OBSERVATIONS ON THE GIANT FIJI LONG-HORN BEETLE, XIXUTHRUS HEROS (HEER)

BY

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The long-horned or longicorn beetles (Cerambycidae) form a large family (c.20,000 species) of plant-feeding Coleoptera. There are about 120 species known from Fiji (Dillon and Dillon, 1952; Bigger and Schofield 1983), and a number of new species remain to be described. The larvae of cerambycids are mostly wood-borers, and may be very destructive to forest and crop trees, and to recently cut logs and timber. The majority of species prefer to breed in freshly cut logs or weakened or dying trees or branches. A few attack living trees, and these can be of considerable economic importance (e.g. Beeson, 1941; Browne, 1968).

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The genus Xixuthrus Thomson belongs to the subfamily Prioninae, a group which includes some of the largest cerambycids, and, indeed, some of the largest beetles in the world. Xixuthrus comprises six species distributed from the South-East Asian archipelago to Fiji. In Fiji, there are two endemic species, Xixuthrus heros (Heer) and X.heyrovskyi Tippmann (see Ryan, 1988, for a colour photograph of both species). The record of a third species, X.ganglbaueri Lameere from Fiji (Bigger and Schofield, 1983) seems to be incorrect. With the exception of X.costatus (Montrouz.) of 40-75 mm size, all the species of Xixuthrus are large beetles, measuring over 100 mm in body length. It has been claimed that X.heros is one of the largest beetles in the world (Simmonds, 1964); X.heyrovskyi is of similar size.

Both Fijian species are rare, and only occasional captures have been made in the last ten years. The first record of X.heros appeared in 1868 by a Swiss naturalist, E. Graeffe, who captured three specimens in 1862 near Viria along the Rewa River, Vitilevu. Based on a 144 mm sized male, it was described by O Heer (see pp.47-8 in Graeffe, 1868) as Macrotoma heros. It was only in 1945 that Tippmann discovered that two giant species occur in Fiji and described the second one as X.herovskyi.

Nothing has been recorded of the behaviour of the species. It seems useful, therefore, to note the capture of a male specimen of X.heros (Plates 1 and 2), taken when flying to light on 8 September, 1988 at Navua, Vitilevu, and to record observations on its behaviour in a laboratory situation.

The horizontal length of the beetle is 130 mm (elytra 84 mm, prothorax 19 mm, head plus mandibles 35 mm; total 138 mm). The discrepancy between the two measurements of total length is primarily a consequence of the curvature of the body. The maximum width across the elytra is 39 mm. The forelegs are 112 mm long and span 225 mm when outstretched. The dry weight of the specimen was 10.8 g. Dillon and Dillon (1952) give a range of body lengths from 80-130 mm for X.heros. Linsley (1959) notes that the Malesian species X.microcerus (White) reaches 120 mm, and X.heros, 135 mm, while the Brazilian Titanus giganteus (L.) attains 160 mm. However, larger specimens of X. heros have been recorded. Simmonds (1964) mentions two specimens which measured "over eight inches" (205 mm), and another which measured "six and a half inches from the tip of the mandibles to the end of the elytra" (165 mm). The size of the former specimen at least must be regarded with some doubt, since it is not clear that Simmonds actually saw the specimens. There is also a tendency for collectors of such large beetles to pull out the body to as great a length as possible when it is being preserved, rather than allowing it to remain at its natural length. This is clearly evident in a large specimen held at Koronivia Agricultural Station, Nausori. It may also be noted that the length of the forelegs of the captured specimen rivals that of the well-known neotropical harlequin

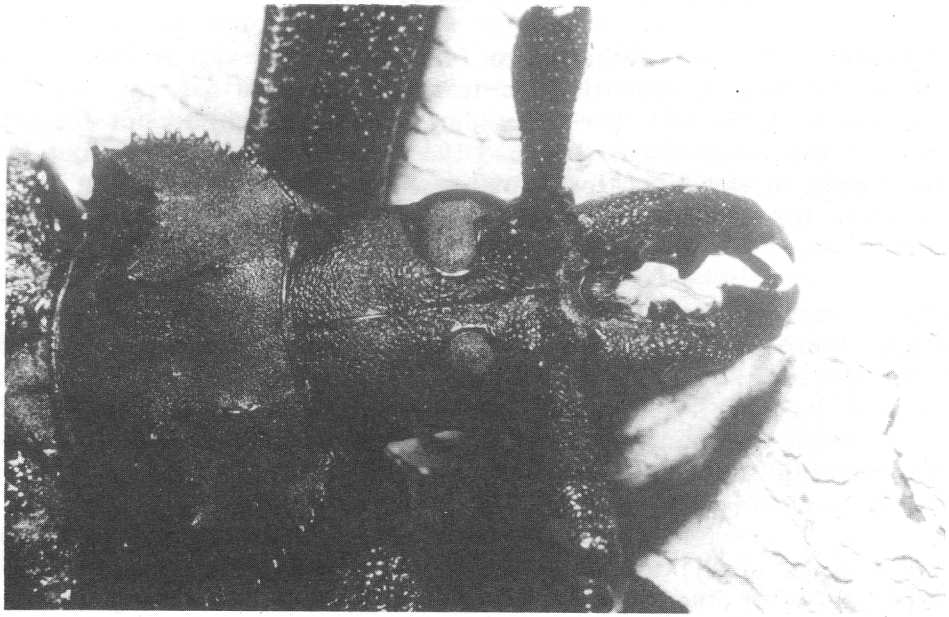
beetle (Acrocinus longimanus L.). In that species, the male forelegs may reach 159 mm (specimen in GFB's collection).

The beetle was not observed to feed in captivity. For most adult cerambycids, feeding is essential, at least in females, for egg maturation and oviposition. However, there are some species which do not seem to require food in the adult stage (Beeson, 1941; Linsley, 1959). The beetle survived for 7 days in the laboratory during which time it excreted a large quantity of white liquid which soon dried to a hard white deposit (uric acid crystals?).

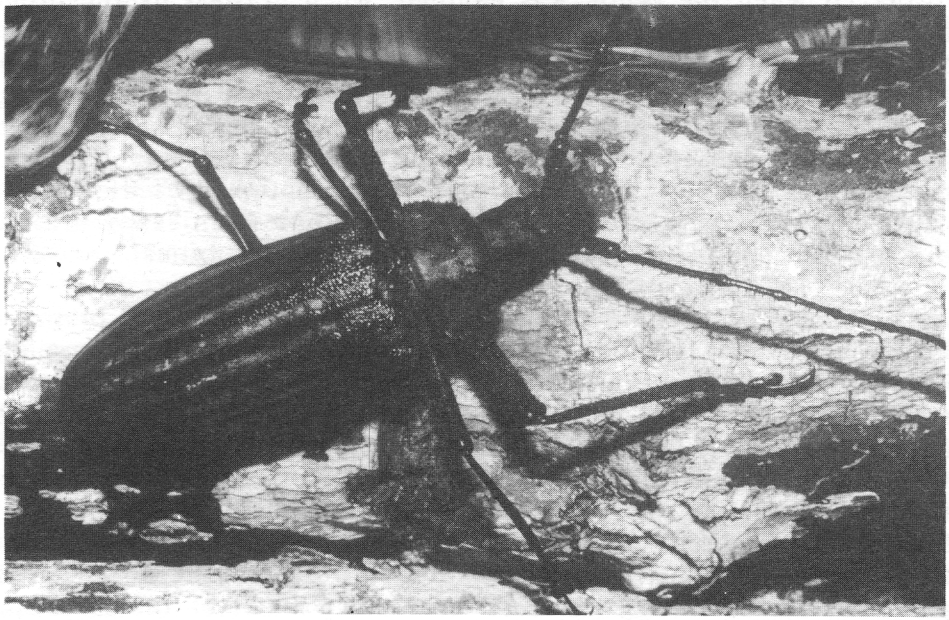
When first captured the beetle was placed on a mosquito screen inside a house (there being no containers of adequate size to hold the animal!). It rested during the day, remaining totally immobile unless directly threatened. At dusk its activity increased and it took to the wing. This was disturbing to the house occupants because of the loud whirring made by the wings and the crashing as the beetle blundered into obstacles. Once trapped on the screen by closing glass louvres, it settled down.

The species of Xixuthrus have several passive defense mechanisms. The large size and hard cuticle of the adult must be enough to deter most potential predators. The dull brownish colours of the beetles provide camouflage on the bark of trees. However, X.heros, and presumably other species of Xixuthrus, also have active defense mechanisms, which were displayed when the beetle was handled. When grasped by the pronotum, the beetle raises its head and attempts to entrap the "predator" between the antennae and the pronotum. In a species of this size, the musculature of the basal antennal segments is quite strong, and the ventral surface of antennal segments 3-9 bears spines, which are most strongly developed on segment 3. The beetle can also entrap a finger between the elytral base and the spine at the posterolateral tip of the pronotum. In both cases, the force exerted is sufficient to cause pain. The mandibles can easily draw blood and did so when one of us (PAR) carelessly handled the animal.

In addition, the beetle stridulates loudly when picked up. In the subfamily Prioninae, sound is produced by rubbing the posterior femora against the edge of the elytra (Linsley, 1959). There is no special mesoscuto-pronotal stridulatory apparatus as is found in other subfamilies of Cerambycidae (Breidbach, 1988). The elytral margins of the specimen showed signs of wear in the middle where the femora had rubbed against them. It seems likely that the elytra act as a sounding board magnifying the sound produced. Stridulation is used by cerambycids primarily in intraspecific interactions (aggressive or sexual), and to indicate alarm (Breidbach, 1988). Male prionines are often aggressive towards other males of the same species, and will fight over females (Linsley, 1959).



Xixuthrus heros head detail. The powerful mandibles and the spines on the pronotum are clearly visible.



Xixuthrus heros, a 130 mm length male. The spines present on the ventral surface of antennal segments 3-9 can be seen in the right antenna.

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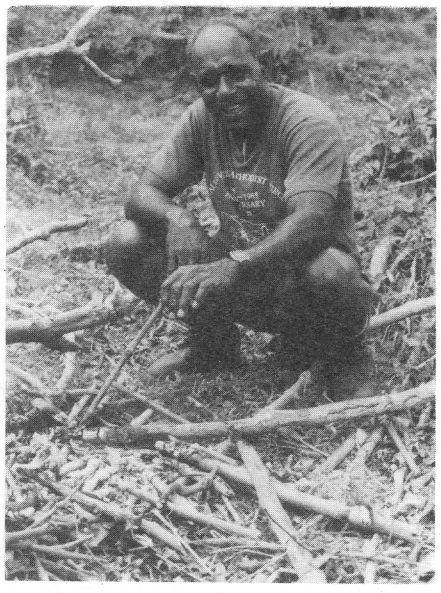

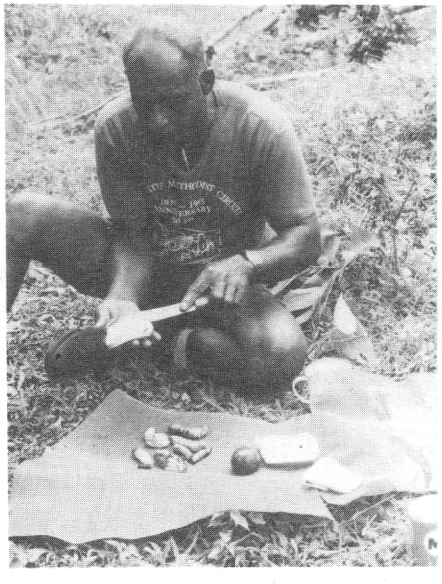

Inhabitants of the tropics eagerly search out "grubs" such as these Olethrius tyrannus larvae as a nutritious supplement to their diet. In these pictures Irami shows how it is done in Fijian style, complete with a tomato and buttered bread. GFB agrees with his forerunner, Dr Graeffe, that they are delicious. Inside the crisp skin (thin, prawn-like "shell") everything turns into a peanut butter-like consistency with a mild taste, resembling sweet almond. That the "Fijians have eaten heros out of existence", as some authors claim, is hopefully a fanciful fiction.

The range of host tree species is not known. It is probable that, like most prionines, the beetles are not strongly host-selective. Specimens of both X. heros and X. heyrpvskyi have been hacked out of dying mango (Mangifera indica L.) trees by Jona Uluinaceva (pers. comm.), and a specimen of X. heros was obtained from mango on Taveuni (M. Kamath, pers. comm.). Fergus Clunie (pers. comm.) reports taking Xixuthrus larvae from a dead standing rain tree (Albizia saman (Jacq.) F.V. Muell.) in Suva. As both these tree species were introduced to Fiji, they can not be the ancestral hosts. Larval galleries (recognised by their size) have also been located in the heartwood of large, dead, but unidentified, trees in the rain forest.

The reasons for the rarity of Xixuthrus in Fiji are not clear. The large larvae of prionines are used as food throughout Melanesia, and human predation may sometimes be enough to keep populations low (Linsley, 1959). In Fiji, the larvae and pupae of the prionine Olethrius tyrannus Thomson, are eaten (Plate 3), and the larvae of Xixuthrus mentioned above in a rain tree were taken home to eat (F. Clunie, pers. comm.). Although usually roasted over the embers of a fire, they are occasionally eaten raw by biting off the head and chewing up the rest. It seems to us unlikely that use of

Xixuthrus larvae as food, now or in the past, can explain its present rarity, although the rate of increase of the species must be very low. It is possible that logging activity, together with the effects of introduced predators (rats, mongooses and cats) have reduced the abundance of these spectacular animals.

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