PAN-PACIFIC ENTOMOLOGIST
65(1), 1989, pp. 68–73

Neonemobius eurynotus (Rehn and Hebard) (Grylloptera: Trigonidiidae: Nemobiinae), a Cricket of the San Francisco Bay Area, California

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Abstract.—The nemobiine cricket, *Neonemobius eurynotus* (Rehn and Hebard, 1918) is compared with other species of *Neonemobius.* This species has been known only from the female holotype. The male sex is described.

Weissman and Rentz (1978) recorded and discussed the saltatorial orthopteroid fauna of Jasper Ridge, a Biological Preserve of Stanford University, and neighboring Palo Alto, California. Included was a nemobiine cricket, *Neonemobius eurynotus* (Rehn and Hebard, 1918). The species was described from a single female from Berkeley and was not seen again until the report of Weissman and Rentz (1978). The male has not been described.

Superficially the cricket looks like *Modicogryllus* but comparison of females with the unique holotype (Academy of Natural Sciences, Philadelphia, type H472) showed clearly that it is *N. eurynotus.* The ovipositor of the holotype is badly worn so that the teeth on the dorsal valve are missing (Rehn and Hebard, 1918: 103, fig. 2). A normal ovipositor is shown in Figure 1. The dorsal aspect of the holotype (Rehn and Hebard, 1918:103, fig. 1) shows all legs present; when examined during the present study all right legs were missing (Fig. 2b). In all other respects the Palo Alto specimens and the holotype are almost identical.

Rehn and Hebard (1918) considered its closest relative to be *Brachynemobius panteli* Hebard, a Mexican species, but that more specimens would be required to determine whether *eurynotus* should be assigned to a different genus. It resem-

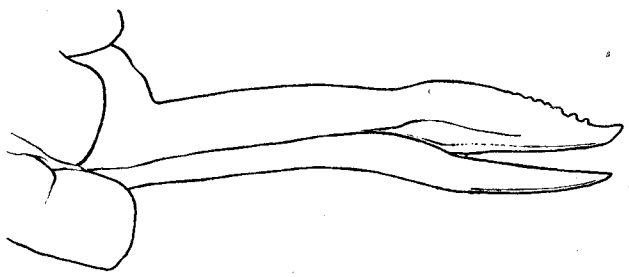

Figure 1. *Neonemobius eurynotus,* ovipositor.

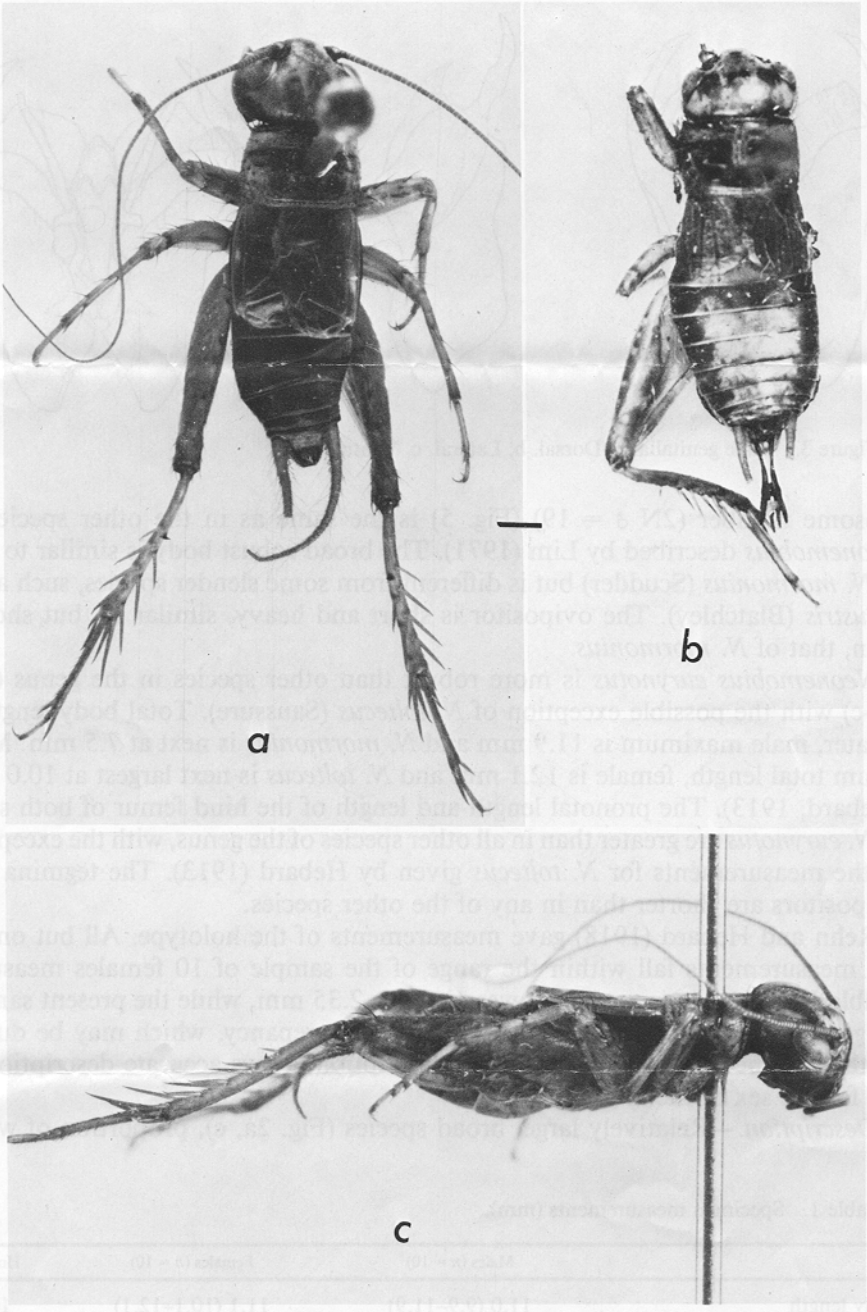

Figure 2. Photographs, *Neonemobius eurynotus*. a. Male, Palo Alto, California, dorsal. b. Female holotype, Berkeley, California, dorsal. c. Male, lateral.

bles *B. panteli* in some respects but differs in others and is here placed in the genus *Neonemobius* Hebard, 1913.

The male genitalia (Fig. 3a–c), the tibial spines and the distal spurs of the hind tibia (Fig. 4a, b) are similar to those of other species of *Neonemobius*. The chro-

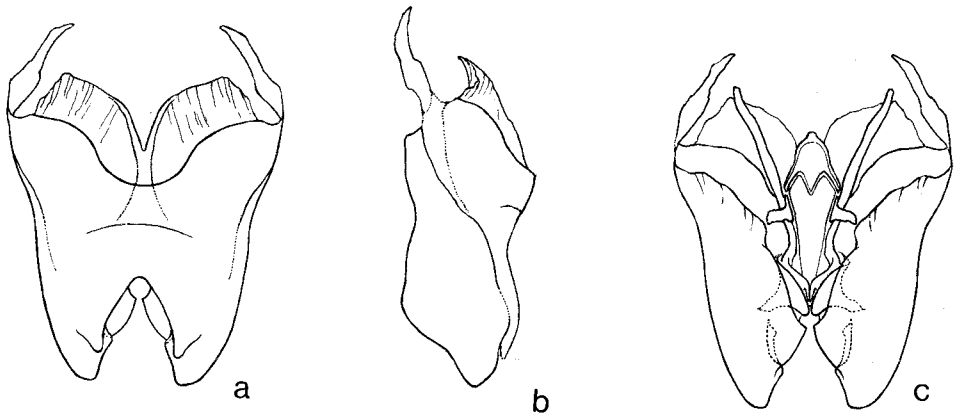

Figure 3. Male genitalia. a. Dorsal. b. Lateral. c. Ventral.

mosome number (2N ♂ = 19) (Fig. 5) is the same as in the other species of *Neonemobius* described by Lim (1971). The broad robust body is similar to that of *N. mormonius* (Scudder) but is different from some slender species, such as *N. palustris* (Blatchley). The ovipositor is short and heavy, similar to, but shorter than, that of *N. mormonius.*

Neonemobius eurynotus is more robust than other species in the genus (Fig. 2a–c) with the possible exception of *N. toltecus* (Saussure). Total body length is greater, male maximum is 11.9 mm and *N. mormonius* is next at 7.5 mm. Maximum total length, female is 12.1 mm and *N. toltecus* is next largest at 10.0 mm (Hebard, 1913). The pronotal length and length of the hind femur of both sexes of *N. eurynotus* are greater than in all other species of the genus, with the exception of the measurements for *N. toltecus* given by Hebard (1913). The tegmina and ovipositors are shorter than in any of the other species.

Rehn and Hebard (1918) gave measurements of the holotype. All but one of the measurements fall within the range of the sample of 10 females measured (Table 1). The ovipositor length was given as 2.35 mm, while the present sample ranges from 1.8 to 2.2 mm. Other than this discrepancy, which may be due to method of measurement, the original description allows accurate description of the female sex of the species.

Description.—Relatively large, broad species (Fig. 2a, c), proportion of width

Table 1. Specimen measurements (mm).

	Males (n = 10)	Females (n = 10)	Holotype[1]
Body length	11.0 (9.9–11.9)	11.1 (10.1–12.1)	10.0
Head length	2.0 (1.7–2.2)	2.0 (1.8–2.1)	—
Head width	3.0 (2.7–3.2)	2.9 (2.6–3.1)	3.1
Pronotum length	1.8 (1.7–1.9)	1.8 (1.7–2.1)	1.95
Pronotum width	2.8 (2.6–3.1)	2.7 (2.5–3.0)	3.0
H. femur length	5.2 (5.0–5.4)	5.1 (4.6–5.6)	5.5
H. tibia length	3.9 (3.6–4.4)	3.8 (3.1–4.2)	4.2
Tegmen length	2.8 (2.5–2.9)	2.1 (1.9–2.4)	2.15
Ovipositor length		2.0 (1.8–2.2)	2.35

[1] Measurements of female holotype from Rehn and Hebard (1918).

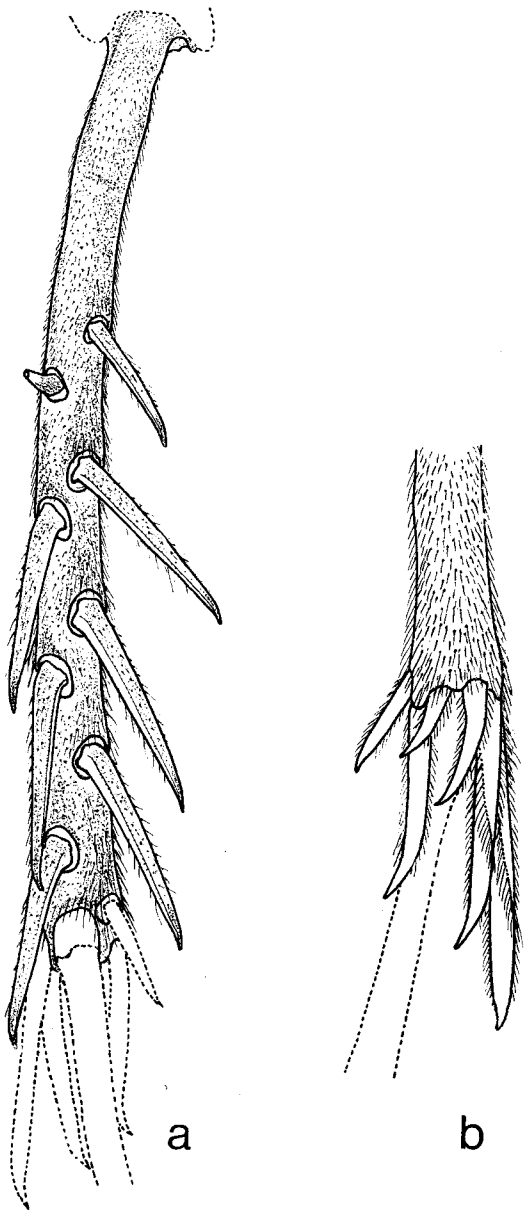

Figure 4. Hind tibia. a. Tibial spines. b. Distal spurs.

to length (Table 1) greater than for other North American nemobiine genera. Head large, rounded, distinctly broader than pronotum. Pronotal width slightly less than twice the length; pronotum rounded; anterior and posterior widths about equal, sides subparallel. Tegmina short, less than one and one-half times longer than pronotum. Wings reduced to very small lateral pads. Eyes small in dorsal aspect, not protruding; antennae very long, about one and one-half times body length, mostly pale, darker apically; distoventral spurs of hind tibiae typical of the genus *Neonemobius,* unequal in length, the interior spur longer (Fig. 4b).

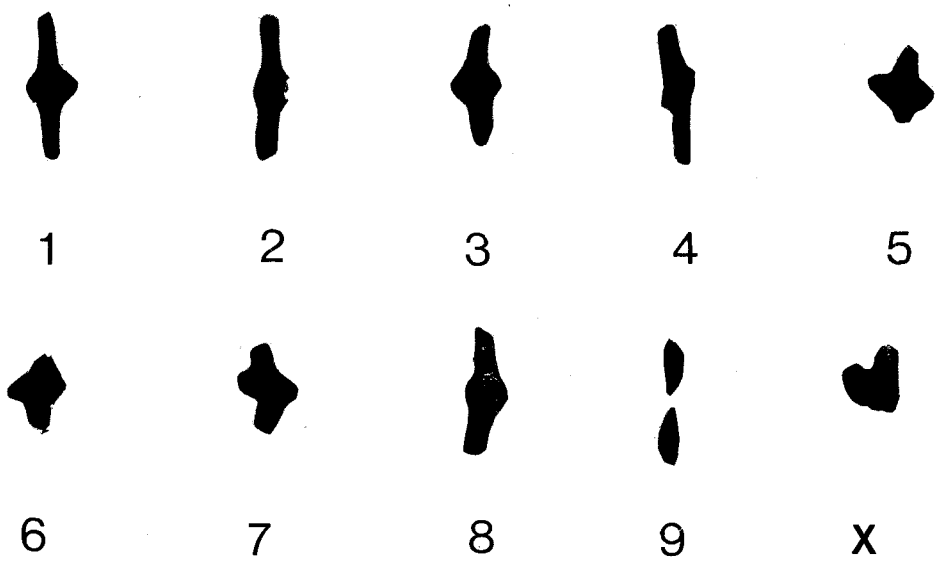

Figure 5. Karyotype of *Neonemobius eurynotus.*

Description of male.—Characteristics of male stridulatory file as in Table 2.

Hind tibiae with four internal and three external spines plus the glandular spine, this conical and nearly black (Fig. 4a).

Male genitalia (Fig. 3a–c) subquadrate, tapering on distal two-thirds; anterior margin of dorsal epiphallic plate with relatively shallow median U-emargination (shallower than in most nemobiines); transverse epiphallic sulcus anterior in position; distal part of dorsal epiphallic plate long and flat with deep distal median V-emargination; rami long and slender with terminal processes broad, ventral processes blunt; mesal lobes curved posteriorly.

Color: Front of face dark brown beneath eyes and extending as a dark triangle dorsally between eyes to include at the apex the dorsal ocellus; area above antennae to middle of eyes pale; dorsum of head brown with very small darker spots and pale blotches, cut by four longitudinal paler lines extending to the occiput, the outer two lines beginning at the inner margins of the compound eyes; labial palps pale; maxillary palps generally pale with apical half of apical segment infumate, brownish.

Pronotum pale brown, with two narrow triangular darker areas, with apices directed laterally, and two raised, darker, brownish areas posterior to the triangles. Wings hyaline. Legs pale brown with long, thin black spines, except those of hind tibiae which are pale, robust and very long in both sexes, not short and heavy as stated by Rehn and Hebard (1918).

Table 2. Characteristics of male stridulatory file (n = 8).

No. of teeth	160.25	(148–175)
Length of file (mm)	0.99	(0.80–1.15)
No. of teeth/mm	163.8	(143–200)

Abdomen medium brown above with two longitudinal broad pale stripes laterally on each segment but these are much less distinct than in females; cerci pale brown.

Cytology

The cytology of two male crickets from Palo Alto, Santa Clara County, was examined. Diakinesis-metaphase I preparations show a total of 18 autosomes, all of which appear to be telocentric, plus an XO/XX sex chromosome system, which gives 2N ♂ = 19 and 2N ♀ = 20 elements (Fig. 5) as in other species of *Neonemobius* (Lim, 1971). The X is a rather large chromosome. One of the autosomal elements (No. 9 in Fig. 5) is much smaller than the others and separates earlier. Most bivalents form only a single chiasma, frequently interstitially or distally located.

Desutter (1987) has clarified the general classification of the Grylloidea. We agree with her in placing the Nemobiinae as a subfamily of the Trigonidiidae rather than of the Gryllidae.

Acknowledgments

The specimens will be returned to the California Academy of Sciences, San Francisco. The first author owes thanks to the late Dr. H. R. Roberts, Academy of Natural Sciences, Philadelphia for the loan of the holotype of *Neonemobius eurynotus*. Thanks also to Dr. P. G. Fontana for the photographs of the chromosomes and to Mr. Pierre Langlois for photographs of specimens.

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