

stirred only by "Living Word" and "Living Example". Thus we need above all in the villages men who will be an embodiment of knowledge, inspiration and example—persons who can put heart and soul into the despairing rural population. Such patriotic souls, who can pour knowledge as sacrifice at the altar of the Motherland is the greatest need of the hour in India, during those days of renaissance and reconstruction. May they come forth in sufficient number and great speed!

THE BREEDING OF THE THICK TYPE OF CANES FOR INDIA*

BY N. L. DUTT, M. Sc., & M. K. KRISHNASWAMI, M. A.
Imperial Sugarcane Breeding Station, Coimbatore.

So far as their distribution in India is concerned, the thick or tropical type of canes are grown chiefly in the Madras and Bombay Presidencies, as also in Burma, parts of Bengal, Assam and in the North-West Frontier Province. Besides their cultivation in the above mentioned parts, these canes are grown for chewing purposes in the United Provinces, the Punjab and Bihar. According to the Sugar Committee of 1921, the area under the thick canes, in the United Provinces alone is estimated to be 75,000 acres.

As is well known, the yield from the thick type of canes (*Siccharum officinarum* L.) is considerably more than that of the indigenous North Indian canes (*S. Barberi* Jesw.). In the Madras Presidency, the yield is about 28 tons per acre and in the Bombay Presidency the yields are fairly high and compare favourably with those obtained in Java. The drawback, however, is the high cost of production which is from 7 to 12 annas a maund in Madras and about 12 annas a maund of cane in Bombay, a price which is much higher than in Bihar where it is between 4 and 5 annas per maund. The aim therefore, has been to produce canes of the thick type which should be hardy and whose cost of production would be less. It is proposed to deal in this brief and preliminary note the manner in which the Imperial Sugarcane Station, Coimbatore, is trying to solve this aspect of the Indian Sugar Industry.

The breeding of the thick type of canes was taken up at Coimbatore in 1926 when a separate area of 28 acres was acquired for this purpose. It may be mentioned that in the earlier years (i.e. 1912 to 1914) of the Coimbatore station, 17 seedlings of the thick type were produced, as the thick canes happened to be the only ones flowering at that time. The work on the breeding of this type of canes has also been in progress at Hebbal under the Mysore Department of Agriculture, as a result of which the varieties H. M. 320 and H. M. 544 are being grown in the Mysore State as also in certain localities beyond the borders of the State.

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Though the general principles of breeding the thin or thick type of canes are similar, and one familiar with the breeding of thin canes can tackle the problems connected with thick cane breeding and *vice versa*, there is a difference in the details. The thick canes as a class flower earlier in the season than the thin canes and, if the hardy blood of the thin types has to be introduced into the seedlings it becomes necessary to bridge the disparity in the flowering time. The "photoperiodism" and "topping" experiments for solving this problem have been attended with some success.

One of the directions in which very meagre information was available was the male fertility of the sugarcane varieties and particularly of the thick canes. In fact, the attempts to germinate the pollen artificially and thus obtain a criterion of pollen viability had not been successful at Coimbatore and elsewhere. Attention was therefore directed to this problem and a technique has now been developed by which pollen can be successfully cultured. About 70 varieties which are of use in hybridization work have been studied for their pollen fertility. This method developed at Coimbatore is now being successfully used in Mauritius and Hawaii. Opportunity was also taken to study the problem of storage of the sugarcane pollen so as to do away with the disparity in the flowering time of the various groups of sugarcanes. Though a fair amount of success has attended these experiments, it has not been possible to store the pollen beyond 11 days and, as the disparity in flowering time is in some cases over a month and as the storage of pollen has a direct bearing on the breeding of canes, constant endeavour is being made to solve this difficulty.

Success in sugarcane breeding depends to a great extent on the raising of a large number of seedlings. The one great drawback in the thick canes is the poor germination of the seeds as compared with the thin canes in which as a rule a high percentage of germination is obtained. By raising a large number of all possible combinations from year to year, certain combinations have been obtained which repeatedly give a high percentage of germination and are also otherwise desirable. These have been termed bulk-scale combinations and over 100,000 seeds are germinated in these combinations every year besides another 50,000 or so, in what may be termed experimental crosses. The bulk-scale crosses are so designed that the combination of characters is such as to yield desirable type of seedlings.

Disease-resistance and hardiness are the two characters which are constantly kept in view besides yield and satisfactory sucrose. Five years after the starting of the work (i. e. in 1931) on the breeding of the thick canes, the first batch of seedlings was distributed for trial at the various Provincial Experimental stations in India. Till now three such batches have been distributed and the main characteristics of these seedlings are given below :—

(1) First batch of thick cane seedlings—1931 :

<i>Seedling No.</i>	<i>Parentage.</i>
Co. 358	P. O. J. 2727 G. C. (self or possible cross with S. W. 111)
Co. 359	Co. 213 unbagged self.
Co. 360	P. O. J. 2725 × Q. 116
Co. 361	P. O. J. 2625 × B. 3412
Co. 362	Vellai × D. 74
Co. 363	Maur. 1237 × Q. 813
Co. 364	P. O. J. 2725 × Fiji B. (Badila)
Co. 365	P. O. J. 2725 × Q. 813.

Though it is yet early to have the yield data on field scale, from the impression gained by the growth of these seedlings at various stations and from the preliminary reports, Co. 360 appears to be the outstanding seedling in this batch. It combines erect habit, good root system and satisfactory sucrose.

(2) Second batch of thick cane seedlings—1932.

<i>Seedling No.</i>	<i>Parentage.</i>
Co. 400 } Co. 401 }	Vellai × Q. 813.
Co. 402 } Co. 403 }	Vellai × Co. 243.
Co. 404	Vellai × P. O. J. 2878.
Co. 405	B. 6308 × P. O. J. 2696.
Co. 406	B. 6308 × Co. 281.
Co. 407	P. O. J. 2725 × B. 3412.
Co. 408	P. O. J. 2725 × Co. 243.
Co. 409	P. O. J. 2725 × Fiji B. (Badila)
Co. 410	P. O. J. 2727 G. C. (self or possible cross with D. 74)
Co. 411	P. O. J. 2727 × P. O. J. 2878.
Co. 412	P. O. J. 2878 × Co. 243.
Co. 413	Co. 290 × 247. B.
Co. 414	Co. 359 × Co. 360.
Co. 415	Maur. 1237 × P. O. J. 1410.

The outstanding seedling in this batch and for which favourable preliminary reports have been received from practically every place to which they have been distributed, are Co. 402 and Co. 408. The first mentioned variety, i. e. Co. 402 is a heavy yielder and scores over certain other canes in its relatively non-flowering habit. Co. 408 is also a heavy yielder and is hardier than the other seedlings. The percentage of flowering is higher than in Co. 402, but the compensating features are (1) higher yield, (2) good root system, and (3) jaggery of high quality.

(3) Third batch of thick cane seedlings—1933 :

<i>Seedling No.</i>	<i>Parentage.</i>
Co. 416.	Vellai × Co. 243.
Co. 417.	P. O. J. 2725 × Co. 290.
Co. 418.	P. O. J. 2725 × Co. 290.
Co. 419.	P. O. J. 2878 × Co. 290.
Co. 420.	Karun × Co. 243.

These seedlings are as yet only in the multiplication stage at the various Provincial stations, but the outstanding seedling in this batch would appear to be Co. 419. It combines the good qualities of such famous canes as P. O. J. 2878 and Co. 290.

In this note the main object has been to detail briefly the work done at the Thick Cane Area of the Imperial Sugarcane Breeding Station, Coimbatore, and to indicate the seedlings that, from preliminary reports, appear to be promising. The varieties suitable for a particular tract can only be found out by trying them in the tract itself and the credit for finding the varieties most suited for the tract should, of course, go to the officers of the Provincial Departments of Agriculture who experiment on them on a field scale.

SOME TRIALS WITH ERI SILK WORMS

BY M. C. CHERIAN, B. A., B. Sc., D. I. C.,

Lecturer in Entomology, Agricultural College, Coimbatore.

Introduction. About three lakhs of acres of Castor (*Ricinus Communis*) are grown every year in the Madras Presidency. Coupled with this is the fact that the climatic and the weather conditions in this Presidency are such that Eri silk worms can be reared for at least seven to eight months in the year. The Madras Agricultural and Industrial departments are now studying the problem of popularising Eri silk worm rearing as a cottage industry. With a view to getting detailed information under Coimbatore conditions the writer made a few preliminary trials last year and the following is a short account of the information gained so far.

Leaf and Seed Yields of Castor. For yield trials "Central Farm Spineless" variety of castor was used. Leaves and seeds were collected regularly. The yields from an area of one cent (7 yards × 7 yards containing 67 plants) of the above mentioned variety grown in red soil as a rain-fed crop are given below:—

Table I. Comparative yields of 'Leaf picked' and Control plots.

Pickings.	Yield from 'Leaf picked' plot.		Yield of seed from control plot.
	** Leaf.	Seed.	
	lb. oz.	lb. oz.	lb. oz.
1st picking.	55 8	1 4	1 5
2nd "	13 8	0 2	0 14
3rd "	10 8	2 14½	8 0
4th "	4 8	1 1½	1 3
Total.	84 0	5 6	11 6

** The weight of the leaf including the stalk is given in the table. When feeding worms only stalkless leaves are given. Roughly the percentage of blade to stalk is about 70—75 per cent.