NOTES

OCCURRENCE OF THE KAURI COCCID, *CONIFERICOCCUS AGATHIDIS* BRIMBLECOMBE (HOMOPTERA: MONOPHLEBIDAE) IN QUEENSLAND

By A. R. BRIMBLECOMBE and N. W. HEATHER

Department of Primary Industries and Department of Forestry, respectively, Brisbane

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Damage to kauri pine, *Agathis* species, by the kauri coccid, *Conifericoccus agathidis* Brimb., (Homoptera:Monophlebidae) was first recorded in Queensland in 1959 when extensive and widely separated plantations in the Mary Valley were attacked (Plate 1).

A number of species of kauri pine are native to Queensland and are premium timber species in natural rainforest habitats. Two of these, the southern kauri pine, *A. robusta* (C. Moore) F. M. Bail., and the northern kauri pine, *A. palmerstoni* F. M. Bail., have been grown in plantations by the Forestry Department for more than 40 years. Largest areas, particularly of *A. robusta*, are in the Mary Valley in south eastern Queensland.

Both natural and plantation stands of the two major kauri pines have always been under close observation. Except for some noticeable damage to young foliage by the kauri thrips, *Oxythrips agathidis* Mor., serious insect damage was unknown. With the new growth in the spring of 1959, however, serious damage by the kauri coccid was obvious in plantations of both kauri pine species in the Mary Valley and the attack developed into an outbreak with greatest intensity in the Amamoor area.

This coccid has subsequently been recorded in all other kauri pine plantations in the Mary Valley (at Imbil and Kenilworth as well as at Amamoor), in coastal plantations of *A. robusta* at Como, in remnants of natural stands at Como and Cooloolah, and from natural stands and plantations on Fraser Is. In 1962 evidence of damage on natural trees of *A. palmerstoni* was seen at Julatten in North Queensland and recently the insect was found infesting trees of this species at Gadgarra on the Atherton Tableland.

Appearance of the insect

The kauri coccid adult female is a flaccid bodied, wingless, brownish-green insect varying up to 3.0 mm in length. Greater detail is given in the original description (Brimblecombe 1960). The adult male is the typical coccid: a frail, two winged, soft bodied insect with a body length of about 1.2 mm.

Life history and habits

Breeding by the kauri coccid occurs throughout the year with several generations and a population peak coinciding with the spring flush of growth on the host. The female passes through the egg, nymphal stage, an encysted stage and adult. The male however has an additional nymphal stage and a preadult stage.

The observed periods for generations in the spring varied from 4 to 6 weeks. Periods of development for females were as follows—incubation 7 to 17 days, nymphal stage 9 to 14 days, encysted stage 10 to 11 days and from emergence of the adult to oviposition 2 to 7 days. Metamorphosis of the male following emergence from the cyst required 5 days.

Adult females are very sluggish and awkward in movement. After emergence from the cyst they move away from exposed positions. Oviposition occurs normally in the shelter of older leaves or amongst the leaf scales at the bases of the new shoots, or the females may move down the twigs to sheltered places in forks or to lower positions on the trunk. Oviposition is accompanied by the secretion of a mealy eggsac. The number of eggs laid varies from 150 to 200 per eggsac and each female lays only one batch of eggs.

Parthenogenetic reproduction appears to be facultative and does not seem to influence the number of eggs produced or their viability.

Most insects breed through on the very young foliage. Nymphs hatching from eggs at this time crawl to and settle on the very immature and succulent tissue which as growth proceeds almost completely envelops the insect by the time it becomes encysted. The leaves then have a distinctly pimpled appearance (Plate 1). Later generations can complete development on leaves, young twigs and immature cones without becoming embedded in the host tissue. The flaccid adult emerges posterior end first from the cyst. Many, however, do not completely emerge and can lay eggs even with the abdominal half of the body extruded from the cyst.

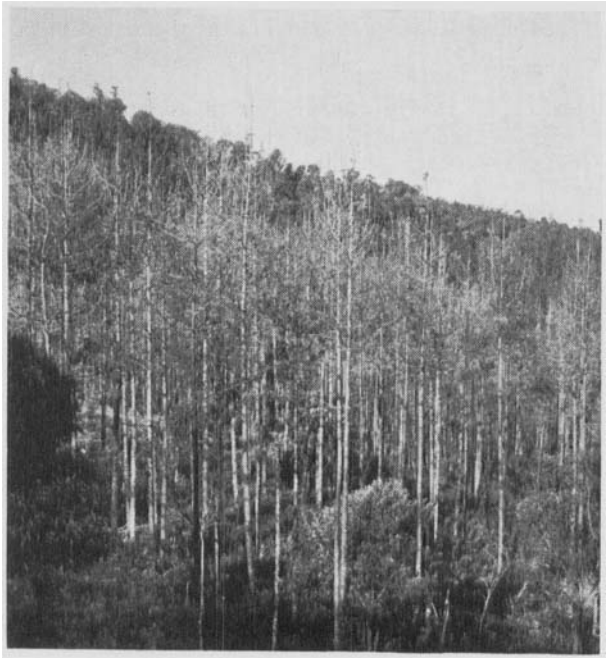

PLATE I

TOP. Cysts of *Conifericoccus agathidis* Brimb. on young growth of kauri pine.

BOTTOM. Defoliation of plantation trees of kauri pine following attack by *C. agathidis*.

The male nymph emerges from the cyst in the same way as the adult female and closely resembles it in appearance but is smaller in size. This stage settles in a sheltered position, secretes some protective mealy material and changes to the pupa-like preadult stage with wing buds, which finally gives rise to the winged adult male.

Nature of the damage

Damage to trees is most serious when large numbers of nymphs settle on the very young foliage. This can result in defoliation. Density of larvae can exceed 10 per sq. cm. but of these often only one per sq. cm. may survive to the encysted stage. Populations of this density and sometimes less, are sufficient to cause serious leaf injury. A brown area of affected tissue surrounds the cyst position and spreads to coalesce with other areas so that the whole leaf dries and falls (Plate I).

With peak emergences of nymphs and population increases quickly following the flush of growth, the whole of the new season's young leaves can be damaged. Complete defoliation of the leader and major branches and most of the remainder of the tree results (Plate I). Attacks of this intensity over several years causes death of the trees.

Serious attacks have occurred on plantations of all ages up to 40 years. Damage to plantation trees in some of the older areas of the Mary Valley has been so severe that clear felling salvage operations have been commenced. It is likely that the attacks in this area have developed in the absence of the range of natural controlling factors in the natural habitat areas near the coast. A study of these factors as well as possible chemical control is being undertaken.

REFERENCE

BRIMBLECOMBE, A. R. (1960).—Studies of the Coccoidea II. New genera and species of Monophlebidae. *Qd J. Agric. Sc.* **17**: 183-193.

NEW RECORDS OF COLEOPTERA IN AUSTRALIA

By J. G. BROOKS

P.O. Box 354, Cairns, Queensland

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Family OTHNIIDAE

Othnius delusa Pasc.

Elacatis delusa Pascoe, 1860, *J. Ent.* **1**: 53.

Othnius delusa (Pascoe) Leconte, 1861, *Class. Col. N. Amer.* **1**: 102.

This species, taken from recently-fallen trees in north Queensland, resembles a buprestid, and was determined by Mr. J. Balfour-Browne of the British Museum (Natural History). He stated that the only previous record was from Borneo.

Distribution.—BORNEO: in British Museum (Nat. Hist.). NEW GUINEA: Nadzab, Mar. 1945, J.G.B.: NORTH QUEENSLAND: Barron Waters, Cairns, Apr. 1947, J.G.B.: in J.G.B. Collection.

Family CHRYSOMELIDAE

Subfamily GALERUCINAE

Plesistia brunnea Mlk.

Plesistia brunnea Maulik, 1929, *Ins. Samoa* IV(3): 199.

This species was determined by Mr. J. Balfour-Browne who suggested that it was probably introduced from Samoa. Specimens appeared in small numbers at light in 1947.

Distribution.—SAMOA: in British Museum (Nat. Hist.). NORTH QUEENSLAND: Edge Hill, Cairns, Mar. 1947: in J.G.B. Collection.

Family SCARABAEIDAE

Subfamily DYNASTINAE

Papuana woodlarkiana (Montr.)

Scarabaeus woodlarkiana Montrouzier, 1855, *Ann. Soc. Agric. Lyon* (2) **7**: 21.

Pimelopus armicollis Fairmaire, 1879, *Le Nat.* **1879**: 47.

Scarabaeus woodlarkiana Montrouzier Fairmaire, 1883, *Ann. Soc. Ent. Belge* **27**(2): 13.

Papuana woodlarkiana (Montrouzier) Arrow, 1911, *Ann. Mag. Nat. Hist.* 8 (**8**): 157, Prell, 1912, *Ent. Bl.* **8**: 228; Heller, 1913, op. cit. **9**: 39.

When Carne (1957) revised the Australian Dynastinae, he noted a single specimen of this species, reputedly taken at Nudgee in the Brisbane area. The specimen was dated 1921 and, in the absence of further records in that area, Carne (personal communication) considered it unlikely that the species had become established. A pair was collected at Iron Range in May 1961, and a further three females at the same locality in April 1964, placing beyond doubt the existence of a population of *P. woodlarkiana* in the far north of Queensland. The 1964 specimens were checked against the type by Dr. E. B. Britton.

Distribution.—NEW GUINEA: Aru Is., Woodlark Is., New Hebrides. NORTH QUEENSLAND: Iron Range, May 1961—J. Macqueen and J. Kerr, Apr. 1964—I. F. B. Common and M. W. Upton: in Australian National Insect Collection, Canberra, and J. G. B. Collection.

REFERENCES

CARNE, P. B. (1957).—A systematic revision of the Australian Dynastinae (Coleoptera:Scarabaeidae). (C.S.I.R.O.: Melbourne)