Growth Promoting Factors in Jowar (*Andropogan Sorghum* Linn.)

IN the course of our feeding experiments with the rice moth, *Carcyra ciphalonica*, it was found that the insect needs a water-soluble factor and also one which is fat-soluble. Whole jowar, dried and powdered to pass through a 30-mesh sieve, when fed to these insects, has been found to constitute an adequate diet, but the material subjected to an extraction with ether, does not support the growth of the insect, although the diet is supplemented with an equivalent quantity of fat in the form of groundnut oil. The addition of the ether extract to the extracted meal, however, restores the adequacy of the diet, although the diet suffers in quality to a certain extent. This deterioration in quality is attributed to a partial destruction of the fat-soluble factor in the course of the preparation of this diet.

Batches of ten larvæ were fed on three different diets (1) whole jowar, (2) jowar extracted with ether but the fat deficiency made up by groundnut oil and (3) ether extracted jowar to which an equivalent quantity of the extract has been added. Results of these experiments have been graphically represented in Fig. 1, which

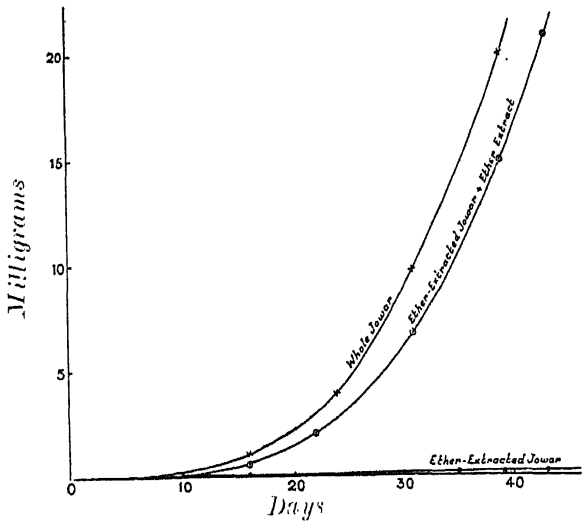

FIG. 1.
Growth curves of the rice moth (*Carcyra ciphalonica* fed on different diets
Scale—x axis 1 cm. = 2 days
y axis 2 cm. = 2·5 mgms.

demonstrates in a convincing manner, the presence of a potent fat-soluble, growth-promoting factor in the ether extract. Experiments with a view to isolate this factor in a concentrated if not a pure form, are now in progress.

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Nitric Nitrogen in Soils under Cotton

A GENERAL complaint in the cotton growing districts of the Punjab is that American varieties of cotton do not often give successful crops. At the flowering stage the plants usually become yellowish green in colour, and at times there is a considerable shedding of leaves and flowers and bad opening of bolls. This trouble has also been encountered in Sind.

Since soils in tropical countries are generally deficient in nitrogen, the yellowish green appearance of plants led us to suspect nitrogen starvation at the time of seed formation when it is most required. Preliminary observations on the amount and type of nitrogen in soils under cotton were taken in 1928. These showed a deficiency of available nitrogen in such soils.

In 1929 and again in 1933, with the assistance of the Cotton Research Botanist weekly determinations of different forms of nitrogen were made during the entire cotton season. These were correlated in 1929 with the types of micro-organisms present in fallow and the cropped soils.

The results of such observations (Table I) showed that the amount of nitric nitrogen in soils under cotton was practically nil from about the end of July onwards.

Another set of observations was taken in September this year (1939). Determinations for available nitrogen were made in samples of soil removed from 16 different fields under American cottons at Risalewala and Lyallpur Agricultural Farms. The amount of available nitrogen was found to be practically nil in all these (Table II).

TABLE I

Mgm. Nitric Nitrogen per 100 gms. of Soil

Year 1929	Fallow	Under Cotton	Year 1933	Fallow	Under Cotton
29th July	1·43	Nil	31st July ..	1·2	0·56
5th Aug.	1·80	Nil	7th Aug. ..	1·2	0·33
10th ,, ...	2·14	Nil	14th ,, ..	1·27	0·71
19th ,, ...	1·31	Nil	21st ,, ..	1·50	0·90
26th ,, ...	1·65	Nil	27th ,, ..	0·70	Trace
2nd Sept.	2·00	Nil	11th Sept. ..	0·33	0·18
10th ,, ...	1·90	Nil	18th ,, ..	1·01	0·52
17th ,, ...	1·62	Nil	25th ,, ..	0·63	0·30
23rd ,, ...	1·50	Nil	2nd Oct.	0·60	0·22
2nd Oct.	2·90	Nil	9th ,, ...	0·35	0·09
7th ,, ...	1·50	Trace	15th ,, ...	0·52	0·11
21st ,, ...	2·85	,,	23rd ,, ...	0·52	0·22
30th ,, ...	2·92	,,	30th ,, ...	0·52	0·26
5th Nov.	2·85	,,	6th Nov. ..	0·90	0·27
12th ,, ...	2·30	0·62	12th ,, ..	0·60	(0·15)
20th ,, ...	2·80	0·58	20th ,, ..	0·9	0·11

TABLE II

Mgm. Nitric Nitrogen per 100 gms. of Soil

S.No.	Field No.	Variety of cotton	Nitric N. Mgm.	S. No.	Field No.	Variety of cotton	Nitric N. Mgm.
1	Risalewala Farm B/8	43F	Trace		Lyallpur Agricultural Station		
2	,, ,, B/10	43F	,,	9	,, ,, 3/23	L.S.S.	Nil
3	,, ,, B/12	43F	Nil	10	,, ,, 3/24	K.T.25	,,
4	,, ,, E/4	L.S.S.	,,	11	,, ,, 3/25	L.S.S.	,,
5	,, ,, E/8	L.S.S.	,,	12	,, ,, 4/21	L.S.S.	,,
6	,, ,, E/12	L.S.S.	0·02	13	,, ,, 5/10	L.S.S.	,,
7	,, ,, H/1	L.S.S.	Nil	14	,, ,, 5/11	L.S.S.	,,
8	,, ,, H/2	L.S.S.	,,	15	,, ,, 5/20	L.S.S.	,,
				16	,, ,, 5/21	L.S.S.	,,

Besides nitric nitrogen, estimations of nitrous and ammoniacal nitrogen were also made. Nitrous nitrogen was found to vary from 1/100th to 1/20th of a mg. per 100 gms. soil while ammoniacal nitrogen was generally present in traces only.

It appears, therefore, that deficiency of available nitrogen in soils under cotton at the fruiting stage of the crop may have something to do with its partial failure.

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Occurrence of Celestite in the Phosphatic Nodules of Utatur

SEVERAL investigators[1,2,3] have reported on the extensive deposits of phosphatic nodules in the Utatur area. Crushed specimens of phosphatic nodules revealed the presence of a white platy mineral which filled the cracks in the nodule and appeared to have concentrated near the core. Since it could be easily loosened and isolated and also since it comprised more than 3 per cent. (even 10 per cent. in exceptional cases) of the entire nodule, it was obtainable in sufficient quantity for study.

A careful chemical examination which involved the separation of calcium, strontium and barium by reliable methods showed that the mineral consisted approximately of 93 per cent. of strontium sulphate, 4 per cent. of the sulphates of calcium and barium and 3 per cent. of quartz.

We have also examined a lump of celestite occurring in the gypsum beds in the same area. This specimen was a massive aggregate of columnar crystals each of which was 10–12 mm. long.

In view of the fact that no significant deposits[1,5,6,7] of strontium minerals in India have so far been known to exist, this finding of a large source of strontium compounds in the Utatur area appears to be of some importance to this country.

A detailed study of the occurrence of celestite and of other minerals occurring in the Utatur area is now in progress.

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A Note on the Effect of Indole-butyric and Indole-acetic Acids on Rooting of Green Wood Cuttings with Special Reference to Litchi and Mango

PRELIMINARY results obtained during the summer of 1939 definitely indicate the effectiveness of indole-butyric acid in stimulating root growth in cuttings of litchi and a hedge plant, namely, *Justicia gendarusa* Linn. The time allowed (60 days) was found too short for rooting in mango but the effect of the chemicals was evident in callus growth. The importance[1] of propagation by cutting, if really practicable, would be very great in litchi and mango. The present methods of marcotting of litchi, and inarching of mango using seedling stocks are not only tedious but also do not give satisfactory results.

In the present experiments, cuttings about 6 inches in length were taken from one- and two-year old shoots, during the last week in March 1939. All leaves were removed and the cuttings immersed to a depth of about 1 inch in various concentrations of a water solution (tap water) of indole-butyric and indole-acetic acids for 6, 12, 24 and 48-hour periods. After treatment the cuttings were planted to about two-third of their length in a sand bed. These were excavated after 60 days. The *justicia* sp.