

**FIELD SCREENING OF KABULI CHICKPEA GENOTYPES AGAINST BOTRYTIS GRAY MOLD**M. SHAHIDUZZAMAN<sup>1</sup>

Chickpea (*Cicer arietinum* L.) commonly known as gram is one of the important pulse crops in Bangladesh. It is generally grown under rainfed with residual soil moisture conditions in the *rabi* season. Among the major pulses grown in Bangladesh, chickpea ranked seventh in area and sixth in production (Anon., 2015) but second in consumption priority. The national average productivity of chickpea is miserably low (1.09 t/ha) (Anon., 2015). Botrytis gray mold (BGM) caused by *Botrytis ceneria* is an important disease of chickpea in northern India, Nepal, Bangladesh and Pakistan. It was first reported in India in 1915 (Shaw and Ajrekar, 1915). Outside the Indian subcontinent the disease has been reported from Argentina (Carranza, 1965), Australia (Nene *et al.*, 1989), Canada (Kharbanda and Bernier, 1979), and Chile (Sepulveda and Alvarez, 1984). It was first documented in 1981 in Bangladesh (Anon., 1981) but its recurrence after 1985 drastically reduced the chickpea area and production in this country. Nine varieties have been released from Pulse Research Center (PRC), BARI, but they could not create significant impact on chickpea production in the country because of BGM problem. The disease becomes serious following frequent winter rainfall that results in excessive vegetative growth and high humidity, which favor its infection, epidemic and severity. The disease is seed, soil and air borne. In the recent years, this disease has become a great threat to chickpea cultivation. Preventive measures such as low seed rate, chemical spray, wider row spacing, intercropping with linseed help to reduce disease intensity. But resistant cultivars offer the best solution to control the disease. Keeping this view in mind, 32 lines and one released variety were screened for determining their relative susceptibility/resistance to BGM. Suitable resistant chickpea genotypes also prevent spore production build up and able to compensate damage by producing increased number of healthy pods/plant that were taken as parameters for assessing disease-plant relationship in chickpea.

A total of 32 kabuli chickpea lines with a check BARI Chola 5 were evaluated in the field under the natural epiphytic condition. The seeds of chickpea lines were collected from Australian Center for International Agricultural Research (ACIAR), Australia. The land was well ploughed by tractor and properly leveled. Weeds and stubbles were removed from the field. NPK fertilizers @ 20-40-20 kg/ha in the form of urea, triple super phosphate and muriate of potash were applied at final land preparation. The experiment was laid out in Randomized Complete Block Design with three replications. Varieties/lines were considered

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<sup>1</sup>Scientific Officer, Regional Pulses Research Station, Bangladesh Agricultural Research Institute (BARI), Madaripur, Bangladesh.

as treatment of the experiment. The seeds of respective lines with check were sown on 20 December, 2010 in rows with 50 cm spacing. Uniform plant population was maintained by keeping 10 cm plant to plant distance. The unit plot size was 4m x 16.5m. Intercultural operations (irrigation, thinning and weeding) were done manually and herbicides application (Rahman and Miah, 1989). The experiment was monitored regularly to observe the onset of disease. The crop was kept completely free from fungicide application. The genotypes were closely examined to identify resistant cultivars to BGM of chickpea. BGM of chickpea was graded on a 1-9 scoring scale (Singh, 1999). The scale described as 1= no infection on any part of the plant, 2= minute lesions on lower leaves, flowers and pods covered under dense plant canopy, 3= lesions on less than 5% of the leaves, flowers and pods covered and under dense plant canopy, 4= lesions and some fungal growth (conidiophores and conidia) can be seen on up to 15% of the leaves, flowers and pods and branches covered under dense plant canopy, 5= lesions and slight fungal growth on up to 25% of the leaves, flowers and pods, stems and branches covered under dense plant canopy, 6= lesions and fungal growth on up to 40% of the leaves, flowers and pods, stems and branches defoliation, 25% of the plant killed, 7= large lesions and good fungal growth on up to 60% of the leaves, flowers and pods, stems and branches defoliation common, drying of branches and 50% of the plants killed, 8= large lesions and profuse fungal growth on up to 80% of the leaves, flowers and pods, stems and branches, severe defoliation, drying of branches and 75% of the plants killed, 9= large lesions, very profuse fungal growth on up to 100% of the flowers, pods, stems, branches, almost complete defoliation, drying of plants and 100% of the plants killed. The interpretation of the scale was 1= Immune (I), 2-3= highly resistant (HR), 4-5= resistant (R), 6-7= susceptible (S) and 8-9= highly susceptible (HS) under artificial inoculation and epiphytic condition. The crop was harvested on 15 March 2011 at matured stage. The pods were then threshed, grains were cleaned and dried in the bright sunshine. The grain yield was obtained from each line converted into kg/ha. The experimental data were analyzed by MSTAT-C software. Mean comparisons for treatment parameters were made Duncan's Multiple Range Test (Steel and Torrie, 1960) at 5% level of significance.

The tested chickpea variety/genotypes differ significantly from one to another in respect of disease score and yield under field condition (Table 1). BGM score among the test entries ranged from 2.66-6.33. Among the 32 lines 9 were graded as tolerant which bear the score 2.66 (3), 3.33 (4) and 3.66 (2) and the rest 23 lines were susceptible to BGM as they bear the score more than 4.00. The check variety BARI Chola 5 had the score 5.00. Among the tolerant genotypes, 7 lines out yielded than check BARI Chola-5 and other lines, due to the susceptibility to BGM, reduced the yield. The yield of the test lines ranged from 265-1232 kg/ha. Seven lines viz. FLIP 01-30C, FLIP 01-34C, FLIP 01-38C, FLIP 01-39C, FLIP

03-42C, FLIP 03-45C, FLIP 03-53C yielded (975, 894, 1180, 1067, 927, 1232, 1149 kg/ha respectively) better than the check (830 kg/ha). All these seven lines showed BGM tolerant score (2.66-3.66). The variation in yield in these seven lines was due to podding potentiality, pod size, seed size and seed weight.

**Table 1. Disease score and yield of 32 kabuli Chickpea genotypes and a check BARI Chola 5 under field condition at RPRS, Madaripur in 2010-11**

| Name of entry        | BGM Score (1-9) | Yield (kg/ha) |
|----------------------|-----------------|---------------|
| ILC-1929C            | 4.16 a-c        | 478 lm        |
| FLIP 97-173C         | 4.33 a-c        | 621 k         |
| FLIP 98-37C          | 5.66 ab         | 758 hi        |
| FLIP 98-206C         | 3.33 bc         | 619 k         |
| FLIP 00-14C          | 4.66 a-c        | 720 ij        |
| FLIP 00-17C          | 5.00 a-c        | 745 i         |
| FLIP 01-2C           | 3.66 bc         | 395 o         |
| FLIP 01-4C           | 5.33 ab         | 283 pq        |
| FLIP 01-30C          | 3.66 bc         | 975 d         |
| FLIP 01-32C          | 4.33 a-c        | 488 lm        |
| FLIP 01-34C          | 3.33 bc         | 894 e         |
| FLIP 01-37C          | 4.66 a-c        | 520 l         |
| FLIP 01-38C          | 2.66 c          | 1180 b        |
| FLIP 01-39C          | 2.66 c          | 1067 c        |
| FLIP 98-502C         | 5.33 ab         | 601 k         |
| FLIP 01-54C          | 5.33 ab         | 399 o         |
| FLIP 01-56C          | 5.33 ab         | 265 q         |
| FLIP 01-60C          | 4.66 a-c        | 515 l         |
| FLIP 01-63C          | 4.66 a-c        | 485 lm        |
| FLIP 02-39C          | 6.33 a          | 446 mn        |
| FLIP 02-40C          | 5.66 ab         | 387 o         |
| FLIP 02-47C          | 4.66 a-c        | 423 no        |
| FLIP 03-36C          | 4.33 a-c        | 790 gh        |
| FLIP 03-42C          | 3.33 bc         | 927 e         |
| FLIP 03-45C          | 2.66 c          | 1232 a        |
| FLIP 03-53C          | 2.66 c          | 1149 b        |
| FLIP 03-103C         | 5.00 a-c        | 681 j         |
| FLIP 03-104C         | 5.00 a-c        | 805 fg        |
| FLIP 03-106C         | 5.33 ab         | 699 j         |
| FLIP 03-118C         | 4.33 a-c        | 688 j         |
| FLIP 03-119C         | 5.00 a-c        | 836 f         |
| FLIP 03-134C         | 4.33 a-c        | 309 p         |
| BARI Chola-5 (Check) | 5.00 a-c        | 830 fg        |

In a column, treatment means having the same letter(s) didn't differ significantly at 5% level; BGM = Botrytis Gray Mold.

Considering BGM scoring scale and yield together, the relative position of the genotypes with respect to check did not follow any definite trend. Considering overall performance, FLIP 01-30C, FLIP 01-34C, FLIP 01-38C, FLIP 01-39C, FLIP 03-42C, FLIP 03-45C, FLIP 03-53C rated tolerant to BGM attack in comparison to check of which FLIP 03-45C was the best.

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