

many a preparation; foods, drinks and sweetmeats in every household. The days when its use was more or less a luxury and a dainty belong to the past. The increased consumption of the article is evidenced by the steadily increasing imports of sugar from foreign countries, the local production being unable to meet the demand in full. It would seem a paradox that India which is one of the largest sugarcane producing countries in the world, is obliged to import such a large quantity of sugar as 600,000 tons-the causes are not far to seek. A large portion of the Indian population is becoming more and more accustomed to the use of sugar in a refined form. The jaggery produced in India, owing to its impure and crude state is going out of favour. The influx of cheap sugars from foreign countries partially controls the price of jaggery as well as its production. The area under sugarcane is consequently in the downward movement. Statisticians say that the prices of jaggery have not risen in the past 20 or 25 years in the same proportion as the prices of food crops and cotton. The question of the future of the sugarcane crop therefore becomes one of great economic importance. The past, present and future of sugarcane crop in relation to Singanallur and its neighbouring sugarcane villages as representative of the sugarcane crop in the Noyyal valley, will be dealt with in the succeeding pages; while doing so, reference to the Sugarcane crop of India as a whole, is found necessary, as the future of the crop of any particular tract is closely bound up with the future of the sugarcane crop of India.

Origin of sugarcane. Sugarcane is known in India from time immemorial. Many travellers also who had visited India in earlier times make mention of it as seen by them for the first time in India. The existence of sanskrit equivalents (Ikshu-sugarcane, Sharkara-sugar) for sugar and sugarcane, and mention said to be made of it in, 'Mahabharatha' show that the plant is of great antiquity. In 86 A. D. an Indian king is said to have sent sugar as tribute to China. In the 7th century a Chinese Emperor is said to have sent his man to Bihar to learn sugar making. By long and repeated cultivation, sugarcane which must have been once a reed, has produced numerous

varieties, some thin some thick. An eminent authority on sugarcane, traces the original parentage of that plant to *Saccharum spontaneum*. The sugarcane plant belongs to the grass order and has roots which do not penetrate into the soil to any depth. Hence its liability to lodging on disturbance. Some varieties of cane flower in hot climates, but most of the seeds are infertile. None believed till recently that sugarcane seed would germinate and produce plants, until it was shown that it does, at Barbados. This discovery is now made use of by Botanists to produce more profitable varieties. Sugarcane is propagated only vegetatively for a crop on a field scale. This is why most of its seeds are infertile.

Climate. Sugarcane thrives well in warm climates and does best in places whose mean temperature is about 77° F. The range of its cultivation is wide. India answers well both the conditions of proximity to the Equator and mean temperature necessary for its most successful cultivation, but has not the natural advantage of requisite and well-distributed rainfall as in Java. In the latter place, the rainfall is 70 inches distributed over 9 months in the year. Irrigation therefore plays a very important part in the cultivation of sugarcane in this country as in many districts the rainfall falls far short of the above named quantity and is defective in distribution.

Soils. Sugarcane can be cultivated in any description of soil of fair depth provided it is a well-drained soil. It is found cultivated successfully in black clay soils of the Godavari Delta, clay loams of the Nagaram delta, sandy loams of Ganjam, black loams of Coimbatore, red loams of Vizag; and in similar or intermediate soils in many other parts of the Presidency. The one condition essential for this crop is fair to good drainage. Stagnation of water in soil is fatal to it. The soils in the Noyyal valley which are clay loams with fairly good drainage produce heavy crops of sugarcane. The cultivation of this crop in light soils is more expensive because they will require more irrigations and more manuring and in loamy soils more profitable owing to the more retentive nature of the soil both in respect of moisture and plant food. The former are capable of improvement by

repeated addition of organic matter in the shape of green manure and of tank silt. Organic matter improves the soil both in fertility and texture. The general practice of applying kolingi leaf to sugarcane crops year after year in Sulur, Singanallur, and other villages has in the long course of time materially improved the soils in organic matter—which circumstance helps the ryots to take heavy crops of sugarcane out of the land, even if manuring be defective.

Preparation of land. The land is ploughed length and crosswise about 8 times at intervals of about a week between the ploughings. The number of ploughings is reduced by one or two by poorer ryots. Tradition prescribes sheep folding at 10,000 sheep per acre. This practice was the rule in the past but is now only an exception. Very few ryots in wet lands have recourse to sheep penning at present because there is more land and less sheep. The remuneration demanded by the sheep owners, which was only Rs. 25 in the past is at present Rs. 50 per 10,000 sheep. Silt carting was being much resorted to in the past but to a less extent at the present time. In most cases of wet land sugarcane, in Singanallur and Sulur, there is practically no preliminary manuring. But in garden lands, sheep penning is invariably resorted to as a preliminary manuring for the sugarcane crop.

Planting. The planting is done in *Adi pattam* (July—August) in the wet lands. The setts are planted on either side of the ridges previously made for the purpose. The ridges will be $1\frac{1}{2}$ ' to $1\frac{3}{4}$ ' wide and the adjacent furrow will be $\frac{3}{4}$ ' wide—so the distances between rows will be $\frac{3}{4}$ ' and $1\frac{1}{8}$ ' alternating. The planting in the garden soils will be done in *Masi* i.e., February—March. In the wet lands, planting is done in July—August because it is then the tanks get filled. The seed rate is at present 30,000 setts per acre and was in the past i.e., about 10 or 15 years ago, only 20,000 sets. The ryots state as their experience that closer planting is attended with better outturn. The material used for seed is cuttings from whole cane for wet lands and mostly tops in garden lands. Although the ryots know the economy of planting tops, the wet land ryot cannot do it because (1) the period of growth of sugarcane crop in wet lands is about 13 to 14 months—consequently the harvesting and planting seasons are not

simultaneous. The use of tops for seed is therefore out of question in this case. (2) the ryots think that tops if planted in wet land soils, get spoiled owing to the over saturated condition of the land. The planting of tops in place of cuttings of ripe cane wherever possible is good in the interest of economy. Ryots pay nearly 35 to 40 rupees for cane cuttings required for planting an acre. If tops which are not useful in any other way be used for planting, the expenditure on cane sets will be saved. Now as it is, the tops or the major portion of them find their way into the cane crushing mill and the resultant juice will be more impure (with more glucose). When tops are cut for planting, only ripe portions of canes will have to be utilised for milling and a better jaggery will be produced. In most parts of this presidency the use of sets from whole ripe canes is the usual practice. But the use of tops for seed is also well known to, and practiced by ryots in parts of Godavari, South Canara, Kurnool and Anantapur districts. Some ryots seem to be under the impression that sets from whole canes produce a better crop and more tillering and that tops though they germinate well give rise to a poorer crop. This impression or rather the belief among some ryots, is simply imaginary and groundless. The results of elaborate experiments conducted at the Louisiana Sugar Station over a series of years, by planting tops, middles and butts in comparative plots are sufficiently emphatic in declaring that crop from tops is in no way inferior to, if not better than crops raised from cuttings. (3) *The above facts therefore urge the desirability of the use of tops for planting wherever that is possible.

Preparation of sets for planting. In the sugarcane villages of the Noyyal valley, the practice of preparing sets before planting is entirely absent and is unknown. In some places in South Canara and Ganjam districts, cane sets are steeped for 12 or 24 hours in water before planting. The object of steeping seems to be to reduce sugar in sets. Presence of sugar in sets sometimes causes the planted sets to ferment and often attracts white ants. These evils are to a large extent minimised by steeping. In Taliparamba the cane sets are dipped in cow dung water and then arranged in loose heaps on a raised bamboo

*Dr. Stubbs on Sugarcane.

platform, covered with a layer of paddy straw and hand watered daily to keep the sets moist. In about a fortnight the germinated sets will be ready for planting. By this method, irrigation which will be necessary for about a fortnight will be saved, and better attention could be paid to sets during their germination. Where planting has to be done in summer, the plan is worth adopting. In the South Canara district the tops are allowed to wilt for about a week and then tied into bundles and steeped in water for a day. The bundles are then removed, placed under shade, covered with straw and handwatered morning and evening for a week or two. The field would be made ready to receive sets by that time.

Number of sets per acre. The quantity of sets used per acre varies in different localities. The cultural experiments made in Samalkot in 1907-08 and the seed rate experiment made in Central Farm Coimbatore in 1912-13 show in favour of closer planting. The large variations in quantity of seed used can be seen from the following figures.

		Sets used per acre.
Ganjam	...	... 36,000
Vizag	...	... 25,000
Godavari	...	... 25,000
Kurnool	...	... 15,000
Cuddapah	...	... 12,300
Bellary	...	... 8,000
South Canara	...	... 12 to 20 thousands
Singanallur (Coimbatore Dt.)	...	... 30,000

Filling of vacancies. This is not practised in the Noyyal valley. The deaths of plants are few. The seed rate is large. The ryots therefore do not feel the necessity to fill the blanks.

Ratooning is practised in the Noyyal valley but by very few ryots. The ratooning is not found profitable by the ryots here. It is only a tenant of slender means, that takes a ratoon crop. The yield obtained from a ratoon crop is about 15 podies (1 podi 250 lbs.) which, say at Rs. 20 per podi, equals to Rs. 300 and that from a first

crop is 30 pothiesor Rs. 600. The saving to the tenant in cultivation expenses from a ratoon crop is about Rs. 100. From a ratoon crop then, the tenant saves Rs. 100 in initial expenditure but loses Rs. 200 in the harvest. In Singanallur therefore, one can hardly see ratoon crops in more than one or two holdings.

Irrigation.

The cane crop is as a rule irrigated once in 8 days. The interval between two irrigations is lengthened to 10 days in retentive clay loams and shortened to 6 or 7 days in sandy loams. Soils of sandy character are not much used for cane cultivation owing to difficulty of their irrigation unless the source of water is a good tank or a canal.

In Singanallur and Sular villages the source of water supply to wet lands is a tank which is fed by the Noyyal river. This river flows for about 6 months in the year and is practically a stream which runs dry in summer. The tanks dependent on this river similarly supply water for about 6 months in the year from July to December. The wet land ryots have therefore got a well in each wet land holding, from which water is baled out to crops for the remaining 6 months. Water is used with certain amount of economy for the sugarcane crop in garden lands. Roughly estimated, the total quantity used in garden lands is about 60 to 65 inches including the annual rainfall of 22 inches. The water used for the cane crop in wet lands is estimated to be 70 to 75 inches including 22 inches of rainfall. In the case of thin varieties such as *chittananal* which was being grown in the gardens in the past, required much less i. e., about 50 to 55 inches of water. Sugarcane is a plant which revels in excess of moisture. Abundant water supply is a necessary condition for a successful heavy crop. The moisture that would be evaporated through the leaf itself will be immense and there is also the evaporation from the soil to be taken into account. Any curtailment therefore in the quantity of irrigation water for sugarcane crop will be an economy on the wrong side. There will be less harm done by irrigating sugarcane a little more than a little less.

Drainage. The lands with good drainage are generally selected for cane growing. If in the ryot's experience a certain piece of land is badly drained, he would altogether abstain from planting cane there. Good to fairly good drainage is as essential a condition for cane cultivation, as manuring and water supply. In our country we have well drained lands in enough area, and badly drained lands are exceptions to the rule. For the purpose of extension of sugarcane, want of well drained land will not stand in the way. The question of badly drained land and its improvement is not therefore of such immediate importance. But all the care a sugarcane cultivator has to take even on a well drained land is not to allow water to stagnate on the surface for over a day, and to drain off rain water collected in the trenches on receipt of every heavy rainfall. The idea is to keep the soil moist but not so completely blocked up by over saturation as to prevent access of air.

After cultivation. In Singanallur and Sular the ryots give 2 to 3 weedings and the same number of hoeings. The former are given in the first three months of its growth and the latter between the third and the 6th month. But there are many instances of ryots who had been content with giving one weeding and one or two hoeings. In all the sugarcane growing tracts of the Presidency, after cultivation may be said in general terms to consist of about 2 to 3 weedings and 2 to 4 hoeings. But there are places where practically no hoeing is done. Bellary is an instance to the point—where the ryots give only 3 weedings. In South Canara, the cane plants are earthed up three times with a view to fill up the trenches before the heavy rains of South West Monsoon set in, but no weeding is done. The cane field in this place will consequently be foul with weeds which is bound to tell upon the yield to some appreciable extent. Stirring of soil helps to let in air, accelerates nitrification and other chemical changes in the soil beneficial for the production of available plant food. The greater therefore the number of times the land is hoed, the better for the crop. But under no circumstances should this operation be done when the soil is wet—since this will more than defeat the purpose intended.

Wrapping and Propping. Neither the one nor the other is practised at Singanallur and its neighbouring villages. Thick crops as the result of close planting and absence of very tall growth in the crop, dispenses with these operations. In parts of the Circars these operations are done when the canes grow very tall but have a weak hold in the ground.

M. Mangesa Rao.

(To be Continued.)

Notes.

Crow as a natural enemy to insect life:—On a certain morning while setting out for work, I happened to observe a crow taking hold of a Rhinoceros Beetle near the Farm manure-pit. Tempted by curiosity, I passed to notice what happens to the creature. The crow first pulled off the legs of the Insect and went on pecking at it for sometime and flew away leaving only the thick hard wings—observed by C. R. S.

Ratoon cholam:—There is a practice of ratooning the cholam crop in the Karur Taluk. The land intended for cholam receives sheep penning generally. In the month of March—April, Chinna Vellai Cholam is sown under well irrigation. If at the harvest time, the stubbles are found to be strong and the yield of grain satisfactory, the crop is harvested leaving 6 inch stubble. Cattle are then allowed to graze. Hoeing is done which is then followed by irrigation. Sometimes the ground is hard when watering is done first and then hoeing. No other operation is done. The crop comes to maturity much earlier than the first crop i. e., in about $2\frac{1}{2}$ months. The yield is generally $\frac{3}{4}$ to $\frac{1}{2}$ of the first crop. All the cholam varieties are treated in this way where the land is rich and the yield good. This goes by the name of "Pudangu Cholam". W. R.
