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COCONUT RESEARCH INSTITUTE

Leaflet No. 8

MANURING OF YOUNG PALMS

1. Introduction.

THE recommendations made below are based on the results of three field experiments conducted by the Soil Chemistry Division on the manuring of young palms from the seedling stage — one on underplanted seedlings at Letchemy Estate, Nattandiya (1939-1957), another on seedlings planted on a new clearing of secondary jungle at Ratmalagara Estate, Madampe, (commenced 1948) and the third on a virgin jungle clearing at Pothukulama Estate, Pallama, (commenced 1961).

These experiments have clearly shown that regular manuring with a balanced fertilizer mixture containing the three major plant nutrients nitrogen, phosphorus and potassium is essential for the healthy growth of young palms both in second plantations as well as in new clearings. Manuring improves vegetative growth ,promotes early bearing, and leads to high yields. Young palms require a greater proportion of nitrogen and phosphorous and less potash than adult palms. But excess nitrogen under conditions of phosphate deficiency makes the leaves of young palms highly susceptible to fungus disease.

In the virgin jungle clearing at Pothukulama, about 75% of the young palms treated with complete NPK fertilizers were in flower at the end of their 5th year of age (1965), whereas the corres ponding figure for the palms not treated with any fertilizer was 30%.

At the Ratmalagara secondary jungle clearing 90% of palms treated with complete NPK fertilizer mixture were in bearing by the 8th year, while only 50% of the palms receiving no fertilizer had come into bearing within this period. Palms receiving the complete fertilizer mixture gave an average of 105 nuts per palm in their 17th year (1965), while the corresponding figure for palms not treated with fertilizer was 46.

The experiment on underplanted young palms at Letchemy Estate showed a similar pattern. Palms receiving the complete NPK treatment gave 62 nuts per palm in the 15th year, while those not given any fertilizers showed an annual return of only 30 nuts per palm. The latter palms have been treated annually with the complete NPK mixture since the 15th year (1954), but even 8 years later (1962) their annual yield (55 nuts per palm) was considerably lower than that of the palms regularly treated with NPK fertilizers from the seedling stage (72 nuts per palm). This difference in bearing capacity between the two groups of palms was still visible in 1965 — 12 years after the unfertilized palms began to receive the same treatment as those treated with complete NPK mixture. The former palms gave 53 nuts per palm in 1965, while the latter gave 70 nuts per palm.

The systematic manuring of young palms must therefore be considered to be an indispensable item of capital expenditure. No attempt must be made to cut down on the manuring of young palms when prices fall, for neglect during the early stages of growth can lead to permanent retardation.

Recently, yellowing of palms due to magnesium deficiency has been observed to be widespread in many coconut areas. Second plantations, particularly those on gravelly and light sandy soils are more likely to develop symptoms of magnesium deficiency. *The inclusion of magnesium fertilizers such as ground dolomitic limestone in all planting holes and in manurial programmes of young second plantations should therefore be done as a matter of routine,* (see also Advisory Leaflet No. 43 on "*Magnesium deficiency in coconut palms*").

Seedlings planted in new jungle clearings in colonisation schemes have been reported to be attacked by the fungus disease Helminthosporium — probably a consequence of phosphate deficiency aggravated by the high content of soil nitrogen generally associated with new clearings. *Hence the incorporation of phosphatic fertilizer in planting holes is also recommended below as a routine measure.*

2. Fertilizer for planting holes.

The preparation of planting holes is described in Advisory eaflet No. 4 on "Transplanting". The top soil used for filling each planting hole should be mixed with 2 lbs. ground dolomitic limestone and 1 lb. saphos phosphate.

In the case of second plantations (replantations, underplantations, or replacements on bearing land), and new plantations on poor sandy soils, 1 lb. Sulphate of ammonia and 1/2 lb. muriate of potash (60%K_2O) should also be mixed in with the top soil. Where available, locally available organic materials should be preferably used according to the directions given in leaflet No. 9.

3. Fertilizer mixtures

Fertilizer mixtures with a comparatively higher proportion of nitrogen and phosphorus are recommended for application until bearing stage. Thereafter, the recommendations for adult palms (Advisory leaflet No. 36) should be adopted. The following mixtures are recommended:

(i) **C.R.I. General mixture for young palms** (9.15%N, 9.15% P_2O_5, 13.32%K_2O)

Sulphate of ammonia (20.6%N)— 4 parts by weight.
Saphos phosphate (27.5%P_2O_5) — 3 parts by weight.
Muriate of potash (60%K_2O) — 2 parts by weight.
This mixture is recommended for general use.

(ii) **C.R.I. Special mixture for young palms** (9.15%N, 8.72% P_2O_5, 13.17%K_2O, 2.44%Mg0)

Ammonium sulphate nitrate (25%N), — 15 parts by weight.
Saphos phosphate (27.5%P_2O_5) — 13 parts by weight.
Muriate of potash (60%K_2O) — 9 parts by weight.
Kieserite (25%Mg0) — 4 parts by weight.

Mixtures containing ammonium sulphate nitrate tend to absorb moisture, and are therefore unsuitable for storage. They should be used within a few days of mixing. Where this is not possible, it is best to obtain the straight fertilizers (unmixed), and mix the amounts required for each day's application.

This mixture is also suitable for general application, but it is a little more expensive.

It has the advantage of having part of its nitrogen in the readily available form of nitrate, and also some magnesium. *It is particularly recommended for application on the white coastal sandy soils, and other sandy soils which are poor in organic matter, carry little or no vegetative cover, and appear to be sterile.*

This mixture should always be applied in split doses, thrice, or four times a year.

4. Rates of fertilizer application

Rates of fertilizer application are graduated according to the age of palms. A higher dosage is recommended for all second plantations, and also for new plantations on white sandy soils such as the coastal marine sands.

The rates given below are applicable to both the general and special mixtures.

lbs. fertilizer per palm

Time after transplanting	*New clearings*	*Second plantations, and new plantations on Sandy soils*
6 months ...	½ ...	1½
1 year ...	½ ...	1½
1½ years ...	1 ...	1½
2 years ...	1 ...	1½
2½ years ...	1½ ...	2
3 years ...	1½ ...	2
3½ years ...	2 ...	2½
4 years ...	2 ...	2½

4½ years and beyond, until bearing, at 6 monthly intervals. ...	2½ ...	3

On bearing, apply the adult palm mixtures as described in leaflet No. 36.

In addition to the application of the above mixtures, it is recommended that all second plantations be treated with ground dolomitic limestone at the rate of 3 lbs per palm after the 3rd and 6th years. Dolomite should not be mixed with the fertilizer mixtures described above. But it can be applied simultaneously, provided that the fertilizers are dug over into the soil within a few hours of their application.

5. Frequency and Time of application

Generally, rapidly growing young plants respond better to frequent and small applications of fertilizers rather than large doses at long intervals. Hence, until bearing, at least half-yearly application of fertilizer is recommended. Where circumstances permit, quarterly applications may be adopted with advantage — particularly on light sandy soils subject to heavy rainfall during both the S.W. and N.E. monsoons. This can be combined with weeding operations to reduce costs.

Fertilizer application should always be done when the soil is moist early during the rainy seasons. On light sandy soils biannual applications should be done after the heavy rains. Quarterly applications should be done at the beginning and towards the end of each of the monsoon periods. If there is a tendency for the land to get water-logged, fertilizer application should be done after the heavy rains are over.

6. Method of Placement

In the early stages (up to 12-18 months) fertilizers should be applied close to the palm on the weeded surface up to a distance of 1 foot from the base, and the soil turned over with mammoties or mammoty forks. As the palm grows older the area round which fertilizer is applied should be gradually extended up to about 5 feet at flowering.

7. Cultivation

Leaflet No. 4 gives particulars of other cultural operations necessary for the healthy growth of transplanted seedlings.

Young palms are particularly susceptible to drought conditions. Before the onset of dry period the soil round the palm should be weeded and mulched with coir dust or coconut husks. When coir dust is used to mulch seedlings an area round the base up to six inches should be left unmulched since when coir dust is in contact with the young leaf bases the latter tend to rot.

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