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SCREENING OF RESISTANCE SOYBEAN [GLYCINE MAX (L.)MERR.] GENOTYPES AGAINST THE YELLOW MOSAIC VIRUS (YMV) DISEASE

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Abstract- Yellow mosaic virus (YMV) is a major disease of soybean, which can cause up to 80 % yield loss in severe cases. Chemical or cultural control of YMV is neither economical nor environment-friendly. Deployment of genetic resistance is considered to be the effective way to control it. Therefore, present study was conducted to identify stable sources of resistance for YMV disease, A 72 soybean germplasm lines, collected from different parts of the India were screened for YMV disease reaction at YMV hotspot in 2014. No genotypes were exhibited absolute resistant reaction; however 40 genotypes *viz.,* CAT 87, JS 98-79, JS 20-05, JS 20-24, JS 20-29, JS 20-74, JS 20-76, JS 20-82, JS 20-69, JS 20-90, JS 20-98, JS (IS) 90-5-12-1, PK 885, PK 1225, PS 1466, PS 1539, PS 1540, SPC 175, SL 96, SL 517, SL 710, SL 744, SL 799, SL 900, SL 955, UPSM 534, PK 515, PS 1225, PS 1584, GSDL 7, GSDL 49, GSDL 57, GSDL 82, PK 416, PS 564 , PS 19, PS 1573, SL 958, SL 983 and PSB 13-15 exhibited highly resistance. Similarly, 16 genotypes *viz.*, B 327 B1664 CAT 783 DS 2410 HIMSO 1681 JS 99-72 JS 20-21 JS 20-30 JS 20-73 JS 20-77 NRC 56 PK 768 PS 1518 RVS 2002-4 SL 738 and PSB 13-16 etc. were showed moderately resistant reaction. The rest genotypes showed moderately susceptible (02) susceptible (08) and highly susceptible (06) reactions

Keywords- Yellow Mosaic Virus, Highly Resistance, Genotypes and Soybean

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Introduction

Soybean [*Glycine max*] is the unique grain legume globally known for its dual purpose use as pulse and oilseed containing 38-44% protein and 18-22% oil. Soybean also finds place as the key component in a diverse range of industrial products like solvents, adhesives, inks, lubricants and insulating foams are. In a large section of vegetarian people in country like India, soybean plays an important role as a rich source of protein. Occupying an area of 11.62 mha with total production of 8.64 mt and productivity 781.0 kg /ha soybean finds an important place in the Indian agriculture[1]. India is the third largest importer of soya oil in the world and is one of the major exporters of soya meal to the other Asian countries [1]. The South and Central India particularly the state of Madhya Pradesh and Maharashtra are the hubs of soybean production in India, where soybean has already been established as an important industrial crop [3]. Soybean production has been challenged by a number of biotic and abiotic stresses. Among the different biotic stresses, Yellow Mosaic Virus (YMV) disease is one of the predominant viral diseases, especially in North, North east and Central India. This YMV disease is transmitted by white fly *Bassimia tabacci.* The all India Coordinated Project on Soybean has identified YMV disease as one of the most biotic threats to soybean. In severe cases, the growing tip stops growing and becomes a clump of un-opened leaves. Pod setting gets drastically reduced with eventual loss of yield. The incidence of YMV disease in soybean is most pronounced in North Eastern India as well as Northern India [4]. Yield losses due to its attack are as high as 80% [5] so, further spread of this disease may bring disaster towards soybean industry in our country. Therefore, resistance to YMV must be improved incorporated into selected germplasm to minimize yield loss. We tried to screen the germplasm resistance towards the infectivity of Yellow Mosaic Virus and hence can be considered for selection and breeding programme to design variety with YMV resistance.

Materials and Methods

The material consisted of 72 genotypes of soybean collected from different place of India and abroad are mentioned in [Table-1].

The experiment was laid augmented design at the Research Farm of Jawaharlal Nehru Krishi VishwaVidyalaya, Jabalpur during kharif season of 2014. In each replication, the genotypes were grown in 2 m long rows with spacing of 30cm × 5cm for row-to-row and plant to plant, respectively. Within a row, seed were hand dibbled 5 cm apart. Standard package of practices was followed to raise the crop. Ten competitive plants were randomly selected from each treatment in each replication and data were recorded on yellow mosaic disease resistance. Number of plants showing distinct symptoms in each line was counted 60 days after sowing and percent disease incidence was calculated. The genotypes were later grouped into different categories from immune to highly susceptible using 0-9 scale [6] mentioned in [Table-2].

Table-1 *Source of soybean germplasm evaluated against YMD during kharif of 2014.*

S. No.	Source	No. of Lines
1	Jawaharlal Nehru KrishiVishwaVidyalaya, Jabalpur (M.P.)	22
2	Punjab Agricultural University, Ludhiana (Punjab)	15
3	Directorate of Soybean Research, Indore (M.P.)	08
4	Agricultural University, Borkhera Farm, Baran Road, Kota (Raj.)	01
5	GBPUA & T, Pantnagar (Uttarakhand)	20
6	RajmataVijayrajeScindiaKrishiVishwaVidyalaya, RAK College of Agricultura, Sehore (M.P.)	02
7	Exotic collection	04
	Total	**72**

Table-2 *Disease Scoring Scale (0-9) for YMD.*

Severity	% Infection	Infection Category	Reaction Group
0	No symptoms on any plant	Absolutely resistant	AR
1	Yellow mottle or necrotic mottle in up-to 1% plants	Highly resistant	HR
3	Yellow mottle or necrotic mottle in traces on 1.1 - 10% plants.	Moderately resistant	MR
5	Necrotic mottle/Mild mottle/ Mild symptoms 10.1 - 25% plants: no reduction in plant growth: no yield loss	Moderately susceptible	MS
7	Yellow mottle symptoms not covering the whole leaf lamina on 25.1 - 50% plants: reduction in leaf and plant growth	susceptible	S
9	Yellow mottle symptoms on more than 50% plants: severe reduction in leaf and plant growth as well as pod formation and death of plant	Highly susceptible	HS

Results and Discussion

In the present study, genotypes were subjected to *in vivo* screening following the protocol described above .Here, no genotypes were exhibited absolute resistant reaction; however 40 genotypes *viz.,* CAT 87, JS 98-79, JS 20-05, JS 20-24, JS 20-29,JS 20-69, JS 20-74, JS 20-76, JS 20-82, JS 20-90, JS 20-98, JS (IS) 90-5-12-1, PK 885, PK 1225, PS 1466, PS 1539, PS 1540, SPC 175, SL 96, SL 517, SL 710, SL 744, SL 799, SL 900, SL 955, UPSM 534, PK 515, PS 1225, PS 1584, GSDL 7, GSDL 49, GSDL 57, GSDL 82, PK 416, PS 564, PS 19, PS 1573, SL 958, SL 983 and PSB 13-15 exhibited highly resistance with score '1'. Similarly, 16 genotypes *viz*., B 327 B1664 CAT 783 DS 2410 HIMSO 1681 JS 99-72 JS 20-21 JS 20-30, JS 20-73 JS 20-77 NRC 56 PK 768 PS 1518 RVS 2002-4 SL 738 and PSB 13-16 etc. were showing moderately resistant reaction with disease score '3'. The rest genotypes were showed moderately susceptible (02), susceptible (08) and highly susceptible (06)reactions [Table-3]. Screening of the soybean genotypes for YMV disease under field conditions depicted the existence of genetic variations for YMV responses. However, degree of responses (i.e. resistance and susceptibility) was found to vary. This implies the need for continuous stringent screening through creation of disease pressure even in the hot-spot. It would reduce the chances of reading disease escape as disease resistant. [7 & 8] also screened 88 indigenous and exotic soybean genotypes in the field and found EC-107014, EC-107003 and EC-100777 resistant. [9] also screened 44 genotypes for incidence of yellow mosaic virus (YMV) resistance. They observed moderate to severe incidence of the disease only in a limited number of entries (Nine moderate and one highly susceptible). The genotypes DS 9712 and DS 9814 were found to be highly resistant to YMV infection.

Table-3 *Distribution of Soybean Lines in Various Infection Category of Yellow Mosaic Disease (YMD).*

Infection Category	Disease Severity Index	No. of Genotypes	Lines Involved
Absolutely resistant	0	00	
Highly resistant	1	40	CAT 87, JS 98-79, JS 20-05, JS 20-24, JS 20-29, JS 20-74, JS 20-76, JS 20-82, JS 20-90, JS 20-98, JS (IS) 90-5-12-1, PK 885, PK 1225, PS 1466, PS 1539, PS 1540, SPC 175, SL 96, SL 517, SL 710, SL 744, SL 799, SL 900, SL 955, UPSM 534, PK 515, PS 1225, PS 1584, GSDL 7, GSDL 49, GSDL 57, GSDL 82, PK 416, PS 564, PS 19, PS 1573, SL 958, SL 983, PSB 13-15
Moderately resistant	3	16	B 327, B1664, CAT 783, DS 2410, HIMSO 1681, JS 99-72, JS 20-21, JS 20-30, JS 20-73, JS 20-77, NRC 56, PK 768, PS 1518, RVS 2002-4, SL 738, PSB 13-16
Moderately susceptible	5	02	PSB 13-16, JS 20-65
susceptible	7	08	EC 242093, EC 251352, JS 95-56, PS 1450, PS 1469, RKS 48, RVS 2002-7, SL 747
Highly susceptible	9	06	EC 538828, JS 94-71, JS 20-38, JS 20-61, JS 20-64, PK 1566
	Total	**72**	

Table-4 *Weekly environment data (average) for the experiment period, Jabalpur (July-August-September, 2014)*

Standard Weeks	Temperature °C			Relative humidity %			Rainfall (mm)	Operation done
	Max	Min.	Mean	Mor	Eve	Mean		
July 2 - 8	36.8	26.1	31.45	71.0	41.0	56.00	15.9	Sowing & Germination
July 9 -15	36.2	25.6	30.90	79.0	59.0	69.00	70.8	
July16 - 22	29.7	24.5	27.10	90.0	79.0	84.50	160.4	Whitefly landing
July23 - 29	27.8	23.3	25.55	91.0	79.0	85.00	55.8	Whitefly feeding and emergence of YMD
July 30 to Aug.5	30.1	24.6	27.35	92.0	79.0	85.50	137.8	YMD prevalence rising
Aug. 6 -12	28.5	23.7	26.10	86.0	73.0	79.50	97.8	YMD incidence and severity rising
Aug. 13 -19	30.0	24.0	27.00	86.0	63.0	74.50	8.2	Do
Aug. 20 - 26	34.1	25.1	29.60	83.0	58.0	70.50	0.0	Do
Aug.27 to Sept.2	32.9	24.2	28.55	88.0	65.0	76.50	47.6	YMD incidence and severity maximum
Sept. 3 - 9	30.1	23.7	26.90	91.0	71.0	81.00	101.2	Highest and regular infection

Conflict of Interest: None declared

References

[1] SOPA (2015) SOPA's estimate of soybean crop. The Soybean Processors Association of India Malviya Nagar, Scheme No. 53, A.B. Road, Indore.

[2] Anonymous (2007) *Agricultural statistics of Pakistan. Ministry of Food, Agriculture and Live stock, Economies Wing.Govt. Pakistan. Islamabad.*

[3] Tiwari S.P., Joshi O.P. and Billore S.D. (2001) *Realisable yield potential of soybean varieties at farm level in India. In: Souvenir "Harnessing the soypotential for health and wealth", India Soy Forum. SOPA, India*.108-112.

[4] Habib S., Shad N., Javaid A. and Iqbal U. (2007) *Mycopath,* 5(2), 89-94.

[5] Kumar B., Talukdar A., Verma K., Girmilla V., Bala I., Lal K.S., Singh P.K., Sapra L.R. (2014) *AJCS,* 8(1), 27-34.

[6] Mayee C.R. and Datar V.V. (1986) *Phytopathametry, Maharashtra Agricultural University, Parbhani, Technical Bulletin No*. 1, 1986; pp: 145-146.

[7] Koranne K.D. and Tyagi P.C. (1985) *Indian Journal of Genetics and Plant Breeding*, 45(1), 30-33.

[8] Upadhaya and Paradkar (1991) *Journal of Oilseed Research,* 8, 121-122.

[9] Baruah S., Sarma M.K., Baishya D., Sharma A.A., Borah R., Bhuyan. (2014) *International Journal of Scientific and Research Publications,* 4(9), 2250-3153.