

Variability in Garo Hill Cotton in Meghalaya

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Race cernuum of Gossypium arboreum has unique characters like highest boll weight among the diploid cultivated forms and highest number of seeds per loculus among all species of Gossypium. Ginning out-turn is also higher than any cultivated species and has tolerance to bollworm. 101 collections of cernuum cotton from Garo-Hills of Meghalaya were made and observations on number of bolls/plant, boll weight, number of seeds/three loculi in a boll and bollworm incidence were recorded in the field. Ginning out-turn, seed index and lint index were recorded in the laboratory. Large variability in respect to various characters was recorded. Collection A-60 was found to be the best donor in over-all evaluation for various characters followed by A-24 and D 46-2-1.

India is the centre of origin of *Gossypium arboreum* L. Enormous genetic variability in the three races of this species viz. *bengalense*, *indicum* and *cernuum* is still available. The race *cernuum* has unique characters like highest boll weight among all diploid cultivated forms and highest number of seeds per loculus among all species of *Gossypium*. Fibre is short but coarse. The ginning out-turn is also higher than in any other cultivated species. It has been reported (Singh, 1980; Duhoon and Singh, 1980) that some of the genetic stocks of races *bengalense* and *cernuum* are tolerant to bollworms, while *indicum* lines are highly susceptible. With this basic information in hand, a team consisting of a cotton breeder and a cotton entomologist visited Meghalaya State in October, 1981 for collection and on-the-spot study of *cernuum* being grown in Garo hills, from the point of view of bollworm resistance. Genetic variability for various economic traits as well as bollworm incidence in Garo-hill cotton belonging to race *cernuum* is reported here.

Garo Hills are situated at an elevation of 400 m above sea level. The total rainfall during the crop season is around 1200 mm. Cotton is sown in April and harvested during October-November. The major cotton growing areas in Garo Hills are Rangaran, Dadengiri and Selsella. The total acreage of cotton is around 5.5 thousand hectares. Locally the Garo Hill cotton is known as 'Kil'.

The Team with Mr. A. K. Borthakur of Regional Research Station, Tura, Meghalaya visited various villages like Sibengiri, Dangroug and others where cotton is being grown as a mixed crop with maize, chillies, *Sesamum*, etc. under

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Jhum cultivation on hill slopes. A total of 101 collections (A-1 to A-101) was made from different localities. Observations on number of bolls per plant, boll weight, number of seeds per three loculi in a boll and incidence of bollworm as percentage of loculi damaged were recorded under field conditions. Other observations, viz. ginning out-turn (%), seed index (100 seed weight in g) and lint index, were recorded in the laboratory at Indian Agricultural Research Institute, New Delhi.

Some of the germplasm lines are of potential significance as donors in breeding programmes :

Boll weight : The lowest boll weight of 3.33 g was recorded in collection A-3 and maximum of 7.67 g in recommended variety D 46-2-1 which is under cultivation in Garo Hills. The accessions with boll weight above 5.50 g were : A-16 (5.50), -24 (5.83), -25 (6.67), -41 (5.50), -60 (5.67), 61 (5.50), -67 (5.50) and -71 (5.50).

Number of seeds per three loculi : The lowest number of seeds was recorded in A-22 (32.7) and highest in D 46-2-1 (52.7). The collections which had more than 45 seeds per three loculi *i.e.* more than 15 seeds/loculus were : A-24 (45.7), -25 (48.0), -27 (49.0), -33 (46.0), -34 (45.3), -39 (49.0), -41 (47.7), 42 (47.3), -60 (49.7), -61 (49.7), -71 (45.3), -75 (45.3) and D 46-2-1 (52.7). In contrast to these *cernuum* types, the number of seeds per boll in most of the *bengalense* and *indicum* types ranged from 18-25 *i.e.* about 6-7 seeds per loculus.

Ginning out-turn (GOT) : The minimum of 40 per cent GOT was recorded in A-29 while maximum of 51.8 per cent was recorded in D 46-2-1. The types having nearly 50 per cent ginning out-turn were : A-15 (50.82), -22 (50.0), -41 (49.7), -43 (49.3), -46 (49.4), -52 (49.2), -60 (51.0), -72 (51.8), -73 (49.7), -78 (49.4) and D 46-2-1 (51.8).

Lint Index : The amount of lint on 100 seeds (lint index) showed wide variation with minimum value of 3.67 g in A -29 and maximum value of 8.52 g in D 46-2-1. The collections with higher lint index were : A-(19) (5.76), -24 (6.11), -27 (5.82), -33 (6.28), -43 (5.75) -61 (6.19), -66 (6.14), -67 (5.76), -72 (7.13), -77 (7.13), -78 (6.38), -79 (6.18), -81 (7.22) and D 46-2-1 (8.52). Lint index values of as high as 7.1-8.52 have hardly been reported in any other cotton collection in the world.

Bollworm tolerance : Since the cotton in Garo Hills is grown in unprotected conditions without application of insecticides, on the spot study of incidence of bollworm as percentage of loculi damaged is a good criterion for screening the cotton germplasm for bollworm tolerance. The minimum of 8.5 per cent incidence was recorded in two collections viz. A-60 and A-63. Other collections which showed low level of incidence were : A -57 (10.2), -59 (12.2) and -30 (12.9). In contrast to these types, the commercial variety D 46-2-1 (race *cernuum*) and *hirsutum* types also showed a wide variation for bollworm incidence with values of 19.0 and 86.1 per cent respectively.

On the basis of overall evaluation for various characters, A-60 could be scored as the best donor. The other two collections viz. A-24 and D 46-2-1 could be next better donors for boll weight, seed number, ginning out-turn and lint index.

The entire collection of Garo-hill cotton has been maintained in the Genetics Division of Indian Agricultural Research Institute, New Delhi, India and is being used in breeding programmes.

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