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Alternate Host Plants. So far, the pest is found feeding in *Scacharum spontaneum* and maize. Fletcher and Ghosh (1919) have recorded sorghum, ikri, *cumbu* and Sudan grass as alternate host plants.

Parasites. This borer is subject to the attack of egg, larval and pupal parasites. Eggs are parasitised by *Trichogramma minutum*, R, and *Telenomus* sp. *Stenobracon deesae*, Cam; *Xanthopimpla nursei* Cam., *Pimpla* Sp. *Rhaconotus roslinensis*, Lal and *R. scirpophagae* Walk *Goniozus indicus* Ash. and *Apanteles flavipes*, Cam. are found to parasitise the pest in its various stages of larval life. A fungus—*Isaria* sp.—has been noted on the larvae at Coimbatore. Pupae are attacked by *Tetrastichus ayyari* Roh and *Tricospilus diatraea*, Cherian and Margabandu (MSS).

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A Note on a Synthetic Tetraploid in Asiatic Cotton

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It is frequently observed that when a wild species of cotton is crossed with the cultivated species, there is either very little setting or the hybrid is sterile. A number of workers like Mendes (1939), Beasley (1940), Harland (1940), Amin (1940, 1941), Stephens (1940), Zhebrak and Ozaev (1940) and Kasparyan (1940), have shown that it is possible to induce chromosome doubling in cotton and also to make sterile hybrids fertile when the sterility is due to failure of chromosome pairing as a result of the absence of homologous partner chromosomes. Attempts to induce chromosome doubling in the sterile hybrids of cotton were made for two seasons, at the Cotton Breeding Station, Coimbatore. This note records the details of the trials made to transform a partially fertile hybrid between *G. anomalum* Wawra-et-peyr, (an African wild cotton with 26 somatic chromosomes) and *G. arboreum*, L (strain K. 1. with 26 somatic chromosomes)

The treatment consisted in wetting the shoot tip of an young plant bearing 4 to 5 leaves, with an aqueous solution of colchicine (0·08%). The wetting was done at intervals for a period of 12 hours and the shoot tip was subsequently washed with distilled water. The treated shoot bore malformed leaves. A branch that arose beneath the last malformed leaf appeared to bear normal leaves, but they had much broader lobes than the

control. The lobes overlapped one another and presented a characteristic twisted appearance. The leaves were darker in colour and leathery in texture. The treated shoot grew to a height of about 12 feet before it began to flower and eventually produced a number of bolls.

It was observed that the leaf lobes, stomata, bracts, pollen grains, bolls and seeds in the treated shoot were distinctly larger than those of the diploid hybrid (vide Table 1), as were reported by the authors quoted above.

Cytological examination of the pollen mother cells collected in the new branch showed 26 bivalents at division I and 26 chromosomes at division II. Frequently multivalents and univalents were also noticed. Anaphase I was regular and cases of lagging chromosomes were rarely seen. When the pollen mother cells from untreated plants were examined, the chromosome pairing was found to be very variable, the number of univalents ranging from 0 to 14. In a few pollen mother cells, 13 bivalents were also noticed indicating that the type of pairing was mostly allosyndetic. The mean chromosome conjugations in the untreated and treated shoots were as follows :—

	Uni valents.	*Bi- valents.*	*Tri- valents.*	*Quadri- valents.*
Untreated	3·70	10·70	0·10	0·15
Treated	0·40	22·67	0·42	1·25

It is obvious that the increased fertility noticed in the treated shoot is due to the reduction in the number of univalents present during meiosis. These showed clearly that the treated branch had been turned from a diploid to a tetraploid condition.

The seeds secured from the treated branch were germinated. The seedlings had stout radicles, in contrast to those raised from the seeds of the untreated hybrid which were tiny or medium sized. As they grew old, the mature plants resembled the parent plant in leaf shape, hairiness, flower colour, boll shape, seed size and lint qualities. This phenomenon of progenies of F_1 breeding true to the parent indicated that the type of pairing in the new shoot must be autosyndetic. The existence of autosyndesis to a certain degree in cotton was pointed out previously by Skovsted (1935) in the F_1 hybrid between *G. sturtii* × *G. Davidsonii* where the parental chromosomes differed considerably in size and which could be identified at meiosis. Amin (1941) also reported that in the three F_1 hybrids viz. *anomalum* × *arboreum*, *anomalum* × *herbaceum* and *anomalum* × *Davidsonii*, that F_1 bred true in crosses when their chromosomes were doubled.

From a breeder's point of view, autosyndesis would be advantageous if the resulting reaction of the complements of the parental species would prove of economical value. Unfortunately in the present cross, the lint of the F_1 was coloured, the ginning percentage was poorer and the plant was late maturing when compared with the *arboreum* parent.

The complement of 52 chromosomes in the synthetic tetraploid should, however, be considered as a distinct advantage as it would increase the degree of crossability with the cultivated 52 chromomed New World species.

TABLE I. Figures denote the mean values of the characters.

Serial No.	Characters.	*G. anomalum* 2n=26.	*G. arboreum* (k.1) 2n=26.	*G. anomalum* × *G. arboreum*. F1 2n=26.	*G. anomalum* × *G. arboreum*. F1 2n=52	Remarks.
1	Leaf Index.	1·32	1·25	1·48	1·16	From the main leaves on the monopodial branches.
2	Length of the guard cells of the stomata of the leaves in μ.	21·5	25·6	28·1	36·1	Readings taken from the lower epidermal cells of the mature leaves.
3	Bract:— Length in mm. Breadth in mm.	15·8 5·3	28·4 29·9	36·2 22·6	46·3 30·1	Measurements taken on the date of flower opening.
4	Petals:—Length in mm. Breadth in mm.	37·6 37·1	36·6 30·5	42·9 43·0	53·0 49·6	Do.
5	Pollen grain diameter in μ (air medium without cover glass).	102·1	103·3	94·5	128·5	From fresh flowers between 10–11 A. M.
6	Percentage of shrivelled pollen grains.	3·0	8·7	73·3	33·8	
7	Boll:—Length in mm. Breadth in mm.	24·7 14·0	28·0 22·3	21·6 13·7	34·8 23·6	Measurements taken from 4-locked bolls.
8	Weight of 100 seeds in decigrammes.	19	51	40	70	
9	Weight of lint for 100 seeds in decigrammes.	2	21	11	19	
10	Lint length in mm.	6·2	26·2	23·0	26·2	Halo length.
11	Seed size.	Small with short fuzz.	Medium with very short fuzz.	Medium with medium fuzz.	Big with long fuzz.	
12	Diameter of the fibre in μ.	—	22·0	—	18·9	
13	Fibre weight.	—	1·85	—	1·22	

Crossings were actually tried with a number of strains and species, viz., with (1) *G. hirsutum* (strains Co. 2; 4383 and U4); (2) *G. barbadense* (Sea Island, Quebra and Ishan): (3) *G. religiosum* (strain R. A. 8/4); and with (4) B. C. 10, which is a fertile tetraploid synthesised at Surat by crossing a strain of Dharwar American (D. A. Ron. 4) with an Asiatic *herbaceum* (1027 A. L. F.) and backcrossing to the Darwar American parent. Setting was good in all the cases and it was better when the new tetraploid was used as the female parent.

Progenies of the above crosses were raised. In the cross with Co. 2, where Co. 2 was the female parent, the hypocotyls of the new seedlings were very hairy in contrast to the glabrous condition found in pure Co. 2 seedlings proving that the seedlings were real crosses. The hybrid plant grew vigorously and flowered profusely but the bolls did not set seed. Cytological examination of the flower buds showed that the sterility was due to the formation of a large number of univalents (ranging from 7—17) in all the pollen mother cells. Sterility of a similar nature was reported by Amin (1941) and Stephens (1940) in their hybrids. However Harland, (1940) and Beasley (1940) were able to obtain fertile hybrids in the cross (*G. arboreum* × *G. thurberi*—F_1 doubled) × New World cotton. Such a phenomenon indicated that only in crosses between certain species, it would be possible to get synthetic tetraploid suitable for crossing with the cultivated tetraploids.

Attempts to induce chromosome doubling were also being made in the following sterile F_1 hybrids: *G. arboreum* (K1) × *G. stocksii* (2n = 26), *G. hirsutum* × *G. armourianum* (2n = 39). In the latter hybrid, one of the treated plants set one boll, but the plant died of *pempheres* attack. Cytological examination of the pollen mother cells showed 39 chromosomes at interkinesis at each pole and indicating thereby that the chromosome number of the plant had doubled. Another treated plant showed abnormal leaves and flowers. The anthers failed, however, to dehisce. A similar non-dehiscence phenomenon had been reported by Beasley (1940) in some of his colchicine treated plants.

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