

SURVEY OF FALSE SMUT (*USTILAGINOIDEA VIRENS*) OF RICE (*ORYZA SATIVA* L.) IN SELECTED DISTRICTS OF UTTAR PRADESH, INDIA

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KEYWORDS

False smut
Oryza sativa
Ustilaginoidea virens

Received on :

25.01.2014

Accepted on :

25.02.2014

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ABSTRACT

A survey was carried out in selected districts of Uttar Pradesh (India) to evaluate the incidence of false smut of rice. Among all districts surveyed, the highest incidence (80%) was recorded in Gaur block of Basti district. The incidence ranged between 5-80% in surveyed districts of Uttar Pradesh (India). After the survey, the data imply that false smut is emerging as one of the major diseases of rice in India.

INTRODUCTION

False smut of rice caused by a fungal pathogen, *Ustilaginoidea virens* (Cooke) Takahashi, is a common grain disease of rice around the world. The disease was first reported from Tinneveli in Tamil Nadu, India by Cooke in 1878 (Ou, 1972). Since then, it has been reported from most rice growing countries worldwide (Rush *et al.*, 2000, Abbas *et al.*, 2002 and Biswas, 2001). False smut was recognized as a symbol of a bumper harvest and was categorized as a minor disease due to its sporadic occurrence. However, this disease has been observed in severe form since 2001 due to wide-spread cultivation of high fertilizer responsive cultivars and hybrids, heavy application of nitrogenous fertilizer and an apparent change in climate. In recent years, it has emerged as the most devastating grain disease in the majority of rice growing areas of the world. In India, the disease has been observed in severe form since 2001 in major rice growing states, *viz.*, Haryana, Punjab, Uttar Pradesh, Uttaranchal, Tamil Nadu, Karnataka, Andhra Pradesh, Bihar, Jharkhand, Gujarat, Maharashtra, Jammu & Kashmir and Puducherry (Dodan and Singh, 1996 and Mandhare *et al.*, 2008).

A cursory perusal of the literature revealed that research on the false smut has been negligible in India partly because of its minor importance. In the present work, a random survey has been done to evaluate the variation in incidence of this disease in some selected rice growing districts of Uttar Pradesh (India).

MATERIALS AND METHODS

Roving method of survey was followed to check the incidence of false smut disease of rice (Balai, *et al.*, 2013). The districts surveyed were Allahabad, Gorakhpur, Lucknow, Basti, Sant Kabir Nagar and Siddharth Nagar of Uttar Pradesh, India during October, 2013. In each district, four to five Blocks were randomly selected and in each Block, four to five villages were surveyed. In each village, two to ten, 1m² areas were selected in fields of rice and observations on number of infected tillers/m² and number of smut balls/infected panicle were recorded [Shivalingaiah and Umesha (2011) and Ladhakshmi *et al.* (2012)]. The specimens were collected from different location and the collected samples were wrapped in cellophane paper and brought to the laboratory for their identification (Soosairaj *et al.*, 2012). The data are presented as range and mean (Table 1).

RESULTS AND DISCUSSION

A survey on the incidence of false smut of rice in Uttar Pradesh, India during October, 2013, revealed that the incidence varied widely from one place to another place. The incidence of infected tillers was found to range between 5% and 80%, causing a substantial reduction in grain yield. Numbers of infected balls per infected tillers were found to range between 1 and 18. Maximum number of infected balls per infected tillers was recorded in Basti district followed by Gorakhpur

Table 1: Survey on incidence of false smut of rice in some selected districts of Uttar Pradesh

District	Block	Villages/Surveyed Unit	Percentage of infected tillers			Numbers of infected balls per infected tillers		
			Range	Mean	SEM*	Range	Mean	SEM*
Allahabad	Chaka	Amiliya, Mahuwari, Baramar, Baswar, Dandi	15-25	20.6	0.97	3-6	4.4	0.26
		Karchana, Antahiya, Bhunda, Ghorhat, Bharaha	05-15	10.6		1-4	2.8	
		Raini, Kapsa, Belwa, Chaq Alipur, Dayalpur	18-30	23.2		4-8	5.7	
		Jasra	20-35	26.4		4-8	5.6	
		Meja	05-15	10.5		1-3	2.0	
Gorakhpur	Bansgaon	Khotha, Lalpur, Pali Khas, Singha, Tekwar	05-20	13.0	1.33	3-8	5.6	0.35
		Gola	15-25	22.0		5-8	6.0	
		Pali	15-30	22.4		4-9	6.4	
		Piperauli	15-30	18.4		4-8	5.6	
		Sahjanwa	15-40	29.2		6-10	8.0	
Lucknow	Baksi-ka-talab	Asti, Behata, Dasauli, Dariyapur, Ludhauri	12-25	18.4	0.83	3-5	4.0	0.17
		Mohari, Khurdahi, Rakeebabad, Parehta, Beli	18-25	21.0		4-5	4.4	
		Mangataiya, kushamaura, Sisendi, Dayalpur, Jabrauli	10-20	14.6		3-5	3.8	
		Jayati khera, Neeva,Bani, Banthara, Bibipur	12-22	16.4		3-6	4.2	
		Maghar, Vishwanathpur, Karvi	10-25	18.3	2.04	3-5	4.3	0.56
Sant Kabir Nagar	Semariyawa	Tema Rahmat, Bagh Nagar, Dudhara	15-30	23.3		3-8	5.6	
		Sanichara Bazaar, Govindganj, Godha	15-25	19.3		3-5	4.3	
		Nathnagar, Mukhlispur, Ali-Jagdshpur	17-25	20.6		3-5	4.0	
		Ramwapur Mishra, Pratappur, Dharamsighnwa	20-30	24.0		4-8	5.6	
		Dhorika, Belari, Gotwa, Sonupar, Parsa	20-35	27.6	2.19	6-8	7.2	0.46
Basti	Bankati	Bankati, Kharka, Pakri Chanda, Rautapar, Senduriya	15-35	22.6		4-8	5.6	
		Chakiya, Piperpati Must, Parsauna, Chhardahi, Chakdaha	10-25	19.0		3-7	5.2	
		Gaur, Itabahra, Halua, Purushottampur, Mahua Dabar	30-80	53.0		8-18	12.2	
		Bemahri, Sisauni, Bhiura, Govindpara, Chilma	20-35	26.0		5-8	6.2	
		Basantpur, Chetia, Dasia, Nevari, Harraia Nankar,	05-15	11.0	1.48	1-4	2.8	0.28
Siddharth Nagar	Domariyaganj	Bayara, Bhagwanpur, Bhanpuri Rani, Deoria, Kusmi	05-25	16.0		3-5	3.8	
		Bhaisahawa, Bhopasi, Nagapari, Sehura, Jogibari	15-35	22.0		3-8	5.0	
		Asogawa, Bhabhni Nankar, Jamuni, Jogia Bujurg, Kharika Pandey	15-30	20.4		4-6	5.2	
		Barago, Basauni, Dhauri Kuyia,Jagdshpur, Kodara	15-40	24.4		4-8	5.0	

*Standard error of mean



Figure 1-5: Symptoms of false smut of rice at different stages (yellowish to greenish black coloured smut balls)

district. The heavy incidence of the disease was recorded in Gaur block of Basti district followed by Sahjanwa block of Gorakhpur district (Table 1). Due to this heavy incidence of smut spores in the atmosphere, the air above the infected fields gave a black smoky appearance from a distance. Among the districts surveyed, disease incidence was high in Basti and

Gorakhpur districts.

Perusal of the literature revealed that false smut incidence varied widely from one place to another place. The survey data imply that false smut is emerging as one of the major diseases of rice in India. The infected tillers were found to vary between 5% and 80% in different parts of Uttar Pradesh, India. The Production Oriented Survey (POS) conducted by the All India Coordinated Rice Improvement Programme (AICRIP) also revealed the gradual increase in the incidence and spread of the disease over the years (POS 2000-2009). Singh and Pophaly (2010) reported that an area of more than 600 ha of rice was severely affected by false smut in Raigarh district of Chhattisgarh in 2007. Yield loss due to this disease depends on the environmental conditions, the genetic make-up of the cultivar and the virulence of the pathogen. The disease also causes economic losses to farmers due to a lower market price for their produce owing to the presence of black chlamydospores masses on healthy rice grains. Same work has been done by Ladhakshmi *et al.* (2012); Wang *et al.* (2013) and Singh *et al.* (2012) and their result revealed that the disease incidence varied widely from region to region and within a region, the intensity of the disease varied depending upon the cultivars. The incidence of infected tillers was found to range between 2% and 85% in both the Northern and Southern parts of India (Ladhakshmi *et al.*, 2012).

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