

SOME PROBLEMS OF UNDER-PLANTING

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UNDER-PLANTING has become a national problem of great importance. The time is ripe to plough back the excess profits earned during the last five years when boom prices were prevailing, to be returned in the form of young seedlings in order to rejuvenate the old plantations. Rehabilitation of unproductive areas on an economic basis will be an additional asset to the national income. Under-planting old plantations remained a problem for some time as coconut prices did not leave a sufficient margin to meet the expenses of the proprietors and the cost of under-planting; existing plantations therefore remained neglected, with the result that crops declined and a vicious circle began.

In order to study these problems of under-planting and to advise the small-holders in the matter of improving existing plantations and under-planting them where necessary, a separate Division (Planting) was established in the Coconut Research Institute a few years ago. Even before this Division was established, in anticipation of the problems involved the Soil Chemist's Division of the Coconut Research Institute commenced an experiment on Letchemy Estate, Nattandiya in 1940 mainly to study the manurial problems of under-planted young palms. During this period we have gained incidental experience on other related matters of practical value which are discussed here for the benefit of those who contemplate under-planting.

It is desired that the area of under-planting should be restricted to a section where palms are deteriorating due to senility and the presence of large number of vacancies. The acreage to be planted up depends on the reserve capital accumulated during the period of soaring prices.

Planting Distance

The system of planting and lining also play an important part in under-planting as one has to get the optimum number of palms to an acre. In the past it has been carried out in most of the estates traditionally the form of square planting and it is practised even now.

In the case of triangular planting more palms could be planted to an acre than when planting on the square is adopted and vacant spaces are reduced to the minimum. Thereby the growth of weeds is reduced and less evaporation takes place from the soil as sufficient shade is provided.

In most of the old plantations the old palms are not in line, the seedlings having been planted at varying distances and on different lines as seen in most of the coastal small-holdings. Operation of agricultural implements such as ploughs and harrows on such lands is very difficult. In this instance lining of the second plantation must be commenced within the centre of a square of the old plantation so that the falling of fronds of the old palms may not damage the under-planted seedlings just planted, as well as avoid competition when in proximity to the old palms. Where an old palm comes in alignment with the new lining, the old one definitely has to be removed to make room for the young one, however tempting it may be to retain the bearing palm.

The laying out of the nursery should be on the lines laid down in Leaflet No. 2 published by the Coconut Research Institute, and the preparation of the planting hole should be according to Leaflet No. 4, copies of which can be obtained gratis.

Planting Hole

Burning of the planting hole with husks and/or butt-ends has a very good effect particularly when it happens to be proximate to the site of old vacancies where the debris of the old root system remains. This prevents also the breeding of grubs of the Black Beetle and incidentally adds a supply of potash for the needs of the growing seedling.

In 1939, preparing a planting hole 4' x 4' x 3' in light sandy soil such as found in Letchemy Estate in Nattandiya cost only 17 cents but in 1948 it went up to 35 cents and at present the cost has risen much higher. In lateritic soil this has gone up even to Rs. 2/-.

While digging the planting hole the top soil up to about 9 inches should be kept separately to be used up during filling, and the top soil round the planting hole also should be used up to fill the hole completely. Care should be taken to restore the fertility of the soil in the planting hole as most of the plant food available has been used up by the old plantation. The importance of filling the hole with two layers of husks should be again stressed.

Conservation of Soil Moisture

Conservation of soil moisture is another factor to be determined in under-planting. It is alarming to see vast acres of young plantations without a single catch water drain just planted up after chena cultivation. In particular the attention of the small-holder should be drawn in a matter like this as he does not seem to realise the value of drzining till he sees the rush of water gushing down after heavy showers of rain. On the other hand, on lands which tend to get water-logged such as cinnamon soils excess water should be drained off, and the dug out earth may be used round palms to raise the platform round the palms subsequently lowering the water table. In such areas it often happens that old drains have to be closed and new ones traced in order to get the new line by young palms in alignment. Water-logging even temporarily causes a severe setback on seedlings and deep draining to remove excess water on such lands is particularly important, as seedlings are even more sensitive to water-logging than bearing palms.

Care of an Under-plantation

The major problems of under-planting are in relation to the after care and maintenance of the young palm :

(a) **Fencing and Cattle Damage.**—It is usual for most people to fence a young plantation after the seedlings have been laid down in the planting hole. Transporting seedlings from the nursery and/or elsewhere is much easier to the planting site, when the area is not fenced, from any direction.

Another reason is that full time can be devoted to planting during the wet season if a bigger acreage has been contemplated. As far as possible fencing should be done before planting lest there be cattle damage.

Fencing has become a problem to the big and small-holders.

It is a common sight to see an under-plantation damaged by cattle. If cattle are tethered to the old palms the strictest supervision should be exercised. Even though subsequent weeding becomes a problem the risk involved in letting in cattle is even greater.

(b) **Weeding When No Cattle are Used.**—Excessive weed growth has to be controlled by regular weeding round the palms up to a distance of 6 feet. They can further be checked by a husk mulch round the palms. The weeds beyond this area should be controlled by harrowing. Illuk should never be allowed to establish itself and should be promptly dug out on its first appearance.

(c) **Pests and Diseases.**—In the early stages, the strictest methods of plant sanitation and control of pests and diseases remain the major problem. In the first year termite damage can be heavy but can be obviated by the use of modern insecticides in the planting hole as described in Leaflet No. 4. Of the insects that attack the coconut palm, in particular young plantations, the Red Weevil is the worst. The Black Beetle (*Rhinoceros*) makes borings in the crowns of palms and leaves room for the Red Weevil to lay eggs, and these eggs hatch out into grubs that attack the sappy young palms within till it falls to the ground. Red Weevil also lays eggs in healthy palms of good girth where cracks are to be found and breed profusely causing the death of the palm unless detected early.

Regular routine examination for Black Beetle damage should be the rule. It is very pathetic to see healthy palms in luxuriant young plantations being subjected to vandalism caused by this tiny insect. At least in every three days a labourer should be engaged for detecting the beetle attacks and catching the beetles. Application of Mason's mixture on the "matulla" has proved successful in our experiment at Ratmalagara. The expenditure on beetle catchers may be recurring but it is inevitable.

During the removal of the old stand of palms we noticed Red Weevil breeding prolifically in cut crowns. Reference to this has been made in the previous number of this Journal. These should be promptly burnt and destroyed as Red Weevil is a greater potential danger than Black Beetle.

Diseases of young palms may be caused by lack of nutrients as in the case of Grey Blight. Excess nitrogen may bring leaf diseases like *Helminthosporium incurvatum* (as observed in one of our experiments at Ratmalagara) which is similar to Grey Blight.

(d) **Propping.**—During each monsoon the seedlings that have not got a firm footing and are of good foliage tend to be tilted by the wind. Such palms should be supported by a triangle of props during each monsoon. This has to be attended to as the monsoon begins.

(e) **Manuring.***—In the case of an under-plantation much attention has to be drawn in restoring the fertility of the soil due to the existence of the old palms for a very long time resulting in the depletion of food materials used by the old plantation. Replanting without systematic manuring is a wastage of money as pointed out by our Soil Chemist in a recent number of this Journal (Vol. II, No. 4). Those sceptics who do not believe in manuring young palms should visit the Manurial experiment at Letchemy Estate and see for themselves the difference between the manured and unmanured plots. Manurial treatments to young palms have been recommended by the Soil Chemist in C.R.I. Leaflet No. 8. Potash is the dominant requirement and even if artificial manures are not available, the application of even half a kerosene tinful of ash once in six months must be carried out. The cost of application of manures is negligible as the manure is broadcast and forked in. During the first year the plants do not require any manure, provided the planting hole had been prepared with top soil. The manured areas should be properly mulched with a layer of husks particularly in dry areas.

(f) **Interference of the Old Plantation.**—As the young palms grow up the existing old palms become detrimental, retarding the growth of young palms by (i) robbing the young ones of their plant food; and (ii) providing them with less light. It was observed in the experiment at Letchemy Estate that the increase in crop of the senile palms as a result of manuring young palms covered a good part of the cost of under-planting. At intervals the poor palms that show signs of tapering and low yielding have to be pulled out at the first instance. The remaining ones, as time advances, do interfere with vigorously growing young palms. Though the old palms have improved by themselves with the treatment given to the young ones, they have to be replaced as room should be given for the younger generation.

At Letchemy experiment we have observed that some palms did not flower until old ones were removed and yet others though they were in flower did not bear nuts till the old palms were removed. Without light the leaves cannot prepare plant food and produce nuts. One has to be decisive at this stage and should not vacillate about the immediate loss of crop; it pays in the years to come, to remove the old palms.

The cultivation and manuring given to the under-plantation is of considerable benefit to the old one and up to a period of about five years from the time of planting the second plantation the old palms improve and yield better crops. After the sixth year onwards the old palms begin to decline and they should be removed gradually. The delay in removing the old palms cause the young palms to grow tall and less productive competing for light and plant food. As a rule it should be the policy to remove the old stand wherever the young palms have flowered. This may be a counsel of perfection when markets are good and one hesitates to cut a palm carrying a crop of even ten nuts. In the long run it is a penny wise pound foolish policy.

It is quite apparent from the records kept by the estate on the old plantation from the time they commenced under-planting that there had been a definite improvement.

(g) **Removal of Old Palms.**—Utmost care should be taken in removing the old stand not to damage the under-plantation. Skilled men who are experts on felling should be engaged in removing these palms without damaging a single leaf lest there be room for the Red Weevil to lay eggs.

* Further information will be found in "The Manuring of Under-planted Young Palms" by Dr. M. L. M. Salgado. *Ceylon Coconut Quarterly*, Vol. II, No 4, pages 161 to 164 and in Leaflet No. 8: Manuring of Young Palms. The latter is issued gratis.

The succulent portions of the stem and the crown provide ideal places for breeding of Red Weevil. Before the Red Weevil lays eggs on those cut portions, they have to be removed or smoked as they are sappy and raw.

“Atlas” Tree Killer has been used to kill the old palms. The fronds, in this case, once the palm is dead, drop on the young palms causing much damage. Further, “Atlas” is an arsenical preparation and being very poisonous needs careful handling.

The bole of the palm which should be removed while felling the stem cannot be put to any use, and should never be buried in the site, as it provides in the process of decay, breeding places for the Black Beetle and should be removed from the area to be burnt when dried. Careless disposal of old palms does untold damage to carefully tended second plantations.

In establishing a second plantation and getting it into production one has to toil hard as many complications likely to occur that are not usually experienced in primary plantations on virgin jungle. Experience is hard and costly and one becomes wise after the event. It is hoped that these notes will provide wisdom before one commits disaster.

Cost of Under-planting

We are grateful to Mr. O. B. M. Cheyne, Planting Officer, Coconut Research Institute, for the estimate of the cost of under-planting appended to this article.

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