

A Brief Review of the Progress in the Utilisation of Wild Species of *Gossypium* for the Improvement of Cultivated Cottons in Madras

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The genus *Gossypium* L. comprises of twenty different species falling under two distinct cytological groups viz., those with $2n=26$ chromosomes and others with $2n=52$. The cultivated cottons of the world belong to only one or other of four species of *Gossypium* viz., *hirsutum* and *barbadense* in the American group ($2n=52$) and *arboresum* and *herbaceum* in the Asiatic group ($2n=26$). There are nearly sixteen other related wild species in existence and some of these are known to possess very useful characters like lint fineness, fibre strength, resistance to drought, pests and diseases etc. The role of these wild species as sources of new genes for desirable characters that can be transferred to cultivated cottons has been increasingly recognised in recent times.

Among the several wild species that have attracted the attention of cotton breeders in different parts of the world in the above work of character transference, *G. anomalum*, *G. thurberii*, *G. raimondii* and *G. armourianum* would appear to have yielded promising results. In the Madras State, *G. anomalum* has been utilised in crosses with cultivated Karunganni (*G. arboresum*) cottons, and *G. raimondii* with cultivated Cambodia (*G. hirsutum*) with some measure of success. The most salient features of the results obtained in this programme of work is briefly reviewed in this note.

***G. anomalum* Wawra and Peyr:** The African diploid ($2n=26$) wild species *G. anomalum* is known to possess extremely fine and strong fibres, though short in length. The first attempt at the deliberate utilisation of *G. anomalum* to evolve new types of economic value in *G. arboresum* was perhaps that of Afzal, Sikka and Rahman, (1945). With the specific objective of transferring lint fineness (low mature-fibre-weight) from *G. anomalum* to Karunganni (*G. arboresum*) cotton, hybridisation was taken up at Coimbatore and the technique of recurrent back-crossing to *arboresum* strains was adopted to overcome the problem of low fertility in the *arboresum-anomalum* crosses.

Fully fertile and fine linted plants with good mean fibre length as well, were secured in the F_3 of first and second backcross progenies of these crosses and the detailed results of this programme of work have been discussed elsewhere (Kesava Iyengar, Santhanam and Leela, 1956). The economic characters of some of the outstanding plants derived therein are summarised below.

Nature of cross	Generation	Pl. No.	No. of bolls harvested	Fibre length inch	Mature fibre weight $\times 10^{-6}$ g/cm.	Swollen hair diameter μ
K.5 x (Cl x anomalum)	BC ₁ F ₃	1	21	0.86	1.43	19.3
		2	24	0.92	1.46	21.6
		3	23	0.89	1.48	21.1
		4	14	0.92	1.35	22.1
		5	14	0.91	1.36	21.6
		6	9	0.96	1.36	20.7
1175 x K. 2 x (Cl x anom.)	BC ₃ F ₂	1	8	0.92	1.39	20.7
		2	23	0.85	1.32	20.2
Improved strains	}	Karunganni-2 (<i>arboreum</i>)	11	0.86	2.21	25.0
		Karunganni-5 (<i>arboreum</i>)	10	0.85	2.02	24.4
		<i>G. anomalum</i>	15	0.27	0.59	11.1

An optimum standard for lint fineness to be achieved in this programme of transference has been fixed at a mature fibre weight of about 1.40×10^{-6} g/cm. and a swollen hair diameter of 20.0μ . Such a strain should be considered as appreciably fine linted, when compared to the normal values of 2.10 and 25.0 respectively for Karunganni strains. Further, the above standards are beyond the normal range of variation in *G. arboreum* and therefore justify the utilisation of *G. anomalum*. It is significant that many plants possessing the above standards for fineness as also good fibre length transgressing the parent values have been isolated and it is expected to build up homozygous lines from the progenies of the above plant which have been raised during 1956—'57 for further exploitation.

G. raimondii Ulb: The South American deploid ($2n=26$) wild species *G. raimondii* is considered a putative parent of the present day cultivated tetraploid American cottons. Besides, this species is known to possess vegetative vigour under droughty conditions, resistance to the bacterial disease *blackarm* and *jassid* tolerance. Only a few instances of utilisation of this wild species in the breeding programme of cultivated cottons have been reported so far (Hutchinson *et al.* 1943, Ganesan, 1946).

At Coimbatore, a colchicine induced hexaploid was synthesised from the sterile triploid hybrid 4463 *hirsutum* x *raimondii* and this was backcrossed twice to the cultivated Cambodia strain MCU. 1. Further line breeding up to F_8 stage effecting selection for yield, halo length and ginning percent resulted in the isolation of fully fertile progenies equal in yield of *kapas* to MCU. 1, but superior in halo length and ginning percent and the detailed results of this study have been reported by Kesava Iyengar, Santhanam and Rajagopalan 1955.

The mean values for length and ginning % of the best progeny derived from this cross is given in the table below along with the values of the parents involved in this interspecific hybridisation programme.

S. No.	Material	Mean halo length mm.	Mean Ginning %
1.	<i>G. raimondii</i>	8	7
2.	4463 (<i>G. hirsutum</i>)	25	33
3.	4463 x <i>raimondii</i> F_1	Sterile	
4.	do. hexaploid	29	30
5.	MCU, 1 (<i>hirsutum</i>)	25	36
6.	MCU. 1 x (Hexaploid x MCU. 1)	28	38
	F_8 progeny mean		

Further studies on this material is now in progress at the Cotton Breeding Station, Coimbatore.

It is interesting to note that transgressive values for length and ginning have been obtained in the selected progeny and the higher ginning percent of these plants was traceable to high density of population of seed hairs on the seed coat (calculated as 17,000 per seed), as compared to MCU. 1 (14,400).

G. raimondii, with a short coat of seed hairs and possessing a low ginning percent has thus indicated its latent potentialities in the improvement programme of cultivated American cottons and further work is in progress.

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