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A NOTE ON THE OCCURRENCE OF SMALL OUT GROWTHS ON THE CALYX RING OF THE COTTON FLOWER

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The author of this note has observed for the past four seasons (1929—'33) some peculiar out-growths or organs on the calyx ring of flowers produced in one of the pure lines of cotton, No. 54, a 'Northerns' Selection (*Gossypium indicum*) grown on the Agricultural Research Station, Nandyal. A fair percentage of flowers produced by this culture were found to have these organs, three in number and about two or three millimeters long when fully developed. Sometimes, only two, also one, either fully developed or in a rudimentary stage have been noticed in the flower. These structures spring from the outer base of the calyx ring and are situated one opposite each of the three bracts. Their shape is either conical, ovate or obovate and often they are cup-shaped, the hollow orienting towards the bract and away from the calyx. Rarely, the organ occupies the entire height of the calyx ring and looks as though the proximal ends of two of the sepals of the calyx have reflexed outwards and given rise to each out-growth. The tissue of this supernumerary structure resembles that of the gamosepalous calyx ring—yellowish-green in colour and dotted with black glands so characteristic of the cotton plant—in contradistinction to the dark reddish-green involucre, also full of black glands in the tissue.

Robbins in his text-book (1) mentions the occurrence of intracalcicary organs in upland cottons i.e., organs arising between the Calyx and Corolla and also observes that Cooke and Meade regard them as "Supernumerary calyx lobes or as representing free stipular elements of the calyx lobes."

Morphology of these structures apart, their presence serves as an ancillary distinguishing character for the culture.

In the F_1 of courses involving this strain, this character has been observed to be partially dominant.

Reference.

Robbins. Botany of crop plants.

A SUGARY EXUDATION FROM SORGHUM

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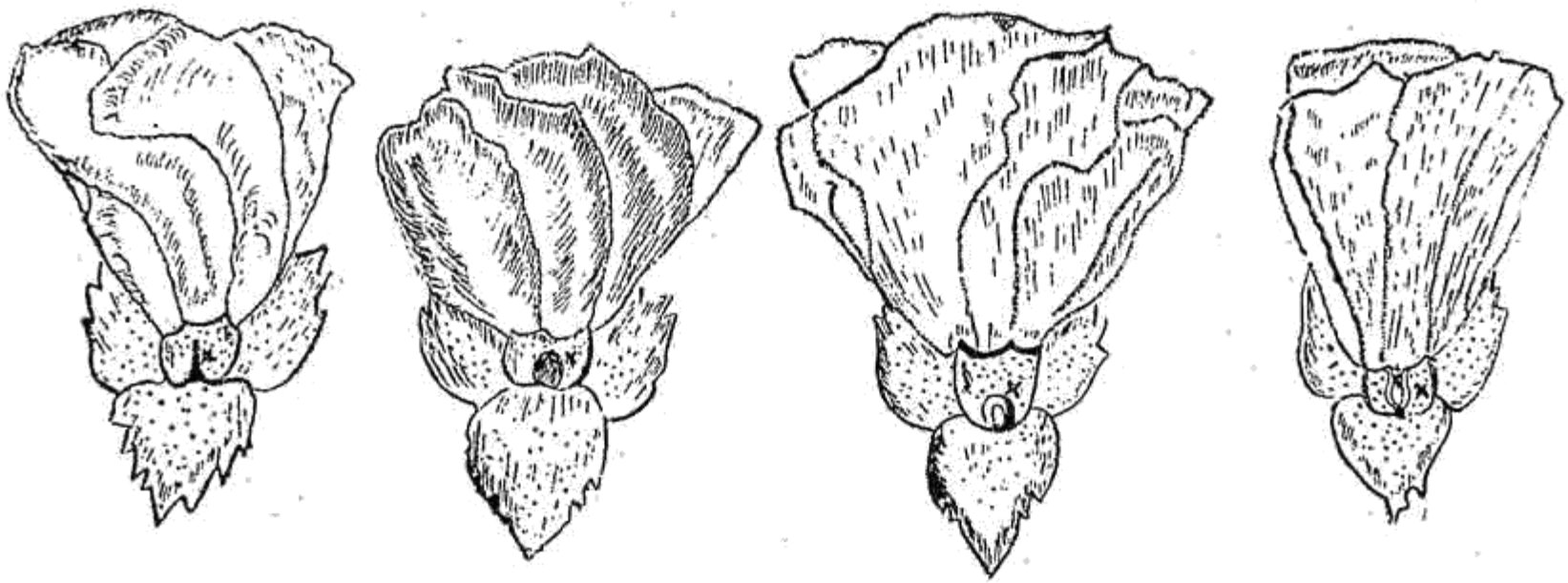
In a variety of sweet sorghum called *Tella Jonna* commonly grown the Bellary district a sweet fluid is found to exude from the ear- of certain plants from the beginning of the flowering season. It

OUTGROWTHS OF DIFFERENT SHAPES ON THE CALYX RING



SHOWN BY THE SIDE OF × MARK

frequently collects and dries on the leaves and is the cause of attraction for the large number of ants and other insects that visit the plants. Usually it is found as a sticky semi-solid; in several cases however, crystals are formed. When this secretion takes place the ear-head remains small and undeveloped though in all other respects the plant may look normal.

T_1 is a strain which yields this secretion in abundance; T_{12} also gives some quantity of it. The sorghums grown in Coimbatore such as *Periamanjal* do not exhibit this phenomenon so markedly. The juicy nature of the variety and the setting in of the cold weather during the flowering stage seem to be the conditions favouring the production of the exudation. In Bellary district flowering takes place in the coldest part of the year and *Tella Jonna* is sweet and juicy. In Coimbatore this condition is not seen in the summer cholam and even during the main season it is occasionally observed only in certain late varieties and in some of the late side shoots. It is noticed that with the *Tella Jonna*, manuring with cattle manure, green manure or mineral manure which gives rise to a good vegetative growth also renders the plants more susceptible to this condition. Further, insects are found to be most prominent in the plants producing this exudation.

Samples of the secretion in a solid form were collected from *Tella Jonna* (T_1) in the Hagari Agricultural Research Station during two seasons - on 30—12—'31 and 24—1—'32 in the season 1931–'32 and on 20–1'–33 during the season 1932–'33. They were obtained by gentle scraping with a spatula or knife so that very little of the plant tissues was included. It was noticed that the January samples were much more crystalline than those taken in December. They were brought in stoppered bottles to Coimbatore laboratories, dried for a week in a desiccator over concentrated sulphuric acid and analysed. At this stage they were a little sticky and hygroscopic and had the smell and taste of jaggery.

By the iodine test aqueous solutions of the samples were found to contain no detectable amounts of starch or dextrin. The following table summarises the results of analyses of the samples.

Date of sampling.	Acid content as C. C. of N. NaOH for 100 g of sample.	Ash %	Total Sugar %	Reducing Sugar %	Sucrose %
30—12—31	7·75	1·36	80·4	23·5	56·9
24—1—32	8·20	1·53	79·0	14·3	64·7
20—1—33	8·60	1·49	80·6	17·8	62·8

The reducing sugars consisted of glucose and fructose only and pure sucrose could be isolated from the samples by repeated treatment with 82% alcohol containing acetic acid and subsequently washing with

rectified spirits. When examined under the microscope a fresh sample of the exudation was found to contain yeast along with plenty of bacteria. A 5% aqueous solution when fresh had a pH of 5·5, after 24 hours 3·5, and after 48 hours 3·2. The total acid content increased 15 times when the solution was allowed to stand for 48 hours. The bulk of the organisms increased rapidly; very little alcohol could be found, the fermentation leading mainly to the production of acid. No fungus spores could be detected and this was kindly verified by the Government Mycologist at Coimbatore.

It should be noted that the percentage of the reducing sugars is high, that it decreases with the advance of the season, and that, there is a corresponding increase in the sucrose content. The results are similar to those obtained for the juice of the sugary sorghums by Annett (Bull. No. 41 of the Imperial Agricultural Research Institute, Pusa). It may, therefore, be concluded that the exudation is simply the flowing out of the sorghum sap. What should have gone to fill up the grains and be transferred into starch is poured out as a sugary fluid. But the exact cause of it is not yet clear

Help from the Farm Manager, Hagari Agricultural Research Station, in the collection of the samples of the sugary exudation is gratefully acknowledged. This work was done when the author was working in the Agricultural Research Institute, Coimbatore.

Correspondence.

I. A locally made and improved type of Wind-mill.

Mr. S. V. Doraiswamy B. A., B. Sc. Ag. writes from Udumalpet:—

In Mr. Subba Rao's garden about 3 miles from Udumalpet on the Thalli road, an ingenious kind of windmill has been erected and is giving very satisfactory results. Mr. Subba Rao's son Mr. Krishna Rao, M. A., B. L., under whose supervision the garden is being cultivated, has been responsible for its erection. It is interesting to note that Mr. Krishna Rao has taken up for cultivation under his supervision about 25 acres of garden which includes about 6 acres on lease. This is probably the first instance when a highly educated gentleman has taken up the position of a tenant and cultivates land on lease in addition to his own. The gardens are mainly devoted to sugarcane growing and there is an oil-engine and pump fitted to one of the wells. Being a Physical Science graduate Mr. Krishna Rao has utilised his knowledge to erect a cheap, simple and efficient type of windmill, the total cost of which is about Rs. 250.

The mill consists of a fan made locally of iron plates and attached to the central shaft of a condemned motor lorry differential, and coupled to a wooden fly-wheel attached to the back axis of the chassis, the wheels having been removed. A brake arrangement has also been made using the brake drum. The fly-wheel is attached to a rotary pump of two-inch delivery by means of belting. The cost of the pump and connected pipes comes to Rs. 150. The cost of the other parts may not exceed Rs. 100, including the cost of the lorry chassis. The six supporting posts are the frames of the chassis. All the parts work on ball bearings. The following are the dimensions of the windmill, discharge etc