

**Description of the Male and the Pupa of *Aedes (Howardina)*  
*lorraineae* Berlin, with a Note on the *Quadrivittatus*  
Group (Diptera, Culicidae)<sup>1</sup>**

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*Aedes (Howardina) lorraineae* was described as a distinct species and, on the basis of correlated features of adult female and larva, was recognized as a member of the *Quadrivittatus* Group, others being the nominate form, *brevis* and *spinosus* (Berlin, 1969). Additional material of *lorraineae* was obtained from its type locality in 1970 for the project "Mosquitoes of Middle America" (Belkin, Schick, et al. 1965) and, therefore, it is now possible to describe and illustrate the hitherto unknown male and pupa. The method of presentation, terminology and abbreviations used in the description follow Belkin (1962).

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**MALE.** Wing: 3.7 mm. Proboscis: 2.67 mm. Forefemur: 2.17 mm. As described for the subgenus and group with the following diagnostic features. *Head:* Light decumbent scales on median stripe and short orbital line creamy to white. Erect scales creamy. Palpus long, subequal in length to proboscis, entirely dark scaled. Torus of antenna with a few creamy scales mesally. *Thorax:* Mesonotal light lines creamy to whitish; inner dorsocentral line complete; outer dorsocentral line complete, broadly joined anteriorly in fossa to entire lateral prescutal area and reaching to scutellum; lateral marginal line shorter, extending from scutal angle to wingbase. Scales on median scutellar lobe narrow, creamy; lateral lobes with a few narrow creamy scales. Scales on antealar area above paratergite creamy to whitish. Pleural scales white. Paratergite, *psp* and *apn* with moderately broad scales; scales on *ppn* predominantly broad, narrow ones restricted to upper margin; *stp* scales usually extending to *ppn* patch; other scale patches as in the group. *Legs:* Forefemur and midfemur predominantly dark anteriorly except for a few basal creamy scales, proximal 0.5 of posterior surfaces creamy, extending distally as a narrow line, rest dark; hindfemur creamy proximally to 0.6 on both sides, rest dark scaled. White knee spots on all legs.

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Tibiae dark scaled. Foretarsus with a few basal white scales on segment 1; midtarsus with short incomplete white rings on 1,2; hindtarsus with moderately broad white rings on 1-3, rest dark scaled. *Haltere*: Stem pale, knob predominantly white, with a few basal and dorsal dark scales. *Abdomen*: Tergites II-VII with basolateral silvery patches, rest dark. Sternites with basal V-shaped white patches, rest dark scaled.

**MALE GENITALIA** (fig. 1). As figured. Ninth tergite lobe distinct, wider than long, bearing 11-14 strong setae. Length of sidepiece 3.0 basal width, with bristles and scales on tergal and sternal surfaces. Claspette represented by a sternal basomesal lobe bearing an apical seta. Clasper about 0.5 of sidepiece, basal 0.4 lightly spiculate; spiniform short, about 0.2 of clasper. Aedeagus subequal in length to proctiger; dorsal sclerotization widely emarginate, producing distinct, narrow, slender lateral apical horns. Proctiger strongly developed, prominent; paraproct with a simple, heavily sclerotized, curved apical tooth; cercal setae distinct, short, 4-5 in number.

**PUPA** (fig. 1). Abdomen: 3.75 mm. Trumpet: 0.55 mm; index: 6.0-6.5. Paddle: 0.85 mm. As figured. *Cephalothorax*: Mesonotum between trumpets lightly pigmented, lateral areas slightly darker. Hairs 1-3 single; 4,5-C double, 5-C strong, about 2.0 of 4-C; hairs 6,8,9-C single, 7-C double. Trumpet strongly pigmented and distinctly contrasting with rest of cephalothorax. Metanotum moderately pigmented. *Abdomen*: Integument faintly imbricate, moderately pigmented progressively lighter caudad. Hair 1-II with 2-4 branches, 1-III-VII single; 2-IV-VII small, usually within basal 0.6 of its tergite; 5-IV,V strong, double, extending distinctly beyond apex of tergite following; 9-II,III laterad, 9-IV-VI distinctly cephalolaterad of hair 6; hair 9-VII double, moderately developed, about 0.5 of tergite length; 9-VIII strongly developed, 4-branched, at least 1.5 of tergite length. *Paddle*: lightly pigmented, midrib slightly darker; apex rounded; external margin serrate; hair 1 single, slender. Male genital lobe extending to 0.45 of paddle.

**DISCUSSION.** The males were reared from pupae collected near Ixtlan de Juarez, Oaxaca, Mexico, the type locality of *lorraineae*. Both larvae and pupae were found in association with those of *quadrivittatus* in the leaf axils of epiphytic bromeliads (MEX 517).

Of the 4 known species of the group, only *quadrivittatus* (Coq. 1901) has a wide distribution, occupying the entire known range. It is also the dominant species in terms of the number of individuals. Except *brevis* (Berlin, 1969) all the species breed in epiphytic bromeliads. The immature stages of *brevis* have been found in the leaf axils of terrestrial aroids, exhibiting ecological isolation from the closely related *spinosus* (Berlin, 1969).

All members of the *Quadrivittatus* Group are readily separated in the external morphology of the adults and the immature stages but, as in the majority of other groups of *Howardina*, the male genitalic differences between members of the group are tenuous. Revised keys to the group are given below. For details of the subgenus, Berlin's revision (loc. cit.) should be consulted.

*Aedes (Howardina) lorraineae* has been recorded only from Sierra Madre del Sur and Sierra Madre de Chiapas in Mexico at elevations of 2100 to 2200 meters.

KEYS TO SPECIES OF QUADRIVITTATUS GROUP

ADULTS

- 1. Outer dorsocentral line connected to lateral marginal line anteriorly ..... 2  
 Outer dorsocentral line shorter, not reaching lateral marginal line anteriorly ..... 3
- 2(1). Foretarsus with white scales on segments 1,2; *ppn* scales predominantly narrow, golden; *ssp* scales in a restricted linear patch not connected to *ppn* scales; outer dorsocentral line uniformly narrow ..... *quadrivittatus*  
 Foretarsus with white scales on segment 1 only; *ppn* scales predominantly broad, whitish; *ssp* scales extending toward *ppn* patch, the 2 patches usually connected; outer dorsocentral line wider in the fossal and lateral prescutal areas ..... *lorraineae*
- 3(1). Inner dorsocentral line narrow; scales on *psp* narrow ..... *brevis*  
 Inner dorsocentral lines moderately broad; scales on *psp* moderately broad ... *spinosus*

MALE GENITALIA

- 1. Ninth tergite lobe with 3-5 setae; dorsal sclerotization of aedeagus narrowly emarginate, producing wide lateral apical lobes ..... *quadrivittatus*  
 Ninth tergite lobe with at least 8 setae; dorsal sclerotization of aedeagus widely emarginate, producing narrow, slender, lateral apical horns ..... 2
- 2(1). Setae on IX tergite lobe 11-14 in number, approximate, arranged in a row; basal 0.3 of clasper lightly spiculose on inner margin; spiniform short, about 0.2 of clasper length ..... *lorraineae*  
 Setae on IX tergite lobe 8,9 in number, scattered; clasper not spiculose; spiniform longer, about 0.25 of clasper length ..... *brevis, spinosus*

PUPAE

- 1. Paddle distinctly emarginate at hair 1 ..... *brevis*  
 Paddle rounded or produced at hair 1 ..... 2
- 2(1). Paddle smoothly rounded apically; hair 10-C usually single, rarely double; 9-VIII usually 4-branched ..... *lorraineae*  
 Paddle slightly produced apically; hair 10-C multiple, at least triple (3-12); hair 9-VIII at least 5-branched (5-11) ..... 3
- 3(2). Hair 12-C usually double ..... *spinosus*  
 Hair 12-C usually single ..... *quadrivittatus*

## LARVAE

1. Siphon without hairlike spicules visible at 100X; hair 12-C double . . . . . 2  
 Siphon distinctly spiculate at 100X; hair 12-C multiple, at least 4 branches (4-12) . . . . . 3
- 2(1). Hair 3-X single; 9-C at least triple (3-6); hair 6-C with at least 5 branches (5-11) . . . . .  
 . . . . . *quadrivittatus*  
 Hair 3-X double; 9-C double; hair 6-C usually triple. . . . . *lorraineae*
- 3(1). Siphon short, index about 2.0; hair 5-C at least 10-branched (11-22) . . . . . *brevis*  
 Siphon longer, index about 3.0; hair 5-C usually 6-branched (4-8) . . . . . *spinus*

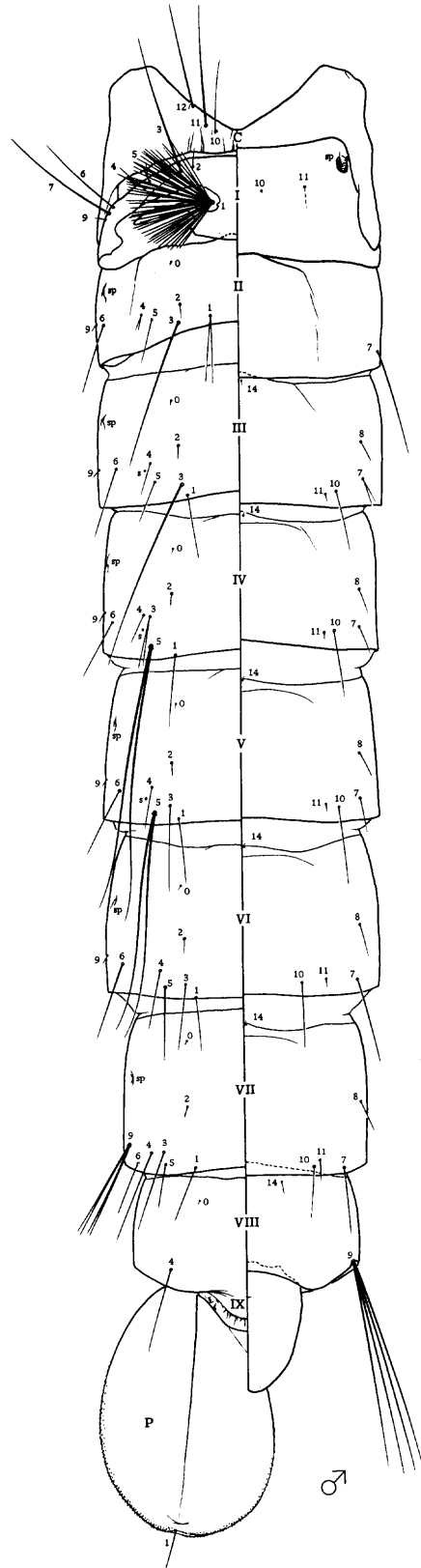
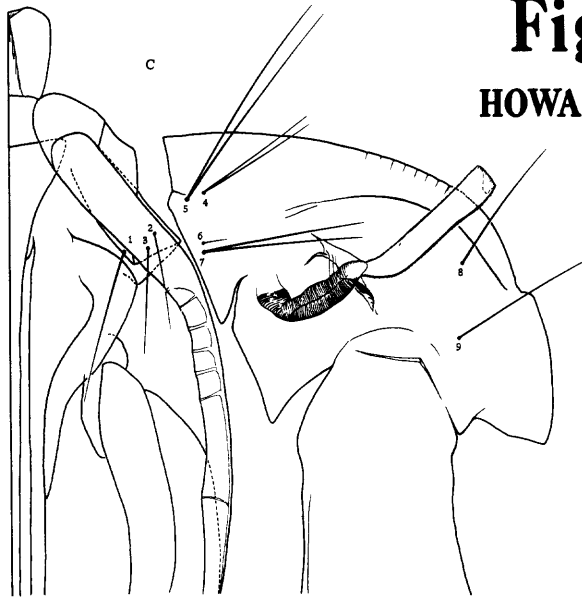
## FIGURE

1. Male genitalia and pupa of *Aedes (Howardina) lorraineae*.

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**Fig. 1**  
**HOWARDINA**



**lorraineae**

MEX 517  
Ixtlan de Juarez  
Oaxaca  
Mexico

