

FOCUS

Grey mildew immune cotton germplasm lines registered

P.M. MUKEWAR and C.D. MAYEE

Central Institute for Cotton Research, Shankar Nagar, Nagpur 440 010

Key words: Grey mildew, germplasm registration, cotton, disease resistance, *Ramularia areola*

Two germplasm lines of *Gossypium arboreum* ('Desi' cotton), one belonging to race *Bengalense* (G-135-49) and another belonging to race *Cernuum* (30805), have been registered by the registration committee of the ICAR in its meeting on 10th May, 2000. These two *G. arboreum* germplasm lines are part of the total number of 1592 *G. arboreum* collection from India and abroad, and maintained at the National Germplasm Bank of the CICR, Nagpur. The lines namely, G-135-49 and 30805 were found consistently immune (no disease symptoms) to grey mildew disease caused by the fungus, *Ramularia areola* Atk. (synonym - *Ramularia gossypii* (Speg.) Ciferri) for ten consecutive crop seasons (1990 to 1999) under the artificial conditions of infection in the glasshouse and field. The germplasm lines, possessing immense importance in International exchange of cotton germplasm and the worldwide cotton improvement programme, were registered under the "Plant Germplasm Registration Notification", during VIth meeting of the ICAR Committee on Germplasm Registration.

The main features of these two germplasm lines are :

G-135-49 (*Gossypium arboreum* Race *Bengalense*) - Registration NO INGR 00017 : The germplasm line is a collection from Jalgaon (Maharashtra), India and has been registered as Indian National Genetic Resources (INGR) NO 00017. The morphological and botanical characters are as follows - Leaf : 4-5, small, broad lobe, moderately hairy; Incision - ovate, curvilinear and slightly acute; venation - reticulate and palmate divergent. Flower : corolla - creamy colour, short claw, red petal spot present; Anthers - yellow, stigma and filaments short; Bracteoles : 3, small broad, 2-4 teeth and serrated at anterior part. Boll/Capsule : oblong and tapering end, surface densely pitted, 3 locules, boll length upto 4.4 cm, diameter upto 2.5 cm, boll volume 17 cc, boll weight 2.11 g to 2.96 g; no. of seeds/locule 16-23. Fibre properties : span length 21.8 mm; uniformity ratio - 50 percent; bundle strength tenacity - 19.7 g/t. Ginning outturn : 35.64 percent.

30805 (*Gossypium arboreum* Race *Cernuum*) - Registration NO INGR 00018 : The germplasm line is a collection from Assam, India and it has been registered as INGR NO. 00018. The morphological and botanical characters are as follows - Leaf : 4-5, long and narrow lobe; Venation - reticulate and palmate divergent; surface smooth and glabrous. Flower : corolla - yellow, long claw, petal blotch red; anther colour - creamy, stigma and filaments short; Bracteoles : 3, small, 3-4 teeth and deeply serrated at apex. Boll/capsule : oblong and tapering end, surface densely pitted, 3 locules, boll length upto 4.5 cm, diameter upto 2.8 cm, boll volume 15.8 cc, boll weight 3.4 g to 3.9 g, no. of seeds/locule 14. Fibre properties : span length 20.2 mm, uniformity ratio - 50 percent, bundle strength tenacity - 17.9 g/t. Ginning outturn : 43.10 percent.

The disease reaction of these two germplasm lines was studied with *Ramularia areola* isolates collected from cotton-growing areas of India, viz., Nagpur, Akola (Maharashtra), Surat (Gujarat), Dharwad (Karnataka), Coimbatore (Tamil Nadu) and Lam-Guntur (Andhra Pradesh) by artificial inoculations in comparison to *G. arboreum* grey mildew susceptible cultivars AKH 4 and AKA 8401. In determining the disease resistance in immune lines, the morphological investigations revealed thick smooth cuticle, interlocked epidermal cells, high degree of lamina thickness and lowest counts of stomata, in comparison to susceptible cultivars. The studies on biochemical basis of resistance showed constitutive and induced PAL (Phenylalanine ammonia lyase) activity and various phenolics catalysed by PAL including flavanols, terpenoid aldehydes, gossypol and tannin to be responsible for conferring resistance against grey mildew pathogen *R. areola*.

The proposal for germplasm registration was submitted by Dr. Punit Mohan, Scientist Sr. Scale (Economic Botany), Dr. P.M. Mukewar, Sr. Scientist (Plant Pathology), Dr. V.V. Singh, Sr. Scientist (Plant Breeding) and Dr. M.S. Kairon, Director (formerly), CICR, Nagpur. The material was deposited with National Bureau of Plant Genetic Resources, New Delhi.