

Important Diseases and Pests of Arecanut and their Control

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FUNGUS DISEASES

1. Koleroga

Perhaps the most important and serious disease of arecanut is the fruit rot or Mahali or Koleroga. It is

of wide occurrence on the West Coast of India. The disease is prevalent in the monsoon season in tracts particularly with a heavy rainfall. The area infected comprises a tract with a rainfall varying from 75 to 300 inches.

The casual organism is a Phycomycetous fungus belonging to the genus "*Phytophthora*". The disease makes its appearance a couple of weeks after the commencement of the monsoon. The first signs of the disease appear on the nuts of all stages of development. A water-soaked area usually develops towards the base of the fruit (Fig. 1). The colour of the nut becomes darker and the patch enlarges. Affected nuts then soon begin to drop in large numbers, which is very characteristic of the disease. A felty whitish mycelial mass soon develops on the fallen nuts and envelops them completely. Tops of trees are seen occasionally attacked in advanced stages of disease when leaves and bunches wither away. An alternation of heavy rain and sunshine is very conducive for the emergence of zoospores which play a vital role in spreading the disease.

Timely action is to be taken to combat the disease lest severe losses should occur to the grower. To prevent the disease, the bunches should be sprayed with 1% Bordeaux mixture prepared as follows (Figure 2).

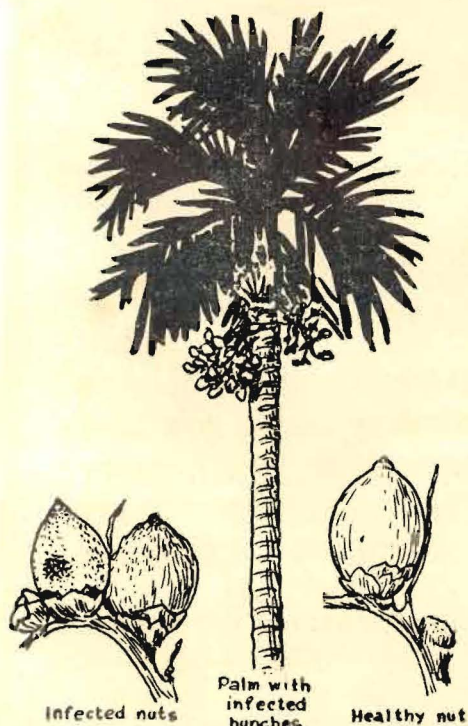


Figure 1.

Copper sulphate ..	5 lb.
Lime ..	5 lb.
Water ..	200 seers or 50 gallons.

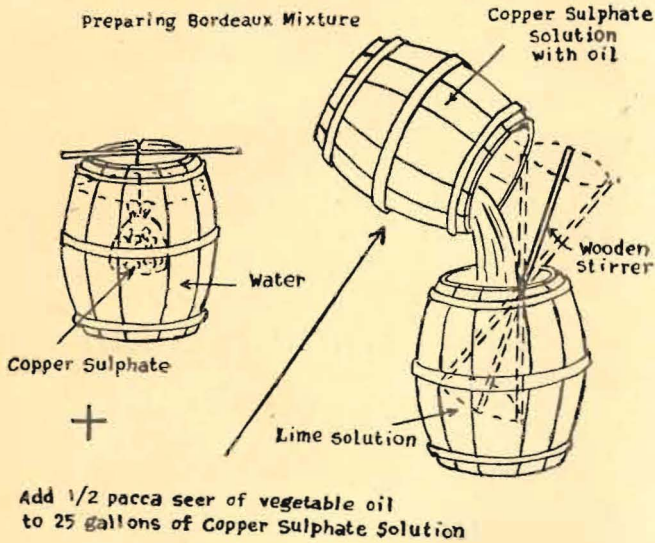


Figure 2.

Five pounds of copper sulphate have to be dissolved by tying the entire quantity loosely in a gunny bag and suspending the same in 25 gallons or 100 seers of water, kept in a wooden copper, brass or earthen vessel. Five pounds of well burnt, stone lime or quick lime of good quality is slaked with a little water separately and then to be made upto 25 gallons or 100 seers solution by adding just the required quantity of water.

The copper sulphate solution is slowly added to the lime solution accompanied by vigorous stirring with a wooden stirrer. The resulting sky-blue coloured mixture should not have excess of copper due to imperfect neutralization. Excess of copper sulphate, if present, may be detected by the deposition of a brown copper on a bright knife blade when the same is dipped into the prepared mixture. In such a case more lime solution is to be added till the blade does not show any deposit. Just the required quantity of the spray mixture has to be prepared since the same cannot be kept long. Under unavoidable conditions if the mixture cannot be used, it can be preserved by adding $\frac{1}{2}$ lb. of jaggery or sugar for 50 gallons of mixture. Addition of $\frac{1}{2}$ pucca seer or 1 lb. of any readily available vegetable oil such as groundnut, coconut or gingelly oil to the copper sulphate solution before adding it to the lime solution increases the spreading and sticking quality of the mixture.

Spraying has to be taken up twice: once before the onset of monsoon, that is, during May-June and again during rains, that is, July-August, but on a clear day. It is advantageous to take up the spraying operation as a routine and well in advance to the appearance of the disease.

A one gallon knapsack-sprayer which could be conveniently carried by climbers is to be used. The climber sits on a wooden plank (Fig. 3) tied to the stem of the palm adjoining to the one to be sprayed. He draws the palm to be sprayed towards him by means of a hook. He then sprays the bunches with a



Figure 3.

fine mist so that all the nuts in the bunches are coated well with the mixture. The diseased nuts fallen on the ground and other such nuts still hanging on the palm, should be removed along with the bunches and these are burnt. Affected leafsheaths are also to be destroyed.

2. Anabe or foot rot

This infectious disease, prevalent to a great extent in arecanut tracts of 'maidan' parts of Mysore, is caused by a fungus (*Ganoderma lucidum*). The disease

is particularly very common in ill-drained and neglected gardens.

Base of the trunk is mostly affected. The affected roots become brittle and dry up. The trunk becomes brownish. The crown narrows up (Fig. 4), and basal leaves droop down. A brownish gummy exudation



Figure 4.

comes out from the base of the trunk. The interior of the stem when cut is found discoloured, rotten and emits a bad odour. When the disease is fairly advanced, fructification of the fungus appears at the base of the stems of affected palms (Fig. 5).

To prevent the spread of the disease, the drainage of the garden has to be improved by providing deep (4-5 ft.) drainage channels at suitable intervals. The affected palms should be dug out and removed from the garden together with all its debris and burnt.

Half to one pound of fine sulphur of 200-300 mesh is then to be applied to the pits caused due to the removal of the diseased portions, and the soil is thrown back to fill up the pits. Trenches of about 9" depth and 3 ft. radius are to be dug around the surrounding



Figure 5.

healthy palms and about the same quantity of sulphur is to be applied uniformly in them. Trenches are then covered back.

3. Stem bleeding.

This disease is caused by the fungus (*Thielaviopsis paradoxa*). It is commonly known as the pineapple disease fungus. The disease occurs to a moderate extent in South-India. The disease starts from the lower end of the stem. Discoloured depressions appear on the stem portions. The splitting of stem develops from thereon gradually. As the disease advances there is further disintegration of the inner tissues and finally the oozing of sap is noticed. The crown dwindles and the palm ceases to bear fruit. The disease is communicable through wounds on the other palms. Particularly the younger palms are more susceptible than the older ones. The same fungus also infects other useful plants like sugarcane, coconut and pineapple.

In the early stages of infection the affected tissues are scraped off with a clean knife and the scraped area is smeared by applying hot tar or bordeaux paste.

PHYSIOGENIC DISEASES.

4. Stem breaking.

In many areca growing tracts of West Coast heavy casualties of areca palms are noticed during windy days. On the stems one can notice on examination patches of deep cracks and fissures. These enlarge and weaken



Figure 6.

the stem. Usually when there is a heavy wind during the South West Monsoon, stems break at these weak points (Fig. 6) thereby rendering huge losses to the growers. Heavy bearing palms are often victims to this sort of breakage. It is a belief amongst growers that stem breaking is caused by the corroding effect of Bordeaux mixture used against 'Koleroga'.

A survey of the arecanut gardens revealed that the stem breaking existed long before the use of Bordeaux mixture, and stem breaking also occurs when Bordeaux mixture has not at all been used. It is a common observation that the cracks and fissures in the areca stems are found invariably on the South-Western side of palms which are more exposed to South Western sun. Gardens protected on this side by tall trees or hillocks are noticed to be quite free from stem breaking. Studies on the temperature of the stem of palms during summer

months have revealed that the temperature is more (109°F.) on the South-Western side than the North Eastern side (91.5°F.) and thus there is a difference of (17.5°F.) between them. These go to show that stem breaking is caused by exposure of the areca stems to the hot sun which causes initial cracks which in turn enlarge and cause a split. Subsequent infections occur due to the entry of mostly wood rotting fungi through the cracks. These weaken the stem further and ultimately cause it to break down. It has been shown that spraying of 1% bordeaux mixture does not induce stem breaking.

To prevent this phenomenon rapidly growing tall leafy trees (like *Vateria indica*, *Cassia siamea* etc.) may be planted on the South Western side of the garden so as to afford a good protection to the palms against sun and wind. Covering of areca stems on the South-

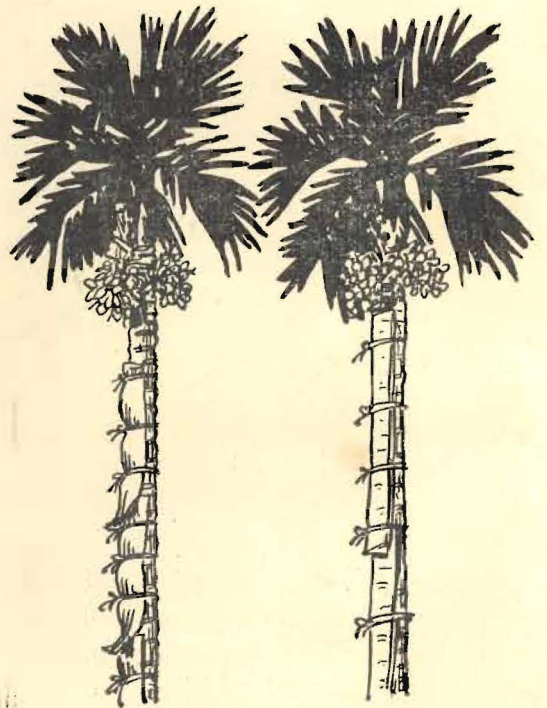


Figure 7.

Western side with areca leaf-sheaths (Fig. 7) during summer months has been found to be advantageous. In case of affected palms, tying split stems of areca over the patches has given much relief by strengthening the trees considerably in withstanding heavy winds.

5 Band or Hidimundige disease.

This disease is prevalent to a large extent in coastal regions of Ratnagiri and to a moderate extent in other

areca growing tracts of West Coast. Palms of all ages from 2 to 30 years of age are attacked.

The first sign of the disease is the production of a leaf smaller than the normal. The successive internodes of the affected palms become shorter. The leaves also become smaller in succession so that the crown ultimately forms a sort of head with abbreviated leaves



Figure 8.

(Fig. 8). The colour of the affected leaves is characteristically dark-green while the healthy leaves are lighter in colour. Texture of the affected leaves is thick and crinkled. Affected palms cease to bear fruit and occasionally 2% of them may get naturally recovered (Fig. 9).

The cause of this disease is not fully known, and the opinion is rather divided. Workers from Bombay have reported that application of 2 tolas of copper sulphate and 2 tolas of lime per palm gave 90% improvement.

A few band affected palms are reported to have recovered when the foliage was sprayed with Zinc Sulphate, Boric acid and Magnesium sulphate.

6. Splitting of nuts

This is a minor disease very frequently found in any areca growing tract. The growth of the pericarp



Figure 9.

does not cope up with the development of the kernel inside and hence the nut splits (Fig. 10). Splitting may start from the base of the fruit or from the tip. Split nuts drop down.

Checking excess of cellsap flow to the nuts by making one or two longitudinal slits just at the base of the spadix by means of a sharp knife gives good results.

PESTS

1. Mites

Mite is a major pest on arecanut. Young seedlings as well as bearing palms are known to get infested by two types of mites, viz., white and red. They are commonly noticed in various areca growing tracts particularly on West Coast.

Palms affected by "Yellow leaf Disease" in Kerala showed the presence of mites in large numbers. These

were noticed on almost any green portion of the palm, viz., tender unfurled spindle, stem and even green tender fruits.

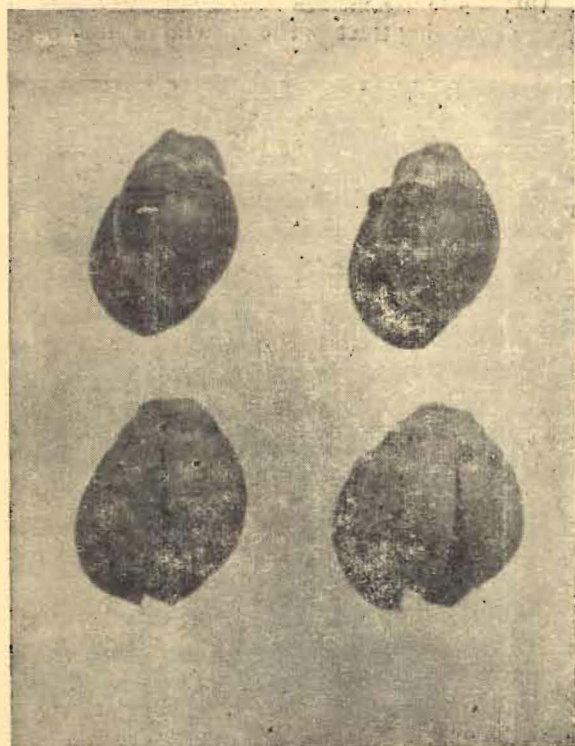


Figure 10.

These mites chiefly dwell on the undersurface of the leaves normally in colonies. They suck the sap

and as a result yellowish patches appear on the leaves. These enlarge and give a bronze appearance to the leaves, which finally dry out. Due to the infestation the growth of the young seedlings gets checked and they put up a sickly appearance (Fig. 11). In cases of severe attack, the young seedlings die. The undersurface of a leaf infested by white mite looks in the early stages of attack as if it has been lightly dusted with fine whitish powder. On close examination a minute web of fine silky strands is made out with a number of minute round eggs fastened to it. In a pure red mite colony the web is usually absent and the eggs which are oblong are also reddish (Fig. 12). Beneath the web on the leaf-surface minute eight legged mites and their young ones in different stages of growth are seen either moving or resting. Eggs give rise to young one which immediately begin to feed. The young mites cast off their skin thrice before they become adults. Pure white or red mite infestation may be occasionally met with but in most of the cases they are found to co-exist.

Mites begin to attack the plants soon after monsoon. They become more and more active and infestation gradually increases with the onset of hot weather. They attain a virulent form especially during the months of April and May. It has been noticed that poorly irrigated gardens and nurseries particularly in much exposed situations are very badly attacked and the incidence is much less in well-irrigated and partially

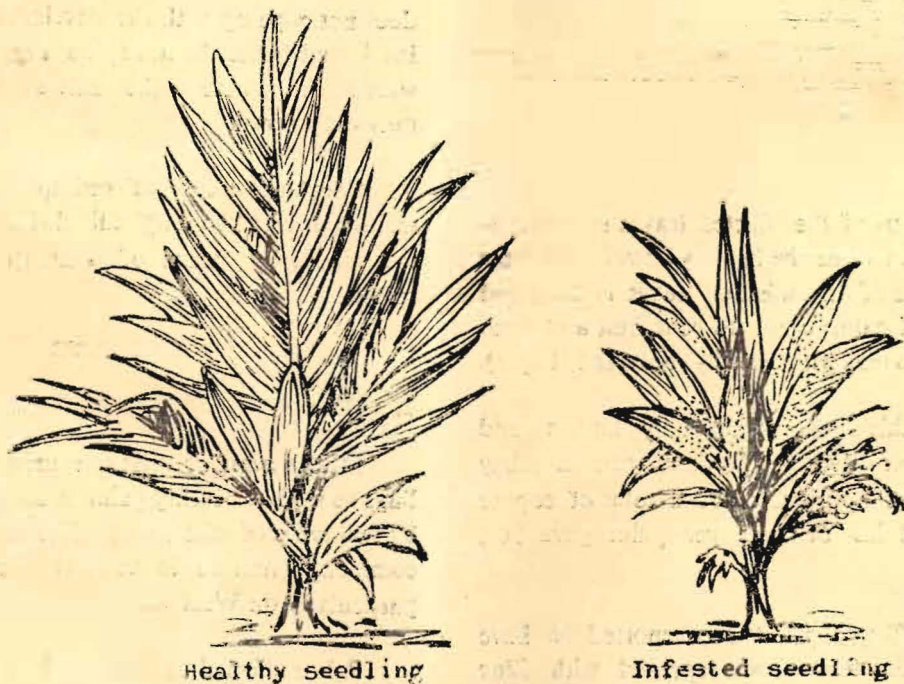
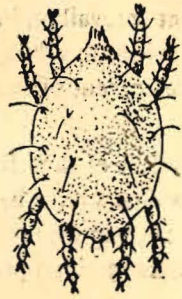


Figure 11.

shaded areas. The population of mites gets very much reduced with the onset of monsoon.



White mite and its egg



Red mite and its egg

Figure 12.

To begin with, the heavily infested and dried leaves are to be pruned and burnt to remove sources of further spread. The mite population can be kept in check by repeated spraying with a solution of wettable sulphur (Spersul : 1 oz. per 2-3 gallons of water) or dusting lime



Figure 13.

sulphur (2 : 1). Spraying or dusting with the concerned chemical should be taken up as soon as the infestation is observed (Fig. 13). Care should be taken to see that the chemical is thoroughly applied to the under surface of the foliage. Preliminary trials with a number of miticides conducted at the Central Arecanut Research Station, Vittal, have indicated that Folidol E.605, or Systox spray (16 oz. per 100 gallons) on Ekatin spray (16 oz. per 100 gallons) have been found more effective than either of the above treatments.

2. Grubs.

Large number of palms were reported from certain gardens round about Vittal to be showing general yellowing of leaves, their weakening and reduction in yield. The leaves of the affected palms turn gradually yellow, drop down and dry out. On examination of some of the gardens large number of white grubs of varying lengths upto 2" were noticed affecting the root system of the palms. Twenty five to forty grubs were noticed at the base of a single palm. They feed particularly on the growing roots of individuals thus causing severe damage.

These white grubs are the larvae of a black beetle (Fig. 14) which also lives in the soil. They are curved bodied and white with six prominent legs and a brown



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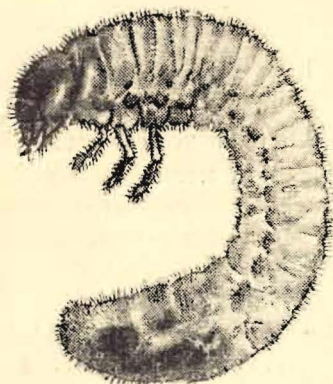
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WHITE GRUB FROM ARECA GARDEN



GRUB (LARVA)



EGG



BEETLE

Figure 14.

head. The hind part of the body is smooth and shiny with dark body contents showing through the skin.

Small pearly, white, roundish eggs are also noticed here and there in the soil. It appears that the moist environment prevailing in these arecanut gardens which are raised in low-lying situations is very congenial for the development of these grubs.

It is evident from the literature that the following treatments have been found effective in the control of root eating white grubs affecting different crops like grasses, graincrops, potatoes, beans, strawberries, etc.

Lead arsenate

Mixing lead arsenate with each top dressing so as to give 5 to 15 lb. of the material per 1000 sq. ft. or spraying a solution of lead arsenate (1:2 lb. in 20 gallons of water) so as to cover 1000 sq. ft.

D. D. T : $\frac{1}{2}$ lb. to 1 lb. per 1000 sq. ft.

Chlordane : $\frac{1}{4}$ to $\frac{1}{2}$ lb. per 1000 sq. ft.

To find out a cheap and effective measure against the grub-affecting arecanut palms, various proprietary chemicals are being tried.

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