मैहतान्सिज

MEHTAENSIS

प्रो0 के.सी. मैहता के नाम पर जारी क्षेत्रीय केन्द्र के शोध का छमाही न्युजलैटर

(SIX-MONTHLY NEWSLETTER NAMED AFTER Prof. K.C. MEHTA)

VOL. NO. 32 JANUARY 2012 NO. 1

सहकर्मियों से अनुरोध है कि वे अपने आस–पास क्षेत्र से रतुआ नमूने एकत्रित करके प्रभेद विश्लेशण के लिए भेजें । THE COOPERATORS ARE REQUESTED TO SEND THE RUST SAMPLES FOR PATHOTYPE ANALYSES

संकलन :

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1. सारांश

जम्मू–कश्मीर के लद्दाख इलाके में तीनों किस्म के रतुए गर्मियों की गेहूँ पर पाए गए । जौ पर पीला रतुआ देखा गया । नील गिरी पहाडियों में गेहूँ के तीनों रतुए विद्यमान थे । हिमाचल प्रदेश में भी गर्मियों की गेहूँ एवं स्वयं उगे हुए गेहूँ पर तीनो रतुए तथा जौ का पीला रतुआ पाया गया । नेपाल में गर्मियों की फसल में गेहूँ के पीले एवं भुरे रतुए को देखा गया । बारबेरिस पर एसियल कप शिमला, मंडी, कांगडा तथा कूल्लू से इकटठे किए गए तथा इन्हे गेहूँ और जौ पर सक्रमित किया गया । पत्तों के आधार पर छः किस्म की बारवेरिस पर से नमूने लिए गए लेकिन कोई भी गेहूँ, जौ और जई को सक्रमित नहीं कर पाया ।

लद्दाख में पीले रतुए के प्रभेद सी–1, सी–2, सी–3 पाए गए । यह वही प्रभेद हैं जो 1992 में पाए गए थे । यह प्रभेद मात्र कल्याणसोना को ही सक्रमित कर पाते हैं । काले रतुए के नमूनों में प्रभेद 34–1 सब नमूनों में पाया गया । ये सभी प्रभेद बहुत ही साधारण हैं तथा पिछले लगभग बीस सालों में सिफारिशसुधा किस्में इनसे प्रतिरोधी हैं। भूरे रतुए में उत्तरी भारत से समानता पाई गई । नीलगिरी पहाड़ियों में भूरे रतुए का प्रभेद 77–5 तथा काले रतुए का 40A ज्यादा मात्रा में पाया गया । यह दोनों पिछले पन्द्रहा वर्षों से अधिक समय से बहुतायत में है । हिमाचल प्रदेश में भूरे रतुए का प्रभेद 104–4 तथा पीले रतुए का 78एस84 बहुतायत में था । नेपाल में भूरे रतुए का प्रभेद 77–5 तथा 104–2 ज्यादा मात्रा में देखे गए ।

इस अवधि में 968 गेहूँ , जौ की पंक्तियां परीक्षित की जा रही हैं। इन में एवीटी–1,2, एनबीडीएसएन एवं प्रजनकों की सामाग्री शामिल हैं । इस अवधि में 43 से अधिक वैज्ञानिकों/केन्द्रों को गेहूँ, जौ के रतुओं के जीवाणुओं की खेप पूर्ती की गई ।

2- Occurrence of rusts in summer/regular crop of wheat and barley

All the rusts of wheat were observed in Nilgiri hills (Tamil Nadu), Nepal, self sown and summer crop in Himachal Pradesh. Three rusts of wheat and yellow rust of barley were recorded in summer crop of Leh area of Jammu & Kashmir. In this crop season, yellow rust was observed in village Abada Barana of district Una (H.P.), few locations in J & K and Punjab. Fungicidal sprays have been resorted to eradicate the initial foci of infection.

None of the aecial samples from at least six *Berberis* species could infect wheat, barley and oat. These samples were drawn from at least four districts (Kullu,Mandi,Kangra and Shimla) of Himachal Pradesh. It indicated that the aecial cups in these areas do not relate to wheat rust. Similarly grass samples did not infect wheat, however, one sample infected oat and was recorded as leaf rust of Oat.

3- Sample receipt of wheat and barley rusts

For pathotype analysis, 272 samples of wheat and barley rusts were collected/received from these areas (Table1).

Table-1: Samples of wheat and barley rusts received up to 31.12.2011

Sr. no.	State	Races			
		Brown	Black	Yellow	
				Wheat	Barley
1.	Tamilnadu	59	40	7	-
2.	Himachal Pradesh	37	3	39	5
3.	Jammu & Kashmir	14	25	30	1
4.	Nepal	6	2	4	-
Total		116	70	80	6

4- Pathotype distribution of *Puccinia* species on wheat and barley

More than 170 samples of wheat and barley rusts were analysed for pathotype distribution. Different pathotypes were named following binomial system of nomenclature. Latest constitution of differential sets for three wheat rust pathogens is given on the last page. **North American equivalents of these pathotypes of brown and black rusts are given in brackets in the foot notes.**

Leh laddkh area (Jammu and Kashmir)

Seventy samples of three rusts of wheat and yellow rust of barley were collected. Among the pathotypes of *Puccinia striiformis* (yellow rust of wheat and barley) 14S64 (C I) followed by 15S64 (C II) and 78S64 (C III) were identified from this area. These pathotypes are very simple and can infect Kalyansona only. There is no change in racial pattern in this area in comparison to 1992. All the present day wheat varieties or those released for cultivation in the last 20 years in Northern India are resistant to these pathotypes. Pathotype 1S0 (M) was observed in the samples of barley yellow rust from this area (Table 2).

Table -2: Pathotype distribution of *Puccinia striiformis* up to 31.12.2011

Sr. no.	Area	No. of isolates analysed	Pathotypes* observed							
			46S119	78S84	14S64	15S64	78S64	M	24	Q
1.	Himachal Pradesh	29	1	6	-	-	-	1	-	1
2.	Leh (J & K)	9	-	-	15	6	5	2	1	-
Total		38	1	6	15	6	5	3	1	1

***1S0=M,0S0-1=24,5S0=Q**

In *P. triticina* (Brown rust of wheat) racial pattern was same to that of Northern India. Pathotype 121R63-1 (77-5) was most frequent in pathotypes identified from this area (Table3).

Table-3: Pathotype distribution of *Puccinia triticina* up to 31.12.2011

Sr. no.	State	No. of isolate analysed	Pathotypes* observed								
			125R55	121R63-1	121R55-1	121R60-1	109R23	21R55	21R63	93R57	93R39
1.	Tamil Nadu	37	1	29	3	4	-	-	-	-	-
2.	Himachal Pradesh	37	-	2	-	-	-	11	6	15	3
3.	Madhya Pradesh#	3	-	1	-	-	1	1	-	-	-
4.	Jammu & Kashmir	10	-	4	3	-	-	2	1	-	-
5.	Nepal	6	-	4	-	-	-	2	-	-	-
Total		93	1	40	6	4	1	16	7	15	3

#=Last season. *125R55=77-3(THTTS),121R63-1=77-5(THTTS),121R55-1=77-6(THTTQ),121R60-1=77-9(MHTTS),109R23=77^a-1(TGTTQ), 21R55=104-2(PHTTL), 93R57=104-4(NHKSP),93R39=162-2(KHTTL)

All the samples of *Puccinia graminis tritici* (Black rust) from this area harbored pt. 10G13 (34-1). Common *Sr* genes like *Sr* 8, *Sr* 11, *Sr* 31 of Indian wheat varieties are resistant to this pathotype. Wheat varieties under cultivation or released for cultivation in Northern India for the last 20 years are resistant to this pathotype (Table4).

Table -4: Pathotype distribution of *Puccinia graminis tritici* up to 31.12.2011

R. no.	State	No. of isolates analysed	Pathotypes observed*		
			62G29	62G29-1	10G13
1.	Tamilnadu	16	7	9	-
2.	Jammu & Kashmir	24	-	-	24
Total		40	7	9	24

***62G29=40A(PTHSC),62G29-1=40-1 (PTHSH),10G13=34-1(MHGHC)**

Nilgiri hills

Fifty three samples of wheat rusts were analyzed. Like previous fifteen years pathotype 121R63-1 (77-5) of *P. triticina* was most predominant among the four pathotypes identified from Nilgiri hills(Table3). Likewise in *P. graminis tritici* pathotype 62G29 (40A) also remained predominant (Table4) followed by 62G29-1 (40-1).

Himachal Pradesh

Forty-six samples of wheat and barley rusts were analysed from self sown crop and summer crop areas in Shimla, Lahaul & Spiti and Kinnaur districts of the state. In yellow rust of wheat 78S84 (PBW 343 virulence) was most predominant whereas 46S119 occurred in one sample only(Table 2). In brown rust newly identified pt. 93R57 (104-4) was most common followed by 21R55 (104-2) and 21R63 (104-3). Two other pts. were also identified (Table3).

Nepal

Six samples of brown rust of wheat were analysed during the period. Among the two pts. identified ,121R63-1 (77-5) was more common than 21R55 (104-2) in these samples(Table3).

5- Studies on seedling resistance to rusts of wheat and barley

i. Breeder's material and AVT lines

To know the rust resistant lines/rust resistance genes, more than 950 lines are being evaluated at seedling stage against the pathotypes of wheat and barley rusts. It includes breeders material comprising of pyramiding for rust resistance as well as transferring of targeted rust resistance genes(Table5).

Table -5: Details of material for seedling rust resistance

S.no.	Details of lines	No. of lines	Pathotypes of rust		
			Brown	Black	Yellow
1	AVT I	105	Selected	Selected	Selected
2	AVT II	84	Selected	Selected	Selected
3	NBDSN/ EBDSN	179	Mixture	Mixture	Selected
4	BREEDERS MATERIAL	600	Selected	Selected	Selected
	Total	**968**			

ii. Evaluation for rust resistance in Barley lines(2010-11)

One Hundred Seventy Nine lines which includes 148 of NBDSN and 31 of EBDSN were evaluated against different pathotypes of three rusts of barley i.e. yellow rust (*Puccinia striiformis*) Leaf rust (*Puccinia hordei*) and black rust (*Puccinia graminis tritici*). The screening was conducted at seedling stage under controlled light and temperature conditions. Selected lines were also evaluated for adult plant resistance to yellow rust of barley.

Rust resistant lines
Resistant to three rusts of barley

Fourteen entries of NBDSN BH952, DWRUB73, DWR81, RD2552, RD2784, RD2785, RD2787, RD2808, RD2812, RD2814, RD2821, RD2822, RD2823, UPB1020 and EBDSN entries BHS392, DWR81 were resistant to all the rusts of barley.

In addition 18 lines were resistant to brown & yellow rusts, Five entries to yellow & black rust and 31 entries were resistant to black & brown rusts (Table 6).

Table 6: Barley lines showing resistance to combination of two rusts.

S. No.	Resistant lines to		
	Black & Yellow	**Brown & Yellow**	**Black & Brown**
1	DWRUB64, HUB113, HUB207, HUB209, RD2809	RD2715, RD2786, RD2810, RD2811, RD2813, RD2815, RD2816, RD2817, RD2818, RD2819, RD2827, RD2828, BHS399, JB187, JB206, PL844, RD2786, RD2787	BH942, BH953, BH954, DWR85, DWR94, DWR97, DWR98, DWR100, HUB205, VLB127, JB211, PL830, PL863, RD2668, UPB 1019, BHS394, BH397, BH398, BH400, BH401, HBL113, VL709, UPB1008, UPB1016, VLB 123, BLV124, DWRUB73, BH941, DWR84, DWR87

Lines namely BH902, JB58, RD2794 were resistant to yellow rust only whereas RD2809, BHS352 were resistant to black rust only.

Adult Plant Resistance to Yellow Rust of Barley

Thirteen selected lines of barley were screened against mixture of pathotype of yellow rust in polyhouse. Both seedling and adult plants were evaluated under same set of conditions. It can be seen from the Table 7. that lines DWRUB 64, DWR81 and RD2552 were resistant both at seedling and adult plant stage .

Table7:Adult plant response of barley lines to yellow rust

S.No.	Line	Response at	
		Seedling	**Adult Plant**
1	BH902	S	**0**
2	DWRUB62	MS	**0**
3	DWRUB 64	R	**0**
4	DWR81	R	**0**
5	DWR85	S	**60S**
6	NDB1173	S	**20S**
7	NDB1465	-	**-**
8	HSB205	S	**80S**
9	K551	S	**80S**
10	PL830	S	**60S**
11	RD2035	S	**80S**
12	RD2552	R	**0**
13	**RD2668**	**S**	**10S**

Adult plant resistance to yellow rust was observed in BH902, DWRUB62 and two some extent in RD2668 and NDB 1173, remaining entries were susceptible to yellow rust at adult plant stage also.

6- Supply of nucleus inocula of rust pathotypes

To facilitate research work on the rusts of wheat and barley, nucleus inocula were supplied to 43 scientists located in different parts of India (Table8).

Table-8 :Details of rust inoculum supplied up to 31.12.2010

Sr. no.	Name (Dr.)	Place	Kind of rust/ pathotypes
1.	A. N. Mishra	Indore	Black & Brown
2.	A. P. Agarwal	Bilaspur	Black & Brown
3.	Atul Kumar	Samastipur	Brown & Mix.
4.	B. K. Honrao	Pune	Black + Mix. & Brown Mix.
5.	B. P. Kurundkar	Mahabaleshwar	Black + seed
6.	B. Sarkar	Karnal	Brown & Yellow Mix.
7.	Dhanvir Singh	Dhaulkaun	Brown & Yellow Mix. (Wheat & barley)
8.	D. P. Walia	Tutikandi	Yellow
9.	D. P. Singh	Karnal	Brown & Yellow Mix.
10.	D. N. Gohil	Bhavnagar	Black & Brown Mix.
11.	J. Kumar	Pantnagar	Brown and Yellow
12.	I. K. Kalappanvar	Dhanwad	Black & Brown Mix.
13.	Deepshika	Pantnagar	Brown & Yellow
14.	Javad Bahar Khan	Kanpur	Brown, Black & Yellow
15.	J. B. Sharma	New Delhi	Brown, Black & Yellow
16.			
17.	K. V. Jivani	Junagarh	Black & Brown
18.	Kamani Kausal	Indore	Brown
19.	Madhumeeta Jindal	Ludhiana	Yellow, Mix. Barley
20.	P.C. Mishra	Powerkhera	Black & Brown Mix.
21.	Parveen Chhuneja	Ludhiana	Brown & Yellow
22.	P.P.S. Pannu	Ludhiana	Yellow
23.	P. Silva Kumar	Karnal	Yellow Barley
24.	M. S. Saharan	Karnal	Yellow & Brown Mix.
25.	Pradeep Shekhawat	Jaipur	Yellow & Brown Mix. Barley & Wheat
26.	Principal Scientist	New Delhi	Black & Yellow
27.	Rajinder Singh Kokar	Karnal	Black
28.	R.P.S. Verma	Karnal	Brown & Yellow Barley Mix.
29.	Rajender Singh Bal	Gurdaspur	Yellow Mix.

30.	Ravinder Singh	Jammu	Yellow Mix. & Seeds
31.	Rajvir Yadav	New Delhi	Yellow Mix. & Brown
32.	Rashmi Bansal	New Delhi	Brown
33.	Rakesh Devlash	Kullu	Yellow Mix.
34.	S. K. Jain	Almora	Brown & Yellow Mix. (Barley & Wheat)
35.	S.K. Rana	Malan	Brown & Yellow Mix.
36.	S.S. Karwasara	Hissar	Brown & Yellow Mix. (Barley & Wheat)
37.	S. I. Patel	Vijapur	Black & Brown Mix.
38.	Subhashis (Student)	New Delhi	Yellow & Brown
40.	U. D. Singh	New Delhi	Yellow & Brown Mix.
41.	V. L. Mazumdar	Jaipur	Yellow Mix. Barley, Brown Mix. Wheat
42.	T. R. Sharma	New Delhi	Brown
43.	Maharastra Hybrid Seed Co.	Karnal	Brown & Yellow Mix., Brown, Black + Seeds for set A, B & O

7- Request for collection and mailing of rust samples

Arisal of new pathotypes in wheat rust pathogens is a natural way of evolution, survival and continuing of its generation. It results in resistant varieties of wheat becoming susceptible over a period of time. Rusts of wheat do not respect geographical and political boundaries. Races of wheat rusts that have occurred in East Europe and East Africa have been traced in Australia and Asia subsequently.

Monitoring of wheat crop is undertaken to pick up a virulent pathotype in initial stages (much before it attains epidemic proportions) and remain prepared with resistant varieties for early deployment.

To monitor pathotype distribution of wheat rusts effectively and to detect new pathotypes in the initial stages in different agro-ecological regions of India, wheat rust samples are analyzed for the occurrence of pathotypes. Therefore, help of all the cooperators is solicited for collecting wheat rust samples from different regions, farmers' fields and disease monitoring nurseries representing different cultivars/lines in this endeavor to combat wheat rusts in the region.

Collection of rust samples

A good rust sample needs following treatment:

I. Small bits (2-3") of rust infected fresh leaves/stems should be **shade dried**/ overnight at room temperature.

II. Shade dried samples should be put in **paper envelops** separately or wrapped in newspaper and sent immediately by post.

III**. Following information may be given on each envelope**

- Type of rust: brown/black/yellow

- Details of host: wheat/barley, variety/line

- Place of collection

- Date of collection

- Name and address of the co-operator

IV. Since samples from lines/varieties having **little rust or from rust resistant material are important from analysis point of view, therefore, these should be treated on priority.**

Precautions to be taken

I. Samples should be **representative of a locality, variety and not repetitive.**

II. Samples **should not be taken from moist, dried or dead plant parts/plants.**

III. Only **fresh uredial infection** may be sent as old and dried plant parts may not have viable spores.

IV. Samples should be sent at the earliest possible.

Very Important

I. Glossy paper/polythene envelopes should not be used for collecting or mailing samples.

II. Samples should not be taken from the sites of artificial inoculations, otherwise it should be mentioned accordingly.

8. News

a. Visitors

- Dr. Pradeep Sharma ,Sr. Scientist and Dr. Satish Kumar, Scientist, were at the station on 9.6.2011.
- Dr. T.R. Sharma, Principal Scientist, NRCPB , New Delhi and Dr. R.S. Chauhan, Head, Department of Biotechnology, J.P. University of Information Technology , Waknaghat discussed about the ongoing projects and future collaborations on 15.7.2011. Dr. R.S. Chauhan resumed further discussions on 17.12.2011.
- Sh. Kuldeep Dhaliwal Member Governing Body, I.C.A.R., New Delhi along with two progressive farmers saw the research activities and facility at Regional Station on 10.8.2011.
- Dr. R.K. Sharma, Pr. Sci. And PI Resource Management and Sh. R.L. Verma, Assist. Adm. Officer, D.W.R., Karnal were at the station on 10.8.2011.
- Dr. B.S. Tyagi, Sr. Sci. and Dr. V.K. Goel, Scientist, visited in connection to breeding for rust resistance on 20.11.2011.

- Dr. Dave Hodson, Global Cereal Rust Monitoring System, CIMMYT, Ethiopia visited the station on 3.10.2011 to see the facilities at Flowerdale.
- Four Scientists from D.W.R., Karnal visited Flowerdale in connection to their orientation programme from Jan.6-8, 2012.

b).Awards

- Sh. Roop Ram, Stenographer, Sh. Udey Singh T2-3,Sh. Bhoop Ram Thakur were conferred the best worker award for 2010 in Adm., Technical and skilled staff category,respectively by Dr. S. Datta , Deputy Director General, I.CA.R., New Delhi in the presence of Dr. Indu Sharma , Project Director, D.W.R., Karnal on 9.9.2011.

c). Promotions

- Sh. Saroop Chand was promoted to T1 from skilled supporting staff w.e.f. May 18, 2011

d). Joinings

- Sh. Jaspal Singh Assist. Administrative Officer, joined at the station w. e. f. 25.7.2011.
- Sh. Om Prakash, Scientist (Pathology), joined at Flowerdale on 5.9.2011.

e). Hindi Diwas

Hindi diwas was celebrated on 14.9.2011 and it was resolved to accelerate work in Hindi. The station was awarded second best award among the central govt. offices at Shimla. Sh. Roop Ram ,Stenographer was given special prize for his contribution to promote Hindi.

f). Foreign visits

- Dr. S. C. Bhardwaj Principal Scientist and In Charge, visited Kathmandu (Nepal) to attend "Durable rust resistance project in wheat (DRRW)-Rust surveillance meeting in Nepal " between Nov. 2 and 3,2011.
- Sh. Om Prakash, Scientist of this station attended 'Wheat improvement and pathology course between Nov. 16-29,2011.

g). Obituary

- Some employees who served at Flowerdale shed their mortal remains during the previous years. We at Flowerdale condole their death. The departed staff are as below:
  - Sh. Dhani Ram SS GR.IV left for heavenly abode on 16.10.2010. He served Flowerdale for more than 30 years. He had been a very humble, honest and dedicated staff. We pray almighty to grant peace to the departed soul and give strength to the bereaved family members to bear this loss.
  - Sh. Ganga Ram Sharma left this world on Dec.1,2010. He was at Flowedale for more than 30 years. He had been a very sincere

worker. We pray God to grant peace to the departed soul and provide strength to the bereaved family members to bear this loss.

- Sh. Deena Nath, SS gr. III is also no more. He had been a very simple person and consistent worker. He served at Flowerdale for more than 10 years succeeding his tenure at Dalang Maidan and Indian army. We pray that his soul rest in peace and strength to the bereaved family members to bear loss.

- Ms. Rashmi Bhatnagar left for heavenly abode on 13.10.2011.She was a very candid person and rendered useful assistance in rust work at Flowerdale. She was very social, friendly and compassionate. Her premature demise has left all of us shocked. She was with us for more than 15 years. We pray almighty to grant peace to the departed soul in heaven and give strength to the bereaved family members to bear this irreparable loss.

- Dr. Sheodhan Singh ex Head of this station, left for heavenly journey on Jan.9, 2012. He was Head of Regional Station, Flowerdale between 28.1.1963-7.1.1967 and 6.3.1970-8.6.1978. He was PI, Wheat Pathology, Wheat Project Directorate, from 1978-1987.He had been a disciple of Dr. J.J. Christenson and trained at Minnesota. He trained many scientists and students of Plant Pathology at IARI, New Delhi. Many of his students rose to high positions. He is remembered as a very knowledgeable person and a tough task master. We pray almighty to grant peace to the departed soul and give strength to the bereaved family members to bear this irreparable loss.

9. Latest sets of differentials for identification of pathotypes of three rust pathogens

Brown rust (*Puccinia triticina*)

Set-0	Set-A	Set- B
IWP 94	*Lr*14a	Loros (*Lr*2c)
Kharchia Mutant	*Lr*24	Webster (*Lr*2a)
Raj 3765	*Lr*18	Democrat (*Lr*3)
PBW 343	*Lr*13	Thew (*Lr*20)
UP 2338	*Lr*17	Malakoff(*Lr*1)
K 8804	*Lr*15	Benno (*Lr*26)
Raj 1555	*Lr*10	HP 1633 (*Lr*9+)
HD 2189	*Lr*19	
Agra Local	*Lr*28	
Black rust (*Puccinia graminis tritici*)		
*Sr*24	*Sr*13	Marquis (*Sr*7b+)
NI 5439	*Sr*9b	Einkorn (*Sr*21)
Sr25	*Sr*11	Kota (*Sr*28+)
DWR 195	*Sr*28	Reliance (*Sr*5+)
HD 2189	*Sr*8b	Charter (*Sr*11+)
Lok 1	*Sr*9e	Khapli (*Sr*7a,*Sr*13, *Sr*14)
HI 1077	*Sr*30	Tc*6/*Sr31*/Lr26 (*Yr*9)
Barley Local	*Sr*37	
Agra Local		
Yellow rust (*Puccinia striiformis*)		
WH147	Chinese 166 (*Yr*1)	Hybrid 46 (*Yr*4)
Bilara	Lee (*Yr*7)	Heines VII (*Yr*2+)
WH416	Heines Kolben(*Yr*6)	Compair (*Yr*8)
HD2329	Vilmorin 23(*Yr*3)	*T.spelta album* (*Yr*5)
HD2667	Moro (*Yr*10)	Tc*6/*Lr*26 (*Yr9*)
PBW343	Strubes Dickkopf	Sonalika (*Yr2+)*
HS240	Suwon92 X Omar	Kalyansona *Yr2*(KS)
Anza	Riebesel47/51(*Yr*9+)	
A-9-30-1		