# Mimicry by a Longhorn Beetle, *Neocalliprason elegans* (Coleoptera: Cerambycidae), of its Parasitoid, *Xanthocryptus novozealandicus* (Hymenoptera: Ichneumonidae)

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Mimicry is widespread among New Zealand insects (Harris 1974, unpublished observations). The larger stinging Hymenoptera, despite their few species in this country, provide many of the models. Pompilids and ichneumonids are mimicked by at least 8 species of endemic longhorns and elaterids (Harris 1974; Hudson 1934). The present note extends the known distribution of the longhorn beetle *Neocalliprason elegans* Brookes, and draws attention to its close similarity in appearance and flight to *Xanthocryptus novozealandicus* (Dalla Torre), an ichneumonid parasitoid of longhorns.

Field observations in the Manginangina Kauri Reserve, Northland (35° 12′ S, 173° 50′E) during 15-17 November 1972 strongly support the view that *N. elegans* is a Batesian mimic of *X. novozealandicus*, and that advantages accrue to both model and mimic. Numbers of *N. elegans* and *X. novozealandicus* were observed flying in bright sunlight in a natural clearing formed by the fall of several trees. The appearance and movements of the 2 species were so similar that it was at first difficult to distinguish between ichneumonids and beetles until specimens had been netted.

The impression given by the 2 species together was of 5 or 6 slender, moderately-large ichneumonids with a leisurely, waltzing flight. The large dark antennae with the conspicuous white preapical band were a very noticeable feature. Whitish areas on the face, sides, abdomen, and on the trailing posterior tarsi completed the image. General movements (and appearance) of the beetles on logs also suggested those of the wasp. Two *X. novozealandicus* females were observed apparently ovipositing in a dead fallen kauri (*Agathis australis* Salisb.). A male *N. elegans* was seen to leave a fresh, but apparently already-formed, emergence gallery in the same log. It (or another individual) flew back 17 minutes later and remained near the hole.

*X. novozealandicus* and its mimic are similar in size and general shape (Fig. 1a, b). Both have short front legs, longer middle legs, and the hind legs very much longer. The antennae of both species are very long. Coloration is strikingly similar. The antennae of both species are dark with a whitish band towards the apex, the apex itself being dark (the white band comprises segments 8-12 in the wasp, and segments 8-9 in the longhorn beetle). Legs of both have femora with reddish-brown basal halves, and brownish-black apical halves with purple reflections. The front and middle tibiae are the same colour as the basal halves of the femora. The hind tibiae have purplish-black apices. Front and middle tarsi are reddish-brown, whereas the hind tarsi are whitish with a very dark apex (the dark hind tibial and tarsal apices enhance the pallid appearance of the intervening segments). Bodies of both wasp and beetle are dark with whitish spots and stripes. White areas occur on the face below the antennal insertions, on the sides of the thorax, and on the abdomen. When the beetle is in flight, the white stripe along the sutural margin causes the elytra to appear very narrow, resembling the thicker fore-costal margin of the wasp.

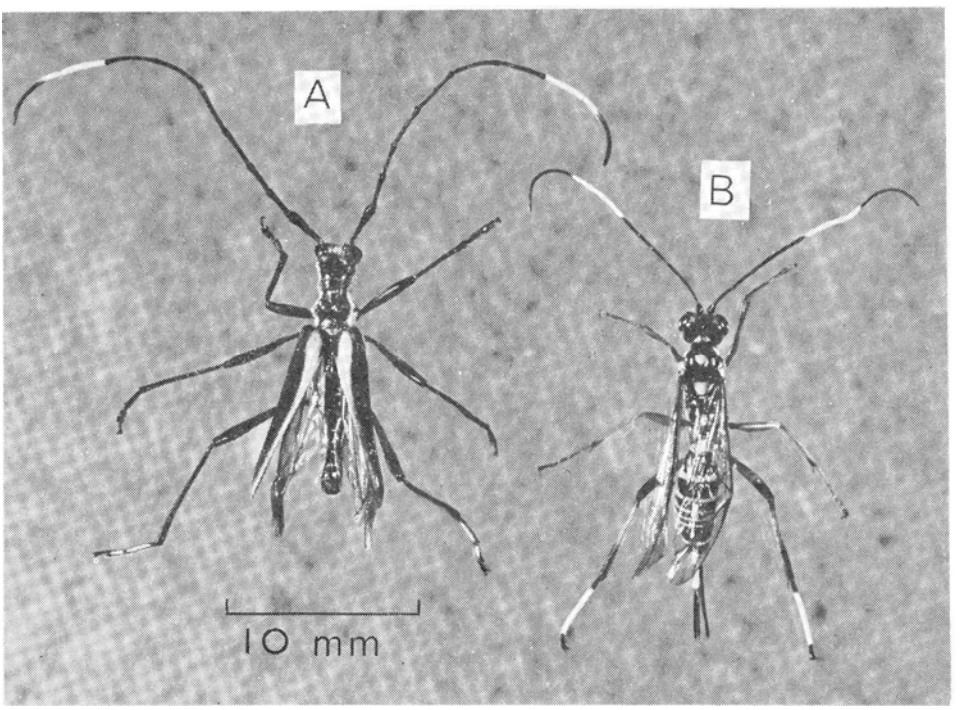


Fig. 1 a *Neocalliprason elegans* (mimic); b *Xanthocryptus novozealandicus* (model).

## DISTRIBUTION OF MIMIC AND MODEL

*Xanthocryptus novozealandicus* is widely distributed throughout New Zealand, and also occurs in Australia and New Guinea (Townes *et al.* 1961). It is known in New Zealand as a parasitoid of 9 species of longhorn (Valentine 1967).

*Neocalliprason elegans* is uncommon. Until now it was known only from 3 Ohakune specimens. These include the type and allotype found (paired) by T. R. Harris on ferns at night prior to 1925 (Brookes 1927), and another found by Mr J. S. Dugdale, "Turoa Road, Ohakune, 900m., 22 Nov. 1977, pupa ex rotten *Podocarpus halli*, adult emerged 28 Nov. 1977." (Dr J. C. Watt pers. comm.).

## DISCUSSION

Rettenmeyer (1970) listed 7 premises upon which Batesian mimicry is based: 1 a species, the model, is unpalatable to predators; 2 a second species, the mimic, is palatable to predators but 3 has evolved away from its ancestral appearance until it resembles the model so closely that potential predators are deceived into leaving it alone; 4 the mimics must be less abundant than the models; 5 the mimics must be found at the same place and time as the models; 6 the model and mimic are conspicuous or readily seen by potential predators; 7 the predators learn or associate unpalatability with the colour pattern of the model.

All 7 premises are applicable to the present example; although 2 and 7 were not proven experimentally, they can be assumed.

Harris (1974) found that 3 large mimicry complexes occur throughout New Zealand. Each complex has a very distinctive colour pattern shared by a stinging Mullerian group (usually hymenopterans such as pompi1ids and ichneumonids) and a Batesian group of palatable beetles, bugs, and flies belonging to many families, and which closely copy in colour and movements the Mullerian group. Experimental evidence was presented to support the idea that the complexes had evolved in

relation to avian predation. Nevertheless, each individual case is very complex. For example, females of the asilid fly *Saropogon extenuatus* Hutton very closely resemble melanic females of the pompilid *Salius diligens* (Smith) (e.g., in Peel Forest, Canterbury). The body of the asilid is black, with golden pile on the face and on the sides and back of the thorax as in the wasp. The legs of both are long and orange-coloured, and the wings are orange-hyaline with a dark apical band. The fly walks on the forest floor in the small shifting sunny patches in a similar manner to that of *S. diligens* females. This mimicry appears to serve a 2-fold function: it protects the fly from being eaten by a bird, and it enables it to feed on male pompilids that fly down to it from the leaves of the trees, as they do to females of their own species. It is thus an aggressive mimic as well (Harris 1974). (Note: a paper on the taxonomy of New Zealand Pompilidae is being prepared.)

*Neocalliprason elegans* and its model, however, do not belong to a large mimicry complex. This may be related to the fact that *X. novozealandicus* occurs outside New Zealand and is possibly a more recent arrival than the pompilids and other components of the large complexes which have been evolving together in New Zealand since well before the Miocene.

*X. novozealandicus* possesses marked aposematic ("warning") coloration and it seems likely that the mimetic resemblance of the beetle to its parasite serves as a protection against avian predation. This may have arisen through a combination of the primary slender, somewhat wasp-like, form of the *Calliprason* group of longhorns; the quick, diurnal behaviour of some of them; and the spatial and temporal association of adults of the 2 species resulting from *X. novozealandicus* flying about the longhorn's habitat, searching for immature beetles to parasitise.

## ACKNOWLEDGMENT

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