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Screening of mungbean genotypes and its wild relatives for resistant sources to *Cercospora leaf* spot disease

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Mungbean [*Vigna radiata* (l.) Wilczek], commonly called as greengram is a major source of protein for poor people. In the present investigation 169 genotypes of mungbean were sown in 13 x 13 simple lattice design with two replications during *rabi* 2004 under field condition. Disease incidence of *Cercospora leaf* spot (CLS) was scored on 0-5 scale as developed by Singh (2001). Only wild species, *Vigna aconitifolia, V. glabrascence, V. sublobata V. umbellata* and a muatant PBM were free from CLS infection were grouped as immune. Five genotypes which registered field resistance to CLS should further subjected to glass house screening and then could be used as resistant sources for introgression of CLS resistant genes into present day susceptible cultivars through hybridization programme.

Key words : *Cercospora leaf* spot, Resistant sources, Screening, Mungbean.

INTRODUCTION

Mungbean [*Vigna radiata* (L.) Wilczek] is an important pulse crop of India. It is principally grown for its protein rich edible seeds, dry seeds and sprouts. It is called by mung, moong, mungo, mungbean, golden gram, chop-suey bean. It is an excellent source of easily digestible protein with low flatulence and is consumed as dhal, bean sprouts, noodles, green beans and boiled dry beans. It is used in preparation of curry or a savoury and moong halwa etc. It is a short duration legume, cultivated in three different season *viz*., *kharif, rabi* and summer. The *kharif* crop is grown both as inter crop and as sole crop. In summer, the crop can be grown both as sole crop or catch crop after wheat or in fields vacated by crops like potato, mustard and rice.

In India, pulses are cultivated in an area of 23.76 million hectares with production of 14.11million tones and productivity of 594 kg/ha during 2006-07 (Anon, 2007). In Karnataka mungbean is cultivated in an area of 5, 23, 384 hectares with production of 82624 tones and the average productivity of 166 kg/ha during 2004-05 (Anon, 2006) is very low due to susceptibility to environmental stresses and diseases. The productivity is very low mainly due to its susceptibility to diseases like *Cercospora* leaf spot and mungbean yellow mosaic virus powdery mildew. *Cercospora* leaf spot is caused by *Cercospora canescens* Ell. and Mart. and *Cercospora cruenta* Sacc. is one of the most common diseases occurring on mungbean. Yield losses upto 47 per cent have been reported during warm and wet seasons (AVRDC, 1976; Grewal, 1978; Gupta and Gupta, 2000). Maximum loss of 61 per cent was reported for grain yield (Iqbal *et al*., 1995). Though fungicides can bring down the incidence of CLS (Singh and Naik, 1977; Singh and Singh, 1978; Iqbal *et al*., 2004), but they are not cost effective and cause environmental pollution. Therefore, development of resistant varieties seems to be most effective, cheapest and eco-friendly method of powdery mildew control. The identification of sources of resistance to CLS could avoid heavy yield losses in mungbean. Therefore, the objective of this was to screen mungbean genotypes and its wild relatives for resistance to CLS.

MATERIALS AND METHODS

The field experiment was carried at UAS, Bangalore during *rabi* season (September-November) 2004. The experiment material consisted of 169 mungbean genotypes comprised of four wild relatives, mungbean and one mutant obtained from AICRP on chickpea, UAS, Bangalore, TNAU, Coimbatore and NBPGR, New Delhi. The experiment was laid out in 13x13 simple lattice design with two replications. All the recommended package of practices was followed except spraying of plant protection chemicals to allow maximum inoculum of powdery mildew. The seeds were hand dibbed with an inter and intra row spacing of 45cm and 10cm, respectively. Disease incidence of CLS was scored on 0-5 scale as developed by Singh (2001) and is described below.

Grade	Per cent of leaf area infested	Disease reaction
0	0.00	Immune
1	0.1-5.0	Resistant
2	5.1-10.0	Moderately resistant
3	10.1-25.0	Moderately susceptible
4	25.1-50.0	Susceptible
5	Above 50	Highly susceptible

RESULTS AND DISCUSSION

The results presented in the Table 1 indicate that out of 169 mungbean genotypes screened against CLS, only four wild species *viz*., *Vigna acconitifolia, Vigna, glabrescence, Vigna sublobata,Vigna umbellate* and a mutant PBM were free from CLS. Ninety one genotypes which expressed 0.1-5.0 per cent infection and score of 1 were considered resistant to CLS. Thirty three genotypes which recorded 5.1-10.0 per cent infection with a score of 2 were found to be moderately resistant to CLS infection. Twenty four mungbean genotypes which showed 10.1-25.0 per cent infection and scored 3 were moderately susceptible to CLS. Nine genotypes which expressed 25.1-50 per cent infection and score of 4 were susceptible to CLS. Seven genotypes which recorded more 50 per cent of CLS infection and score of 5 were highly susceptible to CLS.

Table 1 : Grouping of 169 mungbean genotypes based on *Cercospora* leaf spot reaction under field conditions

Scale	Disease reaction	*Per cent* plants affected	No. of genotypes	Genotype
0	Immune	No infection	5	*V. umbellata, V. acconitifolia, V. glabrascence, V. sublobata,* PBM
1	Resistant	0.1-5.0	91	AC 5, AKM 9911, ATTIAMPALYAM, BL 849, CC 192, CO 4, CO 6, DHOLI, DM 2, DPI 701, G 122(D), GA 8810, GM 8413, KANGAYAM, KG 52, KKM 3, KLM 4, KM 1883, KM 2194, KU 44, LM 182, LM 1900, LM 2023, LM 565, LM 567, M 986, MAVT 807, MAVT 817, MAVT 849, MDU 2010, MDU 2196, MDU 2268, MDU 3156, MDU 3312, MDU 3385, MDU 3404, MDU3404/1, MGG 221, MGG 341, MGG 355, MH -1, MH 90-1, MIVT 843, MIVT 845, MIVT 847, MIVT 850, MIVT 852, MIVT 856, MIVT 862, MIVT 867, ML 173, ML 347, ML 520, ML 561, ML 613, ML 627, MRG 335, N DM 1, NEELAMBER, NIGERIAN VARITY, NP 36, OBGG 11, P 9371, PANT M1, PANT M103, PANT M2, PANT M3, PANT M4, PDM 11, PUSA 105, PUSA 122, PUSA 271, PUSA 9072, PUSA 98-71, PUSA 8871, PUSA RAJOLI, RAJENDRAN, SML 134, SML 151, SM L 331, SML 348, T1, T 2272, TM 9412, TV MALAI, V S 1972, V 2965, VAMBAN 1, VGG 4, WGG 37, PMB 43
2	Moderately Resistant	5.1-10.0	33	ADT1, AGASTHIALINGAPUR, AKM 880, BBS-1-1 CHINAMUNG, GANGA 5, GM 8426, HG 1 9A, HM 912, HUM 6, K 851, K PUDUR 1, KALIKALA, KAVILPATTI, LAM 2, LGG 410, LGG 461, LGG460, MDU 1948, MIVT 854, MIVT 863, MIVT 866, ML 1670, MS 9384, PS16, RMG 62, SOBOURCUTE, SM 29, SONAMUNG, VBNGG 2, VELLAMPATTI, VELLATIKULAM , VS 191, WBM 4-31-1-1
3	Moderately Susceptible	10.1-25.0	24	BAPATHLA, BG 1, BM 4, BPMR 145, HUM 1, LM 13, LM 1554, LM 159, LM 172, M 986(D), M 108, M-131, MAVT 805, MAVT 855, MDU 3465, MH 96-1, MH91/2, MS 9727, MUM 2, MUM 5, PDM 54, PUSABAISAKI, VELLULIOR and VPB 99-3
4	Susceptible	25.1-50.0	9	BODI 1, HUM 12, IPM 99125, MAVT 836, MDU 1942, PDM 84-178, PDM 87229, TAP 7, PUSA 9531
5	Highly Susceptible	Above 50	7	HYB 2, ILONGAI 1, PDM-91242, PLS 326, T3485, VS 197

Since there is not much information available on CLS disease in mungbean, the information from the present study is pre-requisite and initial information for launching crop improvement programme aimed at introgression of CLS resistant genes into elite cultivars. Five genotypes which registered field resistance to CLS should further subjected to glass house screening and then could be used as resistant sources for introgression of CLS resistant genes into present day susceptible cultivars through hybridization programme.

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