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Disease of the Coconut and how to Control them

(By Dr. K. P. V. Menon, Plant Pathologist, Quilon.)

DISEASE in a plant is a state of abnormal physiology which impedes its function or shortens its life. It includes the effects of every unfavourable factor that enters into the life of the plant. The important diseases that the coconut palms are subjected to on the West Coast are (1) Bud rot (2) Leaf rot (3) Leaf Blight (4) Stem bleeding (5) Root disease and (6) Nut fall.

BUD ROT: The first obvious symptom of this disease is a yellowing and sudden wilting of the innermost whorls of leaves The central shoot is the first to suffer. It withers and topples over to one side. The other leaves get infected in turn and fall off In some cases the entire central column itself falls off. The older leaves in the outer whorls and even the outer bunches of nuts may remain attached to the tree for some more time; but with the destruction of the bud the tree is lost for ever.

In India this disease is caused by the fungus *Phytophthora palmivora.* Fungal spores or small bits of mycelium from infected trees get blown about in the wind. They fall between the leaf bases of healthy trees and under optimum environmental conditions the fungus grows passing from the tender leaf bases inwards into the perennial bud or cabbage. On reaching the tender tissue of the cabbage it ramifies in all directions and due to the parasitic activity of the fungus the tissue is converted into a rotten mass.

The incidence of the disease is generally influenced by environmental conditions. High humidity in the atmosphere favours the disease whereas in the dry season it cannot assume epidemic proportions.

CONTROL. In the case of severely infected trees curative measures cannot be applied. They have to be cut down and burnt to ashes so that the infection may not spread to the neighbouring trees. When the infection is only in its initial stage the affected tissues should be gently scooped out and the wounds thus made should be sprayed with full

strength Bordeaux Mixture. The scooped out material should immediately be burnt and destroyed. Whenever there occurs an attack of Bud rot in a coconut garden the trees around the infected one in particular should be given a prophylactic spraying treatment with full strength Bordeaux Mixture. Prevention here is a hundred times better than cure.

LEAF ROT. This is a serious disease of the coconut palm in Travancore and Cochin. An early symptom is a rotting, blackening and shrivelling up of the distal ends of leaflets in some of the inner whorls of leaves. On drying, these are broken off in bits by the wind and the leaves consequently assume a fan-like appearance. Reddish brown patches or spots may be observed on the sides of the tender leaves of the central shoot and these penetrate some distance into the interior of the shoot. The infected spots enlarge in size and a soft rot of the central shoot is gradually developed. The central shoot however continues to grow and when the weather gets hot and dry the rotted portions dry up and fall off in the wind. By this time another shoot emerges from the centre and this gets infected in turn. Each successive central shoot thus gets infected in turn and a stage will ultimately be reached when all the leaves of an infected palm will resemble fan-like tufts. In case of severe infection the rotten material, on drying up, will be so firmly cemented together that the central shoot is not able to open out. The progress of decay is generally slow because the leaves become hardened when they grow older. The tree infected with this disease does not get killed outright as in the case of bud rot. But due to the reduction of leaf lamina photosynthetic activity of the tree is adversely affected. The tree loses its normal health and vigour and the yield also deteriorates. This steady decline is continued in succeeding years and finally the tree succumbs.

The infected leaf tissue when examined under the microscope will be seen to have septate mycelium of a fungus ramifying in all directions and penetrating the vascular bundles. This disease also is most severe during the monsoon when the atmospheric humidity is high.

The fungal organisms (1) *Helminthosporium halodes*, (2) *Gloeosporium* sp. and (3) *Gliocladium roseum* are associated with this disease. Of the three *H. halodes* is the most virulent parasite. Spores of these fungi are blown about in the wind and they fall in the central shoot of healthy trees. Under optimum atmospheric conditions the spores germinate and the germ tubes attack the tender leaves of palms. The spread of this disease is along the direction of prevailing winds.

CONTROL. For controlling this disease the infected portions of the leaves should be cut away and burnt and the trees sprayed three times every year with full strength Bordeaux Mixture. The trees should also be manured with potassic manures. In infected gardens it is safe to have all the trees sprayed with the fungicide. *(to be continued)*

The meetings connected with the sixth session of the Indian Central Coconut Committee which had been fixed for the 25th, 26th and 27th September 1947, have been post-poned. Fresh dates for the meetings will be announced in due course.

Coconut Cultivation

1. Nursery should be raised out of seednuts from regular bearing and high yielding trees.
2. Vigorous seedlings should be chosen from the nursery and they should be planted in straight rows.
3. A minimum spacing of atleast 25 feet is essential. If planted by the triangular system about 15% more seedlings will go in.
4. Seedlings should be watered during the smmer months atleast for the first three years.
5. Ash is a valuable manure for coconut. Crops like cow-pea and sunhemp could be grown and ploughed in. This will add to the fertility of the soil. Along with green manure crop 3 lbs. of Ammonium sulphate + 20 lbs. of ash per tree per year is a very good manure. Cattle manure is also quite good.
6. Coconut gardens should be ploughed at the beginning of the rainy season. With the cessation of rains the weeds should be frequently ploughed in either by working a plough or a cultivator.

If the Above Measures are Adopted Every Year the Gardens will Give Increased Yields and Profit is sure.

(by courtesy of the Department of Agriculture, Madras.)

Coconut can be grown on hill slopes too

COCONUT can be grown with profit under unirrigated conditions not only on the littoral and the shores of backwaters, but also on the slopes of hills which are not rocky. This has been demonstrated at the Government Farm, Ollukara (Cochin State) where there is a thriving 28-acre plot under coconut, more than 50 ft. above sea level. This plot has about a thousand bearing trees, the average yield from each tree being 40 to 50 nuts per annum.

The trees are subjected to the following cultural and manurial treatments:—

1) Before the beginning of July circular trenches 8 ft. wide and 1 ft. deep are prepared round the trees. By the middle of August a manure mixture consisting of 8 lbs. of oil cake (Groundnut, castor or margosa), 2 lbs of bonemeal and 1 tin (Kerosene oil) of ash is applied to the base of each tree and the trenches covered up. Simultaneously the weeds growing in the spaces between the trenches are dug up, mixed with the soil and piled up into small mounds. This helps not only to make the garden tidy, but to increase its fertility by allowing the weeds to decay. When the north-east monsoons are over that is, about the beginning of December) the mounds are levelled. This pro-

cess helps the soil to resist drought in summer and to absorb and retain the water from March or April showers.

2) The hill slopes are levelled into terraces and bunds put up to prevent the soil and manure from being washed away.

3) In certain years, with the commencement of the monsoons, the plot is ploughed and some leguminous crop grown on it. Towards the close of the rainy season the crop is ploughed in thus providing excellent green manure for the soil.

4) Once a month the crowns of the trees are cleaned and pests like the rhinoceros beetle removed and destroyed. Pests can be eliminated to a large extent by sprikling a handful of salt twice a year on the tree crowns and by not allowing cattle manure to accumulate on the soil surface.

In our rural areas hill slopes and level lands are largely used for growing mango, jack, cashew and other trees. This is because people have the erroneous impression that coconut cannot be grown on hill sides without much watering.

But by adopting the methods described above it certainly can be grown on hill sides and with greater profit too.

(From a note by Mr. M. P. Subramonia Iyer, Demonstrator Central Farm, Ollukara, Cochin State).

Indian Central Coconut Committee and its functions

II

During the short period it has been in existence, the Committee has initiated several schemes, of immediate and long range importance to increase the production of coconuts, improve the marketing of copra, encourage research on the cultural, manurial and other aspects of coconut cultivation and the diseases of the coconut palm.

Seven coconut nurseries have been started under the joint auspices of the Committee and Provincial/State Governments for raising and distributing among growers quality seedlings at a cheap price. During the next five years, it is estimated, they will have distributed 350,000 seedlings. Two more nurseries, one at Pattambi (Malabar) started on 1-9-1947 and the other at Kumti in Bombay Province proposed to be started by April next have a five year distribution target of 44 000 seedlings Six of the seven nurseries have begun to supply seedlings from July 1947. For the 5 years of their duration, the nursery schemes will cost the Committee Rs 1,66,000. A list of the places in which these nurseries are located was given in the August issue of the "Bullettin".

Two schemes for the co-operative marketing of copra sanctioned for a period of 3 years at a cost to the Committee of

Rs. 15,000 are under operation – one at Vaikom in Travancore and the other at Narakal in Cochin. They are doing useful work. Steps are being taken to construct two modern hot air copra drying kilns in their premises.

Physical and chemical analysis of copra and coconut oil is in progress to draw up their grade specifications and standards.

Reseerch Work:

The coconut research scheme, Madras which the Committee has taken over with effect from 1-1-1946 has yielded valuable material for establishing the criteria for the selection of seedlings and studying the copra and oil content of trees in relation to their bearing capacity and morphological characters. The scheme for the investigation of diseases of the coconut palm in Travancore which, too, the Committee has taken over from 1-1-1946, has yielded useful data for ascertaining the cause of root and leaf diseases affecting the palm and evolving measures to combat them.

Arrangements are in train for the establishment of two Central Research Stations wholly financed by the Committee. One of these will be situated at Kasaragod, South Kanara District (Madras Province). It will be devoted to fundamental work and the botanical and genetical aspects of coconut cultivation. The non-recurring cost is estimated at Rs. 7,20,000 and the annual net recurring cost at Rs. 71,000. The nucleus of this station will be the Madras Governmet Coconut Research Station at Kasaragod which that Government has agreed to sell to the Committee and which the Committee will shortly take possession of. The Madras Government have also agreed to acquire 110 acres contiguous to the above station for developing the Central Research Station.

The other Central Research Station is located at Krishnapuram in Travancore. An area of 56 acres has been acquired for the station whose foundation stone was laid on 24-4-47 by H. H. The Elaya Raja of Travancore. Plans and estimates for the constructian of laboratories, staff quarters etc. are nearing completion and construction itself will soon be under way. The non-recurring expenditure is estimated at Rs. 4,21,000 and the annual net recurring expenditure at Rs. 82,000.

Regional Research Stations are also being organised. The Committee has sanctioned the establishment of 3 such stations in Travancore, 3 in Cochin, 1 in Mysore and 1 in Orissa. The Committee meets 50% of their recurring expenditure and the total expenditure in this regard for 5 years for which period the schemes have been sanctioned will amount to Rs. 2,37,000.

As regards research on problems of coconut technology, the Committee set up as early as September 1945 a special Sub-Committee to report on the question of setting up the Committee's own Technological Laboratory. This Sub-Committee, while feeling convinced of the necessity for such a laboratory, suggested

Coconut Acreage and Production

A World Picture.

THE average annual world acreage under and the production of coconut have, according to pre-war figures, been estimated at 8 million acres and 14,000 million nuts. The countries of South East Asia are the main areas of production. The following table indicates the distribution of the acreage and production:-

	Area (in million acres)	Production (in million nuts)
The Philippines	2.0	3,500
Netherlands East Indies.	1.5	3,200
India	1.5*	3,000*
Ceylon.	1.1	1,800
Br. Malaya	0.6	850
Br. South Sea Islands	0.6	750
Others.	0.7	900
Total.	8.0	14,000

* The estimated area under and production of coconut in India in 1945-46 are 1.53 million acres and 3,329 million nuts respectivelly.

The position with regard to the quantities of copra prepared in and exported from the above countries is indicated below:-

(Please turn to page 7)

that before specific proposals could be made it was desirable to make a study of coconut technological work being done in Ceylon. Accordingly, the Committee deputed to that country a small delegation whose report was considered in October 1946. As a result of their investigations the Committee have decided to set up a Technological Laboratory of its own but in view of its present financial position, the question of the construction of the laboratory has been deferred for the present. In the meantime attempts are to be made to interest Indian Universities to undertake research into some of the subjects aided by grants from the Committee.

To bring correct information regarding coconut cultivation within the reach of all growers a hand-book embodying in non-technical language, the latest information on all aspects of coconut cultivation is under preparation and will be published in the languages of the principal coconut growing areas. Another medium of furnishing information to the growers and others concerned is this "Bullettin" itself.

	Copra produced per year.	Coconut oil and copra exported per year (in terms of copra)
The Philippines.	750,000 tons.	659,000 tons.
Netherlands East Indies.	725,000 ,,	544,000 ,,
Ceylon.	280,000 ,,	167,000 ,,
India	200,000 ,,	No export.
Malaya	150,000 ,,	262,000 ,, *
South Sea Islands	170,000 tons.	150,000 tons.

* (Including re-export of copra imported from N. E. Indies)

India has presented the spectacle of an exporter turning a bulk importer. This has been because while the acreage and production have remained more or less stationary, the demand for copra and coconut oil for industrial purposes has increased to a large extent.

Prior to world War I, India's annual average exports of coconut products in terms of copra were of the order of 45,000 tons, but she has gardually ceased to be an exporter of coconut and coconut products. In 1939-40 her exports of coconut oil and copra in terms of the latter amounted to a mere 418 tons. Not only that, while her exports were decreasing her imports were rising. The peak figure was reached in 1940-41 when the imports amounted to 184,000 tons in terms of copra.

There is thus a big gulf of deficit between India's production and consumption and unless this is bridged by unremitting efforts on the part of all those connected with the coconut industry, that industry may ultimately have to go to the wall. a prospect which none dare contemplate with equanimity, involving as it does economic disaster to millions in the coconut growing regions of India.

The race for increased production has to start here and now. The example of countries like the Philippines should be a source of inspiration. Under the Japanese occupation, the coconut industry there suffered a serious set-back. But in the short period between the defeat of Japan and now, not only has the harm done been repaired but it is reported that present exports from the Philippines exceed even the peak pre-war level.

With the will to succeed India too could emulate the Philippines and not only wipe out her present deficit but even produce a surplus.

You ask, We answer

Question:—

"I have in my garden at Alleppey three very young coconut trees which present a special problem. They bear 100 and more nuts in a bunch but all of them are barren. The local people tell me that if such trees are tapped for toddy they would be rid of this trouble. Please therefore consult experts and let me have your urgent advice on this matter." Mr. M. L. J.

Answer:—

The production of barren coconuts is generally considered as a varietal character. However, certain environmental and physiological condi-

tions have also been suspected to induce barrenness in coconut palms Preliminary investigations have shown that systematic intercultivation and heavy manuring reduce the percentage of barren nuts in a bunch. Trees applied with the following doses of manure have shown a significant reduction in the percentage of barren nuts.

1.	Cattle manure	100 lbs. per tree per year.
2.	Green leaves	200 lbs. do.
3.	Ammonium sulphate	3 to 4 lbs. do.
4.	Ash	60 lbs. do.
5.	Bonemeal	4 lbs. do.

Tapping trees producing barren nuts has also indicated in some cases a reduction in the proportion of barren nuts. The yield of toddy (juice) from trees producing barren nuts has been found to be almost equal to the quantity of toddy obtained from normal trees.

The problem of production of barren nuts in coconut palms has to be investigated in all its aspects and this has been suggested as one of the items of work to be undertaken at the Central Coconut Research Station to be started at Kasaragod by the Indian Central Coconut Committee.

—O. S. S.

NEWS & NOTES

Work on the establishment of the Central Coconut Research Station at Krishnapuram (near Kayamkulam in Travancore) for investigations on diseases of the coconut palm is making good progress. The construction of the Laboratory is being taken in hand and the estate of the Station laid out for experimental purposes. The present scheme for instigations on diseases of the Coconut palm financed jointly by the Indian Central Coconut Committee and the Government of Travancore and worked under the Plant Pathologist, Quilon, is expected to be amalgamated before long with the work in the Central Research Station, Krishnapuram.

x x x

As the result of cultural and manurial operations of coconut cultivation are only of local application in view of the difference in climate and other conditions in the major producing areas the Committee has decided to set up Regional Research Stations in different coconut growing areas for work on those aspects. Accordingly it was recommended that 4 such stations should be established in the Province of Madras, 3 in Travancore, 2 each in Cochin and Mysore and 1 in Orissa, the Committee offering to meet 50% of the recurring expenditure in respect of them. The Travancore Government have agreed to set up three Regional Research Stations in Travancore. Each station will be 60 acres in extent, and they will be situated one at Kumarakom near Kottayam, which has the typical clayey soil of land reclaimed from the backwaters, another at Thodupuzha representing the laterite soil type of the hill slopes and the third at Neyyattinkara where the soil is of the loamy variety. Results of practical value achieved in these stations will be passed on to

coconut growers of the regions concerned.

x x x

At present grades and qualities of copra and coconut oil are determined by the trade mostly on visual examination. The result is that better types of copra and oil do not fetch any better prices It is hoped that by drawing up grade specifications on the basis of their chemical and physical characteristics, the position could be greately improved. The Committee has, therefore, sanctioned a scheme for the analysis of about 600 samples of all the trade qualities of copra and coconut oil from different parts of the country, under the supervision of the Oilseeds Specialist at Coimbatore. The data collected will be utilized by the Central Agricultural Marketing Department for drawing up standard grade specifications.

x x x

The Committee has recently received from the Madras Government a comprehensive scheme for the establishment of coconut nurseries in eight important centres of the Madras Province [including three already functioning,one each at Pattambi (South Malabar), Pattukottai (Tanjore) and Samalkot (East Godavari)] for the supply of about 1,60,000 selected quality seedlings to the public every year instead of the limited quantity of about 25,000 seedlings at present. The additional nurseries are proposed to be located at the Agricultural Research Stations at Nileshwar (S. Kanara), Aduturai (Tanjore), Maruteru (West godavari) and Anakapalle (Vizagapatam) and the Central Farm, Coimbatore. The scheme will be considered at the next meeting of the Committee.

MARKET REPORT

(September 1947)

The month under report was on the whole a dull and drab one as far as the coconut oil and copra markets were concerned. There was a definite decline in the volume of arrivals which were reported to be not more than 50 to 60% of those during the summer months. The disturbed conditions in Northern India have had their repercussions on the maket as the movement of coconut oil to the North was extremely difficult. Besides, there was little or no transport of the oil to Bengal. The position of supply of caustic soda did not show any improvement either. As a result of these, trading conditions in the market continued to be dull throughout the month and the day-to-day turnover for ready transactions was reported to be small.

Consequently, from the very beginning of the month, prices were marked down. The prices of coconut and coconut products on the 1st of the month were as follows:—

Cochin		Rs.
Coconut per 1000	....	146
Copra per ton	....	1164–8
Coconut oil per ton	....	1661-2
Coconut oil-cake per ton	....	222-10

The prices declined steadily and on 8th September, they were quoted as hereunder:—

	Cochin.	*Alleppey.*	*Calicut.*
	Rs.	Rs.	Rs.
Coconut per 1000	150	....	141
Copra per ton	1147-6	1120	1200
Coconut oil per ton	1566-15	1507	1600
Oil-cake per ton	248-5	231-3	224

From the 12th of September, however, the prices rallied round for a few days and on the 15th, the prices were as follows: —

	Cochin.	*Alleppey.*	*Calicut.*
	Rs.	Rs.	Rs.
Coconut per 1000	148	....	130-8
Copra per ton	1137-2	1096	1200
Coconut oil per ton	1489-14	1438-8	1552
Oil-cake per ton	256-14	256-14	224

The temporary improvement in the tone of the market was brought about by tne somewhat easier position of the supply of railway waggons On the 16th of September, the price of coconut oil at the Cochin market was reported at Rs. 1524 per ton. Thereafter, they moved down.

On the 22nd September, the local papers published an A. P. I. message from New Delhi reporting about the possibilities of the imports of copra and coconut oil from abroad. The "Hindu" of Madras reported about it as follows:—

Copra Allotments to India.

New Delhi, Sept. 23

The Government of India have allocated to several consumers the whole quantity of 8,000 tons of coconut oil, applications for which were invited through a Press Note on July 7.

A Press Note says: "Applicants, who do not receive notice of an allocation should take it that none has been made to them. Correspondence will not be entertained in this connection. All others should at once get in touch with the Philippines Government for the necessary export licences and the Chief Controller of Imports for the import licences.

"In addition to these 8,000 tons, India has been allotted about 10,000 tons of copra from the Philippines, 5,000 tons of copra from Malaya, and 10,000 tons of copra from the Netherlands East Indies.

"It appears that the Chief Controller of Imports has issued various import licences for the import of oil or copra from the Philippines which are still outstanding. The Philippines Government have been requested to distribute the unallocated quantity of 10,000 tons of copra among these licencees, preferably on a *pro rata* basis. The holders of licences should, therefore, contact the Philippines Government or exporters holding licences for this quantity.

"The Government of India have decided that the copra available from Malaya and the Netherlands East Indies should be imported by the trade in the normal way. Licences

will be issued by the Chief Controller of Imports in the usual way."

Unfortunately, the local papers, possibly through a mistake in the transmission of the A. P. I. message, reported that the imports of copra from the Philippines was of the order of 60,000 tons instead of 10,000 tons.

The over-all import position in the country during the current year (in terms of copra) taking into account the quantities proposed to be imported as indicated above, along with the import quota from Ceylon would be as follows :–

Ceylon quota	75,000	tons copra
From the Philippines	22,800	do.
From Malaya	5,000	do.
From Netherlands East Indies	10,000	do.
Total	1,12,800	do.

The immediate reaction was to depress the prices as seen from the figures quoted below :

PRICE PER TON

	Cochin		*Alleppey*	
	Copra	Coconut oil.	Copra	Coconut oil.
Date	Rs.	Rs.	Rs.	Rs.
22..9..47	1111_10	1432	976_2	1404_4
23..9..47	1057_1	1385_5	941_14	1335_12
24..9..47	1040	1364	924–12	1318–10
25..9..47	1016_3	1312_14	Not available	
26..9..47	1057_2	1329_14	923_6	1316_11
27..9..47	1016_3	1329_14	906_5	1333_13

Following the sharp decline in the prices, the coconut oil market at Cochin remained closed since 26th September. The price quoted since that date are only nominal. As the report was going to press on 30th September it was understood that the Oil Merchants' Association at Cochin, after taking into account the seriousness of the situation arising out of the drop in the prices, had decided to restrict all transactions in coconut oil between a minimum level of Rs. 400 and a maximum price of Rs. 550 per candy (655.6 lbs.) Their decision has been endorsed and adopted by the Cochin Oil Mill Owners' Association.

In recent months, the position of caustic soda supply in the country has deteriorated considerably and it is reported that the soap factories have been allotted only about 40% of their normal off-take. This has resulted in the closing down of some of the soap factories, while the others are working only partially. The demand for coconut oil has consequently been reduced considerably and it is apprehended that the present position is bound to continue unless and until steps are taken to improve the supply of caustic soda to the soap industry.

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