Outcome Summary

WHYRV DSS software used the developed database information for Yellow Rust Resistance. After execution of WHYRV software the observations showed that there are four types of varieties:-

- **1st group:** Varieties which were resistant from (1995 – 96) to (1997 – 98) but became susceptible after this. This was due to the spread of a new pathotype, 46S119 (*Yr9* virulence). These are, HD 2329, HD 2285, HD2687, PBW 175, Sonalika, VL738, HS240, HS277.
- **2nd group:** Varieties that were resistant up to 2005 – 06 but became susceptible from 2006 – 07 with inoculum built up of the new pathotype, 78S84 which was first recorded in March 2001. These are, PBW 343, PBW 373, PBW 502, HS 295, HS 365, HS 420.
- **3rd group:** Varieties that were resistant up to (2009 – 10) but susceptible from (2010 – 11). This was due to the very favourable environment and built up of the inoculum of the pathotype 78S84 and may be some new variant of the earlier pathotypes. These are, DBW 17, PBW 550, VL804 .
- 4th **group:** Varieties that remained resistant up to 2010. These are, DBW16, UP2425, VL616, HPW42, WH542, DT46, VL804, WH896, VL832, VL 829, VL892.

Conclusion

- A DSS Database for yellow rust resistance in wheat varieties (16 years) has been created for future reference purpose.
- Rust resistance graphs over the years for selected varieties in NHZ & NWPZ were prepared.
- A DSS software developed is used to retrieve information of resistant varieties in desired format.

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If you have any information that you would like to include it, please send us the same. Your suggestions give strength to our Wheat Decision Support System.

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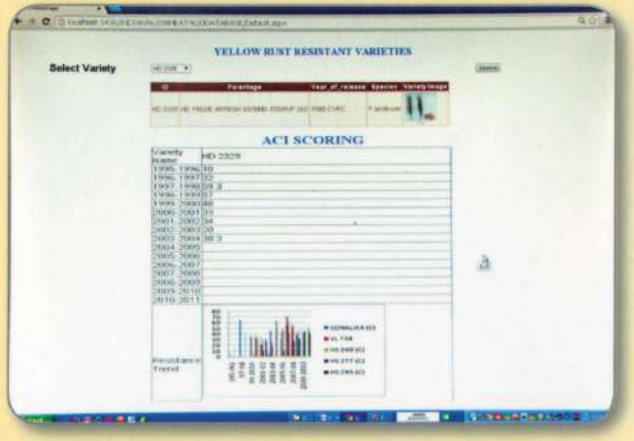
Decision Support System for Wheat Yellow Rust Disease



WHYRV (WHeat Yellow rust Resistant Varieties) Wheat Crop based decision support system (DSS) software developed in ASP.NET using Microsoft Visual Studio 2008 for yellow rust resistant varieties

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DSS Introduction

Decision making is an art of selecting most desirable, reasonable and responsible choice among alternatives. Decision support systems are a subset of computer-based information systems. A DSS can be described as a computer based interactive human - computer decision - making system that supports decision makers rather than replacing them.

Objectives

- To organize the information available on stripe rust (yellow rust) disease of wheat from multilocational evaluation of genotypes under AICW&BIP*, under artificial inoculation conditions, data into structured databases.
- To collect the detailed information of given variety of Zone (NHZ/NWPZ) i.e., its year of release, parentage, its rust resistance (ACI score) from 1995 to 2010, in form of its performance graph.

Design & Development

The Process of DSS planning includes selection of wheat crop disease that causes maximum damage and that is yellow rust, The losses to crop yield are more in two zones i.e., Northern Hills & North West Plane Zone, because of maximum occurrence of this disease in these zones. AVT II year adult plant response data for 16 years is selected to make the DSS database. Planning process also includes the very important step of selecting varieties over the selected years. It is based on their high ACI scores, zone wise importance of the variety and repeated occurrence of the variety in adult plant response trial over the years. After completing the total planning process the Database and the Software development is accomplished.

*All India Co-ordinated Wheat and Barley Improvement Programme

- Database : DSS Database (Ms-Excel) of 16 years for stripe rust resistance (ACI scoring) in NHZ & NWPZ wheat varieties is developed.

Adult plant response of AVT IInd year material against wheat rust under field conditions (artificial inoculations) during 1995-96

Sr.No.	VARIETY	STEM	LEAF		STRIPE
		SOUTH	SOUTH	NORTH	NORTH
		ACI	ACI	ACI	ACI
I. NORTH WESTERN PLAIN ZONE					
1	PBW 382	16.5	23.0	26.1	2.4
2	PBW 393	10.2	24.4	12.7	0.0
3	PBW 396 (C)	18.5	13.0	3.8	0.6
4	PDW 245	20.2	7.4	0.7	0.0
5	PDW 247	8.7	4.8	0.3	0.8
6	PDW 248	23.0	18.4	0.5	0.0
7	WH 601	7.2	1.7	4.2	0.0
8	RAJ 3856	6.0	5.6	9.1	0.0
9	HD 2329 (C)	33.5	37.6	42.5	10.0
10	WH 542 (C)	3.9	3.0	26.0	0.0
11	UP 2338 (C)	15.7	13.6	11.4	3.4
12	PBW 34 (C)	13.0	5.6	1.4	0.1
13	PDW 215 (C)	23.5	3.6	0.4	0.0
14	WH 896 (C)	17.0	4.0	0.1	0.0
15	HD 2285 (C)	19.8	39.8	52.0	6.6
16	PBW 220 (C)	27.5	22.4	36.7	0.6
17	C 306 (C)	36.0	48.2	84.1	1.0
18	PBW 175 (C)	19.0	29.2	31.7	0.8
19	PBW 299 (C)	34.6	34.4	0.1	0.8
20	PBW 343 (C)	8.2	9.8	4.1	0.0
21	PBW 373 (C)	8.7	16.4	1.0	0.0

Adult plant response of AVT IInd year material against wheat rust under field conditions (artificial inoculations) during 2010-11

Sr.No.	VARIETY	STEM	LEAF		STRIPE
		SOUTH	SOUTH	NORTH	NORTH
		ACI	ACI	ACI	ACI
I. NORTH WESTERN PLAIN ZONE					
1	HD 3043	8.2	29.8	6.0	14.0
2	HI 8703	3.6	3.2	5.8	0.1
3	PBW 635	11.8	8.5	8.8	12.0
4	PBW 644	4.8	5.4	10.3	6.7
5	PDW 322	19.0	1.6	0.2	4.6
6	WMD 946	11.0	1.4	5.3	0.7
7	C 306 (C)	42.0	42.5	43.3	17.9
8	DBW 17 (C)	4.4	10.6	10.7	33.8
9	INFECTOR	72.0	80.0	58.7	77.1
10	HD 2967 (I) (C)	4.3	6.2	2.2	4.1
11	PBW 175 (C)	6.8	38.5	5.7	29.0
12	PBW 343 (C)	7.4	29.8	21.7	68.6
13	PBW 373 (C)	13.3	22.5	10.7	42.9
14	PBW 396 (C)	3.6	17.6	3.5	36.0
15	PBW 550 (C)	4.1	3.4	1.0	29.7
16	PBW 590 (C)	7.0	6.4	3.3	25.0
17	DBW 56 (PBW 621) (C)	1.2	4.9	2.1	20.0
18	PBW 289 (C)	14.4	8.7	3.7	3.6
19	PBW 292 (C)	12.8	3.3	4.5	4.9
20	PDW 314 (I) (C)	38.4	6.3	2.7	6.9
21	PDW 315 (I) (C)	14.0	13.3	2.3	3.4
22	WH 1021 (C)	8.8	7.4	1.7	12.1
23	WH 1080 (I) (C)	8.2	9.3	2.0	13.6
24	WMD 913 (I) (C) PBW (C)	8.0	4.3	1.8	3.8

- DSS Software WHYRV (WHeat Yellow rust Resistant Varieties) : Wheat Crop based DSS developed in asp.net for yellow rust resistant varieties, using Microsoft Visual Studio 2008. It uses three layers architecture including :-

1. Presentation Layer Asp.net → Front End
2. Application Layer c# Programming modules
3. Data Access Layer Ms- Excel → Back End

This software provides a facility to select variety and then gives detailed information i.e., Zone, Variety Name, Parentage, Year of Release, species, variety Image, 16 year ACI Scoring and rust resistance graph of that variety in following format.