Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

J P P Journal of Pharmacognosy and Phytochemistry

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(1): 1585-1586
Received: 18-11-2017
Accepted: 22-12-2017

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Effect of major biotic factors on Mung bean leaf curl disease

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Abstract
The PBNv infected Mungbean leaf showing downward, curling of leaves, veinal necrosis, chlorotic areas on the lamina, stunting and death of plants. The vector population in the crop was observed.

Keywords: Mungbean leaf, PBNv, curlingleaves, veinal necrosis, vector population

Introduction
Pulses play a beneficent role in Indian agriculture as providers of protein rich component in every human diet. It is important pulse crops having global economic importance as a dietary ingredient of the stable food. It contains 55% carbohydrate, 26% protein, 10% moisture and 3% vitamins. It is also capable of fixing atmospheric nitrogen (222 kg/ha) through symbiotic relationship with Rhizobium in the root nodule of the crop. 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) (Department of Agricultural and Cooperation Government of India, 2003). 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.The disease is transmitted by *Scirotothrips dorsalis* and *Frankliniella schultzie*. But it was repored that *F. schultzie* was more efficient as vector (Amin *et al*. 1998 and Reddy *et al*. 1983 [8]

Materials and Methods
Inoculation method (or) Bioassay for leaf curl
1gm of infected plant tissues extract in gm/buffer (0.05m phosphate buffer) preparation of 0.05 phosphate buffer PH 7.0

Composition
KH_2PO_4 (Potassium dihydrogen phosphate)	:	2.4g
KH_2PO_4 (Potassium dihydrogen phosphate)	:	5.4g
$Na2SO_3$ (Sodium sulphite)	:	1.2
Distilled water	:	1.1g

Incubation on to 7 days old leaves cv-152, sprinkled with carborendom mesh. The entrie process was carried out under chilled conditions in the glass house. The inoculated cowpea leaves showed chlorotic spots on 5-7 days after inoculated. After inoculation the leaves were washed with a jet of water to remove excess abrasive. The inoculated plants were maintained inside the insect proof glass house.

Physical properties of virus
The physical properties of virus buffer sap were determined by extracting symptomatic leaves in phosphate buffer.

Dilution end Point (DEP)
The mungbean sap was diluted to 10-1-10-5 by serial dilution technique and infectivity of sap at each dilution was tested by local assay above mentioned.

Thermal inactivation point (TIP)

For determining TIP the sap diluted to 10-1 was heated to various temperatures (10-50 ^{0}C) in water both for 10 minutes and assessed the infectivity of the sap at 10, 20, 30, 40 and 50 ^{o}C respectively.

Longevity *in vitro* LIV

For determining longevity *in vitro* sap diluted 10-1 was kept room temperature and infectivity was assessed at hourly intervals (1-5 hrs).

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 green gram. Symptoms are conformity with Nene (1972).

The physical properties of virus in buffer sap (Table No.1). Dilution end point was10^{-3}, Thermal inactivation point was between 45 ^{0}C - 50 ^{0}C and longevity invitro was between4hr to 5hr. Based on physical properties, Symtomatoloy, the virus was identified peanut bud necrosis virus. The dilution end point, longevity invitro and Thermal inactivation points were ion conformity with physical properties of groundnut buffer sap as reported by Ghanekar *et at.* (1979) [6] and that of Amin *et al*. (1981, 1985b) [1, 4] in green gram. However the causal virus was described as Tomato spotted wilt virus.

Table 1: Physical properties of mungbean buffered sap

Physical properties									
Dilution end point (DEP) Reaction	10^{-1} (+)	*10^{-2}* (+)	*10^{-3}* (-)	*10^{-4}* (-)	10^{-5} (-)				
Thermal inactivation points (TIP) Reaction	10 ^{0}C (+)	15 ^{0}C (+)	20 ^{0}C (+)	25 ^{0}C (+)	30 ^{0}C (+)	35 ^{0}C (+)	40 ^{0}C (+)	45 ^{0}C (+)	50 ^{0}C (+)
longevity invitro (LIV) Reaction	1hr (+)	1½ (+)	2hr (+)	2½hr (+)	3hr (+)	3½hr (+)	4hr (+)	4½hr (+)	5hr (-)

(+) Positive
(-) Negative

Summary and conclusion

The PBNV infected mungbean plant showing down ward curling of leaves, venial necrosis, chlorosis on the lamina, stating and death of the plant due to apical necrosis on green gram. The dilution end point (DEP) was found to be in the range of $10^{-2}$to 10^{-3}, thermal inactivation point (TIP) was found to be range of 45-50 ^{0}C longevity invitro (LIV) was in the range of 4-4 ½ hours at room temperature.

The incitant of peanut bud necrosis disease (PBND) was confirmed as (PBNV) based on symptology and physical properties of buffer sap.

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