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Short Note

Karnal bunt of wheat: an emerging problem in mid hills of Himachal Pradesh

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Abstract

Karnal bunt (*Tilletia indica* (Mitra) is an important disease of wheat causing considerable economic losses during favourable years. None of the cultivated varieties was resistant to Karnal bunt. On average basis, none of the varieties recorded incidence less than certification limit i.e. 0.25 %. However, VL 829 an early sown variety recorded the lowest incidence of 0.45% and VL804 a timely sown variety recorded the highest score of 50.8 per cent. Among the wheat varieties under cultivation, maximum samples received were of PBW343 and it recorded the highest average record of Karnal bunt i.e. 5.43 per cent.

Key words: Karnal bunt, wheat, Himachal Pradesh.

Karnal bunt (*Tilletia indica* Mitra) is an important disease of wheat causing considerable economic losses during favourable years. The disease is found to occur in the states of Punjab, Haryana, Uttar Pradesh, Union Territory of Delhi, parts of Bihar and West Bengal, lower altitudes of Himachal Pradesh, Jammu region of Jammu & Kashmir and northern parts of Madhya Pradesh and Rajasthan (Joshi *et al.*,1980, Singh *et al.*, 1980). In Himachal Pradesh it is restricted mainly to foot hills i.e. Dhaulakuan area of district Sirmour, Nalagarh area of district Solan and parts of district Una and Kangra. However, in favourable *rabi* seasons like 2004-05, it has emerged as a serious problem in mid hills also. The present studies were conducted to record the incidence of Karnal bunt in mid hills of H.P. during 2004-05 and 2005-06 crop seasons. In some years, the damage to the crop has been recorded 0.3% to 0.5% of the total production (Joshi *et al.*,1983; Singh *et al.*,1983). In the foot hills of H.P. and J & K, the percentage of infected samples has been reported to increase from 25 to 86% between 1977-78 to 1982-83 (Singh *et al.*,1986).

Wheat seed samples collected by the scientists and those received from the seed multiplication farms of the Department of Agriculture through official personnel and registered and unregistered farmers from Kangra, Mandi, Bilaspur, Hamirpur and Una districts were examined for the incidence of Karnal bunt during 2004-05 and 2005-06. For analysis three replications of 1000 seeds each were drawn from each seed sample separately and Karnal bunt infected seeds were counted. The presence of pathogen in doubtful grains was confirmed by crushing bunted portion with a needle and observing teliospores under microscope. Per cent incidence of Karnal bunt in different varieties was worked out. The meteorological data of the period January to March for 2004-05 and 2005-06 crop seasons of Rice and Wheat Research Centre, Malan representing the mid hills situation was also collected and analyzed.

The data (Table 1) revealed an increase in the incidence and spread of Karnal bunt in low and mid hill areas of the state. It appeared in severe form in parts of Una, Bilaspur, Hamirpur, Kangra and Mandi districts during *rabi* 2004-05. Out of 102 samples examined for disease incidence only 19 (18.63%) samples were eligible for certification. None of the samples, received from Rait, Nurpur, Kangra, Naduan, Akrot and Una areas qualified for certification. In mid hill areas, the incidence of Karnal bunt was less (0.03-0.17%) at Paprola, Bhattoo and Padhiarkhar farms situated at 900-1200m a.s.l. elevation. Whereas, its incidence was high (0.23-6.10%) at Rait, Shahpur, Kangra and Sundernagar areas situated between 650-900m. Below 650m, in foot hill areas like Indora, Nurpur, Fatehpur, Akrot and Una its

incidence was quite high and ranged from 0.07-23.13 per cent. During *rabi* 2005-06, no incidence of Karnal bunt was recorded from mid hill areas due to adverse climatic conditions from January to March. The Karnal bunt pathogen assumed epiphytotic proportion under low temperatures and high humidity at the time of anthesis (Goel *et al.*1977). In the present studies, high incidence of Karnal bunt was recorded during 2004-05 as humidity ranged from 48-56 per cent during anthesis period whereas its incidence was not recorded during 2005-06 due to less humidity (21-25%) during anthesis period. According to Joshi *et al.* (1981) and Singh *et al.* (1980), the disease gets established very well at the maximum temperature ranging between 19 and 23 °C and the minimum between 8 and 10 °C, followed by intermittent rains during the anthesis period. In the present studies also, the maximum temperature ranged between 16 and 23 °C and the minimum 5 and 12 °C, but the rainy days received during 2004-05 were more (34 days) than those in 2005-06 (18 rainy days) which contributed to more incidence of karnal bunt in mid hills.

Table 1. Karnal bunt infection during 2004-05

Location	Incidence range	Total samples	Samples eligible for certification	% samples eligible for certification
Indora	0.07-1.73	21	4	19.05
Rait	0.37-6.10	10	0	0
Nurpur	0.60-7.13	11	0	0
Fatehpur	0.07-23.13	22	4	18.18
Shahpur	0.50-50.8	8	1	12.5
Kangra	0.32-2.5	3	0	0
Paprola	0.0-0.07	4	4	100
Bhattoo	0.0-0.17	2	2	100
Padhiarkhar	0.0-0.03	2	2	100
Nadaun	0.3-1.21	3	0	0
Bilaspur	0.03-3.67	6	1	16.7
Sundernagar	0.23-1.8(	4	1	25
Akrot	0.4-0.73	3	0	0
Una	2.10-7.6'	3	0	0
Total		102	19	18.63

It is evident from the data (Table 2) that none of the cultivated varieties was resistant to Karnal bunt. On average basis, none of the varieties recorded incidence less than certification limit i.e. 0.25 %. However, VL 829 an early sown variety recorded the lowest incidence of 0.45% and VL804 a timely sown variety recorded the highest score of 50.8 per cent. Among the wheat varieties under cultivation, maximum samples received were of PBW343 and it recorded the highest average record of Karnal bunt i.e. 5.43 per cent. Earlier, Aujla *et al.* (1977) observed that the incidence of Karnal bunt was highest on the varieties which came in to flowering rather late. The early flowering varieties had very low incidence. Singh and Parsad (1978) observed that the incidence of the disease increased with delayed sowing while maximum incidence of Karnal bunt in several cultivars was observed when they were sown at normal sowing time i.e. in the third week of November (Aujla *et al.*, 1979).

Table 2. Karnal bunt infection on different varieties during 2004-05

Variety	No. of samples	Incidence range	Av. incidence
HPW42	11	0.03-5.70	1.69
HPW184	7	0.20-7.67	3.22
HPW155	10	0.03-3.51	0.78
HS240	9	0.15-4.90	2.08
HS295	16	0.07-5.67	1.20
VL616	4	0.21-4.43	1.78
VL738	4	0.18–3.67	1.96
VL804	1	50.8	50.8
VL829	1	0.45	0.45
PBW343	21	0.44-23.13	5.43
PBW299	6	0.10-3.17	1.51
UP2338	9	0.13-4.47	2.06
Raj3765	3	0.23-0.73	0.50

Table 3. Weather data for the year 2004-05 and 2005-06

Month	Temp (°C)		RH (%)	Number of rainy days	Total rainfall (mm)
	Max	Min			
Jan 2005	15.9	5.1	53.1	7	74.2
Feb 2005	16.0	7.4	55.6	14	172.3
March 2005	22.0	12.0	47.6	13	85.3
Mean	17.97	8.17	52.1	34	331.8
Jan 2006	17.1	5.1	20.9	6	66.3
Feb 2006	23.8	9.1	23.8	2	7.2
March 2006	23.4	9.4	25.3	10	88.8
Mean	21.43	7.87	23.33	18	162.3

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