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Coconut bulletin

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Apiculture As Aid To Agriculture

INAUGURATING AT TRIVANDRUM IN THE LAST WEEK OF JANUARY, 1964, THE All-India Conference of bee-keepers Dr. Ram Subhag Singh, Union Minister for Agriculture observed that bee-keeping which began as a hobby and later acquired the status of a cottage industry has today come to be recognised as a "respectable partner of agriculture and horticulture".

OF THE SEVERAL INSECTS THAT PLAY A SIGNIFICANT ROLE IN POLLINAtion, the honey-bee is one of the most important. The bees live exclusively on the nectar and pollen produced by most of the plants and the latter in their turn, depend to a large extent on the pollination service of bees for their perpetuation. A most beautiful lesson in co-operation indeed !

TIME WAS WHEN BEES WERE VALUED PRIMARILY FOR THE PRODUCTION of honey and wax. But today the commercial value of bees as pollinators is even more lucrative. The importance of the bee in crop production is so well recognised in foreign countries that there are professional apiculturists (bee-keepers) who hire out bee hives to farmers for pollination. A 25 per cent increase in crop production is not uncommon as a result of keeping apiaries in orchards.

THAT NATURE INTENDED THE COCONUT TO BE POLLINATED BY THE AID of insects must be fairly obvious from the peculiar structure of its flower and the presence in it of honey glands. And as coconut is also cross-pillinated the importance of a pollinator like the bee becomes clear. It will, therefore, be worthwhile for coconut growers to take to the maintenance of bee-hives in their gardens. By doing so, they can kill two birds at one shot ! They can have a subsidiary source of income and can help in better fruit setting in their coconut palms.

AND PERHAPS ANOTHER GAIN, THOUGH INTANGIBLE, WOULD BE THE lesson in industry that bees teach. A strong colony of bees collects about 45 to 65 pounds of pollen in a year. To gather one pound of pollen the bees must visit at least 80 million flowers. That means they must visit 3600 to 5200 million flowers a year!

Thirty-first Meeting of The Indian Central Coconut Committee

PRESIDENT'S ADDRESS TO MEMBERS

"I can assure the representatives of the State Governments that the Indian Central Coconut Committee will make available all its resources, technical and financial to them in every endeavour to improve the standard of coconut cultivation in their areas and to increase the availability of this source of oil, both for human consumption and for industry", observed Shri A. D. Pandit, President, Indian Central Coconut Committee addressing the 31st Meeting of the Committee held at Ernakulam on the 17th January, 1964. Shri Pandit added that considerable sums of foreign exchange on the import of copra spent at present could be saved for other nation-building purposes if self-sufficiency could be achieved in regard to this commodity.

The following is the full text of the address delivered by Shri Pandit :-

Friends,

I have great pleasure in welcoming you to this 31st meeting of the Indian Central Coconut Committee.

Root wilt Investigations

It is usual at these annual meetings to make a brief review of the developments in the field of coconut cultivation

and the coconut industry in general. I had referred last year to the efforts of the Food and Agriculture Organisation of the United Nations to co-ordinate research work going on in different parts of the world on the wilt disease of coconut. Dr. Karl Maramorosch, an eminent virologist, has recently visited the various countries including India and had discussions with the scientists on their programme. The new Director of the Central Coconut Research Station at Kayangulam is himself a virologist and we have every reason to hope that research work on the virological aspect of the disease would receive greater attention under his direction. Investigations on the antigenic properties of the coconut wilt virus have made some progress. Preliminary work has been done with partially purified material of the virus and a serological laboratory established for serological trials. Studies have been taken up on the effect of water-logging on the incidence of the leaf (rot) and the root (wilt) diseases. Investigations on the stem-bleeding disease are also in progress. Work on testing the efficacy of insecticides and fungicides on a field scale in 100-acre blocks in different regions has been taken up this year. The hybridisation programme of the Kasaragod station includes identification of genetic transmitters, two-way and three-way crossing to exploit hybrid vigour. Induction of haploidy by irradiated pollen has been taken up.

As you are aware, the mid-term appraisal of the Third Plan development programmes does not present a gratifying picture. In the distribution of quality seedlings, the supply of fertilisers, adoption of plant protection measures and the provision of irrigation facilities, the achievements of the various coconut-growing States lag behind the targets.

Shri A. D. Pandit addressing the 31st Meeting of the Indian Central Coconut Committee

Weeding out Diseased Palms

One of the handicaps from which our coconut growing suffers is the

practice of growing coconuts on small farms and homesteads. Many of the trees are diseased and yield a few nuts per year. It is not possible for the grower to invest more on these diseased trees and it would be more economical to remove these trees and plant the available area afresh with disease-free seedlings and ensure proper supply of fertilisers, water, drainage and pesticides and fungicides to them. These growers, however, look upon the coconut trees as a source of supplementary income with little investment and are, therefore, not willing to cut them down. Compulsory weeding out of the diseased trees by legislation would be unpopular unless the climate for such enforcement is made propitious by adequate education of the grower. It may even be worthwhile for some State Governments to provide a measure of compensation to growers for their temporary loss of income from low yielding trees if these have to be cut down under the law. Wherever possible, the Government concerned could take up model plantations of 100 acres or more to show what can be done if all the scientific practices are applied on a plantation scale to the coconut crop.

Multiplication of Production by Good Cultivation

I do not think it should be any source of gratification to us if our yields are better than the other coconut growing countries when we know that under proper conditions the yield can be multiplied three times with good cultivation over the present two to three thousand nuts per acre per annum. There is no scope for putting additional areas under coconut in the country as this crop can grow only in certain limited areas on the sea coast. It is understood that in Kerala paddy fields which are certified to be uneconomic by agricultural officers can now be planted with coconut. It is hoped that where such planting is undertaken it will be done with proper advice from extension officers. The Coconut Committee will be glad to make available the advice of its experts to States which wish to undertake fresh plantation of coconuts.

Research Programme for IV Plan

A Working Group is working on the projects to be included in the Fourth Plan. It is necessary to undertake all the preparatory measures in the Third Plan itself so that the actual projects can be implemented right from the beginning of the Plan. In the Fourth Plan an important item of research will be the purification of the root (wilt) virus and electron microscopic studies of the same. While it is known that the root (wilt) disease is caused by a virus which plays a major role in its etiology, this finding can be established beyond doubt only after the virus has been purified and subjected to scrutiny under the electron microscope. Another item of work would be the study of the nature of the spread of root (wilt) disease in the periphery of the infected area in relation to the nutrient status of the soil and of the palms, soil microflora, movement of vectors and climatic conditions.

Package Programme for Coconut

On the development side in the Fourth Plan it is proposed to take up about 140 blocks of approximately 1,000

acres in which intensive cultivation of coconut will be pursued on the lines of the Package Programme for other crops.

Aim of Self-sufficiency

As members are aware, the Indian Central Coconut Committee depends for the implementation of its programmes on the co-operation of the State Governments, in particular of the Agriculture Departments of these Governments. The success of the schemes sponsored by the Committee depends entirely on the keenness with which State Agriculture Departments implement those schemes. I can assure the representatives of the State Governments that the Indian Central Coconut Committee will make available all its resources, technical and financial to them in every endeavour to improve the standard of coconut cultivation in their areas and to increase the availability of this important source of oil, both for human consumption and for industry. We are at present spending considerable amounts of foreign exchange on the import of copra which we can save for other nation-building purposes if we can achieve self-sufficiency in the supply of vegetable oils and fat.

Common Services for Coconut, Arecanut and Spices Committees

Coconut, arecanut and spices are all grown in more or less the same areas in the country. While the existence of separate committees for these crops ensures that they receive individual attention, the size of these committees does not permit them to employ highly qualified personnel separately. There are many problems which are common to coconut and arecanut and it would be necessary to concentrate research on both the types of palms which have common pests and diseases at Kayangulam. Certain other services, such as those for study of economics, collection of statistics, investigation into the problems of marketing, information and publicity can be provided to these committees at a small cost on a contributory basis. A wrong impression has gone round that provision of common services where these services did not exist before is a retrograde step and would lead to the abolition of these committees. I wish to assure the members of this committee as well as the other committees that there is no ground for this apprehension and that the proposed measures of co-ordination are only to ensure that sound technical advice on matters on which it is not available at present is made available to the committes at small cost to themselves.

With these few remarks, I now propose to take up the detailed matters on the agenda.

battle-field where man and insects meet

Multiplying by the million and infesting cultivated plants, insect pests today present a constant challenge to man's efforts in the field of agriculture.

By
SADASIVAN PILLAI.
Central Coconut Research Station, Kayangulam

"THE cultivated plant is the battle ground where the interests of man meet and clash with those of innumerable organisms and phenomena of nature. Rodents may consume the plants, birds may eat their fruits, insects may drain their life-juice, bacteria and fungi may invade their tissues, drought may wither them, weeds may crowd them out, often in spite of man's best efforts". Of these insects are the most serious ones. Quite a large number of them are harmful as plant pests and as carriers of the diseases of plants and animals. In the years 1934–38, grasshoppers in the United States alone destroyed crops valued at $ 315,000,000. It is estimated that about 80,000 species of insects are causing damage to agriculture there and more than $ 100,000,000

worth of insecticides are used annually for the control of these pests. Annual loss of crops due to insect attack in Fiji is estimated at £ 250,000, in Aden at about £ 900,000, in Cyprus £ 1,000,000 and in Zanzibar £ 800,000.

insects as destroyers

The insects' modes of destruction are manyfold. Some defoliate the shoots, others destroy the roots. Some consume the buds, others kill flowers. Some drink the cell sap, others drain away the life juice. Some destroy fruits, others devour the seeds. Some convey diseases, others deform the plants and cause stunted growth. So, in order to find out the successful method for the control of insects, a knowledge of their mode of feeding is essential. They have highly adapted and specially devised organs of feeding. All the leaf-eating caterpillars and some beetles and their grubs, eg. *Oryctes* sp., *Leucopholis* sp. etc. have mouth parts for biting and chewing; they have highly chitinized cutting and grinding organs. The plant bugs suck in the plant juice. Their specially devised suctorial type of mouth parts-the stylets-can make punctures on the plant and suck in the plant juice. Some bugs inject toxic fluids into the plant, which results in considerable disintegration of cells. Like the bugs some thrips also feed on plant juice, but their nature of feeding is slightly different. They rasp the plant body and the juice that flows from the rasped surface is sucked in through the back.

reasons for insect abundance

The following are the reasons for insect multiplication:-

1. When the population of man increased he began to explore places of cultivation, and by his effort and skill, barren deserts and thick jungles turned into cultivated fields. Thus agriculture bacame intense and sources of food for insects became easily available.

2. Due to intensive cultivation, changes occurred in the ecological conditions and in the struggle for existence in this changed environment the natural balance is disturbed. This may lead to the outbreak of insects.

3. Shipping and air transport help to introduce new species of insects from one country to another.

4. When new crops are introduced to one country the native insects get a fresh feeding medium and they may assume the status of serious pests.

5. Insects have high potentiality for reproduction. They lay a large number of eggs and the life cycles of most of the insects are short, for example, some aphids complete their life cycle within a week. Many female insects are capable of laying eggs or giving birth to young ones without sexual union. Eggs of some of the hymennopteran parasites divide into a number of daughter eggs or embryos and each of these develops into an insect. It is estimated that a species of African termite, *Terrumus bellicosus* lays about 30,000 eggs a day and thus it is capable of laying about 10 million eggs a year.

6. Insects that have comparatively high survival potential select different plants as their host. For example, locusts feed on almost all plants; *Oryctes* selects coconut, arecanut, date, palmyra, toddy palm etc. as their host plants.

7. At the time of unfavourable conditions many insects are capable of undergoing hibernation; pupal period of insects also helps them to tide over adverse conditions to some extent.

insect pests and host plants

In the early stages of dependency the insects might have approached plants as a shelter to escape from enemies and to lay eggs or giving birth to young ones (in the case of viviparous insects). They then gradually settled on plants and this commensalic form of life might have later turned into pestilence. In some exceptional cases mutual symbiosis between plants and insects are noted, for example, in agave the swollen and hollow axis of the infloresence affords asylum to ants and as a reward to this ants protect the plants from enemies. There are several instances of mutual symbiosis between insects and insects. *Oecophylla* is observed associated with honey-dew-producing Coccids in coconut palm. In East Africa young developing coconuts are destroyed by a coreid bug, a species of *Theraptus* and it is observed that *Oecophylla* is associated with them.

factors of relationship between insects and the host plants

stimuli

Insects, as less evolved organisms are guided by stimuli, colour, external appearance, light reflection etc. of the host plants. In response to particular stimuli the insects select the host plant for feeding or in response to others it selects shelter or the place of oviposition. The choice of food plants sometimes may be only by chance (Broadbent, 1949), but choice of plants from a distance by insects ordinarily is at first a result of trial and error.

form of host plant and insect pests

Some insects are attracted by the particular form and external nature of host plant. In studies of oviposition of cocklebur seedfly in *xanthium*, Currie (1932) reported that the female would not oviposit on the bur of *xanthium* from which the hooked spines are removed. But when artificial bur was made out of rubber and bent pin, they attempted to oviposit on it. Jones *et al* (1934) reported a similar type of insect preference to particular external appearance of the host plant. The onion thrips, *thrips tabaci* Lin. selects varieties of onion with flat leaves only.

strength of the plant

Often it is considered that healthy and vigorous plants are less attacked by insects. The hardness of plant tissue is also cited as a cause of resistance. But this relationship has been considered to be a mechanical prevention of feeding, and significant data is not so far available in support of this view. The view that more vigorous plants or those growing in highly fertile soil are less attacked by insects has been questioned by several workers, and it is reported that even the plants having strong pericarp are found attacked by thrips.

manuring

Manuring has some effect on the attack in plants. Lack of available potash and phosphate creates a decrease in resistance. But the excessive use of

nitrogenous manure may enhance pathogenic infection. It is reported that the increased supply of potash or phosphate gives the plant more resistance to fungus and insect pests.

light reflection

Insects respond to light reflection in various ways. Many workers are of the view that light reflections have great influence on insects' attack on plants and their life. Davidson (1922) working with *Aphis rumicis* L. on beans, found that reproduction of Aphids on beans grown in semi-darkness was about half of that taking place on leaves in light. Evans (1938) in the study of cabbage aphid, under similar conditions found that those aphids on plants grown in light reproduced about five times as fast as those grown in darkness.

resistant plants

Insect resistant plants may possess some repellent qualities or may not have the attractive elements in them. In advanced countries resistant varieties are successfully used in crop protection. In the United States new insecticides were used against the leaf hoppers of sweet potato, and the data showed that the yield in 1948 and 1949 had increased. But in parallel test (Linn *et al*, 1948) showed that from resistant varieties equal quantity of potato was obtained as from the susceptible varieties that were treated with insecticides. The introduction of resistant variety of plants was first suggested by Thomas Andrew Knight in 1915. The resistant varieties are produced by hybridisation. Some wild varieties of plants are found highly resistant to insects and pathogens. If these varieties are crossed with susceptible ones new varieties having the hybrid vigour may be obtained.

It is observed that resistant varieties are more economical than susceptible varieties protected by insecticides. Moreover constant use of insecticides may upset the natural biological balance and some insects may develop immunity to insecticides.

A crop like the coconut palm is attacked by numerous pests, of which some are very serious and other less so.

Breeding of pest resistant varieties of coconut has not been done so far, and this is evidently due to certain handicaps, the most important of which is the perennial nature of the tree. Now hybridisation is being done with a view to producing high yielding varieties. If the breeding of the pest resistant variety is possible it would be an important step against the pest menace.

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Andhra Pradesh hopes to hit the target

By the adoption of intensive methods of cultivation Andhra Pradesh expects to achieve by the end of the III Plan the additional production of 40 million nuts fixed for it.

By
D. VISWANATHA REDDY
Director of Agriculture, Andhra Pradesh

KERALA, Mysore and Madras are in the order mentioned the most important coconut producing States in India. Next comes Andhra Pradesh with an average annual coconut production of about 32 crores of nuts, from 87,000 acres. In Andhra Pradesh, coconut plantations are concentrated in the three districts of East Godavari, with 56,000 acres, West Godavari with 11,600 acres and Srikakulam with 12,200 acres covering more than 90 per cent of the State's acreage under the crop. The reason for this large concentration is that the soils in these areas are fertile with a high water table eminently suited for coconut cultivation. The growth of coconut, is therefore, luxuriant and with only 0.3 per cent of the arable land devoted to coconut, the value of nuts produced is estimated at Rs. 4.5 crores per annum, contributing 7 per cent of the all-India production of coconuts.

quality seedlings

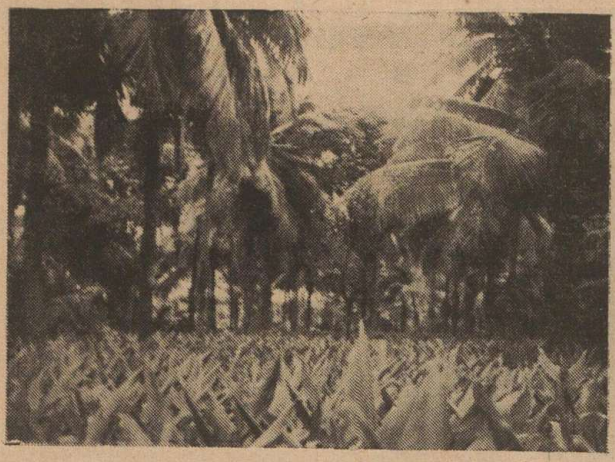
Supply of quality seedlings is one of the important activities in this State and nurseries are being run at various centres for producing seedlings from nuts of specially selected good mother palms on scientific lines. These seedlings are being supplied to the cultivators for fresh planting. Another practice peculiar to the State and largely followed in the delta region of East and West Godavari Districts, is planting of seedlings aged even upto 4 years called *Kuncham Manu*. The gardens planted with *Kuncham Manu* come to bearing soon and at the same time get dwarfed. The trees get established well in the soil and are capable of withstanding the high velocities of winds usual in the delta area. This practice of planting aged seedlings is a special feature in the Godavari delta area and it is found that this is gaining ground.

inter-cropping

Inter-cropping in coconut gardens is another commendable practice in the

A neglected coconut garden.
No manuring, no cultivation.

A well maintained coconut garden
in East Godavari District.



Turmeric as an intercrop in coconut garden.

Banana as an intercrop in coconut garden.

State. The usual inter-crops raised are banana, turmeric, dry paddy, millets and vegetables. Apart from raising such subsidiary crops, coconut is grown with all types of fruit trees in the delta area. It is found that 26.1 per cent of such fruit trees was mango while miscellaneous fruits accounted for the rest. In pure plantations, however, intercrops like banana, turmeric etc. are gaining ground because of the high economic returns. In the inter-cropping trials conducted at Coconut Research Station, Ambajipet it was found that banana and turmeric are more remunerative than other inter-crops. The heavy doses of manures applied and the regular cultivation given to the inter-crops have done more good to the coconut plantations than mere maintenance of pure plantations.

pest control

One of the important pests found on coconut in Andhra Pradesh is the black-headed caterpillar (*Nephantis serinopa*) for which large scale biological control methods are adopted by release of effective natural enemies, specially multiplied at the parasite breeding laboratories located at Ambajipet and Razole. *Trichogramma*, *Microbracon*, *Perisierola*, *Elasmus* and *Trichospilus* are under multiplication. The parasites are being supplied to the cultivators free of cost for control of this serious pest. The distribution of parasites is being done in batches after ascertaining the optimum stage of development of the pest and the prevailing climatic conditions so that effective control is secured. Every year an area of 15,000 acres is covered by release of parasites. Until a decade ago, it was common to observe scorched up crowns due to severity of the pest, but with the establishment of the two laboratories and systematic multiplication and release of parasites to control the different stages of the pest, coconut gardens present a green appearance, a sign of freedom from the pest.

Rhinoceros beetle, another important pest is being controlled by hooking out the adults from the crowns of the palms and also treating the manure pits with BHC. There have also been cases of 'bud-rot' on coconut and in severe cases, the infected trees have to be removed and burnt, but in the early stages the disease is being combated by the use of 1 per cent Bordeaux mixture.

regional research

Realising the need for research on such an important perennial crop like coconut, a Regional Coconut Research Station was established in the coconut belt at Ambajipet in 1955. The object of the Station is to investigate the agronomic problems such as manuring, inter-culture, inter-cropping and nursery practices. Progeny studies and inter-varietal and intra-varietal hybridisation have also been initiated. In the green manuring experiment which has since been concluded it is found that sunn-hemp is the best green manure for coconut in the State.

comprehensive development

To achieve higher production by utilising the potentialities in the State a Comprehensive Coconut Development Scheme has been launched during 1958 and the work is in progress. The object of the scheme is to supply quality seedlings and arrange for intensive propaganda for adoption of improved

SPEAKING OF COCONUT . . .

Did you know

That in the Pacific Islands human life would become intolerable if there were no coconut palms, that on the atolls it would become impossible, that nothing has been found to take its place and nothing is likely to be found in the foreseeable future ?

* * *

That, while the number of roots on the bole of a middle aged coconut palm is said to range from 4,000 to 7000, as many as 11,360 have been counted on the bole of an old palm at the Central Coconut Research Station, Kayangulam, having a total length of 68.16 kilo metres or 42.26 miles ?

* * *

That the crown of an adult coconut palm has 30 to 40 opened leaves and leaf buds in various stages of development in four sets, the first or lowermost set having 10 or 12 opened leaves from the axil of which coconut bunches have already been harvested, the second or the next higher set having 10 to 14 opened leaves supporting fruit bunches in various stages of development, the third set situated still higher having 10 to 12 opened leaves in the axils of which are found spadices in different stages of development and the last or topmost set having leaves in the cabbage of which the few outermost ones will be in different stages of unfurling, the rest being those which have not yet protruded ?

* * *

That coconut flower bunches (inflorescences) have both male and female flowers, that because the male phase is completed before the female phase commences chances of self-pollination are rare, especially in the tall variety of the palm, but that in the dwarf variety the male and female phases overlap and self-pollination is facilitated ?

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methods of coconut cultivation by organising demonstration plots for demonstration of improved methods of coconut cultivation. Emphasis is also laid on items like intensive cultivation drive in selected panchayat samithis, planting gliricidia cuttings on a campaign basis along the boundaries of coconut gardens and conducting coconut mother palm competitions. Till now the Department has distributed coconut seedlings to cover 16,000 acres.

The need for increasing production is obvious especially in the present national emergency. The Government of India have fixed a target of 40 million additional nuts for Andhra Pradesh by the end of Third Five-Year Plan. There is scope for not only increasing the area but also for adoption of intensive methods by cultivators in the State and with the present tempo in implementing the various development programmes for coconut and with the public co-operation which is available to the extent required, there are bright prospects of achieving the target set for this State.

FEBRUARY & MARCH in COCONUT GARDENS

KERALA

February-March

Continue irrigation in loamy and sandy soils; continue vegetable cultivation in loamy soils.

Spray the palms affected by *Nephantis serinopa*, the black-headed caterpillar of the coconut with 0.2 per cent D. D. T. Repeat the spraying after an interval of 15 days. Alternatively, liberate parasites of this pest on the affected palms. Palms on which the parasites have been released should not be sprayed with D. D. T. or any other insecticide as that will kill the parasites also.

Raise subsidiary crops in coconut gardens. Elephant yam can be cultivated successfully. Dig circular pits 2½ ft. diameter and 6 inches deep and burn rubbish in them. Apply 10 to 15 lb. of well rotten cattle manure in the pits. Plant seed corm in the pits and close them with the loose garden soil. The corms start sprouting with the summer showers.

MYSORE

February-March

Cart in jungle earth and heap it up in the different parts of the garden. You can also fold sheep and incorporate the sheep manure into the soil.

MADRAS

February-March

Plough the garden once to get it ready to receive the summer showers.

ORISSA

February

Remove stray shrubs and grasses and burn them. This month and the next the black-headed caterpillar does the worst damage. Hence spray the affected and adjoining palms with 0.2 per cent D. D. T. twice, at an interval of 15 days. If parasites are released to control the pest do not spray with insecticide. Clean all water channels. Use the earth from the channels to strengthen the bunds on which coconuts are grown.

March

Clean up the channels and banks and put back the soil removed from them on the bunds. If there is a severe drought, irrigate the palms. Water the seedlings at least twice a week. If there is a caterpillar attack, give 0.2 per cent spray. Wherever possible pen sheep or cattle.

MAHARASHTRA

February

Hoe or cultivate the garden. Remove all grasses and shrubs and burn the same along with rubbish or trash.

In low-lying areas where coconut is planted on bunds clean the channels between bunds and strengthen and level up bunds by adding to the sides and tops soil dug up from the channels. If parasites are released to control the pest do not spray with insecticide.

March

Look out for the leaf-eating caterpillar. Cut and remove all the affected leaves and spray the palms with 0.2 per cent D. D. T. or B. H. C. Attend to watering also.

WEST BENGAL

February-March

Attend to intercultural operations around the palms. Irrigate the palms in the garden.

TO SUBSCRIBERS

COCONUT BULLETIN is generally published during the first week of the month subsequent to the month to which the issue relates. Complaints regarding non-receipt of copies should be sent during the third week of the publishing month. Subscribers should allow at least two weeks for change of their address to be incorporated in our books. The subscription number (printed on the top left of Subscriber's address) should always be quoted when renewing the subscription or intimating change of address.

Question: *There is a general impression among farmers that concentrated manures like prawn dust, bonemeal, oil cakes and chemical fertilisers are to be applied to the coconut trees every year to ensure continuously good yields. They fear that if this application is stopped in any one year the crop suffers a set-back. Is there any truth in this?*

Answer: According to the concentration and availability of the plant food elements in them, manures can be classified into three kinds—(1) bulky organic manures, (2) organic manures of a concentrated type and (3) chemical fertilisers or inorganic manures. Farm-yard manure, green leaves, compost, waterweeds, etc. belong to the first kind. These are complete manures containing, although in small quantities, all the plant-food elements which become available to the crops somewhat slowly. As the plant-foods become available only slowly the effect of such manures will last for a long time. In some countries 3–4 tons of farmyard manure are applied to every acre of land once in 3 years. The effect of this manure is expected to last for three years.

Prawn dust, fish guano, bonemeal, blood manure (available from big slaughter houses) and oil cakes are organic manures of a concentrated type having in them plant-food elements in larger proportions than in the bulky manures. Again, these plant-food elements become available more easily and quickly than those in bulky manures. Bonemeal, however, is an exception. It takes more than

one year to yield its full quota of plant foods. Bonemeal is, therefore, added to the soil when the land is prepared and its effect is found on the second crop also. All other manures mentioned above yield their plant-food elements quickly and no residual effect can be felt on the succeeding crop.

Quicker still is the action of chemical fertilisers. As soon as they are applied, they get dissolved in the soil moisture and become readily available to the crop. Again, being the most concentrated of all manures they give a quick start to the crops. For example, a paddy crop severely injured by the swarming caterpillar or caseworm comes up with redoubled vigour if to every acre a top dressing of 100-150 lb. of ammonium sulphate is given. Again, pale and stunted coconut seedlings will have a luxuriant growth if a pound of the above fertiliser is applied to each plant. Similarly, if a dose of superphosphate and ash can be forked into the beds of flower plants, they will flower profusely.

Though chemical fertilisers have such a stimulating effect on plants, their effect is not long lasting. They feed the plants, but never enrich the soil. Neither do they improve the texture of the soil nor encourage soil bacteria to thrive. For these purposes bulky organic manures are better.

Experiments conducted with different manures at the agricultural experimental stations of several countries have proved that the ordinary combination of dung, leaves and ashes has the most lasting effect on soils. It has also been proved beyond doubt that the addition of concentrates over and above a basal application of bulky manures gives the best out-turn in respect of all crops. The soil is also enriched by such judicious manuring.

Question: Coconut growers open up trenches on one side of their palms, fill them with manures and cover them up. In the course of four years trenches are opened on all the four sides of the palms. How far is this practice advantageous?

Answer: As the roots of the coconut spread out all round the tree it would be better to open a broad circular basin all round the tree and put the manures in it. If this is done, all old roots could be removed and the emergence of fresh roots facilitated. By putting manures in a trench on one side only of the palm, the soil on the other three sides is not disturbed and the old roots which have become useless are not removed.

Broad trenches should be dug round the palms until the tender roots appear. This will induce the roots to go deeper into the soil. If the soil round the palm is not removed the roots would have the tendency to spread out under the top soil. The manures should not be applied touching the boles of the palms. When trenches are dug there is also the danger of tender roots being cut and damaged. It is, therefore, best

to dig broad basins round the palms and put the manures in them.

Question: How can water hyacinth be controlled and where can I get the weedicide, if any, for controlling it?

Answer: From the literature it could be gathered that a one per cent solution of 2, 4 - Dichlorophenoxy acetic acid at the rate of 100 gallons per acre may be fully effective in the control of this weed.

2, 4 - D may be available from M/s. Andhra Scientific Co., 4. Blackers Road, Mount Road, Madras. Other firms dealing with such chemicals are:-

1. Scientific and Industrial Corporation, Princess Street, Anand Bhuvan, Bombay-2.
2. Nadia Chemical Works(Private) Ltd., C-44, 45 & 46 College Street Market, Calcutta.
3. Himatlal & Co., Bombay.

Question: I am a coconut cultivator of Thana District in Maharashtra. In the four months of June-September from 60 trees I have been getting only 800 nuts. Please let me know how I can make coconut cultivation economical. I want to plant up 14 acres of land situated 1½ miles from the sea shore?

Answer: From a coconut garden raised purely under rainfed conditions and under average conditions of soil fertility only an acre yield of about 2,500 nuts can be expected in a year on the West Coast. Of course this can be stepped up by another 33 per cent by adopting systematic intercultivation and manuring of coconut gardens. Provision of satisfactory irrigation facilities will enhance the yields still further.

During the months of June to September, 30 per cent of the total annual yield is obtained on the West Coast, relatively larger proportions being obtained during the summer months March to May. At the prevailing price of coconuts, viz., Rs. 250 per 1,000 nuts, the gross return works out to Rs. 625 per annum while cost of cultivation inclusive of all improved practices will only be about Rs. 200 leaving a net profit of Rs. 425. Thus coconut cultivation is definitely a paying proposition now-a-days.

Regarding planting of coconut in 14 acres of land you have to first of all lay out the land into convenient blocks and provide necessary cart tracks for communication. Then the area has to be peg-marked giving a spacing of 28′ x 28′ between plants. Seedling pits of 3′ x 3′ x 3′ size or shallower ones if the water-table is high, have to be dug and filled up with soil made up of red earth and sand. The seedlings have to be then planted in these pits.

Clusterbeans — A Green Manure

In South India, all farmers know that clusterbean is a good vegetable. But only a few know that it is a good green manure crop too. One such farmer is Ponnuswamy Vaniar in Thiruvaiyaru Block of Thanjavur District of Madras State.

Ponnuswamy found out for himself how good a green manure clusterbean can be. An enterprising farmer Ponnuswamy chose an area of 25 cents for the trial. The soil was loamy, locally termed as *padugai*. He ploughed the land twice and saw to it that clods were broken. He prepared seed-beds of a convenient size.

He sowed five kilograms of seeds in the plot on 16th May, 1962, and irrigated immediately after. On the third day, there were light showers. He gave the second irrigation a week later. The third irrigation was, however, given after 25 days of the second one.

The crop grew well and by the 40th day, it started flowering. The bumper crop of clusterbeans was harvested on 4th July.

He obtained a yield of 2,135 lbs which works out to be 8,540 lbs an acre. He also harvested eighty pounds of pods. Ponnuswamy feels that he could have obtained a larger quantity of pods, had he sown the crop earlier.

No wonder farmer Ponnuswamy is sold on clusterbean for his green manuring needs now. And the idea is spreading fast. This year more and more farmers in the South have taken to clusterbeans as a green manure crop,

— *Intensive Agriculture*

Banana Food Development Corporation

A banana food development corporation with a capital of Rs. 1 crore is likely to be registered within a few weeks.

The Directors of Horticulture of the Southern States will meet in Bangalore

shortly to draw plans for the scientific development of banana cultivation.

The proposed corporation would promote export of banana, oranges, pineapples, tomatoes and other fruits. Four participant States — Mysore, Madras, Andhra, and Kerala — will contribute Rs. 1.26 each and the balance is open to the public. The central offices will be located in Madras. (Economic Times).

— *Planting & Commerce*

Fertiliser from your Poultry

Not many farmers or even poultrymen in India today know that poultry dropping can be transformed into a potent fertiliser in the built-up deep litter system. All that is required is to raise the birds on litter of chopped up straw, leaves or sawdust, turned over once a week. Bacteria get to work on the mixture and a year later the fertiliser is ready for use.

In many parts of the world, farmers have taken up poultry keeping as a sideline just to get this fertiliser, because even if they only balanced costs on the poultry they would make a good profit from improved yields on their farms due to the high fertiliser and manurial value of the deep litter. Deep litter is built up from the combination between, and bacterial breakdown of litter material plus the manure from the birds. The level of nitrogen in fully built-up deep litter, in average samples when it is 12 months old, reaches about 3 per cent (nearly 20 per cent protein); it also has about 2 per cent phosphorus and 2 per cent potash plus valuable trace elements, etc. It is stated to be of particular value in building up light sandy type soils. The deep litter, which is of six inches depth having been thoroughly composted(its action is that of dry compost, and it is stirred and turned over in the shed about once a week when handled correctly) is ready for use immediately on the land. (Do not leave it out stacked in the rain for a period after cleaning from the shed, for it will lose some of its value.)

One ton of deep litter contains not only needed and valuable organic material giving a rate of nearly half a lb. per square yard per acre (1,000 kilos per acre), but for average samples, approximately 65 lb. of nitrogen equivalent of 300 - 325 lb. ammonium sulphate) and the nitrogen to organic matter ratio is approximately 1:33 plus 45 lb. phosphorus (equivalent of about 258–300 lb. ordinary super phosphate) plus 45 lb. potash (equivalent of about 100 lb. potassium), together with 15 lb. magnesium, 15 lb. sodium and 60 lb. calcium.

— *Indian Farming*

Central Coconut Research Station, Kasaragod

SUPPLY OF QUALITY SEEDLINGS

About twenty-two thousand coconut seedlings of the West Coast Tall variety are expected to be available for sale from the month of June 1964 at the Central Coconut Research Station, Kasaragod as in former years. The cost of the seedlings is 60 nP. each, packing and forwarding at 7 nP. each and railway freight at quarter parcel concession rate being extra.

Applications for the seedlings should reach the Director, Central Coconut Research Station, Kasaragod positively before the 31st March every year. Every application should give the name and address of the applicant in block letters in English and the name of the nearest Railway Station or Railway Outagency (also in block letters) to which the seedlings should be consigned. As there is great demand for coconut seedlings produced at this station, applicants should not be disappointed if they do not get all the seedlings asked for. Seedlings will be allotted according to availability, and intimation about the number of seedlings allotted and the amount to be remitted in advance by M. O. will be sent to the applicants between the 15th and 31st May.

To ensure safe delivery of the parcel waybills to the consignees, they will be sent only by registered post and the registration charges will be included in the amount to be remitted in advance.

WEATHER REVIEW

DECEMBER 1963

	TEMPERATURE				RAINFALL			Sunshine
	Maximum		Minimum		Quantity in m. m.	Departure from normal	No. of rainy days	Total hrs. of bright sunshine
	Highest	Average	Lowest	Average				
Central Coconut Research Station, Kayangulam	34.1°C	31.7°C	18.2°C	22.2°C	94.9	70.5	5	240.4
Central Coconut Research Station, Kasaragod	34.4°C	32.6°C	19.2°C	22.2°C	10.2	—8.5	1	263.1

Market Surveys

Foreign Markets

General Trend

The 'Oil World', Hamburg in its issues for the last two weeks of January 1964 observes that the world market prices of copra displayed a weak trend during the third week of January 1964 and the declining trend continued for both copra and coconut oil in the last week of January also.

With the continued pressure of supplies from the Philippines which has been of late relatively stronger for coconut oil than for copra, the present trend may be further accentuated particularly for coconut oil. Indeed the future price development for competing oils and fats whose trend may be changed in the next several weeks as a result of larger East Bloc requirements, will exert its influence on copra and coconut oil.

Malaya and Singapore in January to September 1963 imported 573000 long tons of copra from Indonesia which amounted to 95 per cent of their total copra imports. These countries (at present part of Malaysia) exported considerably more copra to India, Taiwan, Holland and Italy and more coconut oil to China, Egypt and West Germany. The interruption of trade relation with Indonesia at the end of September 1963 is expected to result in a very sharp reduction in Malaysia's imports and exports of copra and coconut oil.

In the third week of January 1964 the prices for the more important oilseeds, oils and fats had changed little though they were predominantly inclined to weakness but a favourable trend was evident by the increased demand in the U. S. A., the Soviet Union, Argentina and Western Europe. This trend is likely to continue in the next few weeks unless new major factors come into operation.

SINGAPORE

1st December 1963 to 15th January 1964

COPRA

During the month of December 1963 the trading activities in the copra market at Singapore remained limited with small volumes of business changing hands at increased prices. In the first half of January 1964 trading in loose copra continued to be limited and despite lack of offers there was no notable change in price. The F. O. B. prices of copra were not quoted throughout.

COCONUT OIL

Apart from limited transactions in drum oil at lower level, the coconut oil market was generally dull with a certain amount of selling reserve towards the end of December 1963. Price quoted for a picul (133 $\frac{1}{3}$ lb.) of drum oil was $ 52.50 on the 13th and it went up to $ 53.50 by the 20th December 1963.

But during the first half of January 1964, apart from unconfirmed transactions in drum oil at buyers' level, the oil market was quiet and the prices quoted for a picul of drum oil on the 3rd and 10th January 1964 were $ 53.50 and $ 53.75 respectively.

COLOMBO

December 1963 and January 1964

COPRA

During the first half of December 1963 the undertone of the Colombo copra market ruled weak, but in the second half the market improved. On the 7th December copra per candy (560 lb.) Estate No. I quality was quoted at Rs. 162.00 which steadily advanced to Rs. 165.00 on the 14th, Rs. 169.25 on 21st and Rs. 168.00 on the 28th December 1963.

A similar trend in prices was witnessed in the case of milling copra also and the prices quoted were Rs. 159.50, Rs. 162.50, Rs. 166.75 and Rs. 165.50 on the 7th, 14th, 21st and 28th respectively.

The copra market at Colombo presented a mixed trend in prices during the month of January 1964. On the 4th January a candy of copra Estate No. I was priced at Rs. 171.75 which declined to Rs. 168.00 and Rs. 166.50 on the 11th and 18th but improved to Rs. 168.75 on the 25th January 1964.

More or less the same trend was noticed in the case of milling copra and the prices quoted on the 4th, 11th, 18th and 25th were Rs. 169.25, Rs. 165.50, Rs. 164.00 and Rs. 166.25 respectively.

COCONUT OIL

During the first half of December 1963 the coconut oil price in Colombo market fell from the previous month's level but improved in the second half of the month. On the 7th a ton of oil was quoted at Rs. 1010.00 which declined to Rs. 1000.00 on the 14th. But on 21st, the price quoted was Rs. 1030.00 which further increased to Rs. 1050.00 per ton on the 28th December 1963.

Although the coconut oil market at Colombo improved in the first week of January 1964, it presented a declining trend during the rest of the month. On the 4th January 1964 the price for a ton of oil was Rs. 1070.00 which came down to Rs. 1050.00 on the 11th and 18th and further slided down to Rs. 1030.00 on the 25th January 1964.

Indian Markets

COCHIN

December 16th 1963 to January 31st, 1964

When the Cochin coconut oil market opened on the 16th December 1963 a quintal of ready oil was quoted at Rs. 277.00. During the third week of December the market presented a mixed trend in prices as the trend in demand for oil from North Indian markets was not very much encouraging. On the 18th a quintal of oil was quoted at Rs. 276.00 which advanced to Rs. 278.00 per quintal on the 20th and the market closed for the week-end on the 21st at Rs. 276.50. But in the last week of December the market witnessed a declining trend in prices as demand for

oil from upcountry markets was poor and on account of the thick inflow of copra into the market. When the market opened on the 23rd a quintal of oil was priced at Rs. 274.25 and the sagging tendency in price continued when it was quoted at Rs. 273.00 on the the 26th, Rs. 271.00 on the 28th and since 31st was a holiday the market closed on the 30th December at Rs. 270.00.

The market opened on the 2nd January 1964 after observing holiday on the 1st January at Rs. 268.25 per quintal. In the first week of January the market recorded a further decline in prices compared to the previous month's prices for want of demand from North Indian markets and also due to the selling pressure from millers. On the 4th a quintal of ready oil was priced at Rs. 268.50 which declined to Rs. 267.00 on the 6th. But from 8th onwards the coconut oil market displayed an upward trend with slight fluctuations till 18th. Though there was selling pressure from millers, some demand from Calcutta and Assam sides and the report about the Colombo strike were able to maintain the trend. On the 8th a quintal of oil was quoted at Rs. 268.75 which improved to Rs. 269.00 on the 11th, Rs. 270.00 on the 14th, Rs. 276.00 on the 17th and the market closed on the 18th at Rs. 275.00.

When the market opened on the 20th the price quoted for a quintal of oil was Rs. 273.00. During the week the prices lightly declined from previous week's evel but more or less maintained a teady trend till 24th. On the 22nd a uintal of oil was priced at Rs. 272.50 which improved to Rs. 274.00 on the next day and was quoted at Rs. 272.00 on the 24th. The market witnessed a steady declining trend from 25th to 31st. On the 25th a quintal of oil was quoted at Rs. 271.00 which was lowered to Rs. 269.50 on the 29th, Rs. 267.50 on the 30th and the market closed on the 31st January 1964 at Rs. 266.75 per quintal.

ALLEPPEY

When the Alleppey coconut oil market opened on the 16th December 1963 a quintal of ready oil was quoted at Rs. 277.00. The market during the third week of December was weak due to the good arrivals of local copra and selling pressure from millers. On the 17th price quoted for a quintal of oil was Rs, 275.00 which declined to Rs. 274.00 on the 18th and remained at the same level till the 21st. On the 23rd the opening quotation was Rs. 275.00 but the prices declined further due to the seasonal increased inflow of copra into the market and the consequent selling pressure from millers. On the 24th the price quoted for a quintal of ready oil was Rs, 270.00 which gradually declined to Rs. 268.00 on the 26th, Rs, 267.00 on the 28th and the market closed on the 21st December 1963 at Rs. 265.00.

First of January 1964 being a holiday the market opened on the 2nd at Rs. 267.00 per quintal. During the first week there were reasonable orders and only slight fluctuations were noticed in prices compared to the last week of December. On the 3rd a quintal of oil was priced at Rs. 270.00 which slightly declined to Rs. 265.00 on the 6th but

(*Continued on page 341*)

MARKET REPORTS

I. Cochin, Alleppey & Calicut

The daily prices of coconuts, copra, coconut oil and coconut oil cake at Cochin, Alleppey and Calicut from 16th December, 1963 to 31st January, 1964 are given below:

Date	Coconuts per thousand without husk			Copra per quintal*			Coconut oil per quintal			Coconut oil cake per quintal		
	Cochin	Alleppey	Calicut	Cochin	Alleppey	Calicut	Cochin	Alleppey	Calicut	Cochin	Alleppey	Calicut
	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.
16 - 12 - 63	235 00	N.R.	220 00	189 72	193 00	187 50	277 00	277 00	290 00	58 00	57 00	57 00
17 - 12 - 63	235 00	N.R.	220 00	188 50	193 00	187 50	274 50	275 00	288 00	58 00	57 00	57 00
18 - 12 - 63	235 00	270 00	220 00	189 44	192 00	187 00	276 00	274 00	288 00	58 00	57 00	57 00
19 - 12 - 63	230 00	N.R.	220 00	190 00	192 00	189 00	277 00	274 00	291 00	58 00	57 00	57 00
20 - 12 - 63	230 00	N.R.	220 00	190 69	192 00	189 00	278 00	274 00	291 00	58 00	57 00	57 00
21 - 12 - 63	235 00	270 00	220 00	189 75	192 00	189 50	276 50	274 00	291 00	58 00	57 00	57 00
22 - 12 - 63	S	U	N	D	A	Y	S	U	N	D	A	Y
23 - 12 - 63	230 00	N.R.	220 00	188 34	193 00	189 50	274 25	275 00	291 00	58 00	56 50	57 00
24 - 12 - 63	230 00	N.R.	220 00	188 19	192 00	188 00	274 00	270 00	292 00	58 00	56 25	57 00
25 - 12 - 63		X'Mas	Holiday			X'Mas	Holiday			X'Mas	Holiday	
26 - 12 - 63	230 00	N.R.	217 50	187 57	192 00	184 00	273 00	268 00	296 00	58 00	55 00	57 00
27 - 12 - 63	230 00	N.R.	217 50	186 62	190 00	188 00	271 50	265 00	286 00	58 00	55 00	57 00

28 - 12 - 63	230 00	268 00	217 50	186 32	188 00	188 00	271 00	267 00	286 00	58 00	55 00	57 00
29 - 12 - 63	S	U	N	D	A	Y	S	U	N	D	A	Y
30 - 12 - 63	235 00	N.R.	217 50	186 00	190 00	181 00	270 00	270 00	286 00	58 00	55 00	57 00
31 - 12 - 63	235 00	N.R.	217 50	N.R.	190 00	180 00	N.R.	265 00	286 00	N.R.	55 00	57 00
1 - 1 - 64	N.R.	N.R.	217 50	N.R.	N.R.	181 00	N.R.	N.R.	284 00	N.R.	N.R.	58 25
2 - 1 - 64	235 00	N.R.	232 50	184 25	190 00	181 00	268 25	267 00	283 00	57 00	55 00	58 25
3 - 1 - 64	230 00	N.R.	232 50	185 64	190 00	178 00	270 00	270 00	276 00	57 00	55 00	58 25
4 - 1 - 64	240 00	270 00	232 50	184 50	188 00	178 00	268 50	264 00	278 00	57 00	55 00	58 25
5 - 1 - 64	S	U	N	D	A	Y	S	U	N	D	A	Y
6 - 1 - 64	245 00	N.R.	232 50	183 47	188 00	178 00	267 00	265 00	280 00	57 00	54 00	58 25
7 - 1 - 64	245 00	N.R.	232 50	184 50	188 00	178 00	268 50	267 00	280 00	57 00	54 00	58 25
8 - 1 - 64	245 00	270 00	232 50	184 73	190 00	181 50	268 75	270 00	280 50	57 50	54 00	58 00
9 - 1 - 64	245 00	N.R.	227 50	184 40	190 00	181 50	268 50	271 25	280 50	57 00	54 00	58 00
10 - 1 - 64	245 00	N.R.	245 00	184 40	190 00	181 50	268 50	267 00	281 00	57 50	54 00	58 00
11 - 1 - 64	245 00	270 00	245 00	184 62	190 00	181 50	269 00	269 00	282 00	57 50	54 00	58 00
12 - 1 - 64	S	U	N	D	A	Y	S	U	N	D	A	Y
13 - 1 - 64	250 00	N.R.	245 00	185 20	190 00	181 25	269 50	270 00	282 00	56 50	54 50	58 00
14 - 1 - 64	250 00	N.R.	242 50	185 52	190 00	185 00	270 00	268 00	283 50	57 50	55 00	58 00
15 - 1 - 64	250 00	265 00	242 50	186 50	188 00	185 00	272 00	275 00	283 50	57 00	56 00	58 00

Date	Coconuts per thousand without husk			Copra per quintal*			Coconut oil per quintal			Coconut oil cake per quintal		
	Cochin	Alleppey	Calicut	Cochin	Alleppey	Calicut	Cochin	Alleppey	Calicut	Cochin	Alleppey	Calicut
	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.
16 - 1 - 64	250 00	N.R.	242 50	187 88	188 00	185 00	273 50	274 00	283 50	58 00	56 00	58 00
17 - 1 - 64	250 00	N.R.	242 50	189 80	190 00	189 00	276 00	274 00	283 50	58 00	57 00	58 00
18 - 1 - 64	250 00	265 00	242 50	188 80	190 00	189 00	275 00	273 50	285 00	58 00	57 00	58 00
19 - 1 - 64	S	U	N	D	A	Y	S	U	N	D	A	Y
20 - 1 - 64	255 00	N.R.	247 50	187 82	188 00	183 00	273 00	273 00	285 00	59 00	57 00	58 00
21 - 1 - 64	260 00	N.R.	247 50	187 74	188 00	183 00	273 00	272 25	285 00	58 50	57 00	58 00
22 - 1 - 64	260 00	305 00	247 50	187 43	188 00	183 00	272 50	272 00	285 00	58 50	57 00	58 00
23 - 1 - 64	260 00	N.R.	247 50	188 67	195 00	183 00	274 00	272 00	285 00	58 50	57 00	58 00
24 - 1 - 64	255 00	N.R.	247 50	186 59	187 00	184 00	272 00	271 00	285 00	57 00	57 00	58 00
25 - 1 - 64	260 00	305 00	247 50	186 49	N.R.	184 00	271 00	N.R.	283 00	58 50	N.R.	58 00
26 - 1 - 64	S	U	N	D	A	Y	S	U	N	D	A	Y
27 - 1 - 64	N.R.	N.R.	247 50	N.R.	N.R.	184 00	N.R.	N.R.	282 50	N.R.	N.R.	58 00
28 - 1 - 64	N.R.	N.R.	N R.	180 66	188 00	N.R.	270 50	272 00	N R.	N.R.	56 00	N.R.
29 - 1 - 64	N.R.	305 00	N.R.	185 63	187 00	N.R.	269 50	272 00	N R.	58 00	56 00	N.R.
30 - 1 - 64	255 00	N.R.	247 50	184 13	185 00	183 00	267 50	266 00	270 50	58 00	56 00	55 00
31 - 1 - 64	255 00	N.R.	240 00	183 75	185 00	176 50	266 75	265 00	270 50	58 00	55 00	56 00

Source: (1) **Cochin:** Indian Chamber of Commerce, Cochin. (2) **Alleppey:** The Malayala Manorama. (3) **Calicut:** The Mathrubhumi.
N. R. = No report. * Prices quoted for office pass copra at Cochin and Calicut and for Thelivu copra at Alleppey. 1 Quintal = 220.462 lb.

II. Malabar

Arrivals and sales of coconuts and copra in the different markets in Malabar during the month of December, 1963

Commodity - Markets	Carry over	Arrivals	Sales	Balance
Coconuts (in thousands)				
Kozhikode	530	1,950	1,940	540
Badagara	395	725	690	430
Ponnani	23	186	180	29
Tellicherry and Dharmadam	68	1,000	1,000	68
Tirur	83	411	404	90
Cannanore	13	80	79	14
Copra (in quintals)				
Kozhikode	1,165	14,000	12,650	2,515
Badagara	2,490	8,900	9,300	2,090
Cannanore	20	455	445	30

Weekly prices of coconut and copra in some of the Malabar markets during the month of December, 1963

Commodity - Markets	1st week Rs. nP.	2nd week Rs. nP.	3rd week Rs. nP.	4th week Rs. nP.
Coconuts (husked for 1000)				
Badagara	220.00	223.00	225.00	230.00
Ponnani	205.00	200.00	205.00	210.00
Tellicherry and Dharmadam	200.00	198.00	210.00	198.00
Tirur	235.00	200.00	230.00	225.00
Cannanore	223.00	248.00	250.00	243.00
Copra at Badagara market (per quintal)				
Office pass	173.00	173.00	170.00	173.00
Edible Copra				
Madras	N O	S T	O C	K
Dilpas	185.00	188.00	188.00	185.00
Rajpur	228.00	223.00	218.00	218.00

General **1. Coconut:** Arrivals and despatches were moderate when compared to the previous months. The season is on and more arrivals are expected during the coming month. Prices increased.

2. Copra: Arrivals and despatches are on the increase as the season for copra manufacturing is in progress. Prices remained steady.

Arrivals and sales of coconuts and copra in the different markets in Malabar during the month of January, 1964

Commodity - Markets	Carry over	Arrivals	Sales	Balance
Coconuts (in thousands)				
Kozhikode	540	4,000	4,120	420
Badagara	430	1,550	1,480	500
Ponnani	29	466	480	15
Tellicherry and Dharmadam	68	1,200	1,210	58
Tirur	90	1,047	938	199
Cannanore	N O	R E	P O	R T
Copra (in quintals)				
Kozhikode	2,515	14,700	12,850	4,365
Badagara	2,090	10,800	11,660	1,230
Cannanore	30	500	480	50

Weekly prices of coconut and copra in some of the Malabar markets during the month of January, 1964

Commodity - Markets	1st week Rs. nP.	2nd week Rs. nP.	3rd week Rs. nP.	4th week Rs. nP.
Coconuts (husked for 1000)				
Badagara	240.00	235.00	230.00	233.00
Ponnani	230.00	230.00	230.00	230.00
Tellicherry and Dharmadam	220.00	220.00	230.00	235.00
Tirur	225.00	230.00	240.00	245.00
Cannanore	255.00	260.00	253.00	253.00
Copra at Badagara market (per quintal)				
Office pass	172.00	170.00	174.00	173.00
Edible Copra				
Madras	N O	R E	P O	R T
Dilpas	185.00	188.00	185.00	188.00
Rajpur	223.00	218.00	218.00	223.00

General **1. Coconut:** Arrivals and despatches increased considerably when compared to the previous month. Prices also improved appreciably.

2. Copra: Arrivals increased during the month. Despatches were more or less steady. Slight increase in price was noticed.

III. Colombo

The weekly average prices of coconuts and coconut products at Colombo during the month of December, 1963 are given below :-

Commodity	Unit	Week ending 7-12-63 Rs. cts.	Week ending 14-12-63 Rs. cts.	Week ending 21-12-63 Rs. cts.	Week ending 28-12-63 Rs. cts.
Coconuts (Husked) for export at Buyers' Stores	per 1000 nuts	152.50 to 155.00	152.50 to 155.00	152.50 to 155.00	152.50 to 155.00
Fresh Coconuts - (Husked) used for copra making and local consumption	,,	150.00 to 155.00	150.00 to 155.00	150.00 to 155.00	150.00 to 155.00
Copra - Estate No. 1 quality at Buyers' Stores	per candy of 560 lb.	162.00	165.00	169.25	168.00
Desiccated Coconut - Wharf delivery or Buyers Stores' Medium and fine 50%	per lb.	0.39	0.40	0.41	0.41
Coconut oil - White, naked wharf delivery	per ton	1010.00	1000.00	1030.00	1050.00

IV. Malaysia

SINGAPORE

Weekly prices of copra and coconut oil at Singapore market during the months of November & December, 1963 are given below:-

NOVEMBER 1963

Date	Copra $	Coconut Oil $
1st November	No Quotation	52.75
8th November	do	53.75
14th November	do	54.75
22nd November	do	53.75
29th November	do	53.25

DECEMBER 1963

6th December	No quotation	No quotation
13th December	do	52.50
20th December	do	53.50
27th December	do	No quotation

NOTE : The prices quoted above are per picul F. O. B. Singapore inclusive of the cost of containers i. e. second hand drums in the case of coconut oil and second hand gunny bags in the case of copra.

One picul = 133⅓ lb. One M$ = Rs. 1.56.

PENANG

Average monthly prices of copra and coconut oil at Penang market during the months of October, November and December 1963 are given below:-

Month	Copra $	Coconut Oil $
October 1963	No quotation	52.25
November 1963	do	53.50
December 1963	do	52.50

NOTE: The prices quoted above are per picul F. O. B. Singapore and Penang inclusive of the cost of containers i. e. second hand drums in the case of coconut oil and second hand gunny bags in the case of copra.

One picul = 133⅓ lb. One M$ = Rs. 1.56.

Market Surveys ... ... *(Continued from page 333)*

again improved to Rs. 267.00 on the 7th, and Rs. 270.00 and Rs. 271.25 on the next two days. On the 11th a quintal of oil was quoted at Rs. 269.00. Due to the persistent rumour of the possibility of a cut in the electricity supply by the middle of January there was sustained demand for oil throughout the second week which helped to maintain prices at a slightly higher level. On the 13th a quintal of oil was priced at Rs. 270.00 which improved to Rs. 275.00 on the 15th and closed for the week end on the 18th at Rs. 273.50. When the market opened on the 20th price quoted for a quintal of oil was 273.00. Though there was fairly good inflow of copra in the market, as buyers were active the prices did not fall but remained at Rs. 272.00 from 22nd to 29th with slight fluctuations. In the last two days of the month the prices declined due to the increased seasonal inflow of copra in the market and the consequent lack of demand for both ready oil and forward. On the 30th the price for a quintal of oil was Rs. 266.00 and the market closed on the 31st January 1964 at Rs. 265.00.

Imports of copra into India

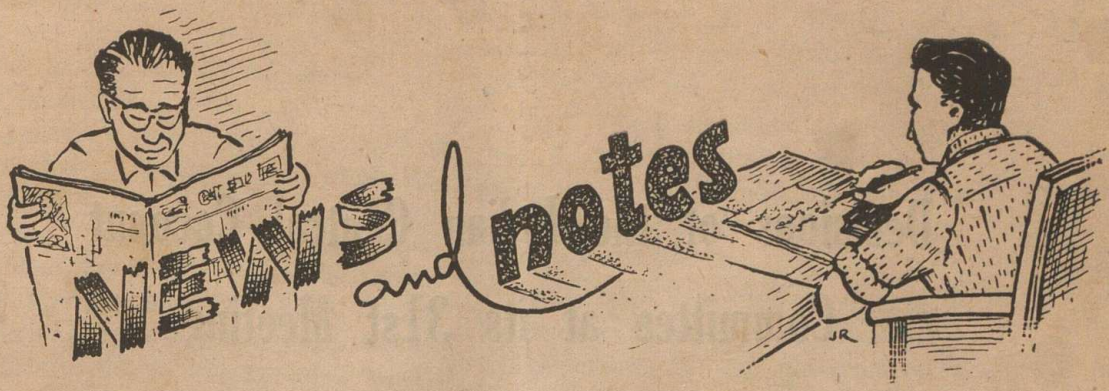
Sources	October 1963		Seven months ended Oct. 1963	
	Qty. in M. tons	Value in (000) Rs.	Qty. in M. tons	Value in (000) Rs
Ceylon	1202	1074	12903	13315
Malaya Fedn.	1657	1653	18888	19730
Maldives	4	4	61	87
Seychelles	684	638	3627	4001
Singapore	145	130	1780	1621
Tanganyika	1444	1292	3342	3065
Zanzibar	843	784	7904	7347
Others	...	...	31	30
Total	5979	5575	48536	49196

Imports of coconut oil into India

Source	October 1963		Seven months ended Oct. 1963	
	Qty. in M. tons	Value in (000) Rs.	Qty. in M. tons	Value in (000) Rs.
Ceylon	30	45	1222	1802

Exports of copra cake from India

Destination	October 1963		Seven month sended Oct. 1963	
	Qty. in M. tons	Value in (000) Rs.	Qty. in M. tons	Value in (000) Rs.
Belgium	...	...	979	321
Bulgaria	100	41	100	41
Denmark	...	...	673	167
France	51	14	1847	496
Germany W.	912	249	3791	1063
Italy	...	...	200	56
Netherlands	466	127	3782	986
Pakistan W.	...	...	165	42
Singapore	123	34	123	34
Spain	250	74	250	73
U. K.	...	...	50	18
Total	1902	539	11960	3297



Fertilizer gives highest paddy yields

The average production of 2,496 pounds of paddy an acre by farmers participating in the Package Programme in West Godavari District, Andhra Pradesh, during rabi, 1962-63, was the highest ever recorded in the District. This was due mainly to more fertilizer used by farmers.

Special fertilizer demonstrations were laid out in the District alongside cultivators' paddy plots. On an average, every acre of the demonstration plot received 41.25 pounds of nitrogen, 32.5 pounds of phosphate and 27.25 pounds of potash, and yielded 3,248 pounds of paddy. The additional income from every acre of the demonstration plot was Rs. 107.80 over the local method of cultivation while the extra cost involved by way of fertilizers was only Rs. 45.30.

Bosco variety of chilli good for kitchen garden

Bosco (also known as *Sinaha*), a variety of chilli, is good for kitchen gardens in South India — recommend experts from Agricultural College and Research Institute, Coimbatore.

Bosco chilli is very pungent. Being a fleshy variety, it is much liked in the green form for making sauces.

Bosco gives good yields in Coimbatore when sown in January and transplanted by the middle of February. The plant begins to bear by the middle of May and continues to do so till March of the following year. The yield of a plant ranges from 600 to 800 fruits in one season. Two or three plants are enough to supply the daily needs of a family.

'Pusa Early Dwarf' — a promising tomato

Pusa Early Dwarf-an early-maturing, high-yielding tomato has been evolved at the Indian Agricultural Research Institute, New Delhi. This variety is earlier by ten days than *Pusa Ruby* which is a popular variety in Delhi and the Punjab, and gives nearly 25 per cent more yield in Delhi. *Pusa Early Dwarf*

(Continued on page 345)

Decisions of the Indian Central Coconut Committee at its 31st Meeting

At its 31st meeting held on the 17th January, 1964, at Ernakulam the Indian Central Coconut Committee got through a 95-subject agenda principally made up of progress reports for the year ending 30th June, 1963 in respect of the Committee's Central Coconut Research Stations, the various research and development schemes to which the Committee gives grant-in-aid and the coconut development schemes worked by the State Departments of Agriculture under the III Five-Year Plan.

The Committee also re-elected Shri K. P. Madhavan Nair as its Vice-President for the 12-month period from the 1st May, 1964 and elected the Finance Sub-Committee, Agricultural Sub-Committee, the Marketing, Statistics and Publicity Sub-Committee and the Appointments Sub-Committee to function during the same period.

The following were some of the more important decisions taken and recommendations made by the Committee:-

(1) The Committee recommended that under the fertilizer distribution schemes in the States, arrangements be made to supply to coconut cultivators both straight fertilisers and approved fertiliser mixtures, according to demand.

(2) A special Sub-Committee consisting of Dr. S. Pradhan (Head of the Division of Entomology, Indian Agricultural Research Institute), Dr. Sardar Singh (Plant Protection Adviser to the Government of India) or his nominee, Dr. M. Q. Khan (Joint Director of Agriculture, Andhra Pradesh), Dr. V. P. Rao (Head of the Commonwealth Institute of Biological Control, Bangalore) and Dr. S. B. Lal (Director, Central Coconut Research Station, Kayangulam) to assess the efficacy of the present biological measures to control *Nephantis serinopa* and make recommendations regarding future policy in this respect by the 30th June, 1964.

(3) The Committee considered a Rs. 2-crore scheme for cutting and removing diseased and senile coconut palms in the taluks of Kartigapally and Karunagappalli in Kerala State and decided to set up a sub-committee consisting of Dr. J. S. Patel (Agricultural Commissioner with the Government of India), Shri C. M. John (Member, Indian

Central Coconut Committee), Dr. S. B. Lal (Director Central Coconut Research Station, Kayangulam), Shri M. Janardhanan Nair (Director of Agriculture, Kerala), Dr. Sirohi (Plant Physiologist, Indian Agricultural Research Institute), Dr. P. R. Mehta (Deputy Director, Plant Diseases, Directorate of Plant Protection, Quarantine and Storage) and Dr. R. L. Nagpal (Principal, Agricultural College, Poona) to examine the various technical aspects of the scheme and report by the 30th June, 1964.

(4) The Committee decided that a team of experts be asked to visit the Regional Coconut Research Stations once in three years to examine their working and to make suggestions for their improvement.

(5) The Committee recommended that if local conditions justified the procedure, seedlings more than one year old could be sold from the Government coconut nurseries.

(6) The Committee passed a resolution, re-iterating its view and strongly recommending to the Government of India that imported copra be distributed among the coconut oil millers and other actual users of copra without being diverted to the exporters of groundnut oil, groundnut oil cake, vanaspathy etc., as export incentives.

News and Notes ... ... (*Continued from page 343*)

has also done well at Sabour in Bihar, Kanpur in Uttar Pradesh, Poona in Maharashtra and Silari in Madhya Pradesh.

The fruits of *Pusa Early Dwarf* are closely set, medium in size and slightly flattish in shape.

To get a good crop, *Pusa Early Dwarf* should be planted one foot apart in rows. The distance between the rows should be 1½ feet. It can be grown in spring, summer as well as in autumn-winter in North India.

Sample seed packets of Pusa Early Dwarf can be obtained from the Head of the Division of Botany, Indian Agricultural Research Institute, New Delhi.

Distribution of Coconut Seedlings

The Coconut Research and Development Officer, Orissa has reported that during the month of December, 1963, a total of 567 quality coconut seedlings were distributed from the nurseries in the state.

The Coconut Extension Officer, Pattukkottai, Madras State has stated that 13,922 coconut seedlings were distributed among the cultivators from the State Nurseries at Pattukkottai, Tindivanam, Shencottah and Salem during December, 1963.

STATEMENT ABOUT OWNERSHIP AND OTHER PARTICULARS ABOUT NEWSPAPER "COCONUT BULLETIN"

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6.	Names and addresses of individuals who own the newspaper and partners or shareholders holding more than one per cent of the total capital		The periodical is owned by the Indian Central Coconut Committee which is a body corporate set up by the Government of India under the Indian Coconut Committee Act, Act X of 1944

I, Dr. P. J. Gregory, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Ernakulam - 1
25-2-1964

P. J. GREGORY
Publisher

Publications of the Indian Central Coconut Committee

BOOKS

		Price per copy including cost, postage, registration etc. Rs.	nP.
1.	The Coconut Palm — A Monograph — de luxe edition Sh. 90/ $ 13.00	43	00
2.	The Coconut Palm — A Monograph — cheaper edition	21	00
3.	The First Conference of Coconut Research Workers in India	15	00
4.	Coconut Cultivation — A Hand Book English edition Rs. 2.90, Malayalam edition Rs. 2.00 and Tamil, Telugu, Kannada, Oriya, Assamese and Marathi editions Rs. 1.38 each.		
5.	Reports on the Marketing of Coconut and Coconut Products (Malayalam)	1	38

PERIODICALS

		Annual subscription Rs.	nP.	Price per copy Rs.	nP.
1.	The Indian Coconut Journal — Quarterly English Inland	4	00	1	00
	,, Foreign	4	57	1	15
2.	Coconut Bulletin — Monthly ,, Inland	2	00	0	20
	,, Foreign	3	32	0	30
3.	Nalikera Bulletin — Monthly—Malayalam Inland	1	00	0	10
	,, Foreign	2	32	0	20
4.	Thengina Bulletin — Monthly—Kannada Inland	1	00	0	10
	,, Foreign	2	32	0	20

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