



P-ISSN: 2349-8528

E-ISSN: 2321-4902

www.chemijournal.com

IJCS 2020; 8(2): 229-231

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Received: 04-01-2020

Accepted: 06-02-2020

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International Journal of Chemical Studies

Assessment of yield loss caused by powdery mildew disease in mungbean

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DOI: <https://doi.org/10.22271/chemi.2020.v8.i2d.8773>

Abstract

An experiment was conducted at the Instructional Farm of Agronomy, College of Agriculture, JAU, Junagadh during *Kharif*, 2015. The yield loss caused by powdery mildew disease was recorded on three treatments *i.e.* application of propiconazole @ 0.025%, water sprays and untreated control under field conditions. Out of three treatments, lower disease intensity (18.5%) and higher seed yield (1242 kg/ha) was recorded in protected plots as compared to untreated control plots where disease intensity was 68.0% and seed yield was 709 kg/ha. With the application of propiconazole, 42.9% seed yield could be saved with the reduction of disease intensity by 72.8%. Whereas, the application of water saved 5.7% seed yield with reduction of disease intensity by 13.8%.

Keywords: Yield loss assessment, powdery mildew, plant disease intensity, *Vigna radiata*

Introduction

Green gram (*Vigna radiata* L) is one of the most important and extensively cultivated pulse crops which is locally known as *Mung* and Golden bean. It is used as human food many other culinary products (Singh *et al.*, 1988) ^[1]. It ranks second in nutritive value amongst pulses crop. The leguminous crops have the capacity to fix-atmospheric nitrogen through symbiotic nitrogen fixation. It is also used as green manure crop. It is grown in summer and *Kharif* season in northern India and in southern India. In India, it is the third important pulse crop. In India, total area under Green gram cultivation is 40.70 lakh hectares, production 19.01 lakh tones and productivity of 406.98 kg/ha. The major Green gram growing states are Gujarat, Maharashtra, Rajasthan, Andhra Pradesh, Karnataka and Orissa. In Gujarat, area under cultivation is 1.53 lakh hectares production 0.88 lakh tones with the productivity of 526.09 kg/ha (Anon., 2018) ^[1]. One of the major obstacles hampering green gram production is heavy incidence of the diseases. (Zote *et al.* 1985, Dhutraj and Zote, 2005) ^[2,3].

The mung bean suffers from many diseases caused by fungi, bacteria, viruses, nematodes and abiotic stresses. Among these, powdery mildew disease caused by *Erysiphe polygoni* is a destructive disease which causes huge yield losses up to 50-90% (Gupta and Mate, 2009) ^[5]. In Gujarat state, the disease appears during warm and humid weather conditions during flowering to maturity of crop. However, its severity may be influenced by the different cultivars, planting time, cultural practices and prevailing environmental conditions (Singh *et al.*, 1999) ^[10].

Materials and Method

The experiment was conducted at the Instructional Farm of Agronomy, College of Agriculture, Junagadh Agricultural University, Junagadh during *Kharif*, 2015. For assessment of yield loss, green gram variety, GM- 4 was planted following sampling design in three strips (15.00 × 2.25 m) and 45 × 10 cm spacing was maintained. One the appearance of disease, one strip was treated with foliar application of propiconazole @ 0.025% followed by two sprays at fifteen days interval. The remaining two strips were considered as check; untreated and water spray.

The foliar application of propiconazole was carried out to maintain disease free condition. Eight samples of size 1.0 x 1.0 were drawn from each strip. The incidence of disease was recorded by following the 0-5 scale on ten randomly selected plants from each sample and five leaves from each plant was selected after one week of last spray.

The seed yield was recorded from each treatment from eight sub plots made in each treatment. Yield reduction (%) was estimated on the basis of seed yield obtained (Gohil *et al.* 1988) [4].

$$\text{Yield loss (\%)} = \frac{\text{Yield of treatment} - \text{Yield of check}}{\text{Yield of treatment}} \times 100$$

Results and Discussion

To assessment of seed yield loss of green gram due to infection of powdery mildew, an experiment was conducted with three treatments including water spray and control during *Kharif* 2015. The foliar application of propiconazole (0.025%) was given at 10 days interval starting from the initiation of disease to maintain disease free condition. The per cent disease intensity was recorded after seven days of last sprayed and seed yield was recorded from each treatment after harvesting.

Disease intensity and yield indicated that minimum disease intensity (18.53%) was observed in foliar application of propiconazole 0.025 per cent. In water spray and without water spray (control) the per cent disease intensity was 58.67 per cent and 68.03 per cent, respectively. The maximum disease control (72.76%) and maximum seed yield (1242 kg/ha) of green gram was obtained in foliar application of propiconazole (0.025%). The treatment of water spray and without water (control) gave 752 kg/ha and 709 kg/ha seed yield, respectively. Similarly the minimum disease intensity and maximum seed yield were recorded with treatment of

propiconazole (0.025%) in other experiment conducted during *Kharif* 2015.

The results indicated that loss in seed yield was 42.91 per cent in greengram due to powdery mildew disease. If powdery mildew infected crop not protected timely caused considerable loss in yield of crop and timely application of propiconazole avoid loss in yield up to 42.91 per cent.

Foliar application of propiconazole 0.025 per cent gave 18.53 per cent disease intensity while 72.76 per cent disease inhibition control and 1242 kg per ha seed yield which was followed by water spray 58.67 per cent disease intensity 13.75 per cent disease control and 752 kg per ha seed yield and in control (without any spray) 68.03 per cent disease intensity 5.71 per cent disease control 5.71 kg per ha seed yield.

On the basis of that propiconazole (0.025%) gave 42.91 per cent avoidable seed yield loss which was followed by water spray gave 5.71 per cent avoidable seed yield loss 752 kg/ha and 709 kg/ha seed yield, respectively. Similarly the minimum disease intensity and maximum seed yield were recorded with treatment of propiconazole (0.025%) in other experiment conducted during *Kharif* 2015.

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Similar results were obtained by Rathi *et al.* (2003) [7], Munjal *et al.* (1963) [6], Raut and Wangikar (1979) [8], Dakshayani and Mummigatti (2004) [2] and Reddy *et al.* (2008) [9].

Table 1: Assessment of yield loss in green gram due to powdery mildew

Sr. No.	Treatment	Per cent Disease index (PDI)	Disease reduction over check (untreated)	Disease reduction over check (water spray)	Seed yield (kg/ha)	Avoidable yield loss (%) over check (untreated)	Avoidable yield loss (%) over check (water spray)
1	Propiconazole @ 0.025%	18.53 (25.43)	72.76	68.42	1242	42.91	39.45
2	Check (water spray)	58.67 (50.00)	13.75	-	752	5.71	-
3	Check (untreated)	68.03 (55.60)	-	-15.95	709	-	-6.07
	SEm ±	0.80	-	-	51.76	-	-
	CD at 5%	2.40	-	-	203.22	-	-
	CV (%)	9.54	-	-	9.95	-	-

*Mean of eight samples; figures in parenthesis are arc sin transformed values.



Fig 1: Field view of protected [A] and powdery mildew infected [B] green gram crop

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