



E-ISSN: 2320-7078  
P-ISSN: 2349-6800  
JEZS 2017; 5(3): 1216-1218  
© 2017 JEZS  
Received: 18-03-2017  
Accepted: 19-04-2017

**Madiha Mobeen Khan**  
Assistant Research Officer  
(Entomology), Regional  
Agricultural Research Institute,  
Bahawalpur, Pakistan

**Imran Akhtar**  
Assistant Entomologist  
Regional Agricultural Research  
Institute, Bahawalpur, Pakistan

**Syed Waqar Hussain Shah**  
Assistant Research Officer  
(Entomology), Regional  
Agricultural Research Institute,  
Bahawalpur, Pakistan

## Efficacy of different insecticides against aphid on brassica juncea

**Madiha Mobeen Khan, Imran Akhtar and Syed Waqar Hussain Shah**

### Abstract

A field experiment was conducted to find out and compare the efficacy of Pyriproxyfen, Nitenpyram, Carbosulfan and Chlorpyrifos against aphid on *Brassica juncea* variety (Bahawalpur Raya) during Rabi 2016-17 at Regional Agricultural Research Institute, Bahawalpur, Pakistan. After 72 hours of treatment carbosulfan, nitenpyram and pyriproxyfen showed statistically similar results. Aphid population reduction of 96.7% was observed on the brassica plants treated with Carbosulfan, followed by 96.4% and 91.6% control of aphid infestation caused by Nitenpyram and Pyriproxyfen respectively. Chlorpyrifos showed 67.8% results.

**Keywords:** *Brassica Juncea*, Nitenpyram, Pyriproxyfen, Chlorpyrifos, Carbosulfan, Aphid

### 1. Introduction

*Brassica* spp. family Cruciferae, is an important oilseed crop of the world. The most common species grown in Pakistan include *Brassica campestris* L, *B. napus* L and *B. juncea* L. [1]. Rape and mustard oilseed crops are the most important sources of vegetable oil grown during the winter season. The area and production level of rape and mustard in Pakistan is about 452000 acres, 158000 tonnes oil seeds and 51000 tonnes oil and that of canola is about 30000 acres, 18000 tonnes of oilseeds and 10000 tonnes of oil [2],

Insect pest infestation plays a limiting factor in its production. Cabbage butterflies, shield bugs, pea leaf minor are the insect pests of Brassica crop. Brassica aphids (*Lipaphis erysimi* Kalt) are of the great importance and have attained the level of key pest [1]. Mustard aphid, *Lipaphis erysimi* Kalt., is widely distributed throughout the world on all Brassica crops [3]. The pest is serious in Pakistan, India, Bangladesh, other countries of South-East Asia and USA [4,5,6]. It is the most destructive pest of rapeseed and mustard and a major limiting factor for successful cultivation of the crop [7-9]. Aphid *Lipaphis erysimi* (Kaltenback) during winter the population increases at such a level that it reduces the yield and quality of Brassica [10]. Both the nymphs and adults suck sap from leaves, inflorescence, stems, flowers and pods; as a result, the plant shows stunted growth, flowers wither and pod formation is hindered. Honeydews secreted by aphids are medium for the development of sooty mold on plants. As a result crop gets black and dies before bearing of seeds [1].

The losses of mustard due to aphids varied from 35 to 90 percent depending upon the seasons [9]. Rohilla *et al*, [11] and Singh and Sharma [12] reported the yield losses from 9 to 96 and 15% oil reduction [4]. High incidence of the pest can sometimes cause complete loss of the crop in mustard, severely infested plants often fail to bear siliqua or leads to poor pod formation [13].

Control of aphids by any measure is a hard task because of fast growth, mode of reproduction, polymorphism and wide adaptability [14]. Presently, a number of chemical insecticides have been evaluated against this insect and some of them have been found successful to control this insect [15-18].

The present study was carried out to determine the relative efficacy of different insecticides being used against aphid population on *Brassica juncea*.

### 2. Material and Methods

The experiment was conducted during 2016-17 on the farms of Regional Agricultural Research Institute Bahawalpur. The Bahawalpur Raya was sown at 15<sup>th</sup> of November in randomized complete block design with three replications. The plot size was 5 x 0.9 meters. The row to row spacing was maintained at 75 centimeters. Fertilizer at the ratio of 75: 75:0 NPK kg/ha was applied.

### Correspondence

**Madiha Mobeen Khan**  
Assistant Research Officer  
(Entomology), Regional  
Agricultural Research Institute,  
Bahawalpur, Pakistan

Data regarding aphids were recorded on the top 10 centimeters of central shoot. When the population reached the economic threshold level the four different insecticides and one control were applied as treatments (Table I) after recording pre-treatment aphid population data. Data after

application of insecticides were recorded after 24, 48 and 72 hours of treatment. Percentage reduction in aphid population was calculated. The data was subjected to analysis of variance (ANOVA) (using Statistix version 8.1. The means were separated by Tukey's HSD

**Table 1:** Detail of different treatments used against aphid on *Brassica juncea*

Common Name	Trade Name	Source	Formulation	Dose/Acre
Pyriproxifen	Admeral	Bayer Crop Science	10 EC	400ml
Nitenpyram	Pyramid	Kanzo AG	10 AS	200 ml
Carbosulfan	Advantage	FMC, U.S.A	20 EC	500
Chlorpyrifos	Larsban	Arysta Life Sciences	40 EC	1000

### 3. Results and Discussion

After 24 hours of spray maximum percentage mortality (92%) was observed on Nitenpyram and Carbosulfan was observed. It was statistically similar with the pyriproxifen (86.8%). Chlorpyrifos showed minimum results (51%) (Table II)

After 48 hours of treatment Nitenpyram showed best results with 96.5% reduction in aphid population which was followed by Carbosulfan (94.3%), pyriproxifen (87.4%) and Chlorpyrifos (67.3%).(Table II)

After 72 hours of treatment carbosulfan, nitenpyram and pyriproxifen showed statistically similar results. Aphid population reduction of 96.7% was observed on the *Brassica juncea* treated with Carbosulfan, followed by 96.4% control of aphid infestation caused by Nitenpyram.

Chlorpyrifos showed 67.8% results. (Table 2)

Over all, carbosulfan and nitenpyram were found most effective in controlling the aphid population on *Brassica*

*juncea*. Results were in conformity with Udaeen and Narang<sup>[19]</sup> and Mohy-ud-din *et al.*,<sup>[20]</sup> who found carbosulfan were effective against aphid on mustard and guar respectively. However, the results were contrary to the findings of Babar *et al.*,<sup>[21]</sup> According to Babar *et al.*,<sup>[21]</sup> nitenpyram was least effective against sucking pests.

The comparatively least effective insecticide was Chlorpyrifos it was in contrast with the findings of Mandal *et al.*,<sup>[22]</sup> Mandal *et al.*,<sup>[22]</sup> reported 93.5% mortality of aphid on rapeseed. This may be due to development of resistance in aphids against the said insecticide.

### 4. Conclusion

It can be concluded that for the effective control of aphid against brassica the spray of insecticides are inevitable. And Carbosulfan and Nitenpyram proved to be the most effective insecticides.

**Table 2:** Toxicity of different insecticide on aphid population at various intervals

Treatment	Mortality		
	After 24 h	After 48 h	After 72 h
Pyriproxifen	86.879 ± 4.4438 A	87.441 ± 3.3243 B	91.671 ± 3.1445 A
Nitenpyram	92.780 ± 4.4438 A	96.573 ± 3.3243 A	96.479 ± 3.1445 A
Carbosulfan	92.123 ± 4.4438 A	94.361 ± 3.324 AB	96.746 ± 3.1445 A
Chlorpyrifos	51.676 ± 4.4438 B	67.313 ± 3.3243 C	67.807 ± 3.1445 B
Check	4.673 ± 4.4438 C	5.958 ± 3.3243 D	10.098 ± 3.1445 B
LSD value	10.247	7.6658	7.2513
t-value	2.306	2.306	2.306

### 5. Acknowledgement

We are thankful to the Regional Agricultural Research, Bahawalpur for providing assistance in the form of farm machinery, labour and resources for conducting this research. Special thanks to Mrs. Humaira Malik, Assistant Research Officer, Ayub Agricultural Research Institute, Faisalabad, for her moral support.

### 6. References

- Khan SM, Begum HA. Chemical control of canola aphid *Lipaphis erysimi* Kalt. (Aphididae; Homoptera). Pakistan Entomologist. 2005; 27(2):29-35.
- Anonymous. Economic survey, Government of Pakistan, Finance Division, Islamabad, 2012-2013, 23.
- Yue B, TX Liu. Host selection, development, survival and reproduction of turnip aphid (Homoptera; Aphididae) on green and red cabbage varieties. Journal of Economic Entomology. 2000; 93:1308-1314.
- Verma SN, Singh OP. Estimation of avoidable losses to mustard by the aphid, *Lipaphis erysimi* in Madhya Pradesh. Indian Journal of Plant Protection. 1987; 15(1):87-89.
- Atwal AS, Dhaliwal GS. Agricultural pest of South Asia and their management. Kalyni publishers, New Delhi, India. 2007, 487.
- Biswas GC. Efficacy of some plant materials against the mustard aphid, *Lipaphis erysimi* (Kalt.) Journal of Asiatic Society of Bangladesh, Science. 2008; 34(1):79-82.
- Islam N, Bhuyah MIM, Karim MA. Effect of date of sowing on abundance of mustard aphid (*Lipaphis erysimi* Kalt.) on the infestation and yield of mustard. Bangladesh Journal of Zoology. 1992; 19:95-100.
- Biswas GC, Das GP, Begum S, Islam N. Resistance of three Brassica species to the aphid, *Lipaphis erysimi* (Kaltenbach). Bangladesh Journal of Zoology, 2000; 28(1):145-151.
- Biswas GC, Das GP. Population dynamics of mustard aphid, *Liaphis erysimi* (Kalt.) (Hemiptera: Aphididae) in relation to weather parameters. Bangladesh Journal of Entomology, 2000; 19(1, 2):15-22.
- Bakhetia DRC. Insect pest problems and their management in rape and mustard crops. XV Anal. Workshop-Cum-Seminar on rapeseed and mustard, held at CSAU Agric. Technol. Khanpur, 1979.
- Rohilla HR, Bhatanagar P, Yadav PR. Chemical control of mustard aphid with newer and conventional

- insecticides. Indian Journal of Entomology. 2004; 66(1):30-32.
12. Singh YP, Sharma KC. Integrated approach to manage the mustard aphid, *Lipaphis erysimi* (Kalt.) (Homoptera: Aphididae) in oil seed Brassica crops-A review. Journal of Aphidology. 2002; 16:77-88.
  13. Das GP, Islam MA. Seasonal activity of a late mustard aphid (*Lipaphis erysimi* Kalt). Bangladesh Journal of Agriculture. 1986; 11(1):56-61.
  14. Sultana NA, Khan MAH, Islam MN, Hasanuzzaman M. Integrated management of Aphid (*Lipaphis erysimi* Kalt.) in Mustard. World Journal of Zoology. 2009; 4(2):105-108.
  15. Mathur YK, Upadhyay KD. Evaluation and economics of some modern insecticides against mustard aphid, *Lipaphis erysimi* (Kalt.). Pesticides. 1980; 40:328-332.
  16. Prasad SK. Chemical control of mustard aphid, *Lipaphis erysimi* Kalt. Indian Journal of Entomology. 1978; 40:328-332.
  17. Singh TR, Singh MP, Singh KI, Devi TB, Singh NG. Comparative efficacy of certain neem products and conventional insecticides against *Lipaphis erysimi* (Kalt.) and their safety to its natural enemies in rapeseed. Indian Journal of Entomology. 2007; 69:259-264.
  18. Singh SP, Singh YP. Bio-efficacy of pesticides against mustard aphid. Annals of Plant Protection Sciences. 2009; 17:240-242.
  19. Udaeen AS, Narang DD. A survey of mustard aphid, *Lipaphis erysimi* (Kalt.) for resistance to insecticides in Punjab. J. Res. Punjab Agri. Univ. 2005; 25:77-80.
  20. Mohy-ud-din Q, Abbas G, Abbas Z, Hussain I, Aslam M, Akram M *et al.* Comparative efficacy of carbamate and pyrethroid insecticides for the control of aphid (*Acyrtosiphon pisum*) on guar (*Cyamopsis tetragonolobus* L.) Crop. Pakistan Entomologist. 2009; 31(1):53-56.
  21. Babar TK, Karar H, Saleem M, Ali A, Ahmad S, Hameed A. Comparative efficacy of various insecticides against whitefly, *Bemisia tabaci* (genn.) adult (Homoptera: Aleyrodidae) on transgenic cotton variety bt-886. Pakistan Entomologist. 2013; 35(2):99-104.
  22. Mandal D, Bhowmik P, Chatterjee ML. Evaluation of new and conventional insecticides for the management of mustard aphid, *Lipaphis erysimi* Kalt. (Homoptera: Aphididae) on rapeseed (*Brassica juncea* L.). The Journal of Plant Protection Sciences. 2012; 4(2):37-42.