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Effect of Chemical Control for the Management of Barley Aphid (*Rhopalosiphum maidis*) in Hanumangarh District of Rajasthan

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A B S T R A C T

A field experiment was conducted to investigate that the refined technology of effect of chemical control for the management of barley aphid (*Rhopalosiphum maidis*) on the yield attributes of barley in Hanumangarh District of Rajasthan. Result showed that the refined technology of T2: Spray of Thiomethoxam 25 WG @ 0.5 gm per litre of water highest average grain yield was recorded (35.85 qtl per ha), highest average net returns (Rs. 21,898 per ha) and highest average B: C ratio (2.29) was recorded as compared to T1 and farmers practice.

Introduction

Barley (*Hordeum vulgare* L.) is a valuable crop because it is grown for several purposes such as food and processed food products for human being and feed for cattle and poultry birds. Barley grain is also valued for smothering and cooling effect on the human body for easy digestion.

Besides these conventional uses, it is an important industrial crop because it is used as raw material for beer, whisky and brewing industries. Each 100 g of barley grain comprises 10.6 g protein; 2.1 g fat, 64.0 g carbohydrate, 50.0 mg calcium, 6.0 mg iron, 31 mg vitamin B1, 0.10 mg vitamin B2 and 50 µg foliate (Vaughan *et al.*, 2006). In recent past, India has made an impressive progress in achieving self-sufficiency in food grain production by elevating productivity of several crops. Among them barley is important crop. It is generally grown in areas where irrigation facilities are limited, as it can tolerate moisture and salt stress to a great extent (Yadav *et al.*, 2003).

In India, barley was cultivated on 0.66 m ha area during 2015-16 with 1.62 m t of production at an average productivity status of 24.7 q ha^{-1}. In Rajasthan, barley was cultivated on 0.31 m ha area during 2015-16 with 0.86 mt of production at an average productivity status of 27.7 q ha^{-1} (IIWBR, 2015-16). This

suggests an ample scope for growing barley for better yield.

The crop is infested by a number of insect pests, viz., armyworm, *Mythimna separata* (Haworth); ghujhia weevil, *Tanymecus indicus* (Faust); termite, *Odontotermes obesus* (Ramb.); cutworms, *Agrotis* spp.; shoot fly, *Atherigona naquii* (Styskal); pink borer, *Sesamia inferens* (Walker); jassids, *Amrasca basalis* (Baly); barley aphid, *Rhopalosiphum maidis* (Fitch) and R. padi (Linn.) (Singh, 1983). Among these insect pests, the aphid, *R. maidis* is most serious and regular insect pest of this crop (Sharma, 1990; Kumawat and Jheeba, 1999). Both nymphs and adults cause damage by sucking the cell sap from the leaves, stems and earheads.

Due to rapid multiplication of the aphid, usually the entire shoot is covered and with the result of continuous desaping by such a large population, yellowing, curling and subsequent drying of leaves takes place which ultimately lead to reduction in size of earheads (Bhatia and Singh, 1977).

KVKs are grass root level organizations meant for application of technology through assessment, refinement and demonstration of proven technologies under different 'micro farming' situations in a district (Das, 2007).

The present investigation was taken to study "Effect of chemical control for the management of barley aphid (*Rhopalosiphum maidis*) in Hanumangarh district of Rajasthan".

Materials and Methods

Present study was conducted in 8 locations under On Farm Testing trials in Hanumangarh district villages during rabi 2014-15 to 2015-16 (Two consecutive years) for the refined technology of effect of chemical control for the management of barley aphid (*Rhopalosiphum maidis*). There were 3 treatments i.e. T0– Spray of Imidachloprid 17.8 SL @ 0.3 ml/ litre of water (Farmer's practices), T1: Spray of Dimethoate 30 EC@ 2ml/litre of water (Recommended), T2–Spray of Thiomethoxam 25 WG @ 0.5 gm/litre of water (Refinement). Four farmers in each village were selected and trial was conducted with 0.25 hectare area for each treatment i.e.0.75 hectare/trial. Parameter of refined was grain yield. The experiment comprised of the following treatments (Table 1).

Results and Discussion

Performance of OFTs (On Farm Trials)

The finding of the study revealed that the refined technology of effect of chemical control for the management of barley aphid (*Rhopalosiphum maidis*) reduced the percentage of aphid incidence and yield was increased (Table 2).

Result showed (Table 2) that the refined technology of T2: Spray of Thiomethoxam 25 WG @ 0.5 gm per litre of water highest average grain yield was recorded (35.85 per ha) as compared to T1: Spray of Dimethoate 30 EC@ 2ml per litre of water (33.90 qtl per ha) and Farmer's practices (34.13 qtl per ha).

Economic analysis of OFTs (On Farm Trials)

The economics of chickpea production under trials were estimated and the results of the study have been presented in Table 3.

The results (Table 3) of economic analysis of barley production revealed that the refined technology of T2: Spray of Thiomethoxam 25 WG @ 0.5 gm per litre of water a highest average net returns of Rs. 21,898 per ha with highest average benefit cost ratio (2.29) as

compared to T1: Spray of Dimethoate 30 EC@ 2ml per litre of water average net returns of Rs.19, 532 per ha with average benefit cost ratio (2.14) and farmer's practices of water average net returns of Rs.20,026 per ha with average benefit cost ratio (2.18).

Table.1 Treatments used in the present experiment

Treatments	Material (s) used
T0	Spray of Imidachloprid 17.8 SL @ 0.3 ml per litre of water. (Farmer's practices)
T1	Spray of Dimethoate 30 EC@ 2ml per litre of water. (Recommended)
T2	Spray of Thiomethoxam 25 WG @ 0.5 gm per litre of water. (Refinement)

Table.2 Performance of OFTs on "Effect of chemical control for the management of barley aphid (Rhopalosiphum Maidis)"

Treatment	Grain Yield (qtl/ha)		
	2015-16	2016-17	Average
T0: Spray of Imidachloprid 17.8 SL @ 0.3 ml per litre of water. (Farmer's practices)	34.75	33.50	34.13
T1: Spray of Dimethoate 30 EC@ 2ml per litre of water. (Recommended)	33.40	34.40	33.90
T2: Spray of Thiomethoxam 25 WG @ 0.5 gm per litre of water. (Refinement)	35.50	36.20	35.85

Table.3 Economic analysis of OFTs on "Effect of chemical control for the management of barley aphid (Rhopalosiphum Maidis)"

Net return (Profit) in Rs./ha			B:C ratio		
2015-16	2016-17	Average	2015-16	2016-17	Average
20,203	19,848	20,026	2.15	2.20	2.18
18,239	20,824	19,532	2.01	2.26	2.14
21,018	22,777	21,898	2.20	2.38	2.29

The present investigation was taken to study the refined technology of "Effect of chemical control for the management of barley aphid (*Rhopalosiphum maidis*) reduced the percentage of aphid incidence and yield was increased. Result showed that the refined technology of T2: Spray of Thiomethoxam 25 WG @ 0.5 gm per litre of water highest average grain yield was recorded (35.85 qtl per ha) as compared to T1: Spray of Dimethoate 30 EC@ 2ml per litre of water (33.90 qtl per ha) and Farmer's practices of water (34.13 qtl per ha). The results of economic analysis of barley production revealed that the refined technology of T2: Spray of Thiomethoxam 25 WG @ 0.5 gm per litre of water a highest average net returns of Rs. 21,898 per ha with highest average benefit cost ratio (2.29) as compared to T1: Spray of Dimethoate 30 EC@ 2ml per litre of water average net returns of Rs.19, 532 per ha with average benefit cost ratio (2.14) and farmer's practices of water average net returns of Rs.20,026 per ha with average

benefit cost ratio (2.18). The Trials also built the relationship and confidence between farmers and scientist of Krishi Vigyan Kendra. Therefore it is suggested that these factors may be taken for considered to increase the scientific temperament of the farmers.

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