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CONTENTS

Short Communication

Health status of farmers' saved seed of wheat crop in Haryana

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Key words: Farmers' seed, infection, IMSCS, seed health, samples

Wheat (*Triticum aestivum* L.) belonging to family *Poaceae* is an important cereal crop grown worldwide. It is staple food for about 2.5 billion people. The global production volume of wheat amounted to over 765 million metric tons (Shahbandeh, 2021). India comes second in production after China. The sown area of wheat in India for the year 2019-20 was 313.57 lac hectares and yield recorded 3.4 metric ton per hectare and production was 107.18 million tons (USDA, 2021).

Quality seed alone can raise agricultural production up to 20 per cent in any farming system. The use of quality seed has become more essential to provide enough food security for the rising population. Seed health status was known by the presence or absence of seed-borne diseases and insect infestation. Seed-borne diseases are referred as particular plant diseases that are associated with the seed and may transmit through seed. Disease free seed is a primary means of reducing the introduction of pathogens into fields and it also reduces the inoculum production and secondary spread of disease after its establishment. The scientific work on the microorganisms as bacterial (Malfanova *et al.,* 2013; Truyens *et al*., 2015), fungal (Porras-Alfaro and Bayman, 2011; Rodriguez *et al.,* 2009) and oomycete (Thines, 2014) residing in and on seeds has been done tremendously in last few years

Farmers saved seed contributes about 85 per cent of total seeds utilized for sowing in India (NITI Ayog, 2018). Seed replacement rate in case of wheat is 40.30 per cent (ICAR, 2017). The remaining 59.70 per cent is farmers saved seed which may act as carrier for spreading of the inoculum in the disease free areas. Farmers use their own saved seeds from the previous harvest which may not be stored in very appropriate conditions required for seed storage as 80 per cent of farmers can't differentiate between seed and grain (Raj *et al.,* 2007). This study gives an overview of farmers' saved seeds in Haryana with highlighting the seed health status of seed of different varieties of wheat.

Collection of wheat seed samples: A total of 246 seed samples (1kg each) were collected from different villages of 11 districts *viz*., Charkhi Dadri, Kurukshetra, Sirsa, Fatehabad, Jind, Hisar, Kaithal, Karnal, Yamunanagar, Ambala and Bhiwani in Haryana during October 2018-19 and 2019-20. The samples were collected from farmers after the harvest of the crop and were brought to the laboratory in sterile plastic bags. All the samples were tested in Seed Pathology Laboratory in the Department of Seed Science and Technology (CCS HAU, Hisar). The collected samples were analyzed for germination following standard germination test using paper towel method (ISTA, 2011) and infection of Karnal bunt and ear cockles by sodium hydroxides soak method (Agrawal, 1985). Each sample was replicated twice (2000 seeds each). The loose smut infection was observed in crop raised during *Rabi* season in both the years and per cent loose smut infection was calculated on infected tiller basis.

Farmers' saved seeds acts as carrier of seed inhabiting micro-flora which can be resulting in deterioration of quality and yield reduction. The perusal of data in Table 1 indicates that all the samples analyzed were satisfying the standards for germination (90.00-98.00 %). There is no occurrence of loose smut and cockles. But Karnal bunt was prominent disease occurred during the analysis process. The percentage of Karnal bunt was 32.53 and range of infection was 0.05-0.70 per cent (Above the prescribed limit *i.e.* 0.25 %) in samples, hence there was rejection of 7.93 per cent seed sample. Among all the districts, Karnal have maximum average infection (0.115 %), followed by Yamunanagar (0.110 %), Kurukshetra (0.107 %) and Charkhi Dadri (0.093 %); whereas minimum average infection was recorded in Ambala (0.037 %). The results found similarity with the studies of Jakhar *et al.* (2019a), Jakhar and Bhuker (2014).

The data presented in Table 1 also indicates the wheat seed health status of farmers own saved seed during 2019-20. A total of 120 seed samples from farmers own saved wheat seed were collected from wheat growing areas of Haryana (11 districts). This year also all the samples fulfilled the

Table 1: Wheat seed health status of farmers own saved seed

District	Total samples	Varieties	Germination	Karnal Bunt(2018-2019)						
				Infected samples		Infected seed	Average infection	Range of infection	Rejected samples	
	No.	No.	%	No.	%	No.	%	%	No.	%
Fatehabad	12	6	92.50-98.00	4	33.33	10	0.041	0.05-0.30	1	8.33
Charkhi-Dadri	8	5	94.00-96.50	3	37.50	15	0.093	0.05-0.40	2	25.00
Kurukshetra	14	8	90.50-96.00	6	42.85	30	0.107	0.05-0.65	3	21.42
Sirsa	12	8	90.00-96.00	3	25.00	8	0.033	0.05-0.20	0	0.00
Jind	14	9	96.00-98.00	4	28.57	12	0.042	0.05-0.25	0	0.00
Hisar	20	10	92.00-96.00	5	25.00	18	0.045	0.05-0.25	0	0.00
Kaithal	8	6	94.00-98.00	3	37.50	7	0.043	0.05-0.20	0	0.00
Karnal	10	6	90.00-94.00	4	40.00	23	0.115	0.05-0.70	2	20.00
Yamuna Nagar	10	7	92.00-98.00	4	40.00	22	0.110	0.05-0.65	2	20.00
Ambala	8	4	90.50-96.00	2	25.00	6	0.037	0.05-0.25	0	0.00
Bhiwani	10	7	92.00-96.00	3	30.00	8	0.040	0.05-0.25	0	0.00
Total	**126**		**90.00-98.00**	**41**	**32.53**	**159**	**0.063**	**0.05-0.70**	**10**	**7.93**
			Karnal Bunt (2019-2020)							
Bhiwani	9	4	90.00-98.00	3	33.33	8	0.044	0.05-0.20	0	0.00
Fatehabad	14	5	94.00-96.00	5	35.71	70	0.250	0.05-3.00	1	7.14
Kurukshetra	10	6	90.00-96.00	6	60.00	70	0.350	0.05-3.00	2	20.00
Charkhi-Dadri	8	5	90.00-98.00	3	37.50	15	0.093	0.05-0.35	2	25.00
Hisar	18	9	94.00-98.00	6	33.33	88	0.214	0.05-2.75	3	16.66
Sirsa	12	5	90.00-96.00	2	16.66	3	0.012	0.05-0.10	0	0.00
Jind	12	6	92.00-96.00	4	33.33	10	0.041	0.05-0.20	0	0.00
Ambala	7	4	90.50-96.00	2	28.57	6	0.042	0.05-0.25	0	0.00
Kaithal	10	5	92.00-96.00	3	30.00	6	0.030	0.05-0.20	0	0.00
Karnal	10	5	92.00-98.00	4	40.00	83	0.415	0.10-3.10	3	30.00
Y Nagar	10	6	92.00-98.00	5	50.00	72	0.360	0.05-3.40	1	10.00
Total	**120**	**-**	**90.00-98.00**	**43**	**35.83**	**431**	**0.179**	**0.05-3.10**	**12**	**10.00**

standards for germination (90.00-98.00 %). This year also no loose smut and cockle infection was observed in field conditions. The Karnal bunt infected sample percentage in 2020 was slightly higher side (35.83) as compared to (32.53) in previous year. The range of infection also followed the similar trend of increasing and was 0.05-3.10 per cent (Above the prescribed limit *i.e.* 0.25 %) in farmers' own saved seed; hence there was rejection of 10 per cent as it was 7.93 per cent seed samples in last year. Among the districts, Karnal again recorded maximum average infection (0.415 %), followed by Yamunanagar (0.360 %), Kurukshetra (0.350 %) and Fatehabad (0.250 %); whereas minimum average infection was observed in Sirsa (0.012 %). The disease severity varies in districts was might be due to the favorable climatic conditions and management practices followed. The results are in accordance with the earlier findings of Jakhar *et al.* (2019b), Jakhar and Punia (2013).

The germination of seed samples collected during the survey has met out the germination (>85%) *i.e.* above the Indian Minimum Seed Certification Standards in both the years. None of the district was found free from Karnal bunt infection. However, the infection was recorded within permissible limit (0.25%) in Sirsa, Jind, Kaithal, Ambala and Bhiwani districts and rest of the districts were crossing the permissible limit. The samples collected from the districts Yamuna Nagar, Karnal and Kurukshetra showed maximum infection. In both the years, none of the samples recorded nematode cockles and loose smut infection. Therefore, there is an urgent need for increasing the use of quality seed instead of farmers own saved seed or to use appropriate storage conditions so that the production can be increased by using quality seed as a basic input.

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