1928, air temperatures (in shade) went below 30° F. only on two occasions, once in 1889 and once again in 1910; whereas during the seven years that have followed 1928, there have been two cold waves resulting in lower than 30° temperatures on one day in 1929 and four days in 1935. One must not really generalise from such meagre premises but it would appear as though we were in for a period of more frequent cold waves!

In the end I must thank the Indian Meteorological Department for giving general permission, several years ago, to their officer-in-charge of the local observatory to allow me access to the records, etc., kept in Lahore. And I cannot close without also thanking the local officer, Mr. Dina Nath Chopra without whose active help and co-operation, I would not have been able to maintain my interest in matters meteorological, nor able to give all the facts and figures incorporated herein.

Stigmas and Awns—Their Homology.

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THE existence in certain varieties of sorghum of fertile pedicelled spikelets has been noted (G. N. Rangaswami Ayyangar, and V. P. Rao, 1935).[1] One of these varieties, M. S. 1644, is awned. It is well known that in awned varieties the sessile spikelets bear awns and the pedicelled ones do not have them. The occurrence of grain-bearing fertile pedicelled spikelets raised the question whether such fertility resulted in the stimulation and manifestation of the otherwise absent awn in the pedicelled spikelets. An examination of these fertile pedicelled spikelets showed that they did develop the awn concurrent with this fertility—only the expression of the presence of awn was a bit feeble. In Fig. 1 the top picture shows

×1

Fig. 1.

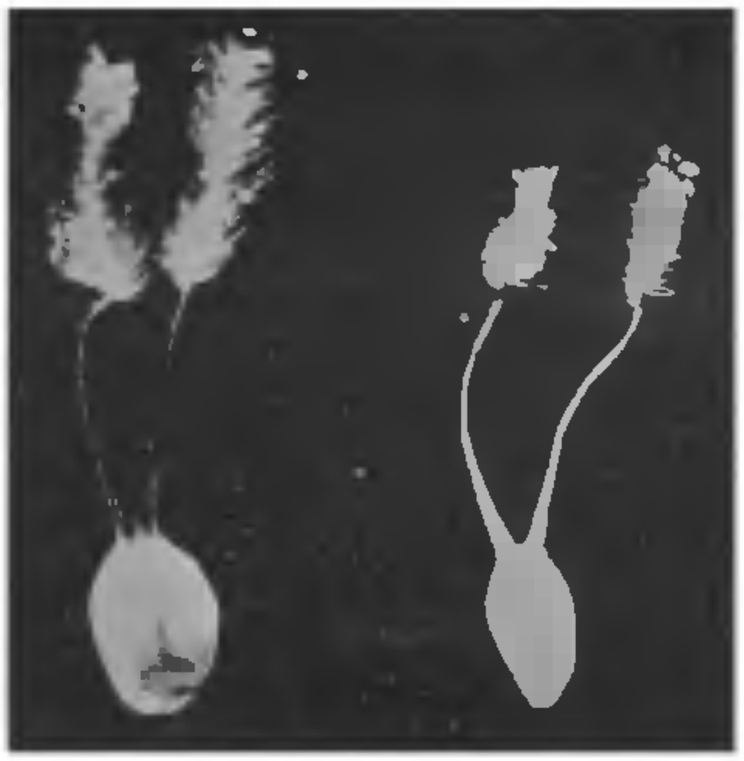
the pedicelled sterile spikelet without awn and in the bottom one the same pedicelled spikelet when it bears a grain also develops the awn. Where awns did occur, measurements show that they were about half the length of the normal awn; normal —6 mm.; pedicelled—2·9 mm.—(average of 100 readings.) Pedicelled spikelets without awns have occasionally anthers. This activation into a manifestation of the awn concurrent with the appearance of the ovary with the stigma raised the probable homology between awns and stigmas. Looking up literature it was noted that Harlan (1931)[2] working in Barley "had felt for some years" that the barbs on the awns and the hairs on the stigma arise from the same basic tissue. In 1915 he noticed a high positive correlation between the number of teeth on the awns and the number of hairs on the stigmas. The experience recorded above in which the awn as an organ manifested itself concurrently with the stigma, gives unmistakable proof of their inter-relationship.

Next to this concurrent presence of stigmas and awns in awned varieties is the parallel that exists in their general morphology. In Fig. 2. are given two stigmas (*a*) that of *Sorghum Durra*, Stapf, the Grain Sorghum, and (*b*) that of *Sorghum Nervosum*, Bess, the fodder type, *Irungu Cholam*. It will be noted that in *S. Durra*, the stigmatic feathers cover half the style, and in *S. Nervosum* a little less than a third. Fig. 3 gives the photographs of the respective

[1] *Curr. Sci.*, 1935, 3, 433–34.

[2] *Jour. Hered.*, 1931, 22, 271.

awns and bears out a somewhat similar distribution between the subule and the column. In Table I the relative measurements are recorded.



(*a*) (*b*) ×7·5

Fig. 2.

(*a*) (*b*) ×7·5

Fig. 3.

TABLE I.

(*Average of* 100 *readings.*)

	(1) Length of Style mm.	(2) Length of Stigmatic Zone mm.	Ratio of (1):(2)	(1) Length of Column mm.	(2) Length of Subule mm.	Ratio of (1):(2)
S. Durra	2·0	2·0	1 : 1	3·5	3·5	1 : 1
S. Nervosum	2·5	1·0	2·5 : 1	6·0	3·0	2 : 1

In Table II are given measurements bearing out the general parallel trend in the spindle shape of the disposition of hairs and barbs of the two organs.

TABLE II.

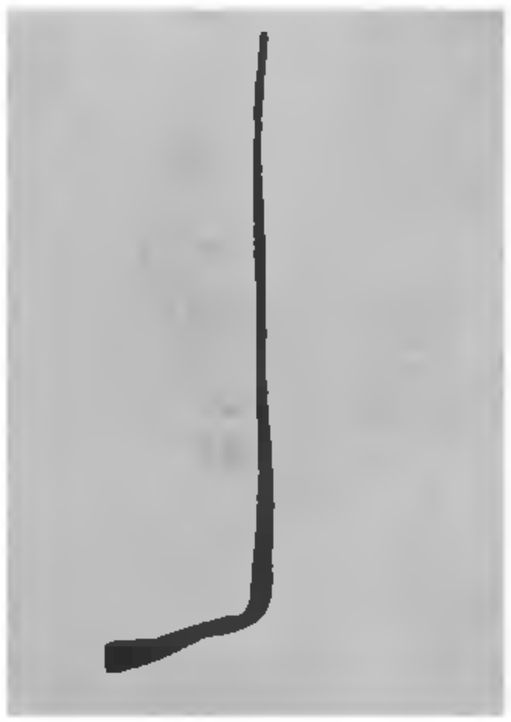
	Length in μ			Average of
	Bottom	Middle	Top	
Stigmatic feathers ..	288	452	164	(300 readings)
Barbs in the subule .	42	132	60	(60 „)

In Table III, the morphological variation in the longest feathers of the spindle keep parallel to the longest barbs in the awns between varieties.

TABLE III.

	Length in μ			Average of
	S. Durra	*S. Nervosum*	*S. Margaretiferum*	
Stigmatic feathers..	555	456	344	(100 readings)
Barbs in the subule ..	180	126	90	(60 „)

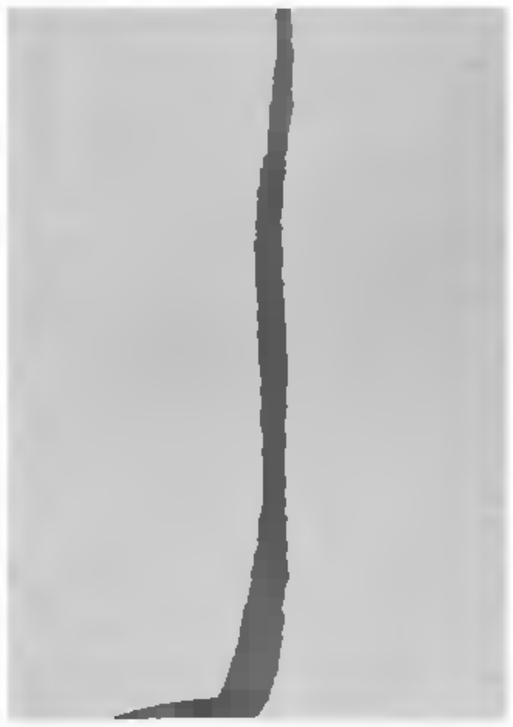
There are no smooth awned varieties in sorghum; but an African variety, A. S. 3155, manifested the rare phenomenon of irregular feathering, giving the stigmas a chequered featheriness in contrast to the usual good brush they ought to be. This variety was examined and its awn gives the nearest approach to a smooth awn that could be had in sorghum (Fig. 4). An



×7·5

Fig. 4.

enlargement of the normal awn borne on a flower with a normal stigma is given in Fig. 5 and the presence and regularity of the



×7·5

Fig. 5.

barbs in the latter will be patent. The stigmatic feathers of this variety instead of being of the bushy multicellular type of the normal stigma (Fig. 6) were a varying

×100

Fig. 6.

mixture of a few multicellular and many unicellular feathers (Fig. 7). An enlarge-

×100

Fig. 7.

ment of a purely unicellular stigma in this variety is given in Fig. 8. In Fig. 9 is

×100

Fig. 8.

×100

Fig. 9.

given an enlargement of the barbs in the normal awn. The resemblance between the two unicellular structures is noticeable.

These parallelisms serve as evidences of the homology between stigmas and awns.

Not all sorghums are awned. There are awnless races, awnlessness being dominant (G. N. Rangaswami Ayyangar, 1934)[3]. These awnless varieties bear grains and have stigmas. The homology is therefore patent only when the factors inhibiting the expression of awn are absent. It would therefore seem that whereas it is probable that both the awn and the stigma may have specialised from the same basic tissue, their parallel and concurrent specialisation is conditioned by the absence of factors inhibiting the expression of the awn. Genetic factors seem thus profoundly to affect homologous expressions.

[3] *Madras Agric. Jour.*, 1934, 22, 18.