of dry weight increase, of rates of production of leaves and new leaf area or of photosynthetic efficiency. Cell size in hybrid and parent also seemed approximately the same, but the embryo of the resting seed seemed larger in all cases.

The only possible conclusion from these results would seem to be that the organization of the growing shoot of the hybrid is upon a larger scale. Embryo and shoot apex form cells more rapidly, but this does not result in a quicker release of leaf primordia from the shoot apex because the whole plan of shoot organization, though still that characteristic of the species, is built upon a larger scale. More cells must accumulate at the apex before the new leaf primordium must separate. Naturally, therefore, when it arises, this primordium is planned on a larger scale from the outset, presumably its procambial and vascular strands are commensurately larger and it grows into a larger leaf, though individual cells in their metabolic and photosynthetic efficiency, correspond with those of the parent forms.

Dr. Ashby speaks of larger primordia in the seed but the term is usually applied to leaf primordia, and in the embryo of the tomato, apart from cotyledons, leaf primordia will scarcely be mainifest yet. It would seem that the comparison is rather upon the scale of organization of the meristematic aggregate in the hybrid shoot; planned on a more generous scale, it yet maintains the rate of leaf development of the parent, so that its growth must mean a larger number of meristematic cells maintained in full activty at any moment, therefore more cell divisions and the growth organization of the species maintained at its usual *tempo* but on a larger scale.

Dr. Ashby's studies are therefore full of significance in relation to the problem of shoot organization in the higher plant, as well as in connexion with the genetic explanation of hybrid vigour. Dr. Ashby points out that his results are not in accordance with the usual interpretation given to the linkage of genes in the $F_1$ generation, but there is as yet so little information as to the way in which the gene is geared into the machinery of development that it is early to say whether the conventional explanation in terms of genes can be applied to the machinery now revealed as operating in the development of the hybrid. (*Nature —May 15, 1937.*)

# Agricultural Fottings.

*(The Department of Agriculture, Madras).*

**Why a Pest Act is necessary for Cambodia Cotton.** Cambodia, karunganni and uppam cottons were sown side by side on the Cotton Breeding Station during the year for certain experimental studies. They were picked separately every week. When their weekly pickings were sorted into good and insect damaged kapas, it was found that Cambodia kapas contained 50% more of damaged sort than karunganni and uppam. These have indicated that though karunganni, uppam and Cambodia are sown together, it is the Cambodia variety that suffers most from pests and that the enforcement of the cotton pest act is especially necessary for this variety.

**The place of money-crops in the Tanjore Delta.** Over a million acres of land are devoted to cultivation of paddy annually in Tanjore District without rotating it with any other crop. Of this area, about 1½ to 2 lakhs of acres are cropped with paddy twice a year while the rest of the area is devoted to a single crop. When prices were ruling high at Rs. 2—8—0 to Rs. 3—0—0 per kalam of 64 lb. there was a decent margin of profit kept for the mirasadars even from a low average yield of 30 kalams per acre. But with the fall in price of paddy ranging from 40 to 60 per cent from 1930 onwards the margin of profit has become very narrow.

Therefore, the immediate problem for the mirasdars was to find out whether there was any possibility of introducing with success other and more profitable crops in wetlands of Tanjore District. Assisted by the departmental crops like sugarcane, plantains and Cambodia cotton were grown.

*Sugarcane.* The trials conducted with sugarcane of various varieties have definitely established the fact that it is quite possible to grow fairly good crops in paddy fields. Medium soils with fairly adequate irrigation and drainage facilities are preferred. The yields per acre ranged from 25 to 40 tons and it is reckoned that an average of 30 tons per acre could be easily realised under proper cultivation and management. Canes have been introduced in all the taluks of the District. It is also gratifying to record that the mirasdars who were new to this crop, straightaway adopted along with the new cane introduced, up-to-date methods of cultivation such as trench planting etc. This is indeed a distinct gain. Co. 281 and 285 medium canes of the Imperial Cane breeding station, Coimbatore have been found to do very well under ryots' conditions. These varieties have the reputation of withstanding adverse seasonal conditions to a greater extent than the thick canes. They are of short duration, requiring less cultivation expenses capable of withstanding drought and water logged conditions. Good jaggery has been obtained in 8 to 9 months amounting on an average to 6,000 lb. per acre. Further, these varieties are prepared by factories and they readily find favour with Nellikkuppam Factory for sugar manufacture and they are being purchased for this purpose in Shiyali Taluk and its vicinity.

*Plantains.* Generally plantain in Tanjore District is confined to 'padugai' lands adjoining river banks and it is seldom grown in paddy fields. The introduction and trial crops grown in the paddy lands for the last few years has shown that under proper cultivation fairly good crops can be obtained in paddy fields for three years in the same field. But due to prevalence of cyclonic weather almost every year during north-east monsoon period when bunches appear, the plants have to be propped. It is quite possible to grow plantains in paddy fields of Tanjore as is done in the neighbouring district of Trichinopoly. The cultivation of Mauritius plantains obviates the costly item of propping.

*Cambodia Cotton.* Trials to grow Cambodia Cotton in between two crops have proved to be of considerable promise. Favourable results have been obtained with the trials conducted in the Agricultural Research Station, Aduturai. Based on this experience, District trials have been laid out in the last season. The results are awaited.

**Pineapple—the prospect of the modan lands.** The dry lands of the West Coast known as the 'modan' lands in South Malabar are considered to be extremely poor in productivity, and the 'Jenmi' or land-owner gets as rent from this kind of land only 'Vithu-pattam' or just enough paddy equal to the seed used for the area. But a very remunerative crop like pineapple can be successfully grown in modan lands. The profitableness of the crop has given a fillip to the cultivation of this valuable fruit on a plantation scale and the area is steadily on the increase. A net profit of Rs 910 per acre was realised at the Agricultural Research Station, Pattambi during a period of 5 years (the total cost of cultivation for the 5 years including manuring was Rs. 596 and the total receipt was Rs. 1,507). The pineapple cultivation at this station has commenced functioning as a source of supply of fruits, and planting material to the intending cultivators, and shall continue to do so in a larger measure in future.

Pineapple can be grown in all kinds of soils provided there is very good drainage; the laterite soils afford enough aeration and drainage and are found to be the best suited. Propagation is generally from suckers which are of different origin. The 'Ratoons' which spring from below the soil and the suckers arising in the axils of the leaves are to be preferred. Planting is generally started with

the onset of the south west monsoon rains in June—July. It is also done In north—east monsoon periods in September—October, the only point to be borne in mind being the presence of adequate moisture in the soils for the plants to establish. The most popular varieties are the 'Kew' and the 'Mauritius'. Trench planting is the ideal and 10,000 to 12,000 suckers can be planted in an acre. No manure is too rich and an average crop is said to remove 60 lb. of Nitrogen, 212 lb. of Potash and 17 lb. of Phosphate per acre. Enough quantity of manure in the form of cattle manure, wood ash and artificials like Super, Nicifos or Ammonium sulphate to replenish the above quantity would be responded to. Once the crop is established it requires very little attention excepting incorporation of manure, and clean cultivation. The harvest of the crop largely depends on the kind of planting material used, its age, season of planting, soil and the fertilisers used. Suckers and ratoons of optimum size (about 6 months old on the mother plant) would produce fruits from the 15th month onwards after planting. There are two main periods of harvest April to July and October to January, though stray fruits may be available at other times also. The average weight of the 'Kew' fruit is found to be from 5 to 8 lb., the highest weight recorded at the Agricultural Station, being 18 lb. Great care has to be taken in handling the fruit as even slight abrasions are bound to damage the fruit. A plantation once started can be kept going for 5 to 6 years or even more. The plant is thoroughly adapted to xerophytic conditions and is purely rainfed on the West Coast. Organised efforts in marketing will find a ready sale for the fruits.

**"The Coconut Caterpillar."** *Introduction.* The coconut caterpillar (*Nephantis serinopa*) is one of the major pests of the Coconut palms on the West Coast. The insect has been noticed doing severe damage to coconut fronds during the summer months February—March to April—May in the taluks of Kurumbranad, Calicut, Ernad and Ponnani in Malabar District and in Mangalore, Ullal and Kasargod in South Kanara District. The pest is not likely to increase in numbers during the monsoon months due to the beneficial activity of the *Eulophid* pupal parasite and also the heavy monsoon showers. The coconut garden owners are, however, warned against the outbreak of the pest during the coming summer months.

*Life History of the pest.* A short account of the life history and habits of the pest is given below for the use of the garden owners. The pest is a caterpillar about 1½" long striped with pale purple. It feeds on the green matter of the lower surface of the leaves sheltering itself in long galleries constructed out of bits of chewed leaf and pellets of excreta bound together with strands of silk. In severe cases of infestation the leaflets may be reduced to a dry papery tissue. When the caterpillar becomes fullfed it prepares an oval chamber of silk and excreta among the galleries, and turns into a seed like object known as 'pupa'. In about ten days the pupal skin bursts and the moth comes out. The moths are able to fly from tree to tree and garden to garden. They lay eggs about 200 to 300 in number, on the leaves and tiny caterpillars hatch out of the eggs in 4 or 5 days. These feed on the leaves and gradually increase in size. It takes about 1½ to 2 months for each insect to develop from egg to moth.

*Methods of control.* Coconut palms are too tall to deal with the pest by spraying with insecticides. The only practical method is to cut down infested fronds in a locality at one time and to destroy the caterpillars found thereon by burning the leaves. Since each caterpillar left undestroyed would mean an increase two hundred fold in the next generation the importance of a thorough cleaning is apparent.

An attempt will also be made by the Agricultural Department to breed parasites which attack the pest in different stages with a view to liberate them in affected gardens.