metasystox produced mortality of 80% and 72% respectively. The result of this study indicated that the insecticide methamidophos is more effective as compared to that of fenpropathrin and metasystox.
Key words: Aphid, Methamidophos, Fenpropathrin, Metasystox, *Brassica campestris*, mortality

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INTRODUCTION

According to Pakistan Agricultural Research Council (PARC, 2013), the deficiency of national edible oil production is met through imports which cost foreign exchange. The disturbing aspect of this deficit is ever increased gap between the local production and consumption, as the consumption increased from 0.4 million to 2.2 million tons with 25% local production contribution and imports worth of 2.7 billion US $ (Anonymous, 2014). Seed oil and meal from *B. napus* or *B. campestris* is known as canola. Canola is the third most important source of edible oil and it contains less than 30% micromoles of aliphatic glucosinolats per gram of oil free meal and less than 2% of total fatty acid as erucic acid (Canola Council, 2009).

Most significant and destructive pests is known as cabbage aphid (Basavaraju *et al.,* 1995). Another important aphid pest of *Brassica* is known as mustard aphid (Aslam, 2005). Upto 70-80% of yield losses caused by insect pests due to the contribution of aphids (Shoaib, 2003) and 7% reduction in oil contents (Singh *et al.,* 1987). Krishnaiah and Mohan (1983) sprayed various insecticides against *M. persicae* on cabbage and obtained the best control with metamidophos followed by mevinphos, demeton-s-methyl and methyl parathion respectively. Methamidophos (Tamaron) effectively controlled the pest upto two weeks due to its systemic action. Zaman (1986) showed that fenpropathrin exhibited least toxicity against aphids. Pareek and Noor (1980) also found that methamidophos is highly toxic against *Myzus persicae* as compared to metasystox a (Demeton -s-methyl) under field condition. Marco (1981) also find out the methamidophos better than metasystox against *M. persicae*. Kumara and Dikshit (2001) found that at harvest, the *Brassica* grains did not contain methamidophos residues. Therefore, methamidophos treatments could be taken as safe for crop protection, consumption of leaves and environmental contamination point of view to reduce aphid population on *Brassica*.

On the basis of the above mentioned reasons, the current work was undertaken to evaluate the effectiveness of insecticides like

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methamidophos (Tamaron, Monitor, Metafort 600EC), fenpropathrin (Sanitol 200EC) and metasystox (Dementon-S-Methyl 25EC) against population of aphids on *B. campestris* at Multan.

MATERIALS AND METHODS

Experiments were conducted in the field of research of Babar Agricultural Farm, Old Shuja Abad Road, Multan, Punjab, Pakistan from the month of October 2013 to April 2014 to find out the comparative efficacy of three insecticides; methamidophos, fenpropathrin and metasystox against aphids on *B. campestris* (Tobin the Canadian canola variety). RCBD (Randomized Complete Block Design) with four replications and six treatments including a check was given as experimental design (Table I).

Table I: Insecticides and their formulations with recommended dosages applied against aphid population on *B. campestris*.

Sr. No.	Name of Insecticide	Formulation	Recom-mended Dosage (l/ha)
1	Methami-dophos	600EC	1.0
2	Fenpro-pathrin	200EC	1.2
3	Metasystox	25EC	1.4

The size of each plot was kept as 5m X 4m in the research farm, according to the six rows. *B. campestris* was grown on October 10, 2013. From each treatment, data based on aphid population were collected randomly by selecting 10 plants at the flowering stage with the help of a magnifying lens total number of aphids counting were done. 30 per plant was mean pre-treatment aphid population density and the level of infestation differences with a block among treatments were not to be significant (P>0.05). From the 3rd week of February, 2014 to 4th week of April, 2014, three formulations of insecticides with recommended dosages at the flowering stage were sprayed with the help of Knapsack sprayer. To prevent spray drift from one treatment to another, large cardboard whets were used during the wind speed less than 13km/h. Furthermore, good coverage was assured by spraying all flowers to the point of run-off.

Upto 96h after the application of the insecticides, mortality data were recorded. According to Kalkat (1961), the criteria for mortality were fixed. By using Abbott's formula (1925) the correct mortality was obtained. Similarly, using M-Stat Package, the data was analyzed on the IBM PC Computer.

From only four central rows, data on yield and other characters were recorded.

RESULTS

Aphid population data were collected by randomly selected 10 plants per 10cm inflorescence on *B. campestris*. These aphid species were *Lipaphis ervismi* (Turnip aphid), *Brevicoryne brassicae* (Cabbage aphid) and *Myzus persicae* (Green peach aphid). With the help of key of Buksh (1975) all these aphids were identified. In all the treatments *Lipaphis ervismi* and *Brevicoryne brassicae* population densities were maximum as comparedto that of *Myzus persicae*. Aphid mortality data showed that methamidophos exhibited an overall highest toxicity as compared to fenpropathrin and metasystox on *B. campestris* under treatment (Table II).

Table II: Mortality data of aphid population on *B. campestris* of insecticides during 2013-2014.

Treatment with insecticides	Mortality of aphids with single application of dosages			
	24h *%	48h %	72h %	96h %
Methamidophos 1.0l/ha	84	80	85	88
Fenpropathrin 1.2l/ha	80	75	68	62
Metasystox 1.4l/ha	72	60	65	66
L.S.D. (0.05)	8	10	10	10

*Mean aphid infestation of pre-treatment and in all the treatments there was no difference of significant (P>0.05) from mean of grand of 30 aphids / plant.

Data showed that methamidophos exhibited an overall highest toxicity against

aphids followed by fenpropathrin. Metasystox was the least toxic among all the insecticides. In crop yield, where fenpropathrin and metasystox were sprayed over the unsprayed check, there was no significant increase while in the treatments where methamidophos was applied, a significant increase was to be found in seed yield (Table III).

Table III: Yield of *B. campestris* for aphid population control after treatment with three insecticides (methamidophos, fenpropathrin and metasystox) at Babar Agricultural Farm at Multan during 2013-2014.

Name of insecticides	Recom-mended dosage* (l/ha)	Yield (kg/ha)	Con-trol (%)
Control	Unsprayed	782	100
Methamido-phos	1.0	1070	137
Fenpropathrin	1.2	1035	132
Metasystox	1.4	978	125

L.S.D. (0.05)
*Highest recommendation of doses for aphid population

DISCUSSION

In the present study, data showed that methamidophos found to be highly toxic against aphid population as compared to fenpropathrin and metasystox. These findings are related with those of Pareek and Noor (1980), who observed that 0.1% dosage of methamidophos performed better results against aphid population (*M. persicae*) as compared to other insecticides.
Under field conditions, methamidophos @ 1.0 l/ha gave maximum initial kill of 84% 24h after application while fenpropathrin 80% and metasystox 72% resulted in mortality. These results are confirmed by Anonymous (1986) who reported that methamidophos gave better results of mortality of aphid population as compared to other insecticides. Marco (1981) and Ritcey *et al.* (1983) also confirmed that methamidophos is highly toxic insecticide. The mortality percentage of aphid population resulting from methamidophos was significantly different from fenpropathrin and metasystox. These results related to the findings of Lal (1980) and Anonymous (1981). Except that of methamidophos and metasystox where mortality percentage increased after 48h of application, the residual toxicity of all the insecticides gradually decreased. These findings are also related to the results of Krishnaiah and Mohan (1983).

CONCLUSION

From the above discussion it has been concluded that out of the three tested chemicals, methamidophos gave aphid mortality greater than 80% as compared to fenpropathrin and metasystox and more than 30% in yield increases. From the use of these insecticides resulting yield increase are remarkable as compared to the aphid population which was considered to be low. It also indicates that by using the most effective insecticides such as methamidophos, fenpropathrin and metasystox during the years of severe aphid attack on rapeseed and mustard, good economic results can be obtained.

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