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MIDRIB FORKING IN SORGHUM

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At the Millets Breeding Station, working on Sorghums, it was noticed in 1926 in family No. A. S. 576 that a few plants had the midrib of some of the leaves forked. The forking varied in intensity, from very slight to quite a pronounced type, depending on the starting point of the forking, as the illustration will show.

On a closer examination of all the lines under study in 1927, it was observed that in 45 families stray cases of forking of degrees were met with. This proved independent of whether the midrib was dull or white in colour.

The forking varied with the number of plants in which it manifested in each line, in the number of leaves in which the forking appeared, and in the intensity of the forking when it did appear. The number of plants showing forking varied from an odd plant to half the population.

To pursue this phenomenon in detail, with a view to exploring the possibility of its constancy proving a distinguishing varietal character, a few selections were taken from four families, A. S. 951, A. S. 376, A. S. 1066, and A. S. 1566.

The following table illustrates the parental character, and progeny behaviour of the selections taken.

TABLE I

Family No.	Forking percentage in 1927	1928 Forked selection number	Forking percentage in progeny
A. S.		A. S.	
951	1·4	2103	2·6
376	5·9	2100	32·6
		2101	22·4
1066	35·1	2108	30·8
		2109	26·8
1566	52·9	2111	58·5
		2112	49·3

This experience was pursued in the year 1929 and the following tables record the counts.

TABLE II

Family No.	Progeny 1929	
	Selection No.	Forking percentage
	A.S.	
A.S. 2103 (2·6% forking) ...	2497	1·9
	2498	0·0
	2499	0·0
	2500	0·0
	2501	0·0
A.S. 2100 (32·6% forking) ...	2491	5·7
	2492	2·8
	2493	9·3
	2494	3·4
	2495	7·2
	2496	6·6
A.S. 2108 (30·8% forking) ..	2502	2·0
	2503	0·8
	2504	3·5
	2505	4·9
	2506	4·8
	2507	5·3
A.S. 2111 (58·5% forking) ...	2508	39·1
	2509	36·6
	2510	44·4
	2511	34·0
	2512	28·1
	2513	35·5

In the 1929 families intensive examination with a view to gauge the nett intensity of the manifestation and the incidence of the details thereof, was made of the plants and the following is the record of the data gathered.

TABLE III.

Clan Number	Number of plants showing forking in the leaf	Number of leaves actually forked
A.S.		
2103	2	2
2108	25	26
2100	35	43
2111	257	299

TABLE IV. **Forking intensity per plant**

No. of forked leaves per plant	No. of plants in Clan No.			
	A.S. 2100	A.S. 2111	A.S. 2108	A.S. 2103
1	31	211	24	2
2	2	30	1	nil
3	1	6	nil	nil
4	0	0	nil	nil
5	1	0	nil	nil

TABLE V. **Where forking shows most**

Position of leaf in the plant		No. of plants manifesting in Clan No.			
		A. S. 2100	A. S. 2111	A. S. 2108	A. S. 2103
Top leaf (flag)	1	20	187	24	1
,,	2	5	85	2	1
,,	3	7	23	nil	nil
,,	4	2	4	nil	nil
,,	5	2	nil	nil	nil
,,	6	3	nil	nil	nil
,,	7	3	nil	nil	nil
,,	8	1	nil	nil	nil

It will be noticed that the forking is fairly constant in the flag, the reproductive end of the leaf series.

TABLE VI. **Extent of forking in the leaf and its incidence**

Clan No.	Degree of forking					
	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{4}$	full
A.S.						
2100	11	14	13	2	2	1
2111	15	103	109	26	8	nil
2108	nil	3	4	4	11	4
2103	nil	nil	1	1	nil	nil

Half and one-third forking are commonest. Full forking is rare.

When the adult manifestation is weak, the seedlings do not give any clue to this character. But in Family No. A. S. 2111 in which the intensity of forking is greatest, even in the earliest seedling stages forking showed out in stray cases in the end leaf of the thinned out seedlings over a month old.

Similar forking was observed in the midribs of the leaves of *Setaria italica*, especially of some of the broad leaved varieties, mostly showing in the flag and in some of the alternate lower leaves.

Bugnon (2) after an examination of several leaves came to the conclusion that leaf dichotomy is an atavistic tendency. In the light of Bugnon's researches the above phenomenon strikes us as interesting also for the phyletic

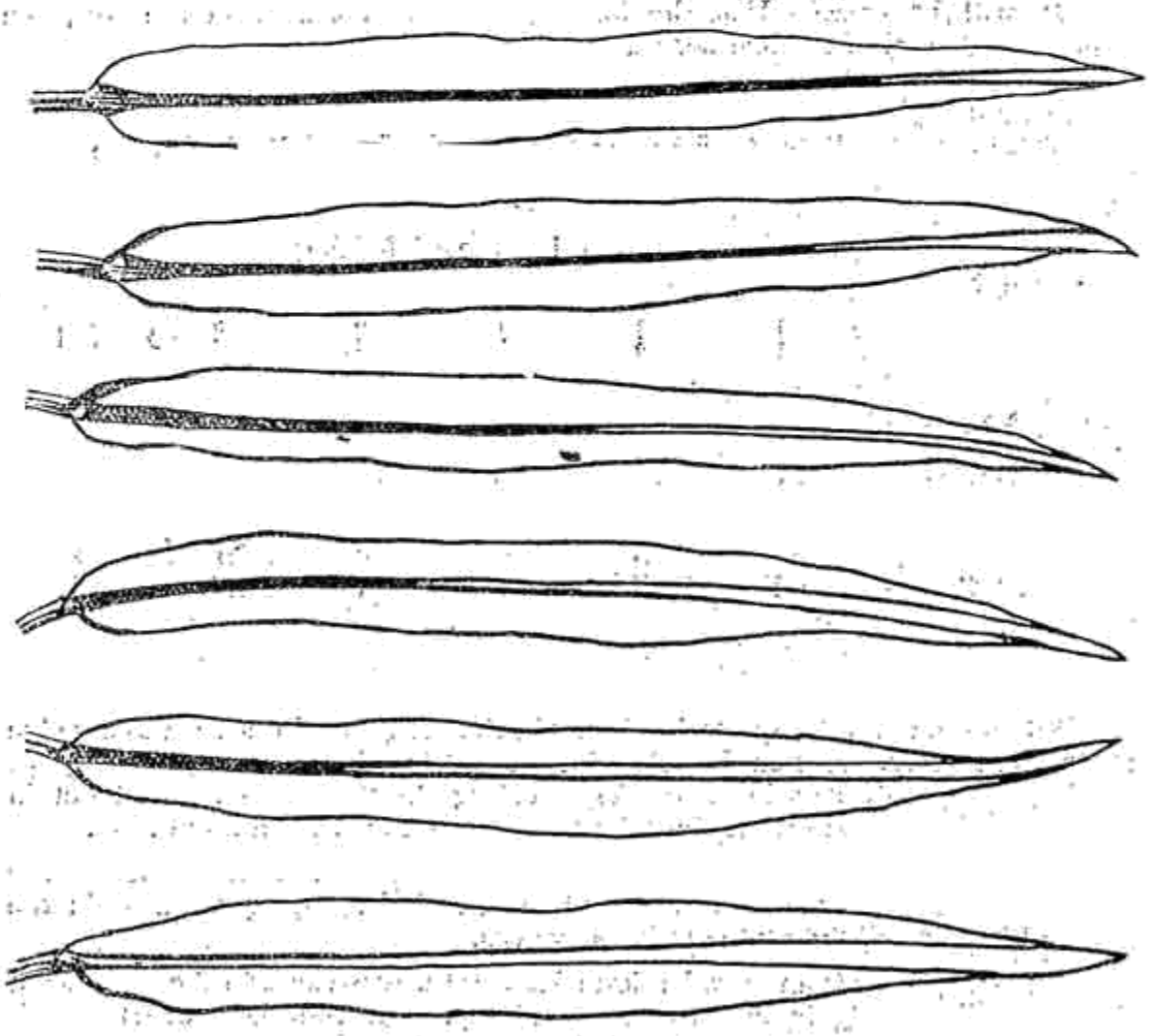
tendencies it seems to exhibit. Midrib forking therefore may possibly be a reversion to the 'ancestral and primitive type of branching found in the vascular plants'. And though it is not Bugnon's leaf dichotomy, the midrib dichotomy more closely parallels the dichotomy of the vascular structures in the primitive vascular plants.

We may also perhaps find in this a faint echo of the origin of monocotyledons by the fusion of the two cotyledons of an ancestral pro-Ranalian dicotylédon (1).

If these results of the study of the unaided eye mean anything, it would be distinctly interesting to pursue it and search for similar phenomena elsewhere among the monocotyledons.

Literature cited :

1. 1903 Sargant, Miss E. ... A Theory of the Origin of monocotyledons, founded on the structure of their seedlings. *Annals of Botany*, 17. pp. 1–92.
2. 1925 Bugnon, P. ... La dichotomie cotylédonaire, caractére ancestral. *Bull. Soc. Bot. France*, 72. pp. 1088–1094.



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