Efficacy of different insecticides against aphid on brassica juncea

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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, Aphi

1. Introduction
Brassica spp. family Cruciferae, is an important oilseed crop of the world. The most common species grown in Pakistan include Brassica compestris 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 silicua 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 [15,16].

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 15th 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.
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.

### 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 pyriproxyfen (86.8%). Chlorpyriphos 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%), pyriproxyfen (87.4%) and Chlorpyriphos (67.3%).(Table II) After 72 hours of treatment carbosulfan, nitenpyram and pyriproxyfen 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. Chlorpyriphos 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 [9] and Mohy-ud-din et al., [20] who found carbosulfan were effective against aphid on mustard and guar respectively.

However, the results were contrary to the findings of Babar et al., [21] According to Babar et al., [22] nitenpyram was least effective against sucking pests. The comparatively least effective insecticide was Chlorpyriphos it was in contrast with the findings of Mandal et al., [23]. Mandal et al., [23] 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.

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### 6. References

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