

## PINE APPLE CULTIVATION IN THE MODAN LANDS OF MALABAR.

BY C. R. SRINIVASA AYYANGAR, L. Ag.,  
Superintendent, Agricultural Research Station, Pattambi.

&

K. KUNHIKANNAN NAMBIAR, B. Sc. (Ag.)  
Assistant, Agricultural Research Station, Pattambi.

**Introduction.** Though the soil and climatic conditions obtained in Malabar are ideal for the cultivation of pine apples even on the proverbially poor *modan* lands, yet its cultivation was until recently, confined to a few isolated plants of the local wild variety along the fences of house compounds. The introduction of the Kew and the West Indian variety of pine apple a few years back through the Agricultural Departments of Madras and Cochin State, coupled with the demonstration of the profitableness of its cultivation has given a fillip to the growing of this valuable fruit crop on a plantation scale throughout the West Coast. The cultivation of Kew pine was taken up in 1930 as an alternate crop for paddy in the *modan* land area of the Agricultural Research Station, Pattambi. Encouraged by the success of the first plantation on the station, a comprehensive study of the crop in all its bearings is in progress. Some of the useful observations made during the six years of its cultivation on this station are embodied in this article.

**Varieties.** There appears to be no definite varietal classification in pine apple. The same varieties are often known by different names in different places. A close study of the collection of all the varieties obtainable in India discloses three broad groups: (1) *Kew* or *Giant Kew*, *Spineless* or *smooth Cayenne*, *Sarawak*, *Mexican White* etc. This is the best of the fancy pine apples. Leaves have ordinarily a few spines on the margin near the tip and base, although they may be occasionally absent. (ii) *Mauritius* is similar to spiny Spanish or *Queen*, *Joldopi*, *Ghaspani* etc. This is much smaller than the smooth Cayenne, the weight of the fruits ranging from 2-4 lb. Plants are small and the leaves coarsely serrated. (iii) *Wild*—This is identical with the *Simhachalam*, the local, or the *Deshi* variety.

**Propagation.** Most of the improved varieties seldom set seed, though some are said to produce seed. Propagation is generally from suckers which are of different kinds. Those that spring from the base of the mother plant below the soil level are generally known as 'ratoons' and those that arise from the axils of leaves above ground level out of contact with soil, are called suckers. Besides these two classes, there are crowns at the top of the fruit and 'crown slips' at



the base of the crowns, and 'slips' originating from the base of the fruit. All the different kinds of propagating material referred to above are common in the case of the indigenous wild varieties. Ratoons, crowns and suckers are the most common in Kew and Mauritius, while slips are absent or almost so. Ratoons in Kew normally appear only after the harvest of the fruit, while in the case of the Mauritius group suckers grow with the mother plant even before the formation of fruits.

All these planting materials do form fruits when propagated, yet the time taken for the formation of fruits varies with the nature of materials planted. Observations on flowering in crops obtained from different types of planting material, have shown that aged suckers form the first fruits twelve months after planting 16 per cent of the plants planted putting forth heads in 16 months, and 82.6 percent at the end of 30 months. In crops raised from crowns and young ratoons (size similar to crowns) however the first fruit was formed only 25 months after planting and 58.1 % and 38.7 % respectively of these plants blossomed at the end of 30 months. It is therefore clear that fairly uniform suckers of sufficient age (4-6 months) that have grown with the mother plant are ideal for planting, the harvests in them commencing 15 months after planting. If the suckers are too aged when planted, small sized fruits are formed prematurely.

**Planting.** Planting can be done in diverse ways, in trenches (most commonly adopted) or in shallow pits. Until recently, trenches were dug 4' apart, 1½' to 2' deep and suckers planted in them 3' apart. As the crop is to be left in the same plot for five or six years, trench planting appears to be convenient as it allows periodical earthing up of the subsequent ratoons. Pine apple plants develop a shallow roof system spreading laterally to about 9 to 12 inches and the roots are closely matted round the stem.

The plots intended for planting are to be thoroughly prepared beforehand and trenches dug about a month prior to planting, to allow the soil so dug out to weather. It will be even advantageous, if the trenches are burnt with rubbish and the surface soil filled up. Experiments are under way to find out the exact manurial requirements of the crop. The most economic method of planting is to open trenches 2' wide and 4' apart and plant 2 rows in each trench, the plants spaced 2' apart. The results of the preliminary experiment on depth of planting conducted with the Mauritius variety, (Table II), point out that shallow planting (1' and 6") induces early fruiting as compared to greater depths of 1½' to 2'. Over 60 per cent. of the plants of the shallow planted group produce fruits between the first 12 to 20 months as compared to about 20 per cent only among the deeply planted group. Rate of planting in different countries varies with the market requirements. Closer planting is adopted if the fruits are intended



for canning purposes. In cases where there is a demand for good sized fruits, wider spacing would seem necessary. 4,000 to 5,000 suckers per acre would be the optimum, though in certain pine apple growing countries even 10,000 are said to be planted per acre.

**Planting Season** Pine apple plantation is generally started with the onset of the south-west monsoon rains in June-July, though it can be deferred to the north-east monsoon period also, the only point to be borne in mind being the presence of adequate amount of moisture in the soil for the plants to establish. Successful crops have been raised during both the seasons at the Agricultural Research Station, Pattambi. The advantage of planting in the north-east monsoon is that a green manure crop can be grown during the south-west monsoon and suckers of sufficient growth would be available which can produce fruits in the next year after planting. Further, the adoption of both systems of planting would help to widen the period of harvest in a farm.

**After-care.** Once the crop is established, it requires very little attention excepting early incorporation of manures and clean diggings, weed control being the chief consideration in the latter.

**Harvest.** The harvest largely depends on the kind of planting material, season of planting, soil, fertilisers etc. Suckers and ratoons of optimum size (4-6 months) produce fruits within 16 to 18 months, crowns take longer time from 24 to 28 months according to the diverse factors affecting the growth of the plant. The frequency of flowering of a first crop planted in June 1933 is set out in Table III (a). It will be seen from the table that the first fruiting commences 12 months after planting and is completed by about 30 months. The interval between the appearance of the head and the maturation of the fruit varies slightly with the season of harvest, (Table IV a). The post-monsoon harvest (October batch) takes about two weeks less than that of the monsoon batch (June-July). This is evidently due to the heavy monsoon rains and a reduced period of sunshine in June-July which probably retards the ripening process. Harvesting should be done at the right stage lest the flavour should be affected. As the fruits ripen, the 'eyes' or 'pips' flatten, the margins round up, and the space between the eyes wilt and shrivel and the bottom and the centre of the eyes turn yellow.

A too luxuriant growth of the crown is a disadvantage. While harvesting, the fruit stalk should be cut with a sharp knife and any amount of care bestowed in handling the fruit from the harvest until it reaches the consumer, is not wasted, since even slight abrasions are likely to cause a rapid decay of the fruits. The pulp of the Kew fruit is very juicy and the fruits display a great tendency to bleed their juices with the slightest knock or wound.



**Yield.** Yield varies widely and is dependent on several factors. With closer planting and use of better planting material the average yield can go up to even 20 tons per acre. From the figures available so far the following inferences can be drawn.

(i) There are two main periods of fruiting, the first period from April to July and the second or late crop from October to January though a few fruits may also be available during other periods.

(ii) The size of the Kew fruits go up to 18 lb. and more, under adequate manuring and favourable seasonal conditions.

(iii) The average weight of July harvested fruits is the lowest ranging from 2.4 to 5.2 lb. per fruit wherever the October batch gives the highest average ranging from 7.2 to 9.1 lb. (Fig 1). This may be due to the fact that the June—July fruits flower and grow during the hot rainless months of March—April, while the October batch gets the beneficial effects of the south-west monsoon.

(iv) A crop once planted can be kept for 4 to 5 years. Maintaining the crop longer, say 6 or more years, very much reduces the size of the fruits. The average weight of a fruit goes down from 9 to 3.7 lb. as the plantation gets older.

**Economics.** Pine apple cultivation in the *modan* lands of Malabar has been proved to be a practical and profitable proposition from the figures given in Table V. Usually such types of lands are of a non-remunerative type. Since the soils are very poor, cultivation is done only once in 4 or 5 years. The net return from an area for a three-year period under the normal cropping practised on such soils at the Agricultural Research Station, Pattambi, would be about Rs. 48—8—0 or Rs. 16 per year. The same area if devoted to pine apple cultivation would give in the corresponding period a profit of Rs. 334—12—0 per acre or Rs. 112 per year, (Table VI).

**Pests and Diseases.** (a) Jackals, certain canine species and rodents are the only major enemies of this crop noted so far in Malabar. If proper protection is not provided, 25 to 40 % of the fruits are likely to be damaged by such animals. A bamboo basket has been improvised to encase each plant just a fortnight before the ripening of the fruit and this has to a very considerable extent diminished the losses. The cost of the basket is only an anna, which if properly preserved may last for two to three seasons.

So far no fungus disease has been noted on the crop. A certain amount of rotting of the central core in newly planted plants is sometimes observed, which in all probability might be due to mechanical injury.

(b) *Sun burn.* When the fruits are directly exposed to sun's rays, injury of a more or less severe type takes place on account of the



factors.  
average  
available

l from  
January

under

lowest  
gives  
may be  
g the  
gets

tain-  
size  
9 to

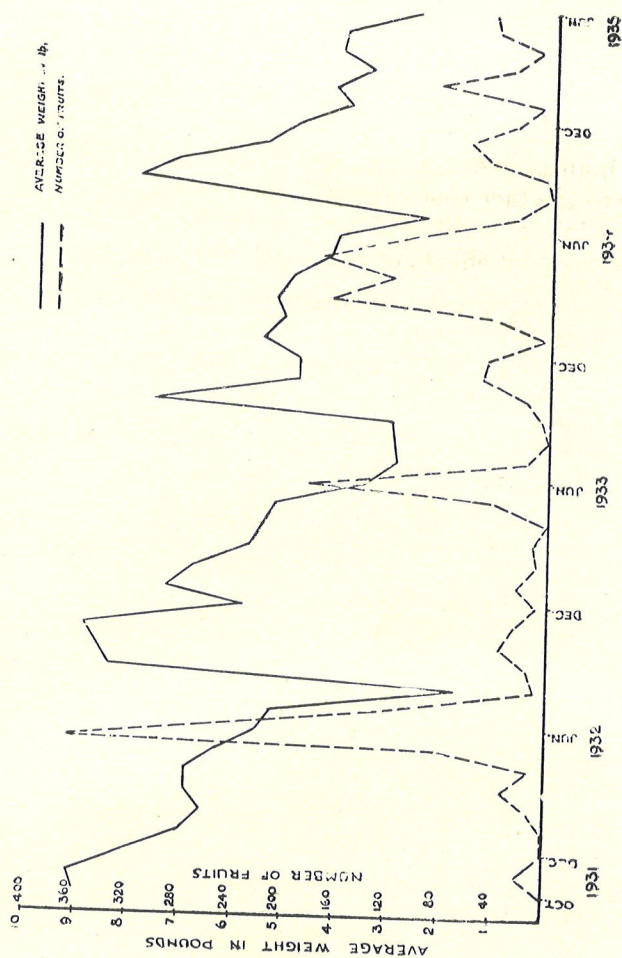
abar  
the  
non-  
one  
ree-  
the  
—0  
ion  
per

nd  
in  
he  
as  
he  
i-  
0-

n  
e-  
ul

,  
e

GRAPH SHOWING THE AVERAGE WEIGHT OF A KEW FRUIT AND  
THE TOTAL NUMBER OF KEW FRUITS HARVESTED DURING  
DIFFERENT MONTHS FROM 1931-1935  
A. R. S. PATTAMBI.









[illegible]



Table III (b).

Flowering of kew suckers when planted in October.

Planted 23 &amp; 24-10-1934.

Total suckers planted-653.

	January.	February.
1936	185	15
%	28.6	30.6

Table IV (a).

Table showing the period taken for ripening of kew apples from the appearance of the 'head'.

Range in days.	May-July.	October-November.	Dec.-January.
95-105	—	9	6
106-115	10	38	17
116-125	35	4	7
126-135	9	—	4
Total ...	54	51	34

Table IV (b).

Periodicity of harvest of 'kew fruits'.

Planted on 17-6-33.

489 suckers planted.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total	%
1934	—	—	—	—	—	—	—	—	1	19	70	35	125	25.6
1935	19	82	7	1	37	25	3	1	1	2	38	54	270	80.8
1936	14	14	38	—	—	—	—	—	—	—	—	—	—	—

Table V.

Economics of the cost of cultivation in an area planted in 1933.

Area: 14.22 cents.

No. of suckers planted: 489

No. planted per acre: 3425

Planted on 16 &amp; 17-6-1933

Expenditure.		1933-35.	1935-36.
Preparatory cultivation	...	11-6-3	—
Suckers and planting	...	22-1-6	—
Manures and manuring	...	8-14-6	3-1-6
After cultivation	...	10-9-9	2-8-0
Proportionate cost for baskets	...	—	3-14-6
Proportionate expenses for putting wire fencing	...	6-0-0	6-0-0
		59-0-0	15-8-0
Receipts.		1933-35.	1935-36.
1933-35.	197 fruits weighing 1235½ lb. at 9 pies per lb.	57-14-8	—
1933-35.	Suckers	—	—
1935-36.	205 fruits weighing 1084 lb.	50-13-0	—
1935-36.	512 suckers at Rs. 4 per 100	20-8-0	—
		129-3-8	—
Total Receipts		129-3-8	—
Total Expenditure		74-8-0	—
		54-11-8	—
* Profit per acre		383-4-0	—

\* 59 fruits were damaged by rats, bandicoots, toddy cats etc., and this would have fetched an additional profit of Rs. 16 per plot and Rs. 112 per acre.



Table VI.

*Economics of the modan land cultivation as ordinarily practised,  
rotated at the Agricultural Research Station, Pattambi.  
(Estimated Cost).*

Year.	Rotation adopted.	Cost of cultivation.	Value of produce.	Net profit.
1933-34	Modan Paddy	16-8-0	27-0-0	10-8-0
"	Gingelly	15-4-0	25-0-0	9-12-0
1934-35	Samai	8-0-0	13-0-0	5-0-0
"	Horsegram	4-0-0	7-0-0	3-0-0
1935-36	Modan paddy	16-8-0	27-0-0	10-8-0
"	Gingelly	15-4-0	25-0-0	9-12-0
Total.		75-8-0	124-0-0	48-8-0
Profit when pine apple is grown			Rs. 383-4-0	
Profit when other crops are grown			" 48-8-0	
Extra profit when pine apple is grown			" 334-12-0	

## Bibliography.

1. Philippine Journal of Agriculture, Vol. II.
2. Queensland Agricultural Journal, Feb. 35 and July 35.
3. Assam Agri. Dept. Leaflet No. 1, 1928.
4. Tropical Agriculturist, Vol. 61.
5. Health and Wealth, Calcutta, Vol. 10 (IV).
6. Pine apple by Max O. Johnson, 1935.
7. Annual reports of the Agricultural Research Station, Pattambi.
- and 8. Pine apple cultivation in Malabar, Madras Agricultural Journal, Vol. XXII, September 1934.

## ON SOME CONTROL EXPERIMENTS ON THE DECCAN GRASSHOPPER (*Colemania sphenarioides*, B).

BY M. S. KYLASAM, B. A. (Hons.)

Assistant to the Government Entomologist, Agricultural Research Institute,  
Coimbatore.

This paper deals with certain experiments carried out by the author in 1930 and 1931 in Adoni, Bellary. It is considered, a history of the pest for the past thirty years and a resume of the work done till now, will be a useful and fitting introduction for the problem dealt with in this paper and hence a brief introduction has been added.

As for the systematic position of the grasshopper, it comes under the tribe *Pyrgomorphini* and is placed very near *Orthacris* which it very closely resembles. The pest would appear to be indigenous to Bombay Presidency, being chiefly confined to the Belgaum, Bijapur and Dharwar tracts; from thence they would appear to have spread south into Mysore, Hyderabad and Madras territories.