COCCID PESTS OF COFFEE.

By John L. Froggatt, B.Sc., Entomologist.

The commercial development of coffee cultivation in this territory is still in its early stages, and the areas are widely scattered.

There are two groups of the *Coccidae,* commonly known as "mealy bugs" and "scale insects". The former are soft-bodied insects covered with a waxy coat and capable of movement; the latter, once they begin to feed, become attached to the plant and develop a tough scaly covering. Both groups obtain their nourishment by puncturing the bark and sucking the sap. When plentiful, they take a considerable amount of sustenance from the plant.

It may be stated that it has been our *general* experience that these insects are much more prevalent during dry weather, the advent of heavy rains quickly leading to a reduction of the pest to a minimum.

Mealy Bug.

The worst pest infestation of coffee to date, has been the attack by a "mealy bug" (*Pseudococcus sp.*) which occurred on one coffee plantation in 1934. The area affected was at first relatively isolated, but the pest became rapidly dispersed until it embraced a considerable section of the area under crop. The dispersion appeared to have been very materially influenced by the prevailing winds.

It was first observed on bushes of *Erythrina* sp., cuttings of which had been introduced partly from trees in the surrounding bush for the development of permanent shade. Later investigations showed that the parent trees of *Erythrina* in the bush were heavily infested by this mealy bug, and that they were, moreover, in the direct line of the prevailing winds at the time of first noting the pest, and were situated only a short distance from the plantation.

After becoming established on the *Erythrina,* the pest quickly spread to the coffee and *Leucaena glauca,* also used as permanent shade. Spraying with various mixtures was tried, but the problem of control rapidly reached a stage where mechanical measures were impractical and uneconomic.

A small "ladybird" beetle (*Cryptolaemus* sp.?) followed the mealy bug into the plantation and increased at such a rate as to permit of distribution from one section of the area to another, and assisted by other factors, eventually gave a good measure of control.

In most cases mealy bug and scale insect infestation are accompanied by large numbers of small ants which protect these pests in order to obtain the sugary excretion (honey-dew) yielded by them, and preventing the natural parasites and predators from functioning. In the infestation referred to, although ants were present they were not in as great numbers as might have been expected.

H. C. James[1] Assistant Entomologist, Department of Agriculture, Kenya, writing on the subject of mealy bugs on coffee in that colony, states that there the prevention of ants gaining access to the trees is a necessary preliminary in order to obtain effective control by predators and parasites. For the purpose he advocates the use of a small cone (made of stiff grease-proof paper or metal) which can be

bound on to the trunk of the tree, and an ant repellant painted on the undersurface; high boiling-point tar oils or crude castor oil and corrosive sublimate are stated to be cheap and with a sufficiently long period of effectiveness as to be of economic value. Banding should never be done direct on to the trunk of the tree, otherwise damage to the bark is liable to ensue.

In reference to the utilization of parasites, James gives a technique for breeding of ladybird beetles in captivity for distribution in the plantation, of which a brief summary is of interest to coffee growers in this territory.

Mature potato tubers are set out in damp sand in trays in a dark place, which must be well ventilated but free from draughts direct onto the plants, and maintained at a temperature of 75° to 80° Fahrenheit; as sprouts develop the tips should be nipped off. When a sufficient stage of growth has been reached, the sprouting tubers are placed in trays in cages made of a light wooden frame work, and covered with calico or similar material on three sides and top and bottom. The fourth side is a door made in two parts and hinged on the side. The lower half of the cage carries the trays of sprouts, and the upper half is left vacant for the collection of the adult ladybird beetles, which tend to move towards the top of the cage. The doors must fit tightly otherwise the insects are liable to escape.

When the sprouts are placed in the cage, they are infested with mealy bugs from the coffee bushes; the numbers introduced should only be sufficient to develop a moderate infestation, otherwise the food plants will be killed before the predators can mature.

When the pest is well established, adult ladybird beetles are placed in the cages, and as the succeeding generation matures the adults can be collected and distributed. The greatest care must be exercised in handling the insects as they are very easily damaged and they will then die.

On coffee plantations where mealy bug infestation has occurred even periodically, it would be an excellent plan to maintain a small "nursery stock" of ladybird beetles to have on hand at the beginning of an outbreak of the pest, and the notes given above may be of assistance in outlining the measures to be adopted.

Great care must be taken in collecting the ladybird beetles in the field to make sure that only those that *are* predators are collected, as some members of this group of beetles are pests themselves.

The Green Coffee Scale.

The green coffee scale, *Coccus viridis*, is common on a number of bushes other than coffee.

This is a small insect covered by a very thin transparent shell which shows green in colour on the leaf. They are usually most prevalent along the midrib on the undersurface of the foliage, but when plentiful they more or less cover the whole of the undersurface. Under the latter conditions especially, the foliage will show a sooty appearance due to the development of a fungus on the "honey-dew" excreted by the insects. This is removed by the spray used to kill the scale.

Spraying.

Owing to the nature of the protective coverings of these insects, the spray fluid must be of such a nature as to remove sufficient of the waxy coat as to reach the insect underneath, and in the other case to penetrate under the shell.

It must, therefore, be one of three types, firstly, corrosive (alkaline), secondly penetrative (light oil) or thirdly generate gases that will kill the insects.

Of the first and third, lime sulphur spray fluid is an example, and of the second, a light to medium oil so combined in a water mixture that on being sprayed on to the foliage the oil is liberated quickly and stays on the foliage while the water runs off.

The apparatus by which the spray is to be applied must depend on the general terrain of the area, and its size.

Where the area is more or less in the nature of a garden, a strong pneumatic knapsack spray pump, fitted with pressure gauge, should be sufficient, but where plantation conditions have to be considered, a portable power sprayer with three or four jets will prove much more satisfactory than a battery of smaller spray outfits.

The spray nozzles should deliver a fine misty spray on to the plants; where shade trees have to be treated, a spray-lance will most probably be required.

BIBLIOGRAPHY.

(1) H. C. James.—Dept. of Agriculture, Colony and Protectorate of Kenya. "Methods for the Biological Control of the Common Mealy Bug, 1930".
"Banding for Coffee Mealy Bug Control", Bull. No. 24 of 1932.