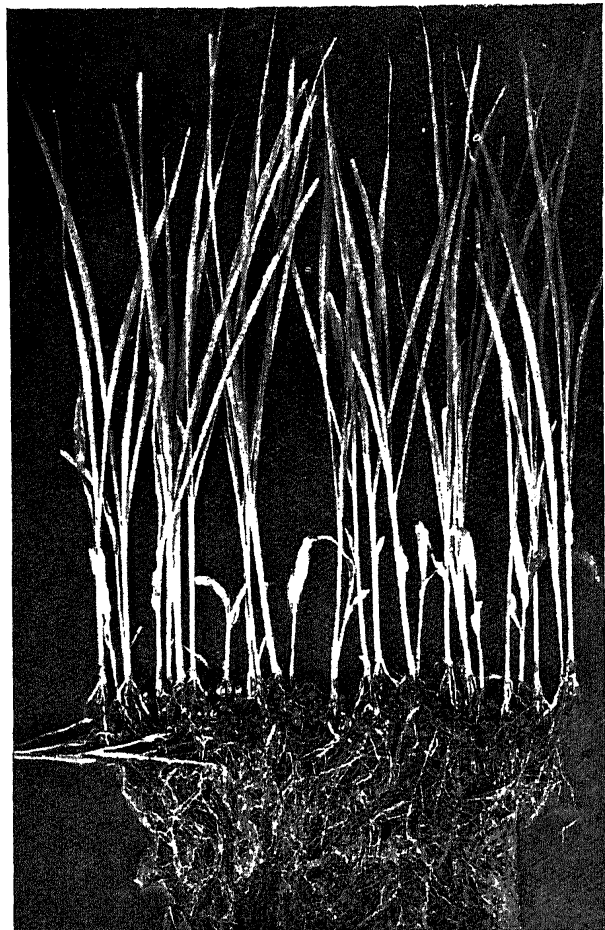


two years at this Station and did not give such lethal seedlings, nor were such seedlings observed in other pure lines or segregating families. Presumably this occurrence is the result of a heterozygous mutation. In this pure line some



Seeds germinating on an earhead of cholam segregating for normal-tall and lethal green-short seedlings, about ten days old were found to be very much stunted in growth and showed signs of dying. They were watched, and when counted, it was found that 187 of the total number died, leaving a surviving population of 609 normal seedlings. Earheads from twelve of these were carried forward and seedlings raised from them. Two came pure and ten of them segregated again giving obviously monogenic segregations, the total of the ten families being 1,374 normal green and 476 lethal green seedlings.

The lethal seedlings can be made out easily from their stunted growth about 4 to 5 days after germination. They show signs of wilting in about a week to ten days, and die when about a month old, when there are 5 to 6 seedling leaves. The first two leaves of the lethal greens do not differ markedly from those of the normal

seedlings. The difference in size starts with the third leaf which in the normal is 3 to 4 times longer than that in the lethal. This difference is maintained in the subsequent leaves also. Similarly there is a marked difference in the height of the seedlings, the normals being 4 to 5 times taller than the lethals. The seminal root in both groups of seedlings about 30 days old, is about the same in length. The difference is in the number and size of the adventitious roots which are very few and short or rudimentary in the lethal greens. In some cases the adventitious roots are not developed at all in the lethal green seedlings.

The occurrence of a lethal seedling with no visible chlorophyll deficiency, indicative of its lethal nature, is very interesting. The lethal condition is brought about by an atrophy in the development of both the shoot and the root in the seedlings. The gene responsible for this type of lethal green has been designated *cl*. *CL* gives normal green seedlings and is a monogenic dominant to *cl*.

A photograph of a hybrid head germinated and showing *in situ* both the normal and lethal seedlings, about a month old, graphically demonstrates this phenomenon.

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Cleistogamy and Its Inheritance in Sorghum

THE occurrence of cleistogamy in sorghum has already been recorded.¹ This phenomenon has been observed in *Sorghum papyrascens*, Stapf (*S. membranaceum*, Chiov.). An examination of all the pure lines belonging to this species grown at the Millets Breeding Station, Coimbatore, shows that all these (which are characterised by very long papery glumes) are generally poor in the extrusion of their anthers. Two of the pure lines were found to be cleistogamic and in them the edges of the lower floral and the upper involucral glumes were found to roll-in, tightly enclosing the upper floral glume and the floral parts. It has also been recorded that the

papery glume in Sorghum (gene *py*) is a simple recessive to the coriaceous glume of the *Durra* type (gene *PY*).²

In a cross between a coriaceous glumed type and a rolled-in edged papery glumed type, the F_1 was found to be coriaceous glumed with un-rolled edges. In the F_2 (A.S. 4916) a 12 : 4 ratio of coriaceous to papery glume was obtained.

cleistogamy is a consequence of the rolling-in of the edges in a papery glume, and its clasp of the contents; (2) that this rolling-in is a heritable character; and (3) that rolling-in manifests only in papery glumes (*py*) and not in coriaceous ones (*PY*).

A gene designated *gx* is responsible for the rolling-in of the edges of the upper involucrel

TABLE I

Family No.	Character of Selection	F_2 Behaviour			
		Coriaceous Glume		Papery Glume	
		Un-rolled edges	Rolled-in edges	Un-rolled edges	Rolled-in edges
A.S. 5760	Papery rolled-in edges	..	..	..	Pure
A.S. 5759	Papery un-rolled edges	..	..	Pure	..
A.S. 5758	„	..	..	Pure	..
A.S. 5757	„	..	..	Pure	..
A.S. 5756	„	..	..	33	11
A.S. 5753	Coriaceous un-rolled edges	Pure	..	..	..
A.S. 5750	„	Pure	..	..	..
A.S. 5748	„	Pure	..	..	..
A.S. 5747	„	Pure	..	..	..
A.S. 5754	„	44	..	14	..
A.S. 5749	„	49	..	19	..
A.S. 5755	„	50	..	16	4
A.S. 5752	„	96	..	26	8
A.S. 5751	„	87	..	19	7

In the 4 group, 3 were with un-rolled edges and one with edges rolled in and cleistogamous. The actual figures obtained were 33 : 8 : 3.

A third generation of 14 selections was raised from the F_2 , and their behaviour is given in Table I.

The totals of the three triple segregations are as follows:—Coriaceous 233, papery un-rolled edges 61, and papery rolled-in edges (cleistogamous) 19 — ($X^2 = 0.12$ $P > .90$)—a significant 12 : 3 : 1 ratio.

From Table I it will be seen (1) that

and lower floral glumes in sorghum. The gene could operate only on a papery glume (*py*). The concurrent presence of the genes *py* and *gx* results in cleistogamy.

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¹ *Curr. Sci.*, 1936, 4, 872-73.

² *Jour. Ind. Bot. Soc.*, 1936, 15, 139-42.