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Short Communication

Evaluation of Some Newer Insecticides against Mustard Aphid on Seed Crop of Radish

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Highly efficacious insecticides with novel modes of action are order of the day. These molecules are becoming increasingly important in agriculture as components of integrated pest management and resistance management strategies. Also, these insecticides are required only in a few gram in comparison to older class of compounds which are required in hundreds of grams and are perceived to carry higher safety/environmental risks [1]. Some of these examples are indoxacarb from Du Pont, spinosad from Dow chemicals, methoxyfenozide from Rohm and Hass Co., against lepidopteron pests. Similarly against sucking pests, thiamethoxam from Syngenta chemicals and imidacloprid from Bayer AG have been identified. Both these chemicals are highly systemic and nicotinic acetylcholine receptor agonists [2]. The development of resistance in insects using these insecticides does not occur as quickly as in other conventional insecticides due to novel mode of action. Also, their requirement is in few grams per hectare as compared to conventional insecticides, the non-target organisms have lower risk. Hence, these two chemicals have been used in the present experiment.

Radish (*Raphanus sativus* L.) is an important vegetable of northern India. Mustard aphid, *Lipaphis erysimi* Kalt. is the major pest infesting the seed crop during cooler months of the winter. The infestation starts from mid January and reaches its peak by the end of February or first week of March. This pest causes serious losses in seed yield as well as quality of radish crop. Hence the present investigation was contemplated to manage this pest using recently released insecticides, *viz.*, thiamethoxam and imidacloprid, as there was no report on the efficacy of these chemicals on this crop.

A field experiment was conducted with radish variety Pusa Chetki at the IARI Regional Station, Karnal during *rabi* season of 2000-2001 with six treatments and four replications in Randomized Block Design. The plot size was 5m x 5m and the distance between rows and plants was 60cm and 45cm, respectively. The crop was sown on 11-10-2000 and the stecklings were transplanted on 25-11-2000. The treatments comprised of thiamethoxam @ 25g a.i. per ha, imidacloprid 40g a.i. per ha, Econeem 2.5 liters per ha, endosulfan @ 350g a.i. per ha along with untreated control. Five plants were tagged randomly in each plot and observations on aphid population were taken on these plants at regular intervals. The sampling unit considered was number of aphids on top 5cm of the central shoot. Observations were recorded on a day before and 1, 2, 7 and 15 days after the treatment. The first set of treatment was given on 12th February when the aphid population reached about 50 per plant. The treatments had given control for about 15 days and population started rebuilding necessitating for second treatment, which was given on 18th day after first spray and when the population reached about 50 again in all the treatments. The sprayer used was Knapsack sprayer and about 400 liters of spray fluid was used per hectare. At the end, seed yield was taken from the tagged plants and used for analysis. The data was subjected to RBD analysis using MICROSTAT package.

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Table 1. Influence of insecticidal sprays on the population build up of mustard aphid on seed crop of radish

Treatment	Number of aphids per plant					
	1 day before spray	1 day after spray	2 days after spray	7 days after spray	15 days after spray	Seed yield (grams/plant)
First spray						
Profenophos	161.50	12.20	8.45	16.00	59.75	-
Imidacloprid	206.75	6.40	1.00	12.90	63.25	-
Econeem	122.25	23.10	23.80	68.00	94.85	-
Thiamethoxam	170.10	13.80	5.20	20.50	65.95	-
Endosulfan	120.20	5.70	1.70	24.95	48.50	-
Control	141.95	136.75	141.30	171.50	224.75	-
C.D. at 0.05	5.59	9.40	6.85	5.75	7.30	-
Second spray						
Profenophos	61.75	3.50	1.85	0.10	0.65	82.6
Imidacloprid	66.50	5.70	1.6	0.05	0.85	84.4
Econeem	65.25	6.30	3.25	1.20	0.60	57.8
Actara	67.15	2.25	1.15	0.00	0.35	80.6
Endosulfan	59.30	0.70	0.35	1.15	0.45	78.2
Control	202.50	197.50	141.3	49.20	1.40	37.8
C.D. at 0.05	5.15	3.30	5.42	1.46	1.08	8.20

The data presented in Table 1 indicated that the statistical differences between treatments was significant immediately after 24 hours of the spray in all the insecticidal treatments and continued till seven days after treatment except in econeem. In econeem treatment, the population increased significantly over other chemicals and was statistically evident after 7 days of treatment. The aphid population however remained significantly lower than the control throughout the experimentation but had reached significant proportions by 15 days after first treatment. The second treatment however brought down the population in all the treatments to below injury level within 24 hours after the treatment. However, due to rise in temperature and increase in the activity of coccinellid predators the population in control also started declining by 10 days after the second spray. The yield data showed that all the chemical control treatments had significantly higher yields over control. The econeem treatment however had significantly lower yield than all the other insecticides. Similar results using older insecticides on the same crop and pest have been reported [3, 4, 5]. The newer chemicals tested here were highly efficacious and have greater role in protecting the environment as these chemicals are required fewer grams when compared to older compounds.

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