

MANURING OF YOUNG PALMS*

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INTRODUCTION.

NO experiments by modern methods have been carried out in Ceylon or in other countries on manuring young coconut palms. The Coconut Research Scheme, now that new land is available at Ratmalagara Estate, Madampe, is commencing such experiments, and is also starting an experiment on another estate in the Chilaw area on manuring young palms underplanted on bearing land where the trees are old. Some time must elapse before results are obtained from these experiments. Meanwhile, however, it is possible to make provisional recommendations on the basis of reasonably successful practice, and of indications given by other scientific work on the coconut palm.

2. Manuring of seedlings, if effective, should improve their growth, and promote early bearing. There is evidence that judicious manuring does both. It has been shown, for example, that certain applications (including Sulphate of ammonia) increase the rate of growth of the leaves and the spread of roots of seedlings grown in pots.

That palms can be brought into earlier bearing by manuring is indicated by some old trials in Ceylon, notably those of the late Gate Mudaliyar A. E. Rajapakse, at Negombo, and of the Colombo Commercial Co., at Hunupitiya. The former showed good results on poor cinnamon soils. A feature of the latter trials was the good effect of potash on early bearing and on the appearance of the palms. In both, manured palms came into flower as early as the fourth to fifth years. These trials were of an obsolete type and therefore cannot yield very accurate information, but there is little doubt that young palms respond to manuring in the above two ways.

The experience of the Coconut Research Scheme with an area of 300 selected seedlings on Marandawila Estate, Bingiriya, and with young supplies on Bandirippuwa Estate, has been similar. On the former estate, 30 per cent. of palms were in flower in the fifth year.

3. Indirect evidence is forthcoming from another source. From analyses of young palms it can be inferred that potash is a predominant requirement. The leaflets of young palms contain in their ash 30 to 40 per cent. of potash compared to about 13 per cent. in the ash of adult palm leaves. Similarly the leaf stalk and petioles of young palms contain large amounts of potash.

* For the purposes of this leaflet, the term "Young Palms" refers to palms from the seedling transplantation stage until the bearing stage.

Upon such evidence have been based the recommendations made in the present leaflet. When results are obtainable later from new experiments, it will doubtless be possible to improve these recommendations, both from the point of view of economy and effectiveness.

When prices of coconut products are low it has been shown that manuring adult palms may be uneconomic. If young palms, however, can be brought into bearing three or four years earlier by manuring, the expense of the latter should be amply covered. Especially should this be the case where (as is usual) catch crops are taken from the land during the period in which the palms are not in bearing. Further reference to manuring in such circumstances will be made in a later leaflet on *Catch Crops*.

RECOMMENDATIONS.

4. In the following recommendations, consideration is given to young palms in three different circumstances :—

- (i.) Palms planted in new clearings ;
- (ii.) Palms underplanted on old estates ;
- (iii.) Palms planted as supplies in vacancies on bearing land ;

and suitable modifications are made for each case. Applications of manure are graduated according to the age of the palms.

FIRST YEAR AFTER TRANSPLANTING.

The preparation of the planting holes is described in Leaflet No. 4 "Transplantation". There it is recommended that the holes should be filled up with good top-soil mixed with two kerosene tinsful of wood ashes. $1\frac{1}{2}$ to 2 lb. of Muriate of potash may be used if wood ash is not available, or 2 to 4 lb. of husk ash.

In the case of underplanted palms or supplies it is especially necessary to give them a good start in this way. On very poor or exhausted soils, two basketfuls of well-rotted cattle manure may be mixed in with advantage.

The Coconut Black beetle does not readily breed in well-rotted cattle manure thoroughly mixed with ash or with Muriate of potash. Young palms should, in any case, be regularly inspected for beetle damage as described in Leaflet No. 4, page 4.

With this treatment of seedling holes, further manuring is not regarded as necessary during the first year after transplanting (compare Leaflet 4, page 4). Moreover, during this period, the plant is supplied with reserve food materials stored in the seednut-potash from the husks and nitrogen and phosphoric acid from the kernel, besides which the oil of the kernel is converted into starch for the young plant before it commences to manufacture sufficient for itself.

SECOND YEAR AFTER TRANSPLANTING.

Manuring is probably not necessary in the second year of seedlings planted out on newly cleared virgin jungle, with ample reserves of plant food in the soil. It is, however, advisable to manure supplies and underplanted seedlings towards the end of the second year.

In general, rapidly growing young plants require frequent small applications rather than larger doses at longer intervals. Although for convenience the total yearly applications are given, they might well be subdivided into half-yearly treatments in the early stages.

APPLICATIONS RECOMMENDED.

The following basic mixture A is that used by the Coconut Research Scheme :—

Sulphate of Ammonia or Calcium cyanamide	..	..	2 parts
Saphos Phosphate	..	..	2 "
Muriate of Potash	..	..	3 "
			—
			7 "
			—

Fertilizer companies are sometimes, in circumstances of war shortages, unable to supply full requirements of imported fertilizers, particularly Sulphate of ammonia and Calcium cyanamide; the procedure has been to supply 50 per cent. of nitrogen requirements as Groundnut cake. The following mixture B may be substituted for the above :—

Sulphate of Ammonia or Calcium cyanamide	..	..	1 part
Groundnut Cake	..	..	3 parts
Saphos Phosphate	..	..	2 "
Muriate of potash	..	..	3 "
			—
			9 "
			—

The mixtures are applied as follows :—

		A	B
2nd year (Supplies and Underplanted palms only)	..	.. 1 $\frac{3}{4}$ lb.	2 $\frac{1}{4}$ lb.
3rd year (All young palms)	..	.. 2 $\frac{1}{2}$ "	3 "
4th year (All young palms)	..	.. 3 "	4 "
5th year and subsequent years until bearing	..	.. 4 "	5 "

On sandy cinnamon soils and lateritic gravels deficient in potash, the above mixture may be modified by increasing the Muriate of potash to 4 lb.

SMALL-HOLDINGS AND SMALL ESTATES.

5. On small-holdings and small estates where the use of artificial manures is not possible, the occasional use of kitchen ash combined with cattle or goat manure is to be strongly recommended. Half a kerosene tinful of ash increasing up to one tin after the fifth year, together with one basketful of well-rotted dung increasing up to four after the 5th year applied annually will be beneficial. Goat manure, if available, may be used instead of cattle manure, less being required. Amounts of one quarter of a basketful in the first year, to one basketful in the fifth year being satisfactory. Goat manure applied to growing palms should properly be crushed if in the form of hard pellets. The ash should be well mixed up with the dung in order to prevent the breeding of Coconut Black beetle, as already mentioned in the case of the original seedling holes.

If cattle or goat manure is not available, manuring with ash alone will be beneficial.

Husk ash may be used instead of kitchen ash at the rate of 2 to 4 lb. per palm.

METHOD OF APPLICATION.

6. In the early stages, until the stem is formed, the manures may be applied close to the palm on the surface, up to a distance of 1 foot during the second year, and the soil turned with mamoties or mamoty forks. As the palm grows older the area round which manures are applied may be gradually extended.

After the stem is formed manures should be applied in a circular trench. To begin with, the trench may be cut 2 feet wide at a distance of 2 ft. from the palm. As the palm comes into bearing this may be extended to the usual manure circle 3 ft. wide cut at a distance of 3 ft. from the palm.

CULTIVATION.

7. Leaflet No. 4 gives particulars of necessary attention to transplanted seedlings. A few supplementary remarks are here added on mulching.

Young palms are particularly susceptible to drought conditions. Before the onset of anticipated dry periods the soil round the palm should be turned and mulched with coir dust or coconut husks. In the Negombo coconut trials referred to above, mulching the manured area with coconut husks produced good results. When coir dust is used to mulch seedlings an area round the base up to six inches should be left unmulched. It has been noticed that when coir dust is in contact with the young leaf bases, the latter tend to rot.

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