

New Invader in The Rice Fields of Bundi: “False Smut”

Abstract

In Rajasthan rice is grown largely under rain fed and irrigated conditions. The present study area, The Bundi district, is situated in the south-eastern part of Rajasthan. In Bundi, rice is an important source of earning because of existence of many rice industries and export of rice. In the present investigation an intensive survey of the fungal pathogens was conducted at various localities. The occurrence of the above said disease was considerably observed in the study area.

Keywords : Pathogen, survey

Introduction

Rice cultivation is the principal activity and source of income for millions of household around the globe and several countries of Asia (Junaid *et al* 2009). Except of course, for Antarctica, every continent of the planet produces rice with over one hundred twenty two countries currently growing the crop (Kenmore 2003). Rice is an important staple food and cash crop of India. It is cultivated in almost all the states of India, covering more than 30 percent of the total cultivated area. In Rajasthan rice is grown largely under rain fed and irrigated conditions. One of the important constraints in achieving higher rice yield is losses caused by abiotic and biotic factors. Amongst the biotic factors plant disease are the most important factors which result in considerable and economical crop losses every year (Asghar *et al* 2007). Among the fungal diseases false smut caused by *Ustilagoidea virens* has become very serious now a days. The survey study will enable us to locate the hot spots for disease in study area. In addition, it will also help us to know their characteristic symptoms. Singh *et al* (1987) studied that false smut is an important rice disease of wet season in eastern Uttar Pradesh causing considerable yield losses. Singh and Pophaly (2010) carried out a survey in Raigarh district of Chattisgarh to observe the extent of false smut infestation and found that more than 600 ha were severely affected by the disease. Ladhaxmi *et al* (2012) studied the intensity of rice false smut disease in selected states of northwest and south India. Guljar (2012) surveyed the occurrence of false smut disease in temperate agro climatic conditions of Kashmir and found the disease to be sporadic.

Aim of the Study

The objective of this study is to survey of occurrence of false smut in the rice growing areas of Bundi district.

Material and Methods

The present study area, The Bundi district, is situated in the south-eastern part of Rajasthan. It is located at 24°49'11" to 25°53'11" North latitude and 75°30' to 76°21'30" East longitude. The present study area is predominantly an agricultural region with an agrarian economy. The district is rich in rice crop cultivation. In Bundi, rice is an important source of earning because of existence of many rice industries and export of rice. In the present investigation an intensive survey of the fungal pathogens was conducted at various localities viz. Ajjanda, Arnetha, Radi, Kapren, keshavraipatan, Gandoli (Tehsil-Keshavraipatan), Laban, Deikhera (Tehsil Indragarh), Gardara, Hattipura, Bardha, Dolara, Matunda, Namana, Talera (Tehsil Bundi), Satoor (Tehsil Hindoli) and Karwar (Tehsil Nainwan) covering the major rice growing areas of the Bundi district, during Kharif season. Each surveyed locality of rice growing area was divided into different zones of approximately the same area, by grouping. In each zone, five rice fields were selected, randomly. In each field, ten sampling units of 3x3 feet area were laid. A total of 50 plant samples (healthy and infected) were selected from 10 sampling units (5 plants from each unit), kept in sterilized plastic bags and brought to the laboratory. Plant tillers of each hill at each sample spot were closely examined for the presence of the



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diseases. On the basis of morphological symptoms healthy and infected plants were separated.

Identification of Fungal disease on Rice

For the identification of fungal pathogens, the rice plant samples were collected from rice fields of the above said localities of the study area. The fungal pathogens from the field collected rice plant samples were identified on the basis of different morphological symptoms and using standard journals, manuals and keys (Subramaniam 1956 and Barnett 1972). Detailed morphological studies of fungal pathogens were made. For the identification of causal organism the

disease symptoms of plant samples were keenly observed. Microscopic preparations of the stained leaf sections, mycelia and spores from infected plant parts were made and observed under microscope for identification of pathogenic fungi. For this purpose infected plant parts were taken, thoroughly washed and finely sectioned. The sectioned pieces were stained with cotton blue and mounted in lactophenol and then observed under microscope for further confirmation of the pathogen on rice.

Observation

Table – Occurrence of Phyto parasitic Fungi on Rice, in different localities of Bundi district, Rajasthan

S.N.	Tehsils of Bundi district	Location	No. of Sampling Unit	No. of Plant Samples Studied	Occurrence of false smut
1	K. Patan	Ajjanda	10	50	-
2		Arnetha	10	50	+
3		Radi	10	50	+
4		Kapren	10	50	+
5		K. Patan	10	50	+
6		Gandoli	10	50	-
7	Indargarh	Laban	10	50	-
8		Deikhera	10	50	-
9	Bundi	Gardara	10	50	+
10		Hattipura	10	50	-
11		Bardha	10	50	+
12		Dolara	10	50	+
13		Matunda	10	50	-
14		Namana	10	50	+
15		Talera	10	50	+
16	Hindoli	Satoor	10	50	-
17	Nainwan	Karwar	10	50	+
18	Total		170	850	10

+ = Occurrence of disease in the area., - = Absence of same disease in the area.

In false smut of rice, the identifying symptoms were confined to ears only. The fungus transformed individual grain into yellow or greenish spore balls of velvety appearance which were small at first and 1 cm or longer at later stages. At early stages the spore balls were covered by a membrane which bursted with further growth. Due to the development of the fructification of the pathogen, the ovaries were transformed into large velvety green masses. In stained preparations spores of the pathogen were observed. The spores were produced in spore balls. The spore balls were present laterally on minute sterigmata on radial hyphae and were spherical to elliptical, warty, olivaceous, 3-4x4-6µm in size. The spores, also called as chlamyospores were ovoid and very minute. The pathogen identified was *Ustilagoidea vires (cke.) Tak*. The systematic position of the fungus is as follows:-

Kingdom – Fungi

Phylum – Ascomycota

Class – Sordariomycetes

Order- Hypocreales

Family –Clavicipitaceae

Genus – Ustilagoidea

Species – Ustilagoidea vires

Result and discussion

The present investigation was aimed to find out the occurrence and distribution of false smut on rice plant in all the seventeen localities of Bundi

district during Kharif season. The occurrence of the above said disease was observed in the study area. Out of 17 localities studied, the disease prevalence was confirmed in 10 localities. It may be due to the favourable climatic conditions, amount of rainfall in the area, moderate temperature, relative high humidity and suitable soil conditions. The results obtained in the present work coincided with the findings of many previous workers such as Subramaniam *et al* (1986), Patel *et al* (1988), Biswas (2003) who suggested that above said climatic conditions were much favourable for the occurrence of fungal disease on rice crop

The survey study thus gives advance knowledge of disease infestations in the area and this could help to plan cropping patterns and to get best advantage of control measures.

Conclusion

The survey study will enable us to locate the hot spots for disease in study area. In addition, it will also help us to know their characteristic symptoms. The survey study thus gives advance knowledge of disease infestations in the area and this could help to plan cropping patterns and to get best advantage of control measures.

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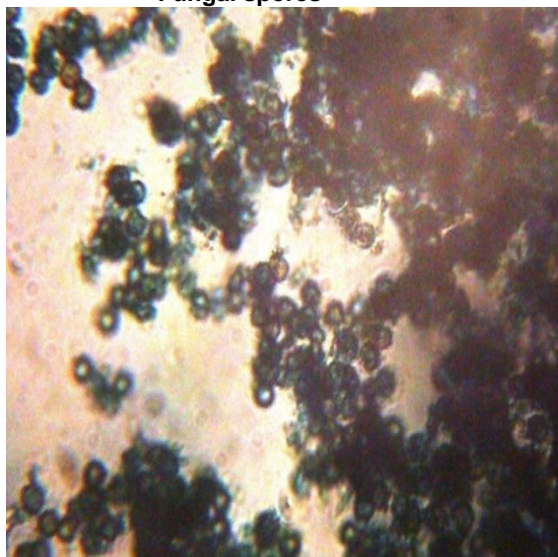
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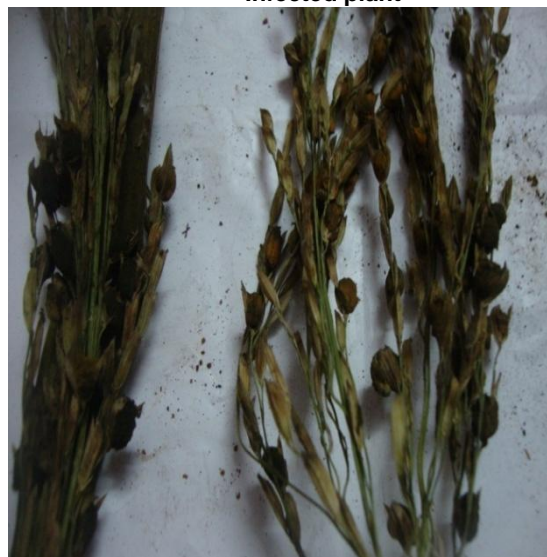
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Fungal spores



Infected plant



MAP: Surveyed Localities of Bundi District of Rajasthan

