SHORT COMMUNICATION

SURVEY OF WHEAT CROP FOR THE PREVAILING BROW RUST (PUCCINIA RECODITA F.SP. TRITCI ROB. EX. DESM.) IN DIFFERENT REGION OF UTTAR PRADESH

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Abstract: Uttar Pradesh is considered to be hot spot area for the development of leaf rust omplex. Thus, this study was carried out to investigate the distribution and intensity of wheat leaf rust, and to detect the virulence spectrum of Puccinia recondita f. sp. tritici Rob. ex. Desm during cropping season 2012-13. Survey programme were conducted in different wheat growing area of Utter Pradesh and covers four regions basically Eastern U.P., Central U.P., Bundelkhand region and Western U.P. region. The data was collected on the basis of Global Cereal Rust Monitoring Form provided by BGRI (borlauge global rust initiative). In East U.P. region, district Lakhimpurkhiri brown rust traces were observed in village Katania (8-10 plants, severity upto 20S) on the cv. Sonalika. However in Paliakalannon brown rust were observed on date. At Golagokharnath leaf rust were recorded on cv. Lalbahadur with severity 10S. In the village Akbarpur of Kanpur Dehat (Central U.P. region) brown rust were observed on variety C-306, LOK1 at the disease severity of 30S. the brown rust were observed in farmer field Uin village in district Lucknow on variety Agra local, HD 2189 , rust severity from 20S -80S were recorded. Area near Unnao at village Atarsa brown rust observed on variety HD 3095, and farmer local varieties, severity 20S- 40S were recorded. In Jhansi, the district of Bundelkhand region only trace of Brown rust were observed in Agra local , C-306 and lok1 at farmer field villages Badanpur , Babina and Amarpur. Survey at Lalitpur area, variety Agra local, Lalbhadur and Lok 1 shows 30S-40S severity. Area near Banda district shows 40S-60S severity at farmer local variety. Survey during West U.P.region in the district Meerut, Muzaffarnagar, and Bijnor brown rust found in very low severity with very low incidence. In district Meerut, village Mihiwa, Mator and Kashampur shows 10S-20S severity on variety PBW 343, PBW 550, W -75. In district Muzaffarnagar variety PBW343, PBW 550 and PBW 373 shows 20S- 40S severity in village Hashampur, Bhuma, Ghatayan. In district Bijnor, village Kasopur, Khaikheda, and Salimpur shows symptoms of brown rust of wheat with severity 10S -20S. Key words: Brown rust, Puccinia recondita f. sp. tritici, Uttar Pradesh, Disease severity, Disease incidence.

Keywords: Survey, Crop, Brown rust, Wheat

INTRODUCTION

Wheat (*Triticum aestvium* L.) is among the major cereal crops cultivated in Ethiopia. Ethiopia is the second largest producer of wheat in sub-Saharan Africa. It was cultivated in about 1.5 million hectares of land with productivity of 1.75 tons per hectare (CSA, 2008/09). However, the productivity is by far below the world's average yield/ha which is about 3.3 tones/ha. This low yield is attributed to multi-faced abiotic and biotic factors such as cultivation of unimproved low yielding varieties, low and uneven distribution of rainfall, poor agronomic practices, insect pests and serious disease like rusts (Derje and Yaynu, 2000).

Rust fungal pathogens are among the major stresses that cause high yield losses in wheat crop. Over 30 fungal wheat diseases are identified in Ethiopia, stem rust caused by *Puccinia graminis* f.sp. *tritici* (*Pgt*) is one of the major production constraints in most wheat growing areas of the country; causing yield losses of up to 100% during epidemic years (Belayneh and Emebet, 2005). Usually, new virulent races of rust are considered to be found in East Africa. Races prevalent in the central highlands of Ethiopia are among the most virulent in the world (Van Ginkel *et al.*, 1989). Studies showed that most of the previously identified races were virulent on most of varieties grown in the country (Belayenh and Embet, 2005).

Hence, continuous surveying, and examining the virulence composition and dynamics of the races in the pathogen population is paramount important for improvement of wheat (Admassu *et al*., 2009). This study was, therefore, carried out to investigate the distribution and intensity of wheat stem rust, and to detect the virulence spectrum of *P. graminis* f.sp. *tritici* in wheat growing areas of Eastern Showa of Central Ethiopia.

MATERIALS AND METHODS

Survey, collection, isolation and identification of pathogen (*Puccinia recondite* f.sp. tritici)

Survey and collection of desired materials

To find out the prevalence and severity of the brown rust of wheat during the crop season 2012-2013. An extensive survey for the occurrence and severity of the disease was carried out in major wheat growing areas of Uttar Pradesh and also in adjoining areas. The survey was covers four region of Uttar Pradesh namely Eastern U.P. region, Central U.P. region,

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Bundelkhand region and Western U.P. region Naturally infected leaves of wheat showing the characteristic symptoms of the brown rust were collected and critically brought to the laboratory. All the specimens were properly preserved, labeled and kept at 10^{C} for further studies and records.

Procedure for recording diseased intensity

Fifty leaves were randomly picked up from infected plant of different location during the survey. These leaves were arranged in different categories on the basis of leaf area infected. To calculate the average percentage leaf area infected by the disease, using modified cob scale method for diseased intensity in percent. In order to determine the intensity of disease in different fields a large number of leaves with varying degree of infection were collected from severely infected fields. The area of the leaf as well as its total diseased area was determined with the represented in term of percentage of leaf area infected. The disease severity was recorded on the basis of modified cob scale method.

Disease severity scale

Visual percentage (%)	Actual percentage (%)
5	1.85
10	3.70
20	7.40
40	14.80
60	22.20
100	37.00

Symptoms of the disease under natural conditions

To study the symptoms of disease appeared on the leaves, of naturally infected plants, were critically examined and the size, shape and color of the postule were noted along with the visual presence of the pathogenic structure. Symptoms produced Brown rust of wheat was studied.

Leaves

The brown rust disease frequently occurred on wheat every year in the vicinity of Uttar Pradesh. Diseased foliage from different localities and varieties were collected and studied for the association of the fungus.

RESULTS

An extensive survey for the occurrence and severity of the disease was carried out in major wheat growing areas of Uttar Pradesh and also in adjoining areas during the crop season 2012-2013. The survey covered four region of Uttar Pradesh namely viz., Eastern U.P., Central U.P., Bundelkhand and Western U.P. The survey data was collected on the basis of Global Cereal Rust Monitoring Form provided by BGRI (Borlaug Global Rust Initiative and giving below in table.

Eastern U.P (Lakhimpur, Palia Kalan, Gola Gokharnath)

During extensive survey in the district Lakhimpur Kheri disease severity of brown rust was observed traces to 20S in the village Katania (severity upto 20S) on the variety Sonalika. However in Palia Kalan no brown rust was observed. During the survey in Gola Gokarnath disease severity of leaf rust was recorded 10S on the variety Lal Bahadur.

Central U.P (Kanpur, Lucknow, Unnao).

During survey in Kanpur Dehat brown rust was observed in the village Akbarpur on the verity C-306, the severity was observed 30S to 40S. During the survey in district Lucknow brown rust was observed in the Uin village severity was ranges 20S -40S. Adjoining areas near Unnao specially in Atarsa village brown rust was observed on the variety HD 3095, with severity 20S-40S.

Bundelkhand (Jhansi, Lalitpur, Banda)

During survey in Jhansi only trace of Brown rust were observed at farmers field in the villages Badanpur, Babina and Amarpur. Survey near Lalitpur area disease severity showed 30S-40S. Area near Banda village showed 10S-20S severity at farmers field.

Western U.P (Meerut, Muzaffarnagar, Bijnor)

Survey during west U.P area nearby Meerut, Muzaffarnagar and Bijnor district brown rust was found in very low severity. Survey during district Meerut in the village Mihiwa, Mator and Kashampur shows 10S-20S severity on variety PBW 343. Survey during district Muzaffarnagar variety PBW343, and PBW 373 shows 20S- 40S severity in the village Hashampur, Bhuma and Ghatayan. Survey during district Bijnor in the village Kasopur, Khaikheda and Salimpur brown rust of wheat was observed with severity 10S -20S.

DISCUSSION

Uttar Pradesh is considered to be hot spot area for the development of leaf rust complex. Thus, this study was carried out to investigate the distribution and intensity of wheat leaf rust, and to detect the virulence spectrum of *Puccinia recondita* f. sp. *tritici* Rob. ex. Desm during cropping season 2012-13. Survey programme were conducted in different wheat growing area of Utter Pradesh and covers four regions basically Eastern U.P., Central U.P., Bundelkhand region and Western U.P. region.. The data were collected on the basis of Global Cereal Rust Monitoring Form provided by BGRI (Borlauge Global Rust Initiative). In East U.P. region, district Lakhimpurkhiri brown rust traces were observed in village Katania (8-10 plants, severity upto 20S) on the cv. Sonalika. However in Paliakalan brown rust were observed on date. At Golagokharnath leaf rust were recorded on cv. Lalbahadur with severity 10S. In the village Akbarpur of Kanpur Dehat (Central U.P. region) brown rust were observed on variety C-306, LOK1 at the disease severity of 30S. the brown rust were observed in farmers field Uin village in

district Lucknow on variety Agra local, HD 2189 , rust severity from 20S -80S were recorded. Area near Unnao at village Atarsa brown rust observed on variety HD 3095, and farmers local varieties, severity 20S-40S were recorded. In Jhansi, the district of Bundelkhand region only trace of Brown rust were observed in Agra local , C-306 and lok1 at farmers field villages Badanpur, Babina and Amarpur. Survey at Lalitpur area, variety Agra local, Lalbhadur and Lok 1 shows 30S-40S severity. A similar finding was also given by (Nagarajan and Joshi, 1975). Lemma, *et al.* (2014) were carried out the survey and found similar results showed that 30 (38.9%) of the fields were affected with stem rust. Area near Banda district shows 40S-60S severity at farmers local variety. Survey during West U.P. region in the district Meerut, Muzaffarnagar, and Bijnor brown rust found in very low severity with very low incidence. In district Meerut, village Mihiwa, Mator and Kashampur shows 10S-20S severity on variety PBW 343, PBW 550, W -75. In district Muzaffarnagar variety PBW343, PBW 550 and PBW 373 shows 20S- 40S severity in village Hashampur, Bhuma, Ghatayan. In district Bijnor, village Kasopur, Khaikheda, and Salimpur shows symptoms of brown rust of wheat with severity 10S - 20S. A similar result was also reported by (Saari and Wilcoxson, 1974) and (Mehta, 1940; Joshi *et al*., 1972).

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