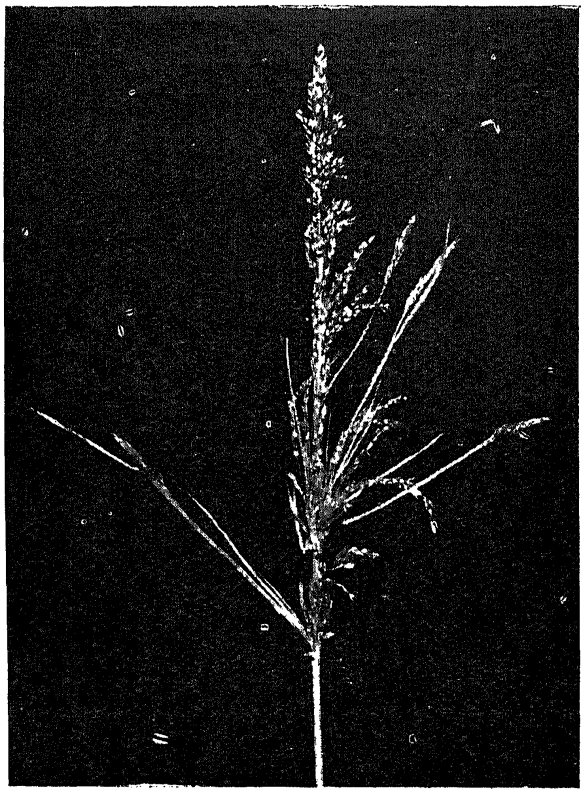


Side-shoots from the axils of panicle branches in *Sorghum sudanense*

panicle. An F_3 generation was raised and in it, the three segregating families gave the following figures.

Selection No.	Character of selection	F_3 Behaviour			
		Ligulate		e-ligulate	
		No axillary shoots	Axillary shoots	No axillary shoots	Axillary shoots
S. 328	Ligulate no axiuary shoots	30	1	..	12
S. 329	,,	57	..	1	17
S. 330	,,	73	..	1	22
	TOTAL .	160	1	2	51

From the above table it will be seen that there is a close linkage between the factor for e-ligulateness and the factor stimulating axillary shoots in panicles, there being a crossover value of about 0·01 per cent. It is interesting to note that in plants in which these shoots developed from the panicle axils, the axillary buds of the stem also were stimulated and gave many side-shoots. This teratological phenomenon has proved heritable.

G. N. RANGASWAMI AYYANGAR.
B. W. X. PONNAIYA.

Millets Breeding Station,
Coimbatore,
August 8, 1941.

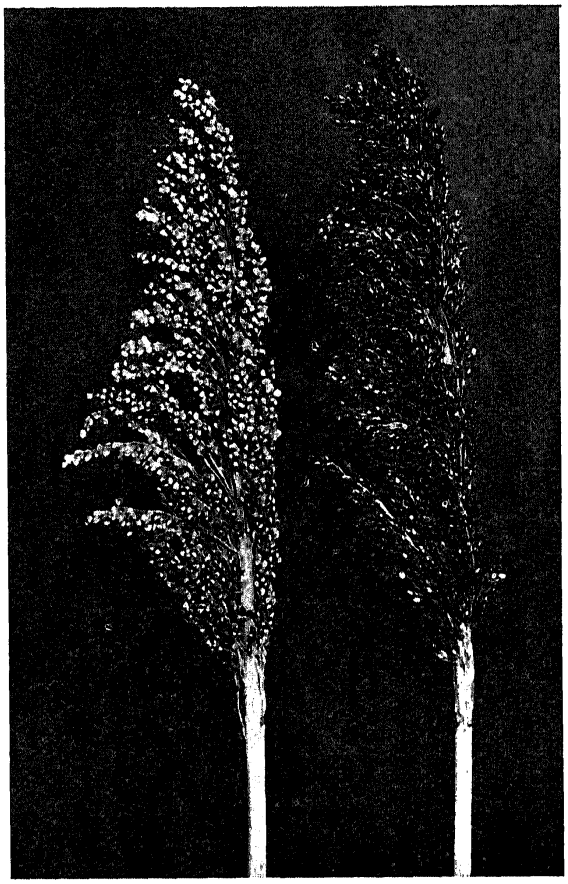
[1] *Proc. Ind. Acad. Sci.*, 1938, **7**, 286-88.

TWO NEW GENES CONDITIONING THE TINT OF THE COLOUR ON THE GLUMES OF SORGHUM

THE glumes of sorghum are reddish purple, blackish purple or brown. Factors P and Q operate and give these three groups. The leaf-sheaths take on the same colour as the glumes.[1] A study of the vast collection of sorghums at the Millets Breeding Station, Coimbatore, reveals many tints on their glumes. Most of the tints remained constant in the progeny and it was obvious that there were other genes in addition to P and Q which were responsible for the tints. With a view to know more about these tints *Sorghum dochna* group was chosen as it exhibited a wealth of tints. In this group the glumes are very coriaceous with the added advantage of prominence due to the grain being almost enclosed and to the absence of transverse wrinkling. Most of the varieties of *S. dochna* have loose panicles and the spikelets get the best chance of exposure to light. The glumes are also very smooth and shiny and for these reasons the glumes of *S. dochna* afford the best theatre for the optimum manifestation of pigment on sorghum spikelets.

Two new types of purple on the mature glumes have been found and these have been termed "Dilute reddish purple" and "Dilute blackish purple" and are brought about by a single dilution gene. In a cross between a dilute reddish purple and a blackish purple type the F_1 was reddish purple. The F_2 generation gave 69 plants with the deeper tint (51 reddish purple, 18 blackish purple) and 20 plants with the dilute tint (16 dilute

reddish purple, 4 dilute blackish purple). In the F_3 generation the 4 dilute tinted selections bred true and of the 12 deep tinted ones 5 were pure. The remaining 7 segregated again giving a total of 883 deep and 277 dilute tinted plants. In 5 families there was also a segregation for reddish and blackish purple tints (genes Q and q); the total of the dihybrid ratio in these being 503 reddish purple, 172 blackish purple, 156 dilute reddish purple and 56 dilute blackish purple. Thus it will be seen that the



Sorghum panicles with Bleached and Unbleached glumes

gene for the dilution of colour in the glume (designated cd) is found to be independent of the gene Q. This gene dilutes the colour on the sheath also but not to the same degree as that on the glume.

The second gene inhibits the manifestation of the colour on the body of the glume and confines it to the very base. On a close examination, faint patches of colour may be noticed on the body of the glume but the total effect is one of bleaching (see photograph). The effect of the bleaching gene is noticed only after the dough stage of the grain. The colour instead of deepening does not develop but remains as a narrow band at the very base of the glume cnly. Thus even with the inhibition it is possible with experience, to separate reddish purple, blackish purple and brown groups with the aid of the basal band.

In a cross between two *S. dochna* types one bleached and the other unbleached, the F_1 generation had bleached glumes. The F_2 segregated giving 106 plants with bleached glumes and 35 plants with unbleached glumes. Sixteen selections were carried forward and an F_3 generation raised. Of these 3 bleached glumes bred true and 6 segregated giving a total of 559 plants with bleached glumes and 188 with unbleached glumes. The remaining seven unbleached glume selections bred true.

From the above it will be seen that a dominant gene Ci is responsible for the inhibition of colour and the bleached appearance of the glumes in sorghum. The gene has no effect on the leaf-sheath colour. The gene R responsible for the red sap colour in sorghum[2] has its effect on the appearance of the bleached glumes also. With R, the bleached glume puts on a pinkish wash.

It will be seen that in addition to P and Q genes, (responsible for reddish and blackish purple) two new genes cd (dilution gene) and Ci (bleaching gene) affect the tint of colour on the glumes of sorghum. The many possible combinations of these genes provide a variety of glume tints. These are again affected by the gene R determining the red in sap colour. The numerous glume colours enumerated by Snowden[3] in the classification of sorghums could be explained against this genic background.

G. N. Rangaswami Ayyangar.
B. W. X. Ponnaiya.
Millets Breeding Station,
Coimbatore,
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[1] *Ind. Jour. Agric. Sci.*, 1933, **3**, 489–94.

[2] *Madras Agric. J.*, 1934, **22**, 1–11.

[3] Snowden, J. D., 1936, *The Cultivated Races of Sorghum*.