

Fertile Pedicelled Spikelets in Sorghum.

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SORGHUM grains develop in sessile hermaphrodite flowers. The sessile flowers have normally attached to them at least one pedicelled flower. These pedicelled flowers have the usual floral envelopes or occasionally, vestiges thereof. They are not usually obtrusive; however, in a few varieties they are prominent and give the ear-head a prickly look. They serve as a padding between the sessile flowers. Sometimes there are two pedicelled flowers one on each side of the sessile. In stray cases sessiles without pedicelled flowers attached to them occur. Sessiles with three pedicelled spikelets are a rarity. Almost all pedicelled spikelets are barren. In the terminal spikelets, where these are in pairs, odd flowers bear anthers. Long,¹ after an extensive examination of the spikelets of *Andropogon halipensis* and *Andropogon Sorghum*, var. *sudanensis*, comes to the conclusion that the aborted pistil of the pedicelled flower suggests that it once had a perfect flower.

An intense botanical examination of the varieties of sorghum at the Millets Breeding Station, Coimbatore, showed three varieties which had pedicelled flowers with seeds (Illustration): A.S. 3441 and M.S. 2687 (from East Africa), and M.S. 1644 (from Bihar). In the two sorghums from Africa all the pedicelled spikelets had both anthers and ovaries at flowering time but not all ovaries developed grains. The analysis of a head in each showed as follows:—

	Total number of pedicelled spikelets with ovaries	Number of pedicelled spikelets with grains	Percentage of grain formation in pedicelled spikelets
A.S. 3441 ..	2,683	1,647	61
M.S. 2687 ..	4,274	945	22

In M.S. 1644, the Indian variety in which the manifestation of this fertility was very poor, 40 heads were analysed and the

incidence of grain-bearing pedicelled spikelets was noted. Twenty-five heads showed under one per cent., ten heads two to three per cent. and five between four and eight per cent. of grain-bearing pedicelled spikelets. The rest of the pedicelled flowers were antheriferous.

The seeds from pedicelled spikelets were normal but smaller than those in the sessile spikelet. Weights of 200 grains showed them to be half the weight of grains from sessile flowers. This halving in size is in consonance with the disability of being pedicelled. Germination tests proved them to be as viable as normal grains.

The distribution of the hermaphrodite pedicelled spikelets in the successive whorls from bottom to top of the panicle was gone into and it showed that there was a progressive increase towards the top. In M.S. 2687 it rose from 5 to 21 per cent., in M.S. 1644 from 4 to 33 per cent. and in A.S. 3441.



Sessile spikelet with pedicelled grain-bearing spikelet attached. $\times 3$.

the African variety which had the largest manifestation of pedicelled hermaphrodites, it was 53 to 85 per cent. In the terminal sessile spikelets, where the pedicelled flowers are mostly in twos, one or both developed seeds. It can be said that generally all the spikelets towards the periphery of the panicle produce grains. Those towards the centre of the ear-head fail to set seeds. Pedicelled

¹ *Bot. Gaz.*, 1930, 39, 154.

flowers with ovaries only and no anthers were not met with.

The pedicelled flowers, when they are antheriferous, start opening at about the close of the main wave of the anthesis of sessile hermaphrodite flowers (G. N. Rangaswami Ayyangar and V. P. Rao, 1931).² The hermaphrodite pedicelled spikelets, however, flower *along with* the sessile flowers. The second wave of anthesis, usually met with in those sorghums which have antheriferous pedicelled spikelets, is absent in the case of panicles in which both sessile and pedicelled spikelets are hermaphrodite.

In all the three cases reported above, it is noticeable that this phenomenon of hermaphrodite pedicelled spikelets occurred in varieties in which the size of grain in the normal sessile hermaphrodite is distinctly smaller than the average grain in Grain Sorghums. It has been noted that in pedicelled spikelets the grains were about half the size of those in the sessile ones.

This smallness in small grained ear-heads gives the panicle in which this phenomenon is recorded, a minuteness of grain disposition, not usual in this Great Millet.

The occurrence of grains in pedicelled spikelets opens up the possibility of breeding an all-fertile ear-head in spite of the basic drag of the sterility of pedicelled flowers which characterises the Andropogons. The smallness of grain is a disability to be faced. A big grain is a desideratum in a Grain Sorghum. Crosses designed to explore the possibilities of this combination are in progress.

Above all the concurrent flowering of the hermaphrodites whether pedicelled or sessile, without falling back as a second wave as in the case of pedicelled antheriferous spikelets, leads to the possible relationship of factors responsible for the opening of flowers and the part that a full sexual complement plays in that process.

Abnormal Fruits—Viviparous Germination in *Coccinia indica* W & A. (Family *Cucurbitaceæ*).

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THE object of this note is to record a rather advanced stage of what is called viviparous germination in *Coccinia indica*. One of the authors, M. Ghouseuddin, collected a few fruits from a plant growing near the tank in the Public Garden, Hyderabad. They show viviparous germination in a very advanced stage in that a tendril and a leaf have found their way out of the fruits (Fig. 1).

Viviparous germination has been recorded in the family *Cucurbitaceæ*, viz., in melon in a considerable detail by Sir Thiselton-dyer. But in the specimens he has described the seedlings were still within the fruit and could not penetrate the fleshy and solid pericarp to find their way out. Only in one instance did he find a tap-root actually penetrating the solid parenchyma of the pericarp. The cotyledons were green but the chlorophyll came out in alcohol very readily, and did not impart good enough colouration to the alcohol.



Fig. 1.

Fruits—*Coccinia indica* Viviparous Germination.

Viviparous germination has long been known in Mangroves (*Rhizophoraceæ*), and it often occurs in *Citrus* fruits, *Carica Papaya*, *Dipterocarpus retusus* (*Dipterocarpaceæ*), *Bertholletia excelsa* (*Lecithydaceæ*), etc. But as far as we are aware, cases have not been recorded in which the seedlings were so well developed as in this case; the shoot comes

² *Ind. J. Agri. Sci.*, 1931, 1, 445.