extra length, are distorted and irregular in shape. The spongy parenchyma in the diseased leaves is irregular and loosely arranged, so that there are many intercellular spaces. Plastids in the palisade cells of the affected leaves are very few and the cells appear almost colourless whereas the palisade cells of the healthy leaves are closely arranged and full of chloroplasts. The sclerenchyma cells of the mid-rib of diseased leaves are bigger but those of healthy leaves are smaller in size and compactly arranged. Figs. 2 and 3 show transverse sections through a healthy and an affected leaf respectively.

Table I gives the results of analysis of the healthy and affected leaves (mgm. per 100 gm.). Samples were collected from healthy and diseased plants standing close to each other in the same field and are comparable with respect to age, size and height.

TABLE I

	Fresh leaf materials			Dry leaf material	
	Total sugars	Reducing sugars	Sucrose	Starch	Nitrogen
Healthy ..	767	549	218	25·9	2·7
Diseased ..	590	466	124	20·7	1·1

The composition of the ash is given in Table II.

TABLE II

	Ash	Hcl. sol. ash	CaO	MgO	P_2O_5	Fe	K O	Na_2O
	Per cent. of dry material							
Healthy	19·25	17·12	5·12	0·80	0·81	0·11	3·64	0·13
Diseased	33·63	21·88	6·44	0·75	1·08	0·45	4·44	0·14

The data given above show that the affected leaves are characterised by (1) decrease in total sugars, reducing sugars, sucrose and starch, (2) lower nitrogen and (3) higher ash content.

Attempts to transmit the disease to healthy plants by the more usual methods have failed so far.

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[1] Mohammad Afzal, Santokh Singh Jaggi and Bishan Singh, *Ind. J. Agric. Sci.*, 1935, **5**, 624.

The Beneficial Effect of Boron on Jute

LAST year in the course of an investigation on jute plants grown in pots filled with manured soil and kept in open, it was noticed that many of the plants developed a characteristic injury; the topmost bud leaves and a few other assimilating leaves shrivelled and fell off; the apex of the stem also withered, became brown at first and ultimately blackened; the injury then spread downwards. This type of injury commonly designated 'dieback' was not observed in plants grown in a trial plot. Similar injury reported in literature, has been traced to (1) deficiency of boron,[1,2] potassium[3] or moisture[4] in the soil, (2) the addition of ammoniacal fertilizers[5] or (3) frost.[6]

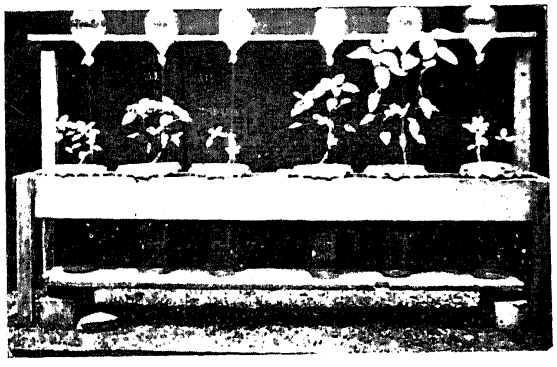

FIG. 1

Jute grown from seeds in sand culture with and without the addition of boric acid. The control is on the left. The plants on the right of this received respectively 0·01 p.p m., 10·0 p.p.m., 0·5 p.p.m., 0·1 p.p.m. and 1·0 p.p m. The plants were irrigated by the drip and drain method.

Jute (*Corchorus capsularis*) seeds were obtained from the Agri-Horticultural Society of Bengal and those with almost the same size and

weight were selected. They were soaked in distilled water for 10 to 15 minutes and 4 to 5 seeds were sown on 24th May in sterilised pots filled with boron-free sand and soaked in distilled water. When the seedlings were ten days old, the pots were thinned out, only 2 plants being allowed to remain in each pot; the pots irrigated with Hoagland's solution. Boron (as boric acid) was added in six different concentrations. The plants were grown for 42 days before harvesting. The first set of five plants was removed on the 16th July, the roots were washed free from sand and the lengths of stem and petiole taken. Readings of the surface area of the leaves were taken by a planimeter. The plants were then cut into tops and roots and the fresh and dry weights determined. These results are tabulated below.

TABLE I

Concentration of boron p.p.m.	Average of five plants						
	Total height cm.	Area of leaf sq. cm.	Length of petiole cm.	Fresh weight of plants gm.		Dry weight of plants gm.	
				Tops	Roots	Tops	Roots
	33·3	175·4	33·7	4·09	0·52	0·49	0·11
0·01	50·7	318·9	48·3	8·38	1·54	1·03	0·17
0·1	73·7	645·8	87·0	19·87	2·82	2·37	0·43
0·5	53·0	325·3	48·9	8·24	1·10	0·99	0·15
1·0	24·7	119·7	20·9	1·19	0·41	0·26	0·07
10·0	24·0	82·8	18·2	1·76	0·41	0·23	0·06
Control in composted soil	54·2	407·4	57·1	10·53	1·44	1·22	0·17

Plants receiving no boron were fairly healthy; only the leaves of the plants were not as green as those of plants receiving boron. Plants receiving concentrations of boron from as low as 0·01 p.p.m. to 0·5 p.p.m. were quite healthy. Those in pots receiving 0·1 p.p.m. of boron showed maximum growth. Higher concentration of boron proved distinctly toxic; thus those receiving 1 p.p.m. and 10 p.p.m. showed yellowing of leaves, the leaves themselves being deeply cupped on the under-surface. The growth was also poor. The special meristems in some cases died and the axillary buds that developed were all yellowish in colour. Roots were very poorly developed.

It was observed that all plants were prone to dieback, thus showing that this effect was not due to boron.

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Bose Research Institute,
Calcutta,
September 10, 1940.

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[2] Warington, K., *Ann. Bot.*, 1923, **37**, 329.
[3] Hartt, C. E., *Bot Gaz.*, 1929, **88**, 229.
[4] Heald, F. D., *Manual of Plant Diseases*, McGraw-Hill Book Co., Inc., 1933, p. 99.
[5] Floyd, B. F., *Fla. Agr. Exp. Sta. Bul.*, 1917, **140**, 1.
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The Nervous System of a Proglottid of *Tentacularia macropora*

THE nervous system of Cestodes was first discovered by J. Muller[1] in *Tetrarhynchus attenuatus*. But in spite of the attempts of Lang,[2] Lönnberg,[3] Pintner[4] and Johnstone[5] the arrangement of the nerves in the proglottides in Tetrarhynchids is even now not known. The supposition is that there should be two lateral nerve cords running the whole length of the proglottid chain. The difficulty experienced by the students of the nervous system of invertebrates is more marked in the case of Cestodes. Most of the previous investigators seem to have either not employed the silver methods or have failed to obtain a sufficiently satisfactory impregnation of the fibres. This may probably be due to non-availability of sufficient material.

In March and July 1940 I obtained a number of *Tentacularia macropora* (Shipley and Hornell, 1906) from the spiral valve of *Stegostoma tigrinum*. After repeated experiments with the Bielchowsky technique I have obtained