Insect Pests of Hevea Brasiliensis *In the Territory of Papua and New Guinea : Their Habits and Control.*

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MOST of the insects attacking rubber (*Hevea brasiliensis*) in the Territory of Papua and New Guinea are relatively unimportant. *Amblypelta lutescens papuensis* Brown (called the *Papuan* tip-wilt bug) is the most serious pest. A number of the more common insects which have been recorded on rubber are described in this article, along with the control measures recommended for use if the damage becomes serious enough to require treatment.

These insects include :—

Papuan tip-wilt bug.	*Amblypelta lutescens papuensis* Brown.
Leaf eating or ' shot-hole ' weevils.	*Idiopsis caerulea* Fst. *Idiopsis grisea* Fst. and other species in the family Curculionidae.
Army worm.	*Tiracola plagiata* (Walk.).
Shot-hole borers.	various species in the families Platypodidae and Scolytidae.
Termites.	*Coptotermes elisae* (Desneux).
Brenthids.	*Miolispa* species.
Tussock moths.	*Euproctis* species.
Cockchafers.	family Melolonthidae.
Butterfly hopper.	*Colgar. tricolor* Dist.
Millipedes.	order Diploda.

Most of these insects only occur on rubber in small localized areas, but as they are mostly indigenous are generally widespread throughout the Territory ; thus they can appear at widely separated points.

THE PAPUAN TIP-WILT BUG.

Amblypelta lutescens papuensis Brown.

Amblypelta lutescens papuensis Brown has been found only in Papua, and is not recorded as occurring in New Guinea. Other species of *Amblypelta* are found on a wide variety of plants, including cacao and coconuts ; all are light brown coloured bugs about half an inch long (*Figure* 1), belonging to the family *Coreidae*.

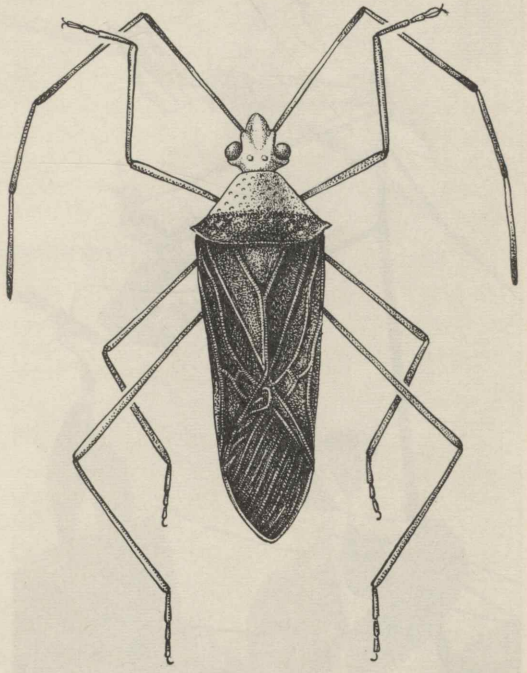

Figure 1.—Papuan tip-wilt bug, *Amblypelta lutescens papuensis* Brown.

Life History.

Very little is known about the life history of these bugs except that one generation lasts from six to seven weeks. The eggs are laid on the upper and lower surfaces of the leaves of the host plants. The nymphs which emerge are similar to the adult, except that they are wingless and their antennae are larger in relation to their size, with flattened segments. There are five nymphal stages, each being similar to the previous one except in size. The nymphs are bright orange-yellow with dark brown markings.

Damage.

The symptoms of *Amblypelta* damage on the young tips are longitudinal grooves appearing on the upper portion of the stems, followed by wilting of the tips (Plate 1). The leaves on the branches near the growing point begin to wilt and droop, eventually falling (Plate II).

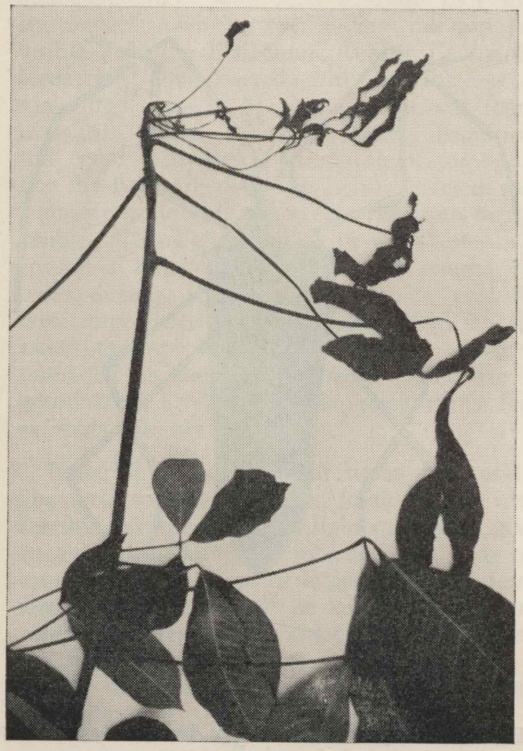

Plate I.—Tip damaged by *Amblypelta.*

Often the extremities of the branches die. On older stems scars are formed which are similar in appearance to the scars on young coconuts which have fallen prematurely due to *Amblypelta* attack (Plate III). These scars are usually reddish-brown in colour, later becoming larger and turning a grey colour. If there are a large number of *Amblypelta* present, the surface of the stem becomes knotty and distorted (Plate IV).

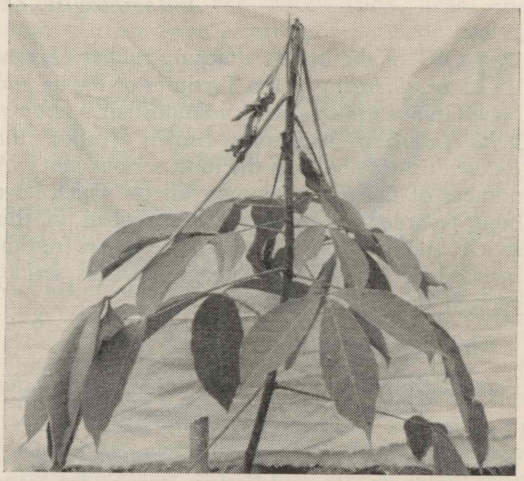

Plate II.—Growing point dying with the leaves wilted following *Amblypelta* attack.

Observations have shown that *Amblypelta* does not occur in pockets as do the cacao capsids, but appears to be fairly evenly distributed through the plantation.

Host Plants.

While other species of *Amblypelta* are found on a very large variety of plants, *Amblypelta lutescens papuensis* is recorded only from rubber, cassava, pawpaw, *Abroma augusta* (devil's cotton), sweet potato, mango, frangipani, choko and coconuts.

On coconut palms it can cause premature nutfall similar to that caused by *Amblypelta cocophaga* in the British Solomon Islands.

Control.

Amblypelta is susceptible to the chlorinated hydro-carbon insecticides, particularly Dieldrin. The usual method of application is by hand-powered knapsack sprayers, using 0.2 per cent. to

0.3 per cent. mixture in water. The trees are usually not attacked after they reach a height of seven feet so that powerful machinery is not needed.

Plate III.—Scars formed by *Amblypelta* feeding on older tissue.

Shoulder-mounted, engine-powered misting machines can be used, with a one per cent. Dieldrin mixture.

In areas where *Amblypelta* attack is common, treatments should be carried out at regular intervals of three weeks or so.

LEAF EATING WEEVILS.

Idiopsis caerulea Fst.
Idiopsis grisea Fst. and other species of Curculionidae.

A number of species of small weevils are recorded as feeding on foliage of rubber. They are generally found on all sizes of trees, but are of importance only on small seedlings and buddings. The species involved include *Idiopsis cærulea* Fst., *Idiopsis grisea* Fst., (*Figure* 2), *Apirocalus cornutus* Pasc., *Oribus cruciatus* Fst., (*Figure* 3) and *Rhinoscapha thomsoni* Waterh. The two *Idiopsis* species are the most important.

Life History.

All these weevils belong to the same tribe, the Celeuthetini (except *Rhinoscapha*) the larvae of which feed on roots (mainly composite weeds) in the ground.

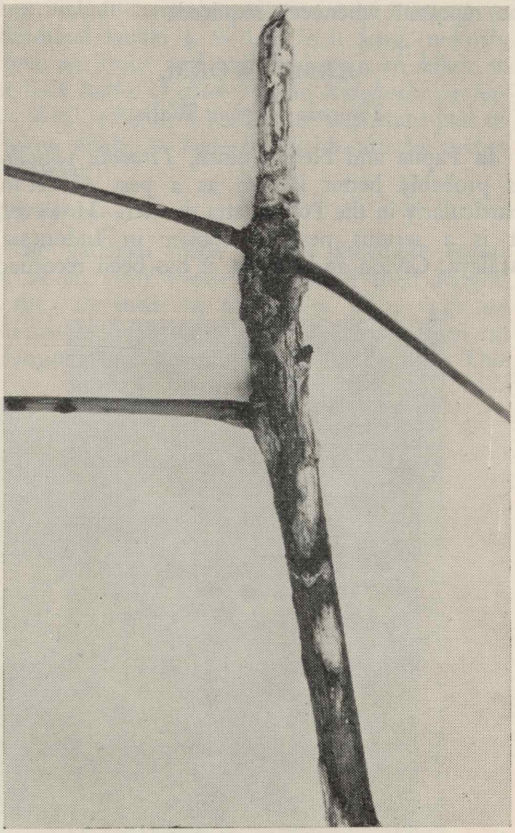

Plate IV.—Scarring and distortion caused by *Amblypelta.*

Damage.

These small weevils all cause extensive " shot-hole " damage to the foliage of rubber.

Host Plants.

Idiopsis grisea has been recorded on Hibiscus, passionfruit, citrus, sweet potato and avocado pear ; *Oribius cruciatus* has been recorded on cassia, citrus, coconuts, coffee, cassava, cacao and many other plants, while *Apirocalus cornutus* (*Figure* 4) is found on peanuts, capsicums, cassia, crotolaria, etc. In addition these insects would be found on many bush trees.

Control.

Various mixtures of DDT are recommended for weevils. A high volume spray of 0.5 per cent. DDT or a low volume mist of two per cent. DDT should give control. The treatment can be repeated whenever required.

ARMY WORM.

Tiracola plagiata Walk.

In Papua and New Guinea, *Tiracola plagiata* is probably better known as a pest of cacao, particularly in the Popondetta district. However, it is a serious pest of rubber in Indonesia, Malaya, Ceylon and Samoa, it has been recorded as attacking rubber in Papua. The first record in Papua was at a plantation in the Central District, in 1958.

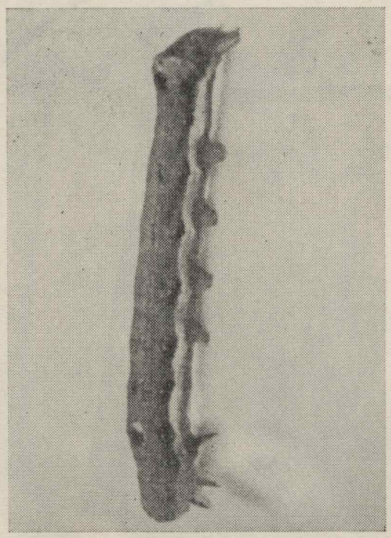

Plate* V.—Sixth instar larva of *Tiracola plagiata.

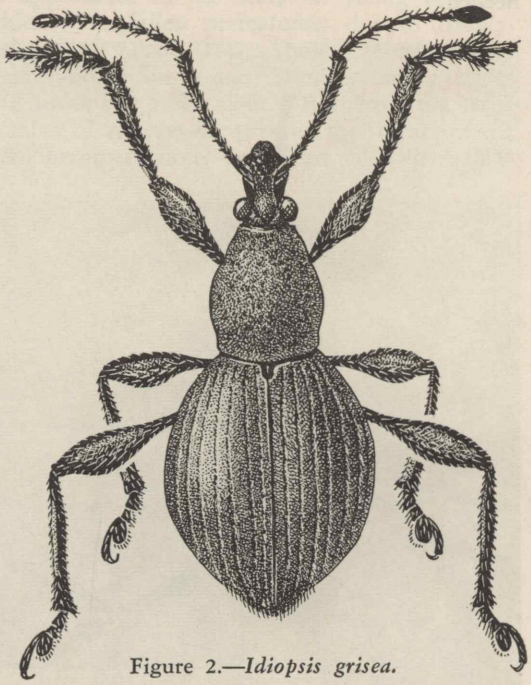

Figure 2.—*Idiopsis grisea.*

The larvae of *Tiracola* in the later stages are a grey colour, with reddish-brown head and a prominent cream to yellow band along both sides of the abdomen (Plate V). The adult is a grey to pinkish-fawn moth, with a distinct dark brown to black V-shaped mark on the fore-margin of the fore-wings (Plate VI).

Life History.

The eggs are laid at night in large batches on the leaves of the host plant. The larvae hatch in $3\frac{1}{2}$ to 4 days and reach full size in 15 to 17 days ; pupation then takes place in the soil, requiring another 10 to 15 days. The total life cycle, egg to egg takes 35 to 40 days under average conditions.

Damage.

At the plantation attacked in the Central District of Papua, *Tiracola* larvae moved in ' swarm lines ' from the rainforest, completely defoliating the rubber stocks and weeds. Once the foliage was eaten, the growing plants were extensively damaged and killed.

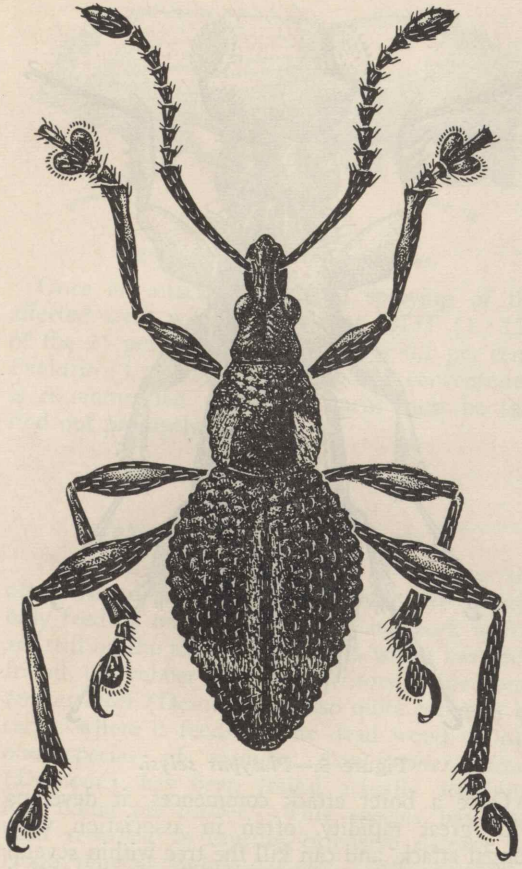

Figure 3.—*Oribius cruciatus.*

Host Plants.

Tiracola plagiata has an extremely wide host range. It includes tea, cacao, tobacco, banana, coffee, *Leucaena glauca*, sweet potato and many other plants, including many weed species.

The control measures as applied to cacao for the control of *Tiracola* are satisfactory for rubber. When using high volume equipment (knapsack sprayers) 0.25 per cent. DDT should be applied as a spray, and when using low volume equipment 2.5 per cent. DDT should be applied as a mist.

SHOT-HOLE BORERS.

The ' shot-hole ' borers belong to two families of beetles, the Scolytidae and the Platipodidae. Quite a number of species of these beetles have been recorded as boring in rubber. They include a number of species of *Platypus* (a cylindrical beetle $\frac{1}{4}$ to 1/3 inch long, reddish-brown in front and a dark brown to black in the back half) (Figure 5) and *Xyleborus perforans* Woll. (Figure 6) (also an important pest of Ceylon, while *X. parvulus* Eichh. attacks rubber in Malaya).

Life History.

The galleries made by the shot-hole borers are of an even width throughout their length, as they are made by the adults. The eggs are laid inside the galleries and the larvae feed on a fungus which grows on the tunnel walls. This

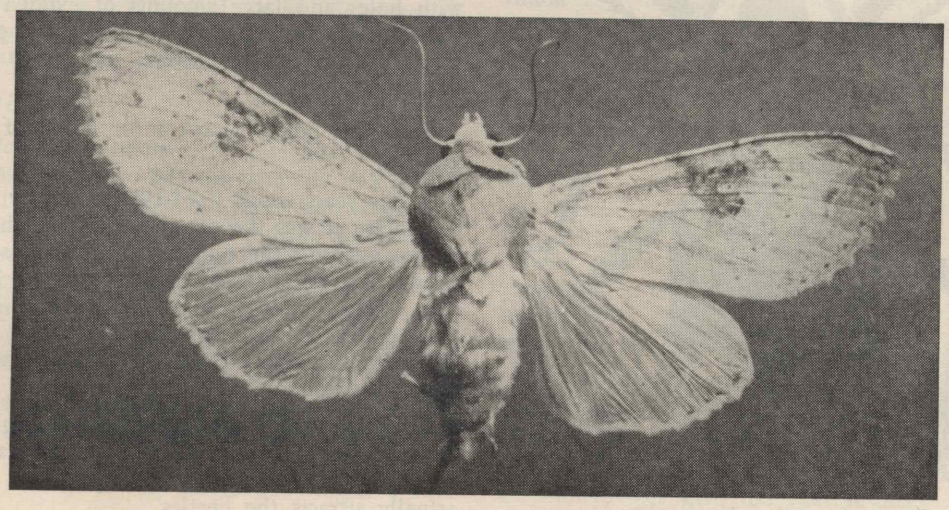

Plate VI.—Adult of *Tiracola plagiata.*

fungus is known as " Ambrosia " fungus and the beetles are sometimes known as " Ambrosia beetles ". The fungus is cultivated by the adult female, which carries the spores in its stomach. Each species of beetle has its own particular fungus, and the larvae feed on this alone. They do not eat wood.

The males of *Xyleborus* are usually much smaller than the females, are fewer in number and are incapable of flying.

Damage.

Serious borer attacks are seldom found on healthy vigorous trees, but when the outer cortical tissues are exposed by scraping or by mechanical damage, the shot-hole borers are attracted and allowed entry. When the bark of the rubber tree is scraped slightly, though not enough to cause exudation of latex, a borer can attack the exposed tissues and, although there is a copius exudation of latex which traps many of the beetles, others come along later and penetrate into the wood.

Shot-hole borers are also attracted to areas of bark which are scorched by fire, sun, fungus or even lightening.

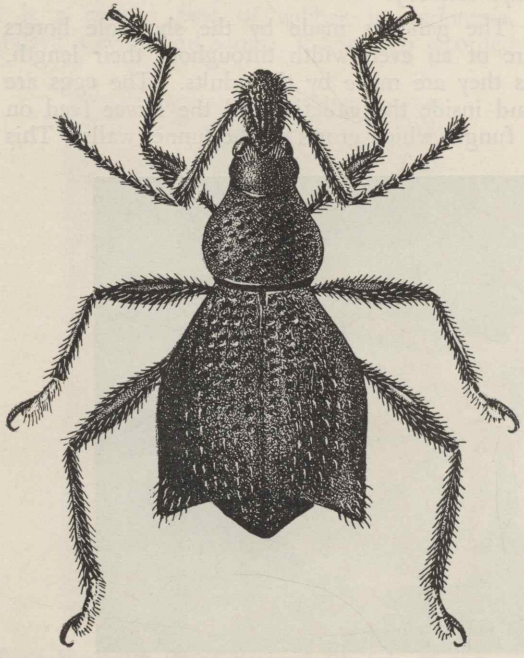

Figure 4.—*Apirocalus cornutus.*

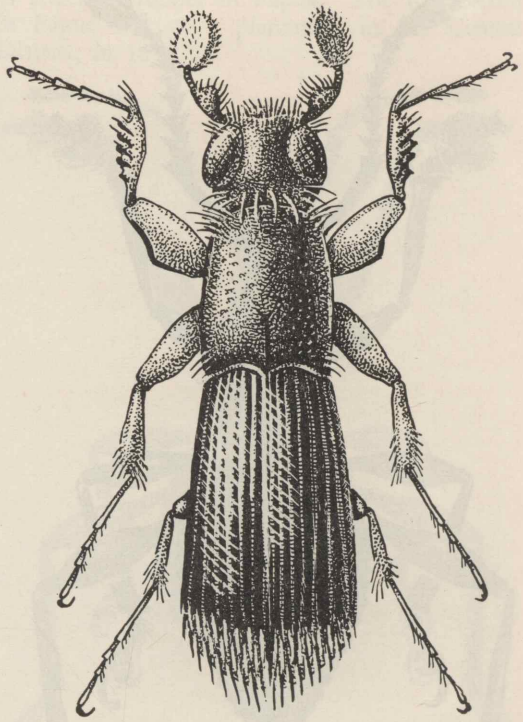

Figure 5.—*Platypus selysi.*

Once a borer attack commences, it develops with great rapidity, often in association with fungal attack, and can kill the tree within several weeks. The bark of the affected areas is riddled with holes and large amounts of exuded wood dust can be seen on the tree and the ground around the base.

Host Plants.

Shot-hole borers attack most kinds of trees.

Control.

In the years about 1914-1916 on many estates in Malaya it was the practice to scrape the bark before opening the tapping panel, as tests had shown that an increased yield of up to 14 per cent. could be expected, but this practice had to be stopped because of borer attack. Once scraping was stopped control followed without other treatment.

Thus the main means of preventing borer attack is to ensure that the bark is not damaged in any way, as it is the damaged bark which actually attracts the beetles.

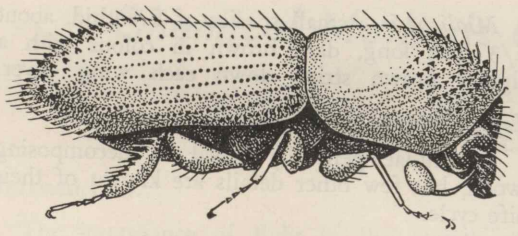

Figure 6.—*Xyleborus perforans.*

Once an attack is observed spraying of the affected areas with 0.2 per cent. DDT (1 : 125 of the 25 per cent. concentrate) or 0.1 per cent. Dieldrin (1 : 150 of the 15 per cent. concentrate) is recommended. This treatment must be carried out promptly.

TERMITES.

Coptotermes elisae (Desneux).

The nests of various species of termites are often found on rubber, but these are mostly only feeding on the dead wood and bark which are still on the tree. One species which has been found on rubber in the Territory, *Microcerotermes biroi* (Desneux) is also quite common in cacao, where it feeds on the dead wood. Only one species of termite, *Coptotermes elisae* (Desneux) has been found actually attacking live tissue on rubber. This species has also been recorded as causing extensive damage to Hoop pine at Bulolo.

In Malaya, a near related species, *Coptotermes curvignathus* Holmgr. is probably the most important pest on rubber.

Life History.

Coptotermes species are soil inhabiting termites, so that their nests are generally in a stump or tree buried underground, often with secondary nests some distance from the main nest, sometimes even on the outside of the attacked tree, above ground. Their biology is similar to that of other termites, with a male ("King") and female ("Queen") as the sexual castes, soldiers and workers.

When the eggs hatch, the young termites are cared for by the adult workers, until they are old enough to fulfil their part in the running of the colony. At intervals, waves of winged forms (normal males and females) emerge from the colony. The males pair with the females and establish new colonies.

Damage.

As *Coptotermes* are soil inhabiting, they attack from the soil, through roots or through galleries constructed on the outside of the tree. They feed inside the tree trunk and roots, weakening the system so that the tree falls when subjected to any undue strain.

Host Plants.

Coptotermes elisae will attack many different trees.

Control.

In Malaya it has been found that soil treatment using Dieldrin, Aldrin and Chlordane gives very good control of *Coptotermes curvignathus.* After the treatment has been applied, some types of soils remain toxic for as long as three years.

The recommendations are given in the following Table :—

Insecticide.	Concentration	Dilution Rates.
	per cent.	
Aldrin	0.025	1 : 800 (20 per cent. emulsifiable concentrate)
Heptachlor	0.025	1 : 800 (20 per cent emulsifiable concentrate)
Chlordane	0.04	1 : 2,000 (80 per cent. emulsifiable concentrate)
Dieldrin	0.015	1 : 1,000 (15 per cent. emulsifiable concentrate)

One of these mixtures is watered onto the ground around the base of the tree. About one or two pints are required, the actual amount depending on the size of the tree.

The above concentration should remain toxic for about two years, but in clay or peat soils the residual effect is greatly reduced. In this type of soil Aldrin, at a higher concentration (1 : 400), will give the best results.

BRENTHIDS.

Miolispa species.

Three species of the beetle family Brenthidae have been recorded as feeding on rubber. One is *Miolispa novae-guineensis* Guer. (Figure 7) and another a *Miolispa* species near *papuana* Kln. at Sogeri in the Central District of Papua.

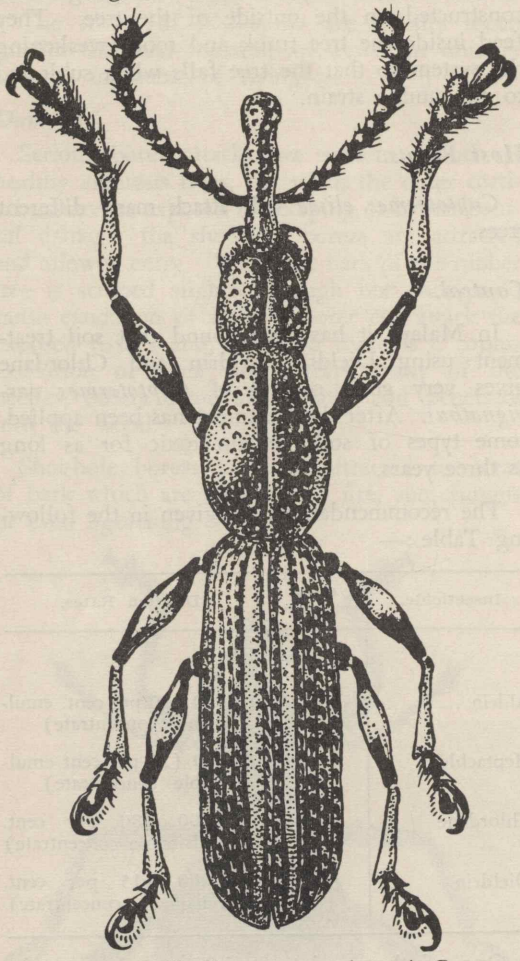

Figure 7.—*Miolispa novae-guineensis* Guer.

Miolispa is a small species of Brenthid, about 1/3 inch long, dark brown in colour with a lighter brown stripe down each wing cover.

Life History.

Brenthidae generally breed in decomposing wood, but few other details are known of their life cycle.

Damage.

In the cases mentioned above, the adults were found feeding on the petioles and growing points of young rubber seedlings, causing extensive damage and retarding growth.

Host Plants.

Miolispa is sometimes found on crolataria, but other hosts are not known.

Control.

DDT as used for weevils is recommended.

MISCELLANEOUS PESTS.

Other insects are sometimes found feeding on rubber, but are only of minor importance. These include insects such as the cupmoth *Euproctis* species (Family Limacodidae), cockchafers or grass beetles (Family Melolonthidae), and the butterfly hopper (*Colgar tricolor* Dist., Family Flatidae). Millipedes have been recorded as causing extensive damage to germinating rubber seeds in the Sepik District; the species concerned was *Orthomorpha coarctata* (Sauss). Ants also can destroy rubber seeds after they have been planted.

For these pests a DDT spray as recommended for weevils etc. is useful, though for millipedes and ants 0.5 per cent. Dieldrin is advised.

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