Forage Res., **38** (3) : pp. 182-183 (2012) **http://forageresearch.in**

SHORT COMMUNICATIONS

INHERITANCE OF BACTERIAL LEAF BLIGHT RESISTANCE IN CLUSTERBEAN

ANIL, S. K. PAHUJA, S. P. KADIAN, S. K. GANDHI AND NABIN BHUSAL

Forage Section, Department of Genetics and Plant Breeding
CCS Haryana Agricultural University, Hisar-125 004 (Haryana), India
*(Email: bhusal.nabin@gmail.com)
(Received: 11 June, 2013, Accepted: 15 July, 2013)

SUMMARY

The F_2 progenies of two crosses i.e. HG 563 X PNB and HG 75 X PNB in clusterbean were studied for inheritance of Bacterial Leaf Blight disease resistance. Individual data were taken for BLB disease using 0-9 scale. The data were analyzed using ÷2 test in clusterbean. F_2 mendelian segregation ratio 13:3 (Inhibitory gene action) was found non significant in both the crosses. The presence of inhibitory gene action was for governing resistance to bacterial leaf blight disease in both the crosses which will enable the breeder to exercise intensive selection among segregants with better chances of finding transgressive segregants for F_2 population.

Key words : Clusterbean, χ^2 test, Inhibitory gene action, Transgressive segregants, Bacterial leaf blight

Clusterbean [*Cyamopsis tetragonoloba* (L.) Taub.] Popularly known as guar, is one of the most important *kharif* legumes and is well adapted to arid and semiarid regions of the world. It belongs to family Leguminaceae having chromosome number, n = 7. Clusterbean is a multi-purpose arid legume grown for seed, green fodder, vegetable and green manuring. It has become an important industrial crop being a source of gum and protein. Bacterial blight caused by *Xanthomonas campestris pv. Cyamopsidis* (Patel, Dhande and Kulkarni) Dye is a serious disease which appears almost every year and has seriously threatened guar production in certain areas (Chand and Gandhi, 1978; Anonymous, 1984; Mihai and Alcorn, 1985). This disease attacks almost all above ground plant parts and sometimes severe infection results in to death of well established plants by cracking and breaking down of the stem. So, there is an importance of varieties which are resistance to bacterial blight. Before starting the breeding process to develop resistance varieties understanding of inheritance of disease resistance along with seed yield and its attributes is a priority consideration. Keeping the above points the present investigation was carried out to study the inheritance of bacterial leaf blight resistance in clusterbean.

MATERIALS AND METHODS

F_2 progenies of two crosses HG 563 X PNB and HG 75 X PNB were sown during *kharif* season, 2010. The planting was done in row of 3m length and spacing between and within rows was kept at 45 and 10 cm, repectively. The parents and F_1's were accommodated in single row. All the recommended package and practices were followed to raise the good crop. The data on individual plants were recorded for bacterial leaf blight disease using scale 0-9 as suggested by Gandhi (1984).

RESULTS AND DISCUSSION

In F_1 all the plants were found resistant to bacterial leaf blight. In F_2 generation, 300 plants were observed in both the crosses i.e. cross HG 563 X PNB and HG 75 X PNB. The plant showing disease score 0-3 were considered as resistant and plants with scale 5-9 scores were considered as susceptible. The data were analyzed using χ^2 test. In F_2 population ratio of resistance: susceptible plants were 249:51(Table 1) and 252:48 (Table 2) in cross of HG 563 X PNB and HG75X PNB,

TABLE 1
Chi- squares for inheritance of bacterial leaf blight resistance in cross HG 563 X PNB

Observed Frequency Resistant : Susceptible	Mendelian segregation ratio	Expected Frequency Resistant : Susceptible	χ^2 calculated
249:51	3:1	225:75	10.24**
249:51	9:7	168.75:131.25	87.23**
249:51	13:3	243.75:56.25	0.65^{NS}
249:51	15:1	281.25:18.75	59.16**

TABLE 2
Chi-squares for inheritance of bacterial leaf blight resistance in cross HG 75X PNB

Observed Frequency Resistant : Susceptible	Mendelian segregation ratio	Expected Frequency Resistant : Susceptible	χ^2 calculated
252:48	3:1	225:75	12.96**
252:48	9:7	168.75:131.25	93.87**
252:48	13:3	243.75:56.25	1.49^{NS}
252:48	15:1	281.25:18.75	48.67**

respectively. The observed frequencies of both F_2 were tested against different Mendelian F_2 ratio *viz.* 3:1, 9:7, 13:3 and 15:1 by using χ^2 test. The estimates of χ^2 for different classical mendelian F_2 segregation ratio for resistant and susceptible plants in both the crosses were calculate and tested against χ^2 tabulated value at 1 and 5% level of significance. Only 13:3, F_2 Mendelian segregation ratio was found non significance in both the crosses. This reveals that in F_2 generation resistant and susceptible plants fit well in diagenic (13 : 3) mendelian ratio. The quantitative nature of inheritance of disease resistance was thus apparent. This was first type of study. No such type of study could be found in literature regarding inheritance of bacterial leaf blight in guar. However, Singh *et al.* (1997) found the importance of both fixable and non fixable gene effect in the inheritance of bacterial blight. Arya *et al.* (2009) reported ratio for inheritance of grain colour in pear millet.

The presence of inhibitory gene effects (interactions) i.e. 13:3 suggested that both HG 75 and HG 563 possess at least two major genes, one governing resistance to bacterial leaf blight and another one inhibiting the effect/expression of another major gene for disease reaction. This expands the changes of selecting desirable recombinants containing disease resistance among larger proportion of F_2 population than in case of normal distribution (9:3:3:1). This also will enable breeder to exercise intensive selection among segregants with better chances of finding transgessive segregants from F_2 population.

REFERENCES

Singh, J. V., Saini, M. L., Lodhi, G. P. and Arora, R. N. (1997).. *Annals of Arid Zone*. **36** : 143-146.

Mihai, J. D. and Alcorn S. M. (1985). *Plant Disease.* **69** : 811.

Chand, J. N. and Ghandhi, S. K. (1978). Diseases of guar and their control. In : guar-its improvement and management, pp 49-66.

Paroda, R. S. and Arora S. K. (eds). Indian society of forage research, Hisar.

Arya, R. K., Yadav, H. P. and Yadav, A. K. (2009). *Natnl. J.Pl. Improv.* **11** : 65-66.