Indian J.L.Sci.1(2) : 39-41, 2012

INCIDENCE OF FOLIAR BLIGHT PATHOGENS OF WHEAT (*Triticum aestivum* L.) IN AGRA REGION

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ABSTRACT

The foliar blights of wheat include the leaf blight and blotches which are caused by *Alternaria* and *Helminthosporium* species respectively. Monitoring of foliar blights of wheat in 5 districts viz., Agra, Mathura, Firozabad, Mainpuri and Etah of Agra region revealed that *Helminthosporium sativum*(Syn. *Bipolaris sorokiniana*) is the most predominant pathogen of wheat followed by *Alternaria triticina* in this region. However, *Alternaria triticina* is less significant. The average incidence of *Bipolaris sorokiniana* and *Alternaria triticina* at maturity of the crop was 62% and 43% respectively but *Alternaria alternata* showed average incidence of 14.4% in the month of April. The maximum incidence of the pathogens was recorded from wheat leaf samples of Mainpuri, while the minimum incidence was noted in the leaf samples collected from Mathura district.

KEYWORDS: Foliar blight, wheat, *Bipolaris sorokiniana, Alternaria triticina*

Wheat (*Triticum aestivum* L.) is the world's most extensively grown crop and important staple food. There are several constraints limiting the potential yield of wheat. Among them foliar blight has recently emerged as major concern throughout the world (Dubin and Van, 1991). In India, foliar blight of wheat had been noticed as early as 1924 (Kulkarni,1924), but it was not of much consequence till recently. In the recent past, with the change in cropping system, foliar blight has now become a major disease far and wide in our country causing 2.72 to 36.24% yield losses under different agroclimatic zones (Parashar et al.,1995). In India, foliar blights of wheat are considered as one complex, which includes leaf blight caused by *Alternaria triticina* Prasada and Prabhu and spot blotch caused by *Bipolaris sorokiniana* (Sacc) Shoemaker (Syn. *Helminthosporium sativum* Pammel, King and Bakke).

In the Indogangetic plains, covering the entire north-western and north-eastern plains, rice-wheat rotation is the dominant cropping sequence. It has been commonly observed that the intensity of foliar blights has considerably increased in the rice-wheat system (Saari and Wilcoxson,1974; Nagarajan and Kumar,1998). During last decade multilocational surveys for determining incidence of foliar blights of wheat have been conducted in eastern U.P., Bihar, Haryana, Punjab, Delhi, Gujrat and Rajasthan (Goel et al.,1999; Singh et al.,2004; Saharan et al.,2008). In view of the growing concern about foliar blight of wheat, it was considered desirable to study the incidence of the disease and the causal organisms in five districts of Agra region, where wheat is main food crop.

MATERIALS AND METHODS

In the present study, the wheat fields of five districts viz., Agra, Mathura, Firozabad, Mainpuri and Etah were surveyed in 2010 for the incidence of foliar blight pathogens. For this purpose 100 diseased leaf samples were collected in sterilized polythene bags in the months of January, February, March and April and brought to the laboratory and screened for the association of moulds by standard technique after surface sterilization following Singh et al.,(1992). The moulds associated with blighted leaves were purified and identified following descriptions given by Barnett,(1960) and Gilman,(1975). The confirmation of Bipolaris sorokiniana, Alternaria triticina and Alternaria alternata was sought from Division of Mycology and Plant Pathology, IARI, New Delhi.

RESULTS AND DISCUSSION

The perusal of table-1 clearly indicates that three pathogens viz., *Bipolaris sorokiniana, Alternaria triticina* and *Alternaria alternata* were found associated with blighted leaves of wheat throughout the crop season. Out of these, *Bipolaris sorokiniana* and *Alternaria triticina* were present during the entire crop season but *Alternaria alternata* was recorded in the months of March and April. It is also clear from the Table that *Bipolaris sorokiniana* was more abundant than the other two pathogens. Further,

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Table 1: Incidence of Foliar Blight Pathogens

S. N	District	No. of samples	Months/Pathogen											
			January			February			March			April		
			BS	AT	AA	BS	AT	AA	BS	AT	AA	BS	AT	AA
1	Agra	100	30	18	-	42	22	-	55	30	8	62	48	12
2	Mathura	100	28	12	-	38	20	-	48	26	7	58	28	10
3	Firozabad	100	32	16	-	46	24	-	58	30	10	64	46	15
4	Mainpuri	100	28	14	-	47	30	5	60	42	15	66	48	18
5	Etah	100	33	18	-	46	28	8	53	38	12	63	47	17
	Total	500	151	78	-	219	124	13	274	166	52	313	217	72

Bs- *Bipolaris sorokiniana*, AT- *Alternaria triticina*, AA- *Alternaria alternata*

Alternaria alternata has been found to be less prevalent fungus on wheat leaves and it was generally recorded from senescent leaves during months of March and April.

A critical analysis of present study indicated that young plants of wheat were less infected, but the incidence of disease increased with maturity of the crop. It can be attributed to the fact that average temperature remains low (below 20°C) in the months of January and February, while temperature increases in the months of March and April. It may be noted that optimum temperature for *Bipolaris sorokiniana, Alternaria triticina* and *A. alternata* ranges between 24-28°C (Nema,1969). Further disease intensity increases with passage of time due to secondary infection and attains maximum value in the month of April, when the crop is nearly ready for harvest (Joshi et al.,1974).

Another interesting finding is that the three pathogens showed almost similar incidence in all the five districts of Agra region, thereby indicating uniform presence over wheat fields in considerably large area. It clearly shows that *Bipolaris sorokiniana* and *Alternaria triticina* are the two major foliar blight pathogens of wheat showing average incidence of about 62% and 43% respectively at mature crop stage. However, *A. alternata* is of less significance as it showed 14.4% average incidence in the month of April. Joshi et al.,(1974) analysed 412 samples collected from different states for foliar blight of wheat. They noted that *Helminthosporium sativum* and *Alternaria triticina* were two major pathogens isolated from 125 and 82 samples respectively, thereby supporting present findings. Goel et al.,(1999) also suggested that the two major pathogens involved in the leaf blight complex as recorded by the analysis of very large number of samples in the country are *Helminthosporium sativum* (Syn. *Bipolaris sorokiniana*) and *Alternaria triticina*. It was also noted that *Alternaria triticina* is mainly confined to India as it has not been reported the causal factor from any other country except Romania. Rajaram ,(1988) has observed that this disease is the main limiting factor in growing wheat after rice as progress in genetic resistance to spot blotch of wheat caused by *Bipolaris sorokiniana* has been slow. Thus, there is need for development of some ecofriendly management strategy for control of foliar blight of wheat.

ACKNOWLEDGMENTS

Authors are thankful to Principal Agra College, Agra for providing us all kinds of facilities.

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