Research Article

Effect of Major Biotic Factors and Percent Disease incidence on different Genotypes of Mung bean leaf curl disease

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Abstract

An investigated of "Effect of major biotic factors and date of sowing on mung bean leaf curl disease" have been carried out glass house in field condition during Ravi 2007 at Allahabad Agriculture Institute. Leaf curl diseases showing the characteristic symptoms of downward curing of leaves veinal necrosis, chlorotic spots and chlorosis on the lamina, stunting and death of the plants. A highly positive significant correlation was recorded between disease incidence on crops (r=0.920769) and no. of thrips (r=0.79623). The maximum temperature (r=0.86223) and sunshine (r=0.441167) showed positive correlation cofficient. The maximum minimum relation humidity (r=0.2112) showed a non-significant negative correlation with percent disease incidence.

Keywords: Mungbean leaf curl disease, biotic factors, Genotypes

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Introduction

Pulses play a beneficent role in Indian agriculture as providers of protein rich component in every human diet. India has the acreage of 21.12 million ha with an average yield of kg/ha (2002-2003). Uttar Pradesh is one of the major pulse growing State of India with an area of 2.7million ha and ranked Ist in yield with 884 kg/ha (2001-2002).The percentage coverage under irrigation (27.4) is also highest among all the pulse growing states (1999-2000) [1].

Among the pulses cultivated in Uttar Pradesh viz. pigeon pea, cowpea, and mungbean is important pulse crop. Some biotic stresses specifically pest and diseases are important constraints in realizing the full yield potential in mung bean production resulting in low yields. The mungbean leaf curl disease caused by peanut bud necrosis virus was one of the serious disease causing severe losses and neglected by the forming community. Based on serological reactions by employing haemo-agglutination Ghanekar *et al* [2, 3] reported that PBNV is more related to tomato spotted wilt viruses (TSWV) and transmitted by *Scirtothrips dorsalis* with low thermal inactivation point.

Though the virus causing the disease is not influenced by environment factors the vector in highly influenced by environmental factors where in temperature has profound influence on the mass flight of thrips, other factors like relative humidity has influence [4]. Black gram and green gram are highly susceptible to virus and vector. The maximum disease incidence ranged from 50-100% in rainy season, in post-rainy season maximum number of F.schultzei occurs in January and February The disease incidence was less at 50 days after sowing (DAS) when sown in the second fortnight of June (14.1%) but more when sown in the first fortnight of July (82.3%) plant spacing of 37.5x5.0cm had lower percentage of disease in post-rainy season.

Materials and Methods

Vector abundance

For recording the thrips population, one plant in each of the fixed areas was bent a side holding a white paper (20x30) below and tapping the plants. The thrips fallen on the white sheet were recorded and No. of thrips vector in the crop were observed from January at Sam Higginbottom Institute of Agriculture, Technology and Sciences Allahabad.

Screening experiment

The disease incidence was calculated by:

$$\text{Percent disease incidence} = \frac{\text{No. infected plant}}{\text{Total no. of plants}} \text{ x100}$$

Based on the percentage disease incidence genotypes were categorized

Per cent disease incidence	Category
1-10	Resistance
11-39	moderately resistance
40-50	Moderately
50-79	Susceptible
80-100	High suscepti

Results and Discussion

Leaf curl diseases showing the characteristic symptoms of downward curing of leaves veinal necrosis, chlorotic spots and chlorosis on the lamina, stunting and death of the plants due to apical necrosis on greengram. Symptoms are conformity with Nene [5].

Natural infection on weeds

The following weeds were identified in mungbean field (**Table 1**). None of the weeds were naturally infected with peanut bud necrosis virus. Gopal [6] reported on Alternate host of PBNV none of alternate host reported were found to be infested mungbean and none of the infested weed were naturally infected with PBNV.

Table1 Weeds infesting Mung bean field

S.No.	Scientific name	Family	Natural infection
1	Commelia benghalensis	Commelinaceae	Not observed
2	Cyperus rodundus	Cyperaceae	Do
3	Euphobia hirta	Euphorbiaceae	Do
4	Parthenium hysterophorus	Asteraceae	Do
5	Bracharia mutica	Poaceae	Do
6	Phyllanthus neruri	Euphorbiaceae	Do
7	Portulaca oleraceae	Portulacaceae	Do
8	Dicanthium annulatum	Poaceae	Do

100 selected varieties with superior agronomies performance were evaluated (**Table 2**) for this reaction to mung bean leaf curl disease. In 100 varieties 48 are resistant varieties namely (ECP398897,AKM-9601,ML-613,MH-309,KHB-132,PUSA-9332,BHUM9P-17,V-17,V 557, PUSA9132-1, SAMRAT,V-2070, DPM90-1, BSN-1, KMB-207, PDM84-143,WGG37, BHUM-93-34, KMB-228, EC399223, LGG-410, OBGG-40, BOYR-2, KM6-134,V-SUBLOBATA, MGG-347, WGG-2, IT76-201, V-1133, 012-326, MOM-1-1, SONAMUN4, SUJAJA, PIMS-11/94,MOM-2,HL515,VSEULUSA,ML-583,EC398884,V-4512,ML-382,NARP-1-1,K1460-1,PS-16, OBGG-11, KM6-238, ML-207, 39 varieties were moderately resistant, 3 varieties were susceptible, and only 1 variety is highly susceptible.

Similar works were done by Chhabra and Kooner [7].Chhabra et al. [8] and Sreenivasulu [9].

Summary and Conclusion

The PBNV infected Mung bean plant showing down ward curling of leaves, veinal necrosis, chlorosis on the lamina, stunting and death of the plant due to apical necrosis on green gram. The following weeds were identified in mungbean field none of the weeds were naturally infected with PBNV. A highly positive significant correlation was recorded between disease incidence on crops (r=0.920769) and no. of thrips (r=0.79623).the maximum temperature(r=0.86223) and sunshine (r=0.441167).The minimum temperature (r==0.36584).The maximum minimum relation humidity (r=0.2112) (r=0.46) and non-significant negative correlation with percent disease incidence. Cultivated varieties LGG499, KM6-219, KM6-131, HUM-10, TARM-2 had recorded zero disease incidence.

Table 2 Reaction of varieties to leaf curl disease. %disease incidence

S. No.	Variety	45 DAS (%)	Category of Resisatnce	S. No.	Variety	45 DAS (%)	Category of Resisatnce
1	Ec398897	6.6	Resistant	51	KM6-202	20	Moderately resistant
2	AKM-9601	5.8	Resistant	52	MGG-347	7.8	Resistant
3	ML-613	5.5	Resistant	53	WGG-2	2.0	Resistant
4	MH-309	5.5	Resistant	54	KM6-203	50	Susceptible
5	KM6-132	6.6	Resistant	55	KM6-201	6.2	Resistant
6	KM6-130	16.6	Moderately resistant	56	PDM-11	5.8	Resistant
7	PUSA-9332	2.0	Resistant	57	K851	14.2	Moderately resistant
8	BHUM9P-17	5.2	Resistant	58	LGG478	20	Moderately resistant
9	V-557	7.6	Resistant	59	V-1133	9.0	Resistant
10	PUSA9132-1	6.6	Resistant	60	MARP-280	11.1	Moderately resistant
11	ML406	33.3	Moderately resistant	61	PS-10	16.6	Moderately resistant
12	LGG499	0	0	62	ML-326	7.6	Resistant
13	SAMRAT	5	Resistance	63	MUM-1-1	6.2	Resistant
14	V-2070	5	Resistance	64	SONA MUNG	9.0	Resistant
15	KM6 219	0	0	65	SUJAJA	10	Resistant
16	DPM90-1	10	Resistance	66	K-92-220	22.2	Moderately resistant
17	BSN-1	6.0	Resistance	67	PIMS-11/99	9.1	Resistant
18	KM5-168	20	Moderately resistant	68	PUSA BAISAKHI	11.1	Moderately resistant
19	KM6-207	7.6	Resistant	69	BAREI JAI BAR	16.2	Moderately resistant
20	LGG477	11.1	Moderately resistant	70	MUM-2	10	Resistant
21	PDM84-143	5	Resistant	71	ML515	10	Resistant
22	WGG-37	5.8	Resistant	72	V SET ULUSA	10	Resistant
23	KM6-232	14.2	Moderately resistant	73	T1	0	0
24	KM6-230	12.5	Moderately resistant	74	ML-583	10	Resistant
25	KM6-131	0	0	75	ML-588	25	Moderately resistant
26	KM6-211	16.6	Moderately resistant	76	EC 398884	7.6	Resistant
27	PUSA-105	11.1	Moderately resistant	77	PDM-84-139	25	Moderately resistant
28	KMG-133	12.5	Moderately resistant	78	AKM-8802	25	Moderately resistant
29	BHUM-93-34	9.0	Resistant	79	NARP-286	90	Highly susceptible
30	AKM9292	16.6	Moderately resistant	80	V-4512	8.3	Resistant
31	KM6-205	0	0	81	ML-382	9.0	Resistant
32	KM6-229	25	Moderately resistant	82	CO-9	33.2	Moderately resistant
33	KM6-228	7.1	Resistant	83	NARP-1-1	10	Resistant
34	KM6-221	11.1	Moderately resistant	84	NP-28	14.2	Moderately resistant
35	EC399223	10	Resistant	85	K1460-1	7.1	Resistant
36	EC30400	20	Moderately resistant	86	PS-16	8.3	Resistant
37	PDM-139	25	Moderately resistant	87	KM6-214	14.2	Moderately resistant
38	LGG-410	10	Resistant	88	EC398888	14.2	Moderately resistant
39	OBGG-40	9.0	Resistant	89	KMG-209	0	0
40	HUM-10	0	0	90	AKM-9241	0	0
41	TARM-2	0	0	91	CK001	15.7	Moderately resistant
42	BOYR-2	9.0	Resistant	92	KM6-222	15.7	Moderately resistant
43	KM6-134	6.2	Resistant	93	441-01	14.2	Moderately resistant
44	KM6-210	16.2	Moderately resistant	94	OBGG-11	6.2	Resistant
45	EC398889	7.6	Resistant	95	MGG-295	14.5	Moderately resistant
46	K-1084	11.1	Moderately resistant	96	BDYR-1	13.4	Moderately resistant
47	LAHRI MUNG	50	Susceptible	97	KM6-238	2.5	Resistant
48	PM9001	14	Moderately resistant	98	ML-207	10	Resistant
49	LGG479	50	Susceptible	99	HUM-15	33	Moderately resistant
50	V-SUBLOBATA	6.2	Resistant	100	KM6-239	33.2	Moderately resistant

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