

**Rediscovery of the Unusual Genus *Ormiscocerus*  
(Neuroptera: Berothidae: Cyrenoberothinae)**

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***Ormiscocerus nitidipennis*, the type species of the genus *Ormiscocerus* Blanchard, 1851, is redescribed after 155 years of uncertainty as to exactly what it was that Blanchard had before him. Our description is based on new male specimens. Based on this new material, we are now able to place the genus in a phylogenetic context, referring it to the neuropteran clade that includes the most primitive known berothids. A neotype for *Ormiscocerus nitidipennis* Blanchard is designated.**

In 1851, Charles Émile Blanchard described a new species of neuropteran, in what was then the broadly defined Hemerobiidae, from Claudio Gay's collection of Chilean insects. The description was accompanied by a detailed habitus drawing, which is reproduced here (Fig. 1). Even allowing for early artistic inaccuracies, this was a most unusual species with small size, prognathous mouthparts, antennae inserted anterior to the eyes, elongate pronotum, expanded forecoxae, and rounded tips to the wings. Brauer (1866) suggested that this species might be more closely related to *Raphidia*, probably because of the prognathous mouthparts and elongate pronotum. The description had been based on an unspecified number of specimens. Gay's Collection is now housed in the Muséum National de Histoire Naturelle, Paris (NMHN), but a search for the type specimen(s) of this species by John Oswald in 1989 proved unsuccessful (Oswald 1993). Because of this, in his 1993 revision of the family Hemerobiidae, Oswald chose to retain *Ormiscocerus nitidipennis* Blanchard as an *incertae sedis* within the Neuropterida.

In 1999, Monserrat and Deretsky described a new species of Hemerobiidae from Chile, *Berothimerobius reticulatus*, with several unusual features. They compared it to *Ormiscocerus nitidipennis*, and surmised that *Ormiscocerus* might be a berothid. They, too, mentioned that the type(s) of *Ormiscocerus nitidipennis* had been lost. Also, in two trips to study the Neuroptera collection of the Paris Museum, one each in 1980 and 1999, NDP could not find the type(s) of *Ormiscocerus nitidipennis* and subsequent e-mails to the curator at the Paris Museum have gone unanswered.

In recent Malaise trap samples sent by Michael E. Irwin to SLW from Chile, there is a male specimen of what appears to be *Ormiscocerus nitidipennis*. In going through Phil Adams' correspondence, NDP came across a rather detailed wing drawing sent to Adams of a second Chilean male specimen that appears quite similar to the one sent to SLW. The second specimen was located in the collection of Ellis MacLeod (now in the possession of John D. Oswald at Texas A&M University).

Based on the confusion surrounding the identity of this species, the apparent loss of the original type(s), and the recent discovery of two new specimens, we take this opportunity to designate

a neotype for *Ormiscocerus nitidipennis*, redescribe the species, and place it in a phylogenetic context.

### MATERIALS AND METHODS

The specimen that we shall designate below as the neotype is preserved in a vial of 95% ETOH. The second specimen has been disarticulated and is preserved in four microvials of glycerin as follows: (1) head and left wings; (2) right wings; (3) abdomen; and (4) gut contents. The abdomen of the neotype has been stained with Chlorazol Black E for 20 minutes.

All observations were made with the aid of a 50X Olympus dissecting microscope.

### Genus *Ormiscocerus* Blanchard

TYPE SPECIES: *Ormiscocerus nitidipennis* Blanchard in Gay, 1851:129, Plate X, fig. 11.

**DIAGNOSIS.**— Head prognathous. Antennal flagellomeres reduced to 18. Pronotum longer than wide. Forewing with one radial sector; Sc and R broadly separated, with 10 subcostal crossveins; apex of veins enlarged and darkened; apical margin of wing rounded. Recurrent humeral crossvein reduced to a basally directed branched crossvein. Male genitalia reduced to two sclerites: a thin, arched gonarcus; and a pair of thin apically elbowed parameres that almost fuse medially, with only a thin membrane separating the two parameres apically.

**INCLUDED SPECIES.**— *O. nitidipennis* Blanchard, 1851; Chile.

### *Ormiscocerus nitidipennis* Blanchard, 1851

**TYPE.**— NEOTYPE: male labeled *Ormiscocerus nitidipennis* Blanchard (Figs. 2–6): “CHILE. Region IV, Elqui Prov.,/ Quebrada El Arrayán, 10 km S[outh of]/ La Villa; malaise in dry wash;/ 5-X-2003, M.E. Irwin, 400 m./ 30°04.26’S, 71°00.04’W.” Deposited in California Academy of Sciences, San Francisco.

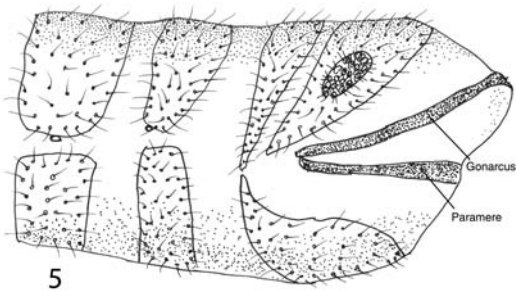
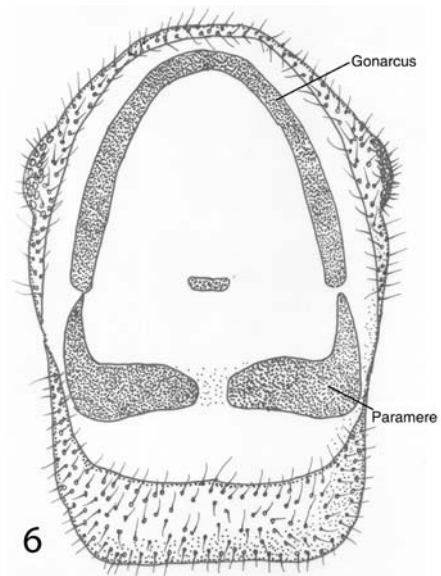
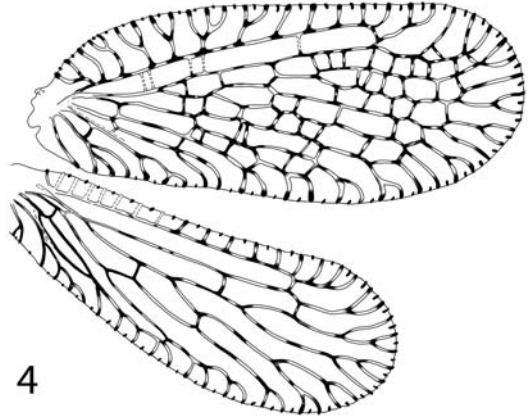
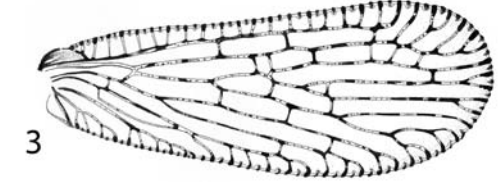
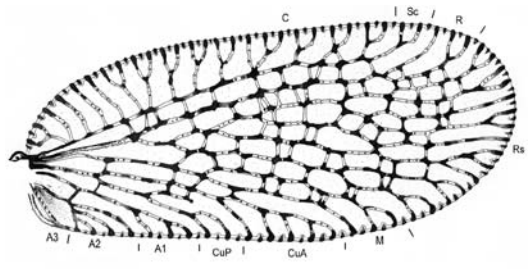
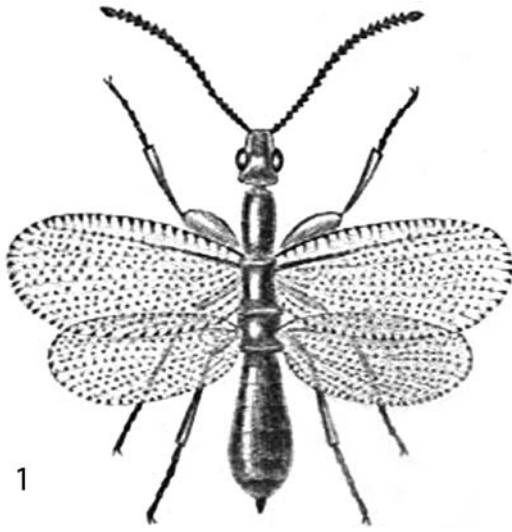
**HEAD.**— Prognathous, black. Mouthparts very short. Mandibles black, extended laterad and just beyond tip of pale labrum; tip curved medially. Maxillary palpi four-segmented, last segment tapered to point. Clypeus with two lateral pair of small setae along ventral margin. Labium short, extended only to anterior margin of compound eye; labial palpi dark, three-segmented, apical segment tapered to point. Frons dark brown with small white spot at medial margin of eyes. Compound eyes small. Occiput dark, covered with small coarse chalazate setae; coronal suture not visible. Ocelli absent. Length of head behind eyes about as long as eye length, not elevated. Antennal bases between eyes; scape and pedicel dark, about twice as long as wide, covered with sparse, stout spines. Flagellum with 18 flagellomeres, basal flagellomeres dark basally and pale apically.

**THORAX.**— Pronotum slightly longer than wide; dark brown with thin white medial stripe interrupted twice at mid-length; pronotum with numerous chalazate setal bases. Premesoscutum narrow, strap-like, dark brown with white marks at mid-line and lateral margins; mesoscutum dark brown with four white spots; mesoscutellum dark brown, unmarked. Metanotum dark brown, unmarked. Pleural and sternal regions mottled pale brown with dark brown margins along sutures.

**LEGS.**— Pale yellow. Forecoxae large, cylindrical, longer than either femur or tibia, with

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FIGURES 1–6. (1) *Ormiscocerus nitidipennis* Blanchard in Gay. Original habitus drawing reproduced from Blanchard (1851). (2) *Ormiscocerus nitidipennis* Blanchard in Gay. Habitus photograph of neotype by S. Winterton. (3) *Ormiscocerus nitidipennis* Blanchard in Gay. Neotype male, fore and hindwings. Forewing length = 3.8 mm. Abbreviations: C, costal vein; Sc, subcostal vein; R, radial vein; Rs, radial sector; M, medial vein; Cua, anterior cubital vein; Cup, posterior cubital vein; A1–A3, anal veins. Drawing courtesy of S. Winterton. (4) *Ormiscocerus nitidipennis* Blanchard in Gay. Second male (Punta Molles), fore and hindwings. Drawing courtesy of V. Saxe. (5) *Ormiscocerus nitidipennis* Blanchard in Gay, male terminalia, lateral view. Drawing by N. Penny. (6) *Ormiscocerus nitidipennis* Blanchard in Gay, male genitalia, caudal view. Drawing by N. Penny.



numerous short, dark setae. Mid- and hind coxae much shorter, with sparse dark setae. Front and hind femora pale with dark setal spotting and numerous long dark setae. Middle legs detached from body, one missing. Front and hind tibiae pale, elongate, cylindrical, with numerous long dark setae. Tibial spurs absent. Tarsi with five tarsomeres, basal four tarsomeres pale, apical tarsomere dark, with two small, untoothed tarsal claws.

**WINGS.**—Forewing length 3.8 mm. Wing membrane gray. Forewing parallel-sided with rounded apex; costal area wide (at widest, one-third of entire wing width); recurrent vein absent; all veins swollen and darkened at wing margin (Figs. 2–3). Longitudinal veins and crossveins pale, with intersections and forks dark. Subcosta (Sc) widely separated from radius (R); with ten subcostal crossveins. One radial sector, with five branches. Anterior media (MA) only one-branched. Posterior media (MP) branched only in apical half. Cubitus (Cu) branched basally. First anal vein (1A) and second anal vein (2A) both branched. Third anal vein (3A) very short, unbranched. Apical crossveins not lined up in clear gradate series. Hindwing widest apically, with three subcostal crossveins. R with two branches. Six R-Rs crossveins. One basal R-M crossvein at origin of radial sector (ORs). Two additional R-M crossveins more distally. M forked slightly distal to level of ORs. Anterior Cu (CuA) unbranched. Posterior Cu (CuP) apically fused with CuA. 1A and 2A only with marginal forks.

**ABDOMEN.**—Sclerites brown with pleural membrane white; sclerites densely covered with stout dark setae with thick, conical bases. First five sternites with annular groove at mid-length. Eighth and ninth tergites and sternites unfused. Ninth sternite not elongated, unmodified. Ectoprocts not fused, not elongated, not modified, caudal margin evenly rounded.

**MALE GENITALIA.**—Highly simplified, with only two components: a dorsal, vertical, thin arched gonarcus without lobes or expansions, and a pair of ventral, horizontal, thin, elbowed parameres (gonocoxites) that are slightly expanded apically and membranous at the midline (Figs. 5–6). Anteriorly the bases of gonarcus and parameres articulate with one another. Mediuncus absent.

**ADDITIONAL MATERIAL STUDIED.**—CHILE: **Aconcagua Province:** Punta Molles, first week of November, 1971, 1 male, D. Janzen (E.G. MacLeod Collection, Texas A&M Univ.).

## DISCUSSION

The characteristics cited in the original description of *Ormiscocerus nitidipennis* that lead us to believe that the two specimens we have studied represent the same species include the highly reduced number of antennal flagellomeres, the very rounded wings, and the darkened, swollen apices of wing veins. The original drawing appears to show a single radial vein, widely separated from the Sc, but this is open to interpretation. The most striking feature of the neotype (Fig. 2) is the alternating black and white pattern along the wing veins and at the wing margin. This is caused, in part, by the swelling and darkening of the apex of each wing vein. This feature is clearly depicted in Blanchard's original illustration (Fig. 1). The neotype specimen currently before us is certainly more accurately depicted by the original description and illustration than any other form that we have seen, and we have, thus, concluded that this specimen from Quebrada El Arrayán is conspecific with *Ormiscocerus nitidipennis*.

The two studied specimens differ in several respects. The neotype is a relatively recently collected specimen and the alternating black and white pattern of body and wings is striking. The second specimen (Fig. 4) is an older specimen and it shows a less contrasting pattern; it is rather drab brown and apparently faded. The neotype has several more subcostal crossveins than the second specimen, but when crossveins are numerous, variation is usually greater. The forewing vein  $R_1$  of the neotype progresses almost in a straight line to the apical margin, whereas forewing vein  $R_1$  of



the second specimen dips posteriorly beyond the last subcostal crossvein. The many crossveins and apical twigs have somewhat different placement in the two specimens. These differences individually are not usually significant, but taken in aggregate might signify separate species. On the other hand, because no differences could be found in the male genitalia, we have decided, tentatively, to include the second specimen as a variant of *Ormiscocerus nitidipennis*.

There are several unique characteristics of this species that make it immediately recognizable. The mouthparts are prognathous. The antenna, with scape, pedicel, and flagellum consists of only 20 segments. The pronotum is quadrate and longer than wide. Wings are short, broad, and apically rounded, with large nodules at the ends of the veins. Most distinctive are the single radial sector in the forewing and the simplified elements of the male genitalia.

On the other hand, some features that appear in the original description and habitus drawing are not present in our specimens: the antennae are inserted between the eyes, not farther forward on the frons; the pronotum is not as elongate as depicted in the original illustration; the forecoxae are not greatly swollen, but rather are normally enlarged, as with other berothids; and the abdomen is cylindrical, not expanded caudally. These apparent discrepancies may be attributable to the small size and somewhat “stylized” rendering of the original drawing.

Superficially, this form appears similar to species of *Nusalala* that have been described from high altitudes in Colombia (Penny and Sturm 1984) and Costa Rica (Oswald 1997) in that the wings are small, short and rounded with reduced recurrent vein, the veins are thickened, and the gradate series are not well aligned. However, the prognathous mouthparts, single radial sector and thin, unelaborated gonarcus and parameres and lack of a developed mediuncus clearly place this species in another group.

Only one species of hemerobiid, *Adelphohemerobius enigmaramus* Oswald, has a single radial sector. It is a much larger form with recurrent vein, distally tapered wings and no swelling of vein apices. Only a single female of *A. enigmaramus* is known, so that terminalia cannot be compared. Oswald (1994) considered it to be the most primitive hemerobiid known at the time and placed it in a separate subfamily, the Adelphohemerobiinae. Oswald also considered placing *Adelphohemerobius* in a separate family but decided that “its possession of a habitus generally similar to that of other hemerobiids (e.g., in size, coloration, wing shape and body form), as well as its possession of several of the autapomorphies attributed by Oswald (1993a) to the hemerobiid stem lineage (i.e., the stem of the clade Hemerobiidae), argue for its inclusion in a slightly expanded concept of the Hemerobiidae.” (Oswald 1994:300–301)

The prognathous mouthparts, trichosors and setal tufts of the wings, the hindwing with oblique sinuous piece of MA, and especially the male genital elements suggest that *Ormiscocerus* belongs in the berothid subfamily Cyrenoberothidae. The separation of the male ninth tergum from the ectoproct and distinct presence of lateral parameres are significant.

Although *Berotherobius reticulatus* (tentatively placed in Hemerobiidae) has a second radial sector, which is not normally found in Berothidae, the wing shape, size, and venation are similar to that of *Ormiscocerus nitidipennis*. Illustrations of the female genitalia of *B. reticulatus* (Monserat and Deretsky 1999, figs. 34–35) are similar to illustrations of female genitalia of *Cyrenoberotha penai* (MacLeod and Adams 1967; figs. 15–16). Although it is not possible to compare head and antennae of the two forms, it seems probable that *Berotherobius* and *Ormiscocerus* are closely related and belong in the berothid subfamily Cyrenoberothinae.

All four of the mentioned genera are known only from Chile and *Adelphohemerobius*, *Berotherobius* and *Ormiscocerus* are known from a combined total of only four specimens (excluding the original type of *Ormiscocerus*).

Recent studies of neuropteran phylogeny (Aspöck 2001; Winterton 2003) place Hemerobiidae

and Berothidae together in the same clade with Rhachiberothidae and Mantispidae. The wing shape, presence of trichosors, number of forewing radial sectors, and presence of parameres are all primitive character states that tend to merge in these basal genera making familial placement more difficult. The elongated state of the mediuncus is a derived feature that unites *Cyrenoberotha* (Berothidae) and Platymantispinae (Mantispidae). The presence of raptorial forelegs is a derived state uniting Rhachiberothidae and Mantispidae. The absence of these derived characters, as well as the single radial sector, help define *Ormiscocerus* and it may be considered the most generalized living member of this clade.

#### ACKNOWLEDGMENTS

We would like to thank John D. Oswald for help in locating the Punta Molles specimen of *Ormiscocerus* and for discussion of hemerobiid morphology. We would also thank him for setting up the online Neuroweb site, which makes finding literature and included species so much easier. We wish to thank Victoria Saxe for the wing drawings of the neotype.

#### LITERATURE CITED

- ASPÖCK, U. 2001. Phylogeny of the Neuropterida (Insecta: Holometaboloa). *Zoologica Scripta* 31:51–55, 1 fig.
- BLANCHARD, C.É. 1851. Mirmeleonianos and Rafidianos. Pages 119–129 and 129–135 (respectively) in C. Gay, ed., *Historia Fisica y Política de Chile. Zoología*, vol. 6. E. Thunot y Co., Paris, France. (7 Neuropterida fig..)
- BRAUER, F. 1866. Zusätze und Berichtigungen zu Hagen's Hemerobidarum Synopsis Synonymica und Beschreibung einer neuen Nymphiden-gattung: *Myiodactylus osmyloides* aus Australien. *Verhandlungen der Kaiserlich-Königlichen Zoologische-Botanischen Gesellschaft in Wien* 16:983–992.
- MACLEOD, E.G., AND P.A. ADAMS. 1967[1968.02.20]. A review of the taxonomy and morphology of the Berothidae, with the description of a new subfamily from Chile (Neuroptera). *Psyche* 74:237–265, 25 figs.
- MONSERRAT, V.J., AND Z. DERETSKY. 1999. New faunistical, taxonomic and systematic data on brown lacewings (Neuroptera: Hemerobiidae). *Journal of Neuropterology* 2:45–66, 39 figs.
- OSWALD, J.D. 1993. Revision and cladistic analysis of the world genera of the family Hemerobiidae (Insecta: Neuroptera). *Journal of the New York Entomological Society* 101:143–299, 222 figs., 10 tables, 5 appendices.
- OSWALD, J.D. 1994. A new phylogenetically basal subfamily of brown lacewings from Chile (Neuroptera: Hemerobiidae). *Entomologica Scandinavica* 25:295–302, 8 figs., 1 table.
- OSWALD, J.D. 1997 [1996]. A new brachypterous *Nusalala* species from Costa Rica, with comments on the evolution of flightlessness in brown lacewings (Neuroptera: Hemerobiidae). *Systematic Entomology* 21:343–352, 8 figs., 1 table.
- PENNY, N.D., AND H. STRUM. 1984. A flightless brown lacewing from Colombia (Neuroptera: Hemerobiidae). *Spixiana* 7:19–22, 6 figs.
- WINTERTON, S.L. 2003. Molecular phylogeny of Neuropterida with emphasis on the lacewings (Neuroptera). *Entomologische Abhandlungen, Staatliches Museum für Tierkunde in Dresden* 61:158–160.