

Original Research Article

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Assessment of Nematodes Management in Wheat in Hanumangarh District of Rajasthan, India

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ABSTRACT

Keywords

On farm trial, Assessment, Nematodes, Management, Wheat

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The finding of the study revealed that the assessed technology of T2-Pacciliomyces 10 kg/ha reduced the percentage of nematodes incidence and yield was increased recorded highest average yield (43.37 q/ha) as compared to recommended practice and farmers practice. The results of economic analysis revealed that on farm trials (OFTs) recorded highest average net return of Rs. 43,330 Rs. /ha with highest average benefit cost ratio (3.52) as compared to the recommended practice & farmers practice (Control).

Introduction

Wheat (*Triticum aestivum* L.) is the world's most widely cultivated food crop. It is eaten in various forms by more than one thousand million human beings in the world (Iftikhar *et al.*, 2002). Besides staple food for human beings, wheat straw also serves as good source of feed for animals (Sarwar *et al.*, 2006). India is the second largest producer of wheat next to China and achieved all time high production of 93.9 million tonnes during 2011-12 from 29.90 million hectare area (Paroda *et al.*, 2012).

Nematodes occur worldwide in nearly all environments and result in losses of

approximately 10% of world crop production (Whitehead, 1998). About 90 species of plant parasitic nematodes have been reported to be associated with wheat crop. Those of economic importance include: cereal cyst nematode, root lesion nematode, root knot nematode, seed gall nematode and stem nematode (McDonald and Nicol, 2005). Out of these cereal cyst nematode, *Heterodera avenae* Woll. (CCN) is the most important and the most studied plant-parasitic nematode on wheat (Toktay *et al.*, 2013).

Its worldwide distribution, predominance in areas where cereals are grown and devastating negative impact on yields make them major pests affecting the world's food supply (Cook and Noel, 2002). It can cause about 40-50 per

cent yield loss that can reach up to 60-75 per cent in case of severe infection (Mathur *et al.*, 1980). In isolated areas losses in wheat up to 100 per cent have been reported in India (Van Berkum and Seshadri, 1970). In 1960s, CCN caused losses worth Rs. 40 million and Rs. 30 million in wheat and barley, respectively in Rajasthan. The annual loss caused in wheat has been estimated to the tune of Rs. 66 crores in Haryana alone (Kanwar *et al.*, 2007). In Punjab, *H. avenae* population was adversely affected with the cropping sequence shift from maize-wheat and groundnut wheat to rice-wheat. During 1990s under the rice-wheat crop rotation it remained below damaging threshold level. Since 2003, infestation of CCN was recorded in rice-wheat rotation fields (Kaur *et al.*, 2009). The nematode can be managed by cultural practices, chemicals, using CCN resistant cultivars or by integrating these approaches. However, resistance is considered to be most economically effective method of managing CCN.

Keeping above facts in view, the present investigation was taken to study the "Assessment of Nematodes Management in Wheat in Hanumangarh District of Rajasthan."

Materials and Methods

Present study was carried out by Krishi Vigyan Kendra, Nohar, Hanumangarh-II Rajasthan during Rabi 2013-14 to 2015-16 (three consecutive years) at farmer's field under on farm trials (OFTs) of different villages for nematodes problem diagnosis low productivity in wheat. There were 2 treatments i.e. T0- farmers practice (Control), T1 – Recommended practice (i.e. Carbofuran (3G) 1.5 kg/ha), T2 – Farmers & Scientist perspective (i.e. Pacciliomyces 10 kg/ha). The On Farm Trials were conducted by Krishi Vigyan Kendra from Rabi 2013-14 to 2015-16 on 18 locations (farmers). Thus, a total of 18 trials were selected. All the participating

farmers were trained on various aspects of wheat production technologies. Recommended practices of wheat were used for on farm trials in 0.25 hectare area per treatment. A one fifth area was also devoted to grow local standard check. The data collected from the reports of trials conducted by the Krishi Vigyan Kendra on the production technology of wheat crop were used.

Survey was conducted in operational area at farmer's field to know: the socio-economic status of farmer, farming situation, cropping pattern and location. The existing level of adoption of technologies on farm trials (OFTs) site and farmers were selected to suit the activity. Accessibility was also taken at priority. Critical input for on farm trials (OFTs) were also identified and made available to farmers. These were compared with prevailing production technologies of wheat crop (which were taken in recommended practice & check plots). The performances of trials evaluated closely by the organizing seasonal training, method of on farm trials (OFTs), field days and by taking crop-cut experiments. Regular diagnostic visit by the scientists helped in proper execution of on farm trials (OFTs) as well as collection of farmer's opinion about the trials field & Recommended practice. Production and economic data for on farm trials (OFTs), recommended practice and farmers practice were collected and analyzed. The experiment comprised of the following treatments (Table 1).

Results and Discussion

Performance of On Farm Trials (OFTs)

The finding of the study revealed that the assessed technology of T2–Pacciliomyces 10 kg/ha reduced the percentage of nematodes incidence and yield was increased (Table 2).

Table.1 Treatments used in the present experiment

Treatments	Material (s) used
T0	Farmers practice
T1	Recommended practice (i.e. Carbofuran (3G) 1.5 kg/ha)
T2	Farmers & Scientist perspective (i.e. Pacciliomyces 10 kg/ha)

Table.2 Performance of trials on Management of Nematodes in Wheat

S.N.	Treatment	Grain Yield (qtl/ha)			
		2013-14	2014-15	2015-16	Average
T0	Farmers practice	38.00	38.00	38.75	38.25
T1	Recommended practice (i.e. Carbofuran (3G) 1.5 kg/ha)	41.50	42.50	41.50	41.83
T2	Farmers & Scientist perspective (i.e. Pacciliomyces 10 kg/ha)	42.05	44.25	43.80	43.37

Table.3 Economic analysis of trials on Management of Nematodes in Wheat

Net return (Profit) in Rs. / Unit				B:C ratio			
2013-14	2014-15	2015-16	Average	2013-14	2014-15	2015-16	Average
38,950	35,200	36,250	36,800	3.73	2.96	3.01	3.23
43,113	41,250	39,850	41,404	3.88	3.26	3.18	3.44
43,720	43,450	42,820	43,330	3.89	3.35	3.31	3.52

Result showed (Table 2) that the assessed technology of T2-Pacciliomyces 10 kg/ha highest average yield was recorded (43.37 q/ha) as compared to recommended practice (41.83 q/ha) and farmers practice (38.25 q/ha).

Economic analysis of OFTs (On Farm Trials)

The economics of wheat production under trials were estimated and the results of the study have been presented in Table 3. The results of economic analysis of wheat production revealed that on farm trials (OFTs) recorded highest net return was recorded during 2013-14 (Table 3). T2: Pacciliomyces 10 kg/ha a highest average net returns of Rs. 43,330 per ha with highest average benefit cost ratio (3.52) as compared to T1: Recommended practice (i.e. Carbofuran (3G) 1.5 kg/ha) average net returns of Rs. 41,404

per ha with average benefit cost ratio (3.44) and farmers practice average net returns of Rs. 36,800 per ha with average benefit cost ratio (3.23).

The finding of the study revealed that the assessed technology of T2-Pacciliomyces 10 kg/ha highest average yield was recorded (43.37 q/ha) as compared to recommended practice (41.83 q/ha) and farmers practice (38.25 q/ha). The results of economic analysis of wheat production revealed that on farm trials (OFTs) recorded highest net return was recorded during 2013-14. T2: Pacciliomyces 10 kg/ha a highest average net returns of Rs. 43,330 per ha with highest average benefit cost ratio (3.52) as compared to T1: Recommended practice (i.e. Carbofuran (3G) 1.5 kg/ha) average net returns of Rs. 41,404 per ha with average benefit cost ratio (3.44) and farmers practice average net returns of Rs. 36,800 per ha with average benefit cost

ratio (3.23). 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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