

and nucellar brown are dominant to a blackish purple leaf-sheath and glume and absence of nucellar brown, respectively.

An interesting experience is met with when varieties with a blackish purple leaf-sheath and nucellar brown are crossed with varieties having a reddish purple leaf-sheath and no nucellar brown. The first generation plants have both the dominant characters, reddish purple leaf-sheath and nucellar brown. In the second generation instead of the 9 : 3 : 3 : 1 ratio which the independent shuffling of these characters should give, there occurs the 2 : 1 : 1 : 0 ratio of double dominants, and parental groups, and an absence of the double recessive group. This shows that the gene *q* determining a blackish purple leaf-sheath is linked to the gene producing nucellar brown.

In a previous paper<sup>7</sup> the linkage between the *Qq* (factors for leaf-sheath and glume colour) and *Bb* (factors for brown colour in dry anther and grain) has been reported. In the present instance it is the brown nucellus below the pericarp instead of the brown-wash on the pericarp. Both these manifestations of brown colour have this in common that they are linked to the *q* factor responsible for the blackish purple pigment on the leaf-sheath and glume.

A number of crosses between these African races and Indian races are under examination at the Millets Breeding Station, Coimbatore, and a fuller paper embodying the results will be published shortly.

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<sup>1</sup> *Ind. Jour. Agr. Sci.*, 1933, **3**, 594-603.

<sup>2</sup> *Ind. Jour. Agr. Sci.*, 1934, **4**, 81-89.

<sup>3</sup> *Jour. Agr. Res.*, 1928, **37**, 577-588.

<sup>4</sup> J. D. Snowden, *The Cultivated Races of Sorghum*, 1936.

<sup>5</sup> *Ind. Jour. Agr. Sci.*, 1933, **3**, 589-594.

<sup>6</sup> *Jour. Agr. Res.*, 1924, **27**, 53-64.

<sup>7</sup> *Ind. Jour. Agr. Sci.*, 1934, **4**, 90-95.

### Some Observations on the Ovule and Embryo-sac of *Sonneratia apetala* Ham.

A FEW observations on the embryology of *Sonneratia apetala* were made by Karsten<sup>1</sup> as early as 1891, but his work is rather

fragmentary and also erroneous in some points. A re-examination of this species has therefore been undertaken in connection with the writer's work on the embryology of the Sonneratiaceæ.<sup>2</sup>

*Ovule*.—The ovules are numerous, anatropous, two-integumented and possess a fair amount of nucellus. Both the integuments take part in the formation of the micropyle. The nucellus does not show a strand of specially differentiated cells in the chalazal region as seen in *Duabanga sonneratioides* and some members of Lythraceæ,<sup>3</sup> but along with the ovule it is markedly bent in this dart towards the raphe.

*Embryo-sac*.—The primary female archesporium usually extends to more than one cell and more than one megaspore mother cells have been occasionally observed. Usually only one of them develops further. It cuts off a parietal cell, which by subsequent divisions gives rise to a 5-6 cells' thick parietal tissue above the embryo-sac. The formation of linear tetrad of megaspores is similar to that seen in *Duabanga sonneratioides*, and the chalazal megaspore is the functional one. It develops into the 8-nucleate embryo-sac after three successive free nuclear divisions in the normal manner. The mature embryo-sac (after the fusion of the polar nuclei) is 4-nucleate due to the early degeneration of the antipodals, just as in *Duabanga sonneratioides*<sup>3</sup> and Lythraceæ. It is a long and narrow structure but even then it has never been seen to reach the epidermis at the micropylar end of the nucellus after crushing the parietal tissue as stated by Karsten.

The structure of the synergids and egg conforms to that observed in *Duabanga sonneratioides*. The polar nuclei meet at about the middle of the embryo-sac, move upwards and finally fuse with each other near the egg-apparatus.

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<sup>1</sup> Karsten, G., *Bibl. Bot.*, 1891, 22 (as cited by K. Schnarf in *Vergleichende Embryologie Der Angiospermen*, 1931).

<sup>2</sup> Venkateswarlu, J., *Curr. Sci.*, 1936, **4**, No. 10.

<sup>3</sup> Joshi, A. C., and Venkateswarlu, J., *Proc. Ind. Acad. Sci.*, B, 1936, **3**, 5.