

therefore a symmetrical karyotype which is considered to be a primitive feature. The karyotype consists of fifteen pairs of chromosomes of which one pair has terminal satellites, eight pairs submedian constrictions and six pairs median constrictions. Figure 1 shows the thirty somatic chromosomes and Fig. 2 is the



FIG. 1. Somatic chromosomes, $\times 1,750$.



FIG. 2. Idiogram of the somatic complement.

idiogram of the complement. The measurements of the chromosomes are given in Table I. The absolute length of the chromosomes is 51.50 microns. The presence of only one pair of nucleolar chromosomes is indicative of the diploid nature of this taxon.

TABLE I

Showing the measurements of the chromosomes of *Turnera ulmifolia*

Pairs	L.A. in μ	S.A. in μ	Total length in μ	Relative length	Index
1	1.65	0.66	2.31	8.97	0.40
2	1.48	0.50	1.98	7.69	0.33
3	0.99	0.99	1.98	7.69	1.00
4	0.99	0.99	1.98	7.69	1.00
5	1.32	0.57	1.89	7.34	0.43
6	1.07	0.82	1.89	7.34	0.76
7	0.99	0.82	1.81	7.03	0.82
8	0.90	0.66+0.16	1.72	6.68	0.91
9	0.90	0.82	1.72	6.68	0.91
10	0.90	0.74	1.64	6.37	0.82
11	0.82	0.82	1.64	6.36	1.00
12	0.82	0.58	1.40	5.34	0.70
13	0.66	0.66	1.32	5.12	1.00
14	0.66	0.58	1.24	4.82	0.87
15	0.82	0.41	1.23	4.78	0.50
Total ..			25.75 μ	99.90	

The authors are thankful to Prof. M. Nagaraj for his interest in this work.

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STOMATAL MOVEMENT IN RELATION TO DROUGHT RESISTANCE IN SUGARCANE*

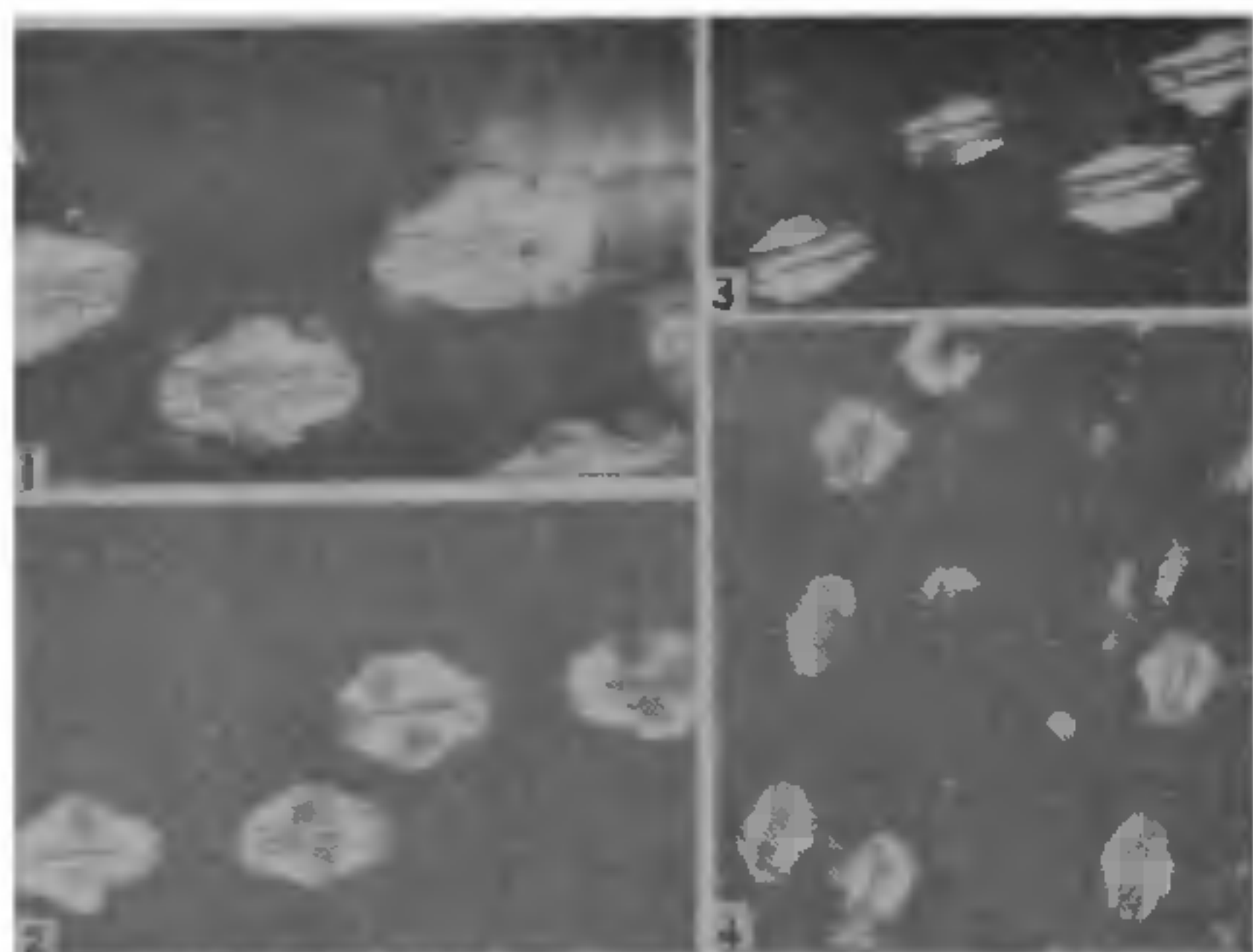
LABORATORY and Field tests of plants, developed so far, for assessing drought resistance are based on the two important aspects of drought avoidance and drought tolerance. Among the factors concerned with drought avoidance, stomatal movement has been felt to be an important one. Soil moisture stress results in water deficits in the leaves and this induces stomatal movement depending on the magnitude of the deficit. According to Van den Honert¹ stomata at 50% of maximum opening and smaller should act effectively as transpiration regulators. Ehling and Gardner² observed that the dehydration of the leaf tends to close the stomata of most plants at a rather definite relative water content.

Preliminary investigations on the effect of soil moisture stress on stomatal movement and its possible relationship with drought resistance in sugarcane are reported in this note.

Two genotypes differing widely in their drought resistant capacity were selected for the study, viz., Badila (drought susceptible), a clone of *S. officinarum* and Co. 312 (drought resistant) a hybrid variety. Single-budded setts were planted in pots and when the plants were 4 months old, the drought treatment was given by withholding water. Leaf samples were fixed every day at 10 a.m. for a period of 10 days from the date of commencement of the treatment and epidermal peelings were taken following the procedure adopted by Singh and Varma.³ The peelings were observed every day for stomatal closure. On the day the closure of the stomata was observed, the plants were rewatered and the recovery of the stomata noted.

In the drought susceptible variety, Badila, nearly 50% of the stomata closed completely on the ninth day from commencement of the treatment. On rewatering, none of them reopened even after 20 hours. On the other

hand, in the drought-resistant variety, Co. 312, all the stomata closed completely within seven days of commencement of the treatment and on rewatering all of them reopened within 20 hours. The closure of the stomata in the two varieties is illustrated in Figs. 1 to 4.



FIGS. 1-4. Fig 1. Co. 312. Normal water-stomata fully open. Fig 2. Co. 312, Drought-treated, stomata completely closed. Fig 3. Badila, Normal water-stomata fully open. Fig 4. Badila. Drought-treated, nearly 50% of stomata closed.

From the above observations, it is clear that the variety Co. 312, by closure of the stomata earlier than in the case of Badila, is in a position to effectively control loss of water by transpiration and hence is able to withstand soil moisture stress to a greater extent than Badila. Further, on rewatering, the photosynthetic rate and total assimilation rate of Co. 312 might be higher than in Badila, since all of its stomata opened earlier after withstanding the soil moisture stress unlike in Badila. The observations indicate the usefulness of such studies as one of the criteria for screening sugarcane varieties for drought resistance.

Our sincere thanks are due to Dr. R. D. Asana, Indian Agricultural Research Institute, New Delhi, for suggestions.

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* Approved for publication by the Director, Sugarcane Breeding Institute, Coimbatore.

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CHROMOSOME BREAKAGE INDUCED BY HYDROLYTIC PRODUCTS OF THALIDOMIDE IN *VICIA FABA*

THALIDOMIDE, a synthetic drug, which was prescribed as a sedative to pregnant women during 1959-61 in several European countries, England and Canada, was responsible for the birth of thousands of severely malformed children (called thalidomide babies) in these countries (Taussig, 1962). Natarajan and Nilsson (1966) reported on the action of thalidomide and its products of hydrolysis on chromosomes of root meristems of *Vicia faba*. They found thalidomide by itself to be ineffective in inducing chromosomal abnormalities but its hydrolytic products induced extensive shattering of chromosomes, chromosomes with gaps and chromosome breaks without rejoining. This communication supports the observation made by Natarajan and Nilsson on the chromosome breaking ability of the hydrolytic products of thalidomide.

Seeds of *Vicia faba* were germinated in sand beds and when the primary root was 2-3 cm. long its root meristem was cut and the root dipped in water in tubes to obtain secondary roots for treatment. A suspension of thalidomide (2 mg./ml.) in 10^{-2} M HCl was hydrolysed for 30 minutes at 60°C. The solution obtained was neutralized with 10% sodium bicarbonate and the secondary roots of *V. faba* were treated with this solution containing hydrolytic products of thalidomide for 5 hours, fixed in acetic alcohol, stained in feulgen and squashed for study. The types of aberrations obtained are given in Table I.

TABLE I
Aberrations induced by hydrolytic products of thalidomide

	Hydrolytic products	Control
Normal cells	.. 48	128
Cells with shattered chromosomes	.. 32	0
Cells with gaps	.. 8	0
Number of breaks	.. 49/23 Cells	0
Total cells scored	.. 111	128

As seen from Table I the number of abnormal cells in the treated material is as high as 56%. The pattern of chromosome breakage resembles that produced by inhibitors of DNA synthesis like 5-fluorodeoxyuridine and aminopterin.

We are grateful to Dr. A. T. Natarajan for providing us a sample of thalidomide.