

## DERMAPTERA AND ORTHOPTERA

By

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The Dermaptera and Orthoptera obtained by the Tanager Expedition from the small islands west of the principal Hawaiian islands, includes, with three exceptions, species probably introduced by man.

Two of these are crickets, known to have a wide Oceanic distribution: *Gryllus oceanicus* from French Frigate Shoals and *Litogryllus flavipes* from Wake Island. The third is a new and very striking species of the peculiarly Hawaiian genus of katydids, *Banza*, secured on the little known island of Nihoa.

From an orthopterological point of view it is clear that field work on such Hawaiian islands as Kahoolawe and Molokai, where little collecting has been done, should be rewarded by the discovery of additional new native species, each probably peculiar to the island on which it occurs.

## DERMAPTERA

## Family LABIDURIDAE

## Subfamily PSALINAE

**Anisolabis maritima** (Géné)

1832. *Forficula maritima* Géné, Ann. Sci. Nat. Regn. Lomb. Venet., Vol. 2, p. 244. [Nice, France; Genoa and Tuscany, Italy; along Mediterranean.]

French Frigate Shoals, June 23 and 26, 1923 (Bryan): 4 males, 10 females, 3 juv. Laysan Island, April 12-18, 1923 (Fullaway and Schlemmer): 4 females. Pearl and Hermes Reef, April 27, 1923 (Fullaway), 2 females, 3 juv. Gardner Rock, May 22, 1923 (Ball): 1 male. Johnston Island, July 17, 1923 (Bryan): 5 males, 12 females, 2 juv., some from dead birds. Wake Island, August 31, 1923 (Bryan): small juv., the only earwig taken on Wake Island.

This cosmopolitan species was probably introduced by the Japanese. The insect is abundant in Japan, but apparently has not yet been introduced to the principal Hawaiian islands.

**Euborellia annulipes** (Lucas)

1847. *Forficesila annulipes* Lucas, Ann. Soc. Ent. France, ser. 2, Vol. 5, p. LXXXIV. ["Jardin des Plantes, Paris" (probably introduced)].

Nihoa Island, June 11 to 14, 1923 (Bryan): 2 under stones, 1 on Euphorbia, 2 males, 2 females, 6 juv. Necker Island, June 17 to 29, 1923 (Bryan): 6 males, 20 females, 15 juv. French Frigate Shoals, June 22, 1923 (Bryan): 9 females, 1 juv. Laysan Island, April 9, 1923 (Fullaway): 1 juv. Pearl and Hermes Reef, April 27, 1923 (Fullaway): 2 males, 3 females, 1 juv. Midway, Eastern Island, April 27, 1923 (Fullaway): 2 females, 1 male, 2 juv. Johnston Island, July 14 and 17, 1923 (Bryan): 4 females, 1 juv.

This cosmopolitan species, though in some regions not reaching as far northward as *Anisolabis maritima* (Géné), is more generally distributed over its range and usually more abundant than that insect. It has been found generally abundant in Hawaii and has been reported previously from Laysan and Palmyra islands.

Most of the specimens here recorded are normal in coloration, a few have the antennae pale with annulus obsolete, while some specimens from Midway Island and Pearl and Hermes Reef are unusually pale in general coloration, the antennae very pale with no annuli and the limbs showing only faint traces of dark annuli. Most of these pale individuals were immature and all appear to have been teneral when captured, a feature strongly indicated in most specimens and may be the cause of the unusually pale coloration and lack of color contrasts. Like *A. maritima*, this insect was probably introduced by man.

#### ORTHOPTERA

##### Family TETTIGONIIDAE

##### Subfamily COPIPHORINAE

##### **Banza nihoa** new species (fig. 9)

This is much the largest species of the genus. It may be further readily distinguished from all previously known species by the great development of the organs of flight, the tegmina surpassing the apex of the abdomen and tapering strongly to their sharply rounded apices.

The brown phase of *B. nihoa* is separable by numerous features of coloration, but in the green phase only the distinctive dark proximal markings of the tibiae persist. These color phases might easily be mistaken for representatives of very differently colored species were the structural agreement not considered and Perkins' observations,<sup>25</sup> in the case of *B. parvula* (Walker), not noted.

##### Male

Size very large for genus, form robust. Fastigium feebly ascendant, with apex evenly rounded; ventral surface conically produced with apex rounded, not spiniform,

<sup>25</sup> Perkins, R. C. L., Orthoptera Supplement: Fauna Hawaiiensis, Vol. 2, p. 687, 1910.

overhanging the frontal costa and separated from it by a moderate interval. Pronotum moderately elongate, disc widening very feebly caudad; surface heavily and evenly more thickly impresso-punctate than genae and dorsal surface of head (the face is almost smooth), showing no irregular rugae as in other species of the genus. Tegmina surpassing apices of caudal femora by a considerable distance; tympanum opaque, covered by a network of very fine veinlets and its caudal margin bounded by a very delicate vein; lateral margins of tegmina converging strongly distad to the sharply rounded apex. Wings extending to distal portion of abdomen, but incapable of sustained flight. Ultimate tergite broad, with lateral apices produced, divergent, acute-angulate and decurved. Cerci of normal type for genus, each bent sharply

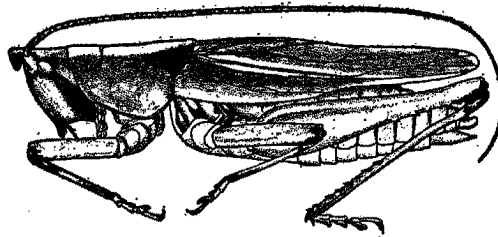


FIGURE 9. *Banza nihoa* new species, Nihoa Island, male, type, lateral view. (X1½)

inward distad with two tapering processes, each of which is armed at apex with a sharp spine, the dorsal process much the smaller, so that the point of its apical spine touches the ventral process mesad. Limbs heavy. Cephalic and median femora armed with a few minute teeth on ventro-cephalic margins. Caudal femora with ventral margins, particularly the internal, supplied with a number of slightly larger teeth. Caudal tibiae supplied with numerous small spines, those on the dorso-internal margins more numerous than those on the dorso-external margins.

#### Female

Larger and distinctly more robust than male. Tegmina and wings considerably more produced, the former reaches nearly to apex of ovipositor. Ultimate tergite produced in two acute-angulate projections, which are not divergent, with apices blunt and slightly incurved, its surface very deeply concave medio-longitudinally. Ovipositor straight, scarcely narrowed to the almost acute apex, unarmed. Limbs much as in male.

Coloration of brown phase. Type and one male paratype. Generally clay color with all but dorsal surface of fastigium shining blackish mummy brown. Suffusions of this color margin the face, this particularly heavy toward the clypeal suture and laterad below the eyes, the bases of the tibiae also marked with blackish mummy brown. A less decided suffusion of the same on the dorso-caudal portion of the pronotal lateral lobes, while the femora briefly and the tibiae extensively are similarly suffused distad. The median and caudal tibiae show conspicuous flecks of blackish mummy brown at the bases of the ventral spines, those at the bases of the dorsal spines of the former being much less decided.

Coloration of green phase. One male paratype and all females. Generally light grass green (faded to yellowish on body and proximad on limbs). Proximal tibial maculations, flecks at bases of spines and (usually but not always) a decided suffusion across clypeal suture alone remain of the striking brown markings which occur in the other phase.

Type (male): Nihoa Island, June 12, 1923, in bunch grass (Bryan);  
Allotype (female), Nihoa Island, June 16, 1923, in bunch grass (Bryan).

Type: Cat. No. 256, Bernice P. Bishop Museum.

MEASUREMENTS (IN MILLIMETERS)

	Length of Body	Length of Pronotum	Caudal Width of Pronotal Disk	Length of Tegmen	Length of Caudal Femur	Length Oviposit
<b>MALE</b>						
Type .....	34.2	10	5.8	28	22.2	
Paratype .....	32	10	5.8	27.3	22	
Paratype .....	34.2	10.4	5.9	28.8	23	
<b>FEMALE</b>						
Allotype .....	37.8	10.8	6.2	36.2	25	19.8
Paratype .....	38.7	10.7	6.2	35.3	24.3	18.8
Paratype .....	40.8	11	6.3	34.4	25.2	18.7

In addition to the described pair, there are two male and three female paratypes and an immature female, bearing the same data, except that a pair was collected by Cooke, and one female by Schlemmer.

[A single egg, probably belonging to this cricket, was found by Cooke in bunchgrass, Nihoa Island June 6, 1923. The egg is cylindrical, about 8 mm. long by slightly over 1 mm. in greatest diameter. It is pointed at both ends, one more acutely than the other; and the entire egg is slightly arched, so that one side forms an even bow curve from tip to tip, while the other is very slightly concave, almost straight. The color is close to Ridgway's "Buffy Brown (17''O-Y)"—Editor.]

CONCEPHALINAE

**Conocephalus saltator** (Saussure)

1859. *Xiphidium saltator* Saussure, Rev. et. Mag. de Zool., ser. 2, Vol. XI, p. 208. [Female, Guiana.]

Midway Island, April, 1923 (Fullaway): 1 male, 1 juv. female.

This insect, recently introduced on the island of Hawaii from tropical America, has rapidly increased its distribution and is now known to occur also on Oahu. It is, however, surprising to find that it has gained a foothold on the remote island from which it is here recorded.

[The carrying of earth from Honolulu, in which to plant trees and gardens at Midway Cable Station, may be responsible for the introduction of *C. saltator* and other common insects and weeds on Midway Island.—Editor.]

Response to a rigorous environment is apparently shown by the decided size reduction in the present specimen which measures as follows: length of

body, 11.9 mm.; length of pronotum, 3 mm.; length of tegmen, 5.4 mm.; length of caudal femur, 11.2 mm. Peruvian material, taken at an elevation of 3,000 feet in the Andes, is nearly but not quite as depauperate.

Family GRYLLIDAE

Subfamily GRYLLINAE

*Gryllus oceanicus* Le Guillou

1841. *Gryllus oceanicus* LeGuillou, Rev. Zool. 1841, p. 293. [Nukahiva, Marquesas.]

Widespread for a long time in Hawaii, this species is known to have an extensive distribution through Oceania, occurring also in Japan and Borneo.

Subfamily TRIGONIDIINAE

LITOGRYLLUS new genus

The new genus *Litogryllus* is erected to include three species which were described, as members of the genus *Trigonidium* Rambur, by Saussure. These are *tahitensis*, *flavipes* and *haani*, of which *flavipes* is selected as genotype. To this phylum, *I. pacificum* Scudder was also assigned by Saussure, that species being now placed in the distinct genus *Paratrigonidium* Brunner.

The genus may be separated from *Trigonidium* by the delicate and much less coriaceous tegmina, which are less convex and show nothing of an ovate tendency, with dorsal field bearing well separated longitudinal veins, connected by a few very feeble cross-veinlets (instead of showing very numerous and closely placed longitudinal veins) and general coloration which is not largely blackish and metallic.

The complete absence of stridulating field or stridulating vein readily distinguishes males of the present genus. Though the male genitalia show general similarity of type to that developed in the genus *Paratrigonidium*, affinity in most of characters is found to *Falcicula* Rehn.

The single described species of *Falcicula* is even smaller than *L. flavipes*, slightly more robust in form, with dorsal veins of tegmina more regularly longitudinal, cross-veinlets subobsolete and caudal tibial spines longer, the longest distinctly longer than the distance from its base to that of the next spine, while the male lacks a stridulating field on the tegmina but shows a distinct, transverse stridulating vein.

In *Litogryllus flavipes* (as shown by the Wake Island material) the tegmina show three lateral and five dorsal longitudinal veins, the two toward the costal margin irregular, due to the more frequent intersection there of cross-veinlets. The genus shows also the following noteworthy characters.

Head with dorsal surface sloping to the well rounded fastigio-facial angle. Maxillary palpi with fifth joint elongate trigonal, its sides straight, its apex transverse truncate. Wings absent. Paired genital valves of male prominent, with straight lateral projection, the dorsal margin rounded distad to the ventral apex. Ovipositor of female decidedly recurved, with apex sharp and margins in that portion very finely serrulate. Cephalic femora without auditory foramina. Caudal tibiae with three internal and three external spines, which are strongly alternating; three external spurs of which the median is the longest; two very much larger internal spurs, of which the dorsal is the longest. Caudal metatarsus approximating length of the two succeeding joints, armed only at apex with two stout spurs.

Great confusion in this subfamily of the Gryllidae is found, due to the supposition that presence or absence of auditory foramina on the cephalic tibiae was a certain index of generic difference. There is now convincing evidence<sup>26</sup> to show that this feature has no generic or even specific significance, and that *Homoeoxiphus insularis* Saussure is actually a synonym of *Litogryllus flavipes* (Saussure). Moreover *Homoeoxiphus tacitus* Saussure is probably a synonym of *Homoeoxiphus tahitensis* (Saussure). In both cases one name was based on the wingless phase (without auditory foramina), the other on the winged phase of the same species (with auditory foramina). We believe, however, that *Litogryllus* represents a genus distinct from *Homoeoxiphus* Saussure, with genotype *H. lycoides* (Walker), and is also distinct from the related genus *Metioche* Stål (synonym, *Piestoxiphus* Saussure), with genotype *M. vittaticollis* (Stål). As originally defined, however, the characters considered most important for their separation are now seen to be not even of specific value, while the features which are probably of generic importance were treated largely as of no more than specific value, if discussed at all.

General revision of the subfamily is urgently needed, but as yet no one collection contains a sufficient representation of the genotypic species to warrant such action.

#### ***Litogryllus flavipes* (Saussure)**

1878. *Trigonidium flavipes* Saussure, Soc. Geneve Mem., Vol. 25, p. 465, pl. 16, sect. XLVII, figs. 1, 2e, and 2i. [Male and female; Fiji; Samoa; Tonga; Australia.]

1878. *H[omoeoxiphus] insularis* Saussure, idem. p. 470. [Male and female; Fiji; Australia; Java.]

This synonymy is explained in the above generic discussion.

Wake Island, July 31, 1923 (Bryan): 20 males on *Boerhaavia*, others all on *Portulaca*; 4 males; 4 females, 10 juv. Wake Island, July 28 to Aug.

<sup>26</sup> Rehn, J. A. G. and Hebard, M., On the genus *Anexipha*: Ent. News, Vol. 23, p. 411, 1912.

5, 1923 (Bryan): pair on *Portulaca* and 4 males, 3 females, 6 juv. on *Sesuvium*; 7 males, 4 females, 6 juv.

In the present series a broad post-ocular suffusion of dark brown is continued caudad, covering most of the pronotal lateral lobes and lateral portions of the tegmina. In one male, however, this appears only as a fleck, ventro-cephalad on the lateral lobes of the pronotum. The antennal joints are usually dark brown. The head is usually marked conspicuously with dark brown, as follows: two longitudinal irregular bands on the occiput (continued on pronotum and there forming irregular maculations on the disk), broad and heavy bands margining the frontal costa and heavy fleck ventrad of the eye. These markings are subject to considerable individual variation, the sub-ocular spots sometimes connected transversely with the frontal costal markings, while a few specimens have the head generally pinkish brown instead of light yellowish buff, with markings much less conspicuous and more suffused.

Saussure originally described a number of color variations, but, though the coloration of the species is subject to decided variation, positive proof is not presented that all of his material, particularly that from Australia, actually represents but a single species, and the Fiji Islands are therefore selected as type locality for *L. flavipes*.