International Journal of Zoology Studies
ISSN: 2455-7269
Impact Factor: RJIF 5.14
www.zoologyjournals.com
Volume 3; Issue 4; July 2018; Page No. 47-48

Evaluation of soybean entries/varieties against target leaf spot (*Corynespora cassiicola)* under field conditions

Arvind Kumar Kurre[*1], Meghchand Dewangan[2]
[1, 2] Department of Plant Pathology, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

Abstract
Target leaf spot disease of soybean caused by *Corynespora cassiicola.* The disease affects leaves, stems, pods and seeds. Leaf lesions are rounded to irregular and reddish brown they vary from speck to big mature spot. Lesions are frequently surrounded by a dull green or yellowish green halo. In studies one hundred thirty entries /varieties were screened for resistance to target leaf spot of soybean at where during *Kharif* 2015. Three entries/varieties exhibited highly resistant, twenty entries/varieties were found resistant, thirty eight entries/varieties were found moderately resistant, forty two entrie/varieties were found moderately susceptible and twenty seven entries /varieties were found susceptible. None of the entries/varieties were categorized in highly susceptible categories.

Keywords: target leaf spot, soybean, *Corynespora cassiicola,* and entries/varieties

Introduction
Soybean (*Glycine max.* L. Merril) belonging to family Leguminaceae is designated as miracle bean established its potential as an industrially vital and viable oilseed crop in many areas of India. The target leaf spot disease of soybean causes by (*Corynespora cassiicola*) was first reported in 1945 (Olive *et al.,* 1945) [4]. Now it has been found in most of soybean growing states. In Chhattisgarh it has been reported during 2002 from Raipur (Patel, 2005) [5]. The disease affects leaves, stems, pods and seeds. Leaf lesions are rounded to irregular and reddish brown; they vary from specks to big mature spots. Lesions are frequently surrounded by a dull green or yellowish green halo. Severely affected leaves drop prematurely (Sinclair, 1982) [6].
The fungus over winters on soybean debris and seed. It can survive in a fallow field for two years. The yield losses to an extent of 18-32 percent have been recorded in susceptible soybean lines grown in Mississippi during years when rainfall was above normal in August and September. There are numerous reports on resistance varieties to control the disease. Kapooria *et al*. (1998) [2] reported that cultivars Santa Rosa and SCSI as moderately resistant and Hernon-147 and Kaleya as susceptible against target leaf spot caused by *C. cassiicola*. Patel (2005) [5] screened Seventy-two germplasm accessions were evaluated under natural field conditions for resistance to target spot of soybean. Thirteen entries to be free from disease, 9 entries were moderately resistant, 2 moderately were susceptible and 3 entries showed susceptible reaction to target spot of soybean under low disease pressure. Madhavi *et al*. (2011) [3] investigated soybean germplasms against different diseases of soybean.

Material and methods
Experimental site
The field experiment was conducted at the research farm, IGAU Raipur, in kharif season 2015 One hundred thirty soybean varieties were evaluated which were sown on 6th July 2015. The entries/varieties were sown in three rows of 3.2m length with the 30 cm row distance and 5cm plant distance. Plot size was 3×5 m and replicated thrice.
All the recommended agronomic practices were adopted. The observation on natural occurrence of *C. cassiicola* on soybean leaf was recorded after appearance of disease. The observation of disease severity was recorded. For recording the observation, five plant of each variety were randomly selected and tagged. The observation of the disease on the foliage was recorded by using 0-9 scale according to Singh *et al*. (1982) and per cent disease index was worked out.

Where
0 - No lesions
1 - 1% leaf area covered with lesion
3 - 1.1 - 10 % leaf area cover with lesion
5 - 10.1 – 25 % of the leaf area covered no defoliation, little damage
7 - 25.1 – 50 % leaf area covered, some leaf drop, death of a few plant damage conspicuous.
9 - More than 50% leaf area covered, lesion very common on all plants, defoliation common, Death of plant common, damage more than 50%.

PDI was calculated by the formula of Wheeler (1969) [7] as given here:

$$\text{Percent disease index} = \frac{\text{Sum of all disease rating}}{\text{Total number of ratings}} \times \frac{100}{\text{Maximum disease grade}}$$

The location severity index (LSI) was calculated using the formula of wheelar (1969) [7] as given below:

$$LSI = \frac{\text{Sum of multiplication of entries and scales}}{\text{Total number of entries}}$$

Table 1: Classification of disease reaction of target leaf spot disease of soybean on the basis of PDI and disease scale of IIPR

Scale (0-9)	PDI	Reaction
0	0	Highly Resistant
1	0.1-10	Resistant
3	10.1-25	Moderately resistant
5	25.1-50	Moderately susceptible
7	50.1-75	Susceptible
9	75.1-100	Highly susceptible

Result and discussion

The data presented in Table 1 that out of One hundred thirty (130) entries/varieties were screened for resistance to target leaf spot of soybean at where during *Kharif* 2015. The observations were recorded at 75 days after sowing and data is presented in Table 2. Indicated that the three entries viz., AMS-323, JS 20-69 and NRC-93 were free from disease, twenty entries (PS-1556, DS-3101, RVS-2008-8, AMS-1003, KDS-780, JS 20-53, DSb-25, MACS 14-10, PS14-12, NRC-82, KS-3, JS 20-34, RKS-115, MACS 14-16, MAVS-612, SL-925, BraGG, PB-1, VLS-58, Sivalik.) were resistant, thirty eight entries were moderately resistant, forty two were moderately susceptible and twenty seven entries (MACS 14-60, KDS - 753, MAYS-706, RVS 2007 - 6, JS 57-52, MACS 13-70, KDS - 726, DSb - 23 - 02, RKS - 18, JS 97-52, IVT-1, 5, 6, 8, 11, 12, 13, 14, 17, 31, 35, 36, 37, 38, 39, 41.) showed susceptible reaction to target leaf spot of soybean with the 2.53 LSI. Bliss *et al*. (1973) [1] screened useful levels of seedling resistance to *Corynespora cassiicola* in P.I. 120265 from Turkey and P.I. 1122 from Ecuador. Kapooria *et al*. (1998) [2] also found cultivars Santa Rosa and SCSI to be moderately resistant while Hernon 147 and Kaleya were recorded as susceptible. Patel (2005) [5] screened Seventy-two germplasm accessions were evaluated under natural field conditions for resistance to target spot of soybean. They found thirteen entries free from disease, 9 entries were moderately resistant, 2 moderately were susceptible and 3 entries showed susceptible reaction to target spot of soybean.

Table 2: Evaluation of soybean entries/varieties against Target leaf spot under natural field condition

Disease score	Disease reaction	Number of entries	Name of entries
0	Highly Resistant	3	AMS-323, JS 20-69, NRC-93.
1	Resistant	20	PS-1556, DS 31-01, RVS-2008-8, AMS-1003, KDS-780, JS 20-53, DSb-25, MACS 14-10, PS-1412, NRC-82, KS-3, JS 20-34, RKS-115, MACS 14-16, MAVS-612, SL-925, BraGG, PB-1, VLS-58, Sivalik.
2	Moderately resistant	38	JS 20 - 98, DS 31-01, DS 27-06, KDS-869, RVS- 2008-24, MAUS-706, KDS-753, NRC-99, JS 20-96, SL-955, MACS-1370, DSb-23-2, JS 20-89, RVS-2002-4, NRC-37, DS 2-13, KD-5319, MACS-1254, SL-795, KD-5354, JS 20-39, PS-1477, KDS-344, SL-900, RKS-113, JS 72-44, JS 75-46, JS 71-05, JS 72-280, PK-262 PK-472, MACS-75, KHSb-2. IVT-15, 21, 30, 33, 43.
3	Moderately susceptible	42	RSC - 1046, PS - 1556, DSB 28 - 3, JS 20 - 87, JS-335, RKS - 18, AMS-1002, RVS 2007-6, MACS-1442, DSb-28-3, VLS-89, MACS-1460, JS-20-87, SL-1028, NRC-37, VLS-86, RSC-10-29, RSC-10-30, C.G. SOYA-1, JS 93-05, NRC-7, MONTTA. IVT-2, 3, 4, 7, 9, 10, 16, 18, 19, 23, 24, 25, 26, 28, 29, 32, 34, 40, 42, 44.
4	Susceptible	27	MACS-1460, KDS - 753, MAYS-706, RVS 2007 - 6, JS 57-52, MACS-1370, KDS - 726, DSb - 23 - 02, RKS - 18, JS-97-52, IVT-1, 5, 6, 8, 11, 12, 13, 14, 17, 31, 35, 36, 37, 38, 39, 41.
5	Highly susceptible	0	None

Location severity index (LSI) = 2.5

Conclusions

The present study in evaluation of soybean entries/varieties against target leaf spot under field conditions reported that out of 130entries/varieties, three entries/varieties exhibited highly resistant, twenty entries/varieties were found resistant, thirty eight entries/varieties were found moderately resistant, forty two entrie/varieties were found moderately susceptible and twenty seven entries/varieties were found susceptible. None of the entries/varieties were categorized in highly susceptible categories and effective in reducing the disease severity under field conditions.

References

1. Bliss FA, Gnesirosan PT, Arny DC. Inheritance of resistance in tomato to target leaf spot. Phytopathology. 1973; 63(7):837-840.
2. Kapooria RG, Ndunguru J, Rong I. First report on *Corynespora cassiicola* and its pathogenicity to soybean cultivars in Zambia. Bulletin OEPP. 1998; 28(2):205-209.
3. Madhavi B, Battiprolu GB, Krishnaveni SL. Field evaluation of soybean germplasms against different diseases. Journal of Food Legumes. 2011; 24(1):65-66.
4. Olive LS, Bain DC, Lefebvre CL. A leaf spot of cowpea and soybean caused by an undescribed species of Helminthosporium. Phytopathology. 1945; 35:822-831.
5. Patel MP. Studies on *Corynespora cassiicola* (Bark. and Curt.) Wei. Causing Target Spot of Soybean (*Glycine Max (L.) Merrill*) M.Sc. (Ag.) Thesis, Indira Gandhi Agricultural University Raipur, 2005, 3.
6. Sinclair JB. Compendium of soybean diseases. American Phytopathology. Society. 1982; 4:27-28.
7. Wheeler BEJ. An introduction to plant diseases. John Willey and sons Ltd. London, 1969, 301.