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SEED-BORNE MYCOFLORA OF WHEAT COLLECTED FROM RAJASTHAN WITH SPECIAL REFERENCE TO *ALTERNARIA SPECIES*

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The seed borne mycoflora of wheat is reported here which comprises of 22 fungal species. Four species of *Alternaria* were recorded. *A. alternata* was associated with seed samples collected from all the districts and was predominant.

Keywords : Agar plate test; Alternaria; Blotter test; Seed Mycoflora; Wheat.

Wheat is an important crop of Rajasthan. Extensive reviews are available for seed borne mycoflora of wheat[1-3]. However, no systematic studies have been conducted on seed borne mycoflora of wheat in Rajasthan, therefore it was considered to investigate the seed borne mycoflora with special reference to *Alternaria* species.

37 samples of wheat seeds from nine district of Rajasthan have been collected and examined under stereobinocular microscope. The standard seed health testing method such as blotter test and agar plate method as prescribed by ISTA[4] were used to analyse the seed borne mycoflora of wheat. For pretreatment seeds were pretreated with sodium hypochlorite with 1.0 per cent available chlorine for 1 minute. The percent incidence (PI) and relative percent occurrence (RPO) of different fungi obtained was calculated by the following formula-

$$PI = \frac{\text{Number of seeds on which a species occurred}}{\text{Total number of seeds analysed}} \times 100$$

$$RPO = \frac{\text{Number of samples on which fungi recorded}}{\text{Total number of samples studied}} \times 100$$

Standard taxonomic literature was followed for determination of fungal species.[5-6]

A total number of 22 fungal species were isolated both by blotter and agar plate method (Table 1). *Cladosporium* sp.; *Epicoccum* sp.; *Helminthosporium* sp.; and *Mycelia sterilea* (white) appeared only on blotter test. Similarly *Myrothecium* sp.; was detected only on agar plate. Several species of *Alternaria* viz. *A.alternaria, A. tenuissima* and *A. triticina* were recorded, besides this *Aspergillus flavus* and *A. niger* were associated with the seed collected from all the nine districts, and were found to be dominant. Maximum per cent incidence and relative percent occurrence were recorded on *A. alternata* 7.45% and 89.1% by blotter method. Likewise *Drechslera rostrata* was minimum on agar plate (0.05%). *D. rostrata* and *Curvularia curvata* were least common as recorded in agar plate method (RPO-5.4).

Four species of *Alternaria* viz.*A. alternata, A. tenuissima, A. triticina* and *A. triticola* were recorded. However their region of prevalence in Rajasthan was variable.

A. alternata, A. tenuissima and *A. triticina* were associated with seeds collected from all the nine district and were found dominant (Table. 1). *A. triticola* was associated with seed samples collected from Ajmer, Bharatpur, Dholpur, Jaipur and Kota.

A. alternata is week parasite common to seeds of many crops including wheat. It has been reported to be seed borne and pathogenic to sunflower[7]; radish[8]; and wheat[9].

A. triticina causing severe blighting on leaves, leaf sheath and glumes of wheat[6]. *A. triticola* causing fusiform, oval or irregular clear brown spots on leaves of wheat[6]. *A. tenuissima* was very common and recorded on a very wide range of plants, usually as a secondary invader rather than a primary parasite.

The measurements of the samples collected tallied with standard measurements. *A. alternata* (7-72µ x 6-25µ with short beaks and long chains); *A. triticina* (15-89µ x 7-30µ with long beak, 2-37µ x 3-7µ and short

Table 1. Seed borne mycoflora on wheat seeds of different districts of Rajasthan (Blotter method and plate method)

District/ No. of Samples studied	Ajmer 8		Bharatpur 4		Bhilwara 2		Dausa 2		Dholpur 4		Ganganagar 2		Jaipur 7		Kota 5		Swaimadhopur 3		Percent Incidence (P.I.)		Relative percent Occurrence (R.P.O.)	
Mycoflora	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A
Alternaria alternata	87 (8)	72 (8)	30 (3)	25 (3)	9 (2)	5 (2)	17 (2)	12 (2)	18 (4)	10 (4)	15 (2)	8 (2)	35 (5)	30 (4)	25 (4)	14 (3)	40 (3)	18 (2)	7.45	5.24	89.1	81.0
A. tenuissima	34 (5)	12 (3)	11 (4)	7 (3)	3 (1)	4 (2)	-	2 (1)	6 (2)	4 (2)	12 (2)	6 (2)	35 (5)	28 (3)	18 (5)	12 (4)	7 (4)	5 (2)	3.40	2.16	70.2	59.4
A. triticina	9 (6)	12 (7)	2 (2)	4 (2)	3 (1)	4 (2)	2 (1)	1 (1)	8 (2)	5 (2)	5 (2)	1 (1)	3 (4)	8 (3)	12 (5)	4 (2)	7 (2)	5 (2)	1.67	0.86	67.5	56.7
A. triticola	1 (1)	3 (1)	1 (1)	-	-	-	-	-	2 (1)	-	-	-	3 (1)	1 (1)	-	2 (1)	-	-	0.18	0.10	10.8	8.1
Aspergillus flavus	9 (8)	5 (5)	8 (4)	2 (2)	4 (1)	5 (1)	2 (1)	-	8 (2)	2 (10)	1 (1)	1 (1)	6 (4)	3 (2)	4 (2)	2 (1)	7 (3)	5 (3)	16.2	0.67	70.2	43.2
A. fumigatus	6 (3)	2 (1)	4 (2)	1 (1)	2 (1)	-	2 (1)	1 (1)	-	-	1 (2)	-	6 (2)	2 (1)	2 (1)	-	3 (1)	-	0.70	0.16	30.13	10.8
A. humicola	5 (3)	2 (1)	2 (1)	-	1 (1)	2 (1)	-	-	-	-	1 (1)	-	8 (2)	4 (2)	2 (1)	-	3 (1)	1 (1)	0.59	0.24	27.0	13.5
A. niger	7 (5)	3 (2)	2 (2)	1 (1)	2 (1)	2 (1)	2 (1)	1 (1)	5 (3)	3 (3)	1 (1)	1 (1)	6 (4)	8 (5)	2 (1)	1 (1)	-	1 (1)	0.72	0.56	48.6	43.2
Chaetomium globosum	-	-	2 (2)	-	-	-	-	-	-	1 (1)	-	-	39 (5)	24 (4)	3 (2)	1 (1)	1 (1)	-	1.2	0.70	29.7	13.5
Cladosporium sp.	2 (1)	-	1 (1)	-	-	-	-	-	-	-	1 (1)	-	3 (2)	-	-	-	-	-	0.18	-	13.5	-
Curvularia curvata	5 (3)	-	-	-	1 (1)	-	1 (1)	1 (1)	-	-	-	-	-	3 (1)	-	-	-	-	0.2	0.18	13.5	5.4

District/ No. of Samples studied	Ajmer 8		Bharatpur 4		Bhilwara 2		Dausa 2		Dholpur 4		Ganganagar 2		Jaipur 7		Kota 5		Swairnadhopur 3		Percent Incidence (P.I.)		Relative percent Occurrence (R.P.O.)	
Mycoflora	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A
C. lunata	2 (2)	3 (2)	-	-	-	-	1 (1)	-	1 (1)	-	-	1 (1)	3 (2)	1 (1)	1 (5)	-	2 (1)	-	0.27	0.13	32.43	10.8
Drechslera halodes	3 (2)	1 (1)	-	-	2 (1)	-	1 (1)	1 (1)	5 (2)	1 (1)	-	-	3 (3)	1 (1)	1 (1)	-	3 (2)	-	0.62	0.10	35.13	10.8
D. rostrata	1 (1)	-	-	-	1 (1)	-	-	-	1 (1)	-	-	-	4 (3)	1 (1)	3 (2)	-	3 (2)	1 (1)	0.35	0.05	27.08	5.4
D. tetramera	-	-	1	-	-	-	-	-	1 (4)	2 (1)	-	-	5 (4)	6 (4)	-	1 (1)	-	2 (1)	0.21	0.27	24.3	18.9
Epicoccum sp.	8 (4)	-	1 (1)	-	1 (1)	-	-	-	-	-	-	-	3 (2)	-	-	-	-	-	0.35	-	21.62	-
Fusarium sp.	-	-	1 (-)	-	-	-	1 (1)	-	3 (2)	4 (3)	-	-	2 (1)	5 (3)	1 (1)	2 (1)	2 (1)	1 (1)	0.02	0.32	18.9	21.62
Helminthosporium sp.	-	-	-	-	-	-	1 (1)	-	-	-	-	-	2 (2)	-	2 (1)	-	-	-	0.10	-	10.8	-
Penicillium sp.	-	-	-	-	1 (1)	-	1 (1)	-	2 (1)	-	-	-	4 (1)	3 (1)	2 (1)	3 (2)	-	2 (1)	0.27	0.21	13.5	21.62
Rhizopus sp.	8 (4)	1 (1)	2 (1)	-	1 (1)	-	2 (2)	1 (1)	3 (2)	2 (1)	1 (1)	-	5 (3)	2 (1)	2 (1)	-	2 (1)	-	0.67	0.16	40.5	16.2
Mycelia sterilea (white)	1 (1)	-	1 (1)	-	-	-	-	-	2 (1)	-	-	-	2 (1)	-	4 (2)	-	-	-	0.27	-	16.2	-
Myrothecium sp.	-	1 (1)	-	-	-	-	-	-	-	2 (1)	-	-	-	-	-	3 (1)	-	1 (1)	-	0.18	-	10.8

B = Blotter method

A = Agar plate method

Value in parentheses are showed that number of samples in which fungi recorded.

chains of 2-4); *A. triticola* (63-172μ x 21 - 36μ with medium beak and short chains of 2-3) and of *A. tenuissima* (23-74μ x 9-12μ).

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