



Revision of the New World leafhopper genus *Neozygina* Dietrich & Dmitriev (Hemiptera: Cicadellidae: Typhlocybinae: Erythroneurini)

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Abstract

The New World erythroneurine leafhopper genus *Neozygina* Dietrich & Dmitriev is revised based on comparative morphological study, and a key for identification of adult males is provided. Twenty-five valid species are recognized, nine of which were previously described and 16 of which are new. One new synonymy is recognized: *Neozygina davisi* (Beamer) equals *N. arida* (Beamer), new synonym. The known range of the genus extends from the U.S.A. to Chile and Argentina.

Key words: *Erythroneura*, *Zygina*, taxonomy, morphology, identification

Introduction

Dietrich and Dmitriev (2006) reviewed the New World genera of the leafhopper tribe Erythroneurini, erecting a new genus, *Neozygina*, to include North American species placed by previous authors in the informal “*Zygina ceonothana* species group” (Young 1952), and following Dworakowska’s (1970) concept of *Zygina* Fieber, which includes only Old World species. Species of *Neozygina* differ from other New World Erythroneurini in having both dorsal and ventral appendages present on the male pygofer, one or more macrosetae just basad of the dorsal appendage on the pygofer margin, and a pair of conspicuous black spots on the crown.

The few available host records indicate that species of the genus feed on shrubs or herbaceous vegetation, including grasses. This habit is unusual for New World Erythroneurini, most species of which appear to feed on trees, but is similar to that of the superficially similar European genus *Arboridia* Zachvatkin and many other Old World erythroneurines.

Although all previously known *Neozygina* species are recorded from North America, the vast majority from the western U.S.A., examination of specimens from North American collections and recent sampling in the Neotropical region indicate that the range of the genus extends southward to Chile and Argentina, and that many species remain undescribed. In this paper, we review the previously described species included in the genus (Dietrich and Dmitriev 2006) and describe 16 new species. More intensive sampling in the Neotropics will undoubtedly reveal additional undescribed species of *Neozygina*.

Morphological terminology follows Dietrich and Dmitriev (2006). Specimens examined are housed in the following collections: Canadian National Collection, Ottawa (CNC); Illinois Natural History Survey, Champaign (INHS); U.S. National Museum of Natural History, Washington (USNM); North Carolina State University, Raleigh (NCSU); Ohio State University, Columbus (OSU); University of Kansas, Lawrence (KU).

Typhlocybinae Kirschbaum

Erythroneurini Young

Neozygina Dietrich & Dmitriev, 2006

Diagnosis. Crown weakly to moderately produced medially, with pair of large brown or black preapical spots; mesonotum with basal triangles usually dark brown, contrasting with remainder of sclerite; forewing lacking distinct spots or oblique patterns, inner apical cell with base oblique; male pygofer with dorsal appendage well developed (except *N. obsoleta*, **n. sp.**), immovably fused to pygofer margin; one or more macrosetae present basad of dorsal appendage; ventral appendage present, usually elongate. Style apex truncate, footlike, with only two points, preapical lobe well developed. Connective U-shaped, without median anterior lobe, arms short. Aedeagus with dorsal apodeme well developed, usually T-shaped in posterior view, without sclerotized connection to dorsal pygofer appendage or anal tube; shaft often with paired or unpaired basal or distal processes, or both; unpaired basal process, when present, closely appressed to shaft.

Distribution. Western United States south to Argentina.

Notes. Phylogenetic analysis of morphological data recovered *Neozygina* as the monophyletic sister group to a clade comprising the New World genera *Mexigina*, *Hepzygina*, and *Zyginama* (Dietrich & Dmitriev 2006). The genus previously included 10 described species, 1 of which is here treated as a junior synonym. An additional 16 species discovered during this study are described below. The following key will separate adult males; females of most species may only be reliably identified through their association with males.

Key to males of *Neozygina* (excluding *N. bimaculata* (Baker))

- 1 Apex of aedeagus, in posterior view, distinctly emarginate or bifid (Fig. 4F). South American species... 2
- 1' Apex of aedeagus, in posterior view, entire, usually acute (Fig. 3C). North and South American species) 5
- 2 Aedeagus with pair of processes arising near base of shaft and extended posterodorsad (Figs. 4B, C) 3
- 2' Aedeagus without pair of basal processes (Figs. 4O, P)..... *retrorsa*, **n. sp.**
- 3 Apex of aedeagus, in posterior view, forcipate, distal processes curved toward midline (Fig. 4K)..... 4
- 3' Apex of aedeagus, in posterior view, not forcipate, distal processes curved away from midline (Fig. 4F) *argentinensis*, **n. sp.**
- 3'' Apex of aedeagus, in posterior view, weakly emarginate, with asymmetrical subapical spine arising on anterior surface and extended dorsad beyond apex (Fig. 4I)..... *asymmetrica*, **n. sp.**
- 4 Apex of aedeagus in posterior view, more than twice as wide preapically than at level of gonopore (Fig. 4K) *expanda*, **n. sp.**
- 4' Apex of aedeagus in posterior view, only slightly wider preapically than at level of gonopore (Fig. 4M) *forcipata*, **n. sp.**
- 5 Aedeagus with paired processes arising basad of shaft midlength and extended distad (Fig. 3I), distal processes present or absent 6
- 5' Aedeagus with paired processes, if present, arising distad of shaft midlength 17
- 6 Aedeagus without paired distal processes (Fig. 3I) 7
- 6' Aedeagus with paired distal processes (Fig. 3Z) 8
- 7 Aedeagus with basal processes extended beyond apex of shaft (Fig. 3I)..... *hondurensis*, **n. sp.**
- 7' Aedeagus with basal processes terminating well short of shaft apex Fig. 3Q) *potosiensis*, **n. sp.**
- 8 Pygofer with dorsal appendage branched (Fig. 2U) 9

8'	Pygofer with dorsal appendage unbranched (Fig. 2A)	12
9	Aedeagal shaft in lateral view broad, apex quadrate, distal processes elongate (Fig. 2V)	10
9'	Aedeagal shaft in lateral view slender, apex acute, distal processes short, spinelike (Fig. 3K).....	
 <i>mandibulata</i> , n. sp.	
10	Aedeagus in posterior view with distal processes curved ventrolaterad (Fig. 2W)... <i>quadricornis</i> (Beamer)	
10'	Aedeagus in posterior view with distal processes curved ventromesad (Fig. 3Z).....	11
11	Crown and pronotum pale yellow (Fig. 1R), length < 2.8 mm, aedeagus with gonoduct extended diagonally across middle of shaft (Fig. 3Y)	<i>zapatai</i> , n. sp.
11'	Crown and pronotum heavily marked with brown (Fig. 1P), length > 2.9 mm, aedeagus with gonoduct parallel to posterior margin (Fig. 3AA)	<i>sordida</i> , n. sp.
12	Distal processes of aedeagus as long as or longer than basal processes (Fig. 4C)	13
12'	Distal processes of aedeagus distinctly shorter than basal processes	15
13	Pygofer with dorsal appendage elongate, elevated above pygofer margin (Fig. 4A); aedeagal shaft with pair of angulate dorsal projections near base (Fig. 4B). Peru	<i>abancayensi</i> , n. sp.
13'	Pygofer with dorsal appendage short, not elevated above pygofer margin (Fig. 2R); aedeagal shaft without angulate dorsal projections near base. Mexico, SW USA	14
14	Apex of aedeagus, in posterior view, distinctly angulate (Fig. 2T).....	<i>penapacha</i> (Beamer)
14'	Apex of aedeagus, in posterior view, broadly rounded (Fig. 3T)	<i>sonorensis</i> , n. sp.
15	Aedeagus with preatrium nearly as long as shaft (Fig. 3E), shaft apex with pair of short slender laterally directed spines (Fig. 3F)	<i>chiapensis</i> , n. sp.
15'	Aedeagus with preatrium less than 1/2 length of shaft (Fig. 2P), apical processes directed ventrolaterally (Fig. 2Q)	16
16	Aedeagal shaft compressed, recurved in lateral view, subbasal processes strongly divergent from shaft (Fig. 2B).....	<i>abluta</i> (McAtee)
16'	Aedeagal shaft depressed, arched posterodorsad in lateral view, subbasal processes closely appressed to shaft (Fig. 2P)	<i>huachucana</i> (Beamer)
17	Aedeagus without paired processes, distal part of shaft in lateral view strongly arcuate (Fig. 2D)	18
17'	Aedeagus with paired distal processes (Fig. 2H)	19
18	Aedeagal shaft without unpaired preapical spine, apex strongly decurved and nearly touching ventral margin (Fig. 2D)	<i>apacha</i> (Baker)
18'	Aedeagal shaft with unpaired posterior preapical spine, apex not nearly touching ventral margin (Fig. 3N)	<i>obsoleta</i> , n. sp.
19	Aedeagus with distal processes in posterior view curved toward and usually crossing midline of shaft (Fig. 2H)	20
19'	Aedeagus with distal processes in posterior view curved away from shaft (Fig. 2K).....	22
20	Forewing conspicuously marked with red pigment (Figs. 1C, Q); length of male usually < 2.7mm	21
20'	Forewing without conspicuous red pigment (Fig. 1E); length of male usually > 2.7mm	<i>davisi</i> Beamer
21	Aedeagal shaft elongate and nearly straight through most of its length; forewing with reddish pigment restricted to brachial cell and clavus (Fig. 1Q)	<i>veracruzensis</i> , n. sp.
21'	Aedeagal shaft shorter, evenly recurved; forewing with reddish pigment covering most of basal two-thirds of wing, including costal area (Fig. 1C)	<i>balli</i> Beamer
22	Aedeagus with distal processes branched (Fig. 3C)	<i>antlera</i> , n. sp.
22'	Aedeagus with distal processes unbranched (Fig. 2K).....	<i>ceonothana</i> (Beamer)

Previously described species

Neozygina abluta (McAtee)

(Figs. 1A, 2A–B)

Erythroneura bipunctata var. *abluta* McAtee, 1924d: 132

Erythroneura abluta, Beamer 1934c: 287

Zygina abluta [sic], Young, 1952: 75

Neozygina abluta, Dietrich & Dmitriev 2006: 148

Notes. No specimens other than the type series of two specimens collected at Indio, California, 19 June 1909, by E. D. Ball, were seen. The holotype (USNM) is a female. The male “allotype” from the same locality previously had the genitalia dissected (presumably by Beamer) and mounted in balsam between two coverslips pinned with the remainder of the specimen. The genitalia are cleared almost to the point of invisibility.

Distribution. USA: California.

Neozygina apacha (Baker)

(Figs. 1B, 2C–E)

Typhlocyba bipunctata Gillette 1898a: 751 (preocc. by *E. bipunctata* Melichar 1896)

Erythroneura apacha Baker 1925b: 537 (nomen novum)

Zygina apacha, Young 1952: 75

Neozygina apacha, Dietrich & Dmitriev 2006: 148

Notes. Gillette’s type (USNM#3441) is a female with the forewings missing. It bears the following labels: “Ariz/2102; Gillette; Type /No. 3441/U.S.N.M.; Typhlocyba/bipunctata/Gill.; ERYTHRONEURA/ bipunctata/ Gill./ Red form/Det./McAtee; Erythroneura/ apacha/ Bak.” Beamer (1930b) included the species in his key but his illustrations of the male genitalia indicate that he confused this species with *N. balli* Beamer. Beamer (1934c) later synonymized the species with *E. balli* Beamer. DeLong (in Knull 1944c) compared specimens in the Ohio State Collection with Gillette’s type and indicated that the bright red color pattern was the same; thus Knull (1944c) reinstated *apacha* from synonymy and provided the first illustrations of the male genitalia. Because the distinctive bright red coloration of this species is not known to occur in other *Neozygina*, Knull’s interpretation of the species appears to be correct. The habitus photo of “*Neozygina apacha*” provided by Dietrich and Dmitriev (2006: fig. 2M) is a misidentification; the species illustrated is *N. antlera*, n. sp., described below.

Distribution. USA: Arizona

Neozygina balli (Beamer)

(Figs. 1C, 2F–H)

Erythroneura balli Beamer, 1932i: 125

Neozygina balli, Dietrich & Dmitriev 2006: 148

Notes. Beamer (1932i) apparently unknowingly based his description of this species on a male with the tip of the aedeagus broken off (holotype in KU) and thus lacking the pair of long ventromedially curved apical processes characteristic of the species. The identity of the type specimen is nonetheless clear because of the characteristic red markings on the forewing and the unusual structure of the pygofer, on which both the dorsal and ventral appendage are very short and arise near the apex. This structure is the same as that found in two taxa

described subsequently by Beamer: *N. arida* and *N. davisii*. Although the male genitalia of these taxa appear to be identical, specimens of *N. balli* are distinguishable by their slightly smaller size and by the conspicuous red pigment of the forewing. Specimens of *N. davisii* lack reddish pigment and are more heavily marked with brown.

Distribution. Mexico: Durango. USA: Arizona, Texas.

Neozygina bimaculata* (Baker), *nomen dubium

Typhlocyba bimaculata Baker, 1903d: 9

Zygina bimaculata, Young, 1952: 75

Neozygina bimaculata, Dietrich & Dmitriev 2006: 148

Notes. The type series of this species, described from Guatemala and southern Mexico, is apparently lost and the original description, although consistent with the generic placement, does not contain sufficient information to clarify its identity.

***Neozygina ceanothana* (Beamer)**

(Figs. 1D, 2I–K)

Erythroneura ceanothana Beamer, 1934c: 287

Zygina ceanothana, Young, 1952: 75

Neozygina ceanothana, Dietrich & Dmitriev, 2006: 148

Notes. Beamer (1934c) recorded *Ceanothus fendleri* Gray (Fam: Rhamnaceae) as the host plant of this species.

Distribution. USA: Arizona, Texas.

***Neozygina davisii* (Beamer)**

(Figs. 1E, 2L–N)

Erythroneura davisii Beamer, 1934d: 96,

Erythroneura arida Beamer, 1937b: 31, **new synonymy**

Neozygina davisii, Dietrich & Dmitriev, 2006: 148

Notes. Beamer (1937b) separated the two taxa here treated as synonyms based on slight differences in coloration and the proportions of the aedeagal shaft and processes. These differences appear to intergrade among and within populations, and therefore do not seem sufficient to justify continued recognition of the taxa as distinct species. Consistent morphological differences, including body proportions and the shape of the basal abdominal apodemes of the males, were not found. As noted above, the male genitalia of *N. davisii* appear to be identical to those of *N. balli*. These two taxa may eventually be found to be color forms of a single, widespread species. Nevertheless, they appear to be distinguishable based on traits described in the key. More collecting and analysis of molecular data may help determine whether *N. balli* and *N. davisii* are truly distinct species.

Distribution. USA: California, Nevada, New Mexico, Texas.

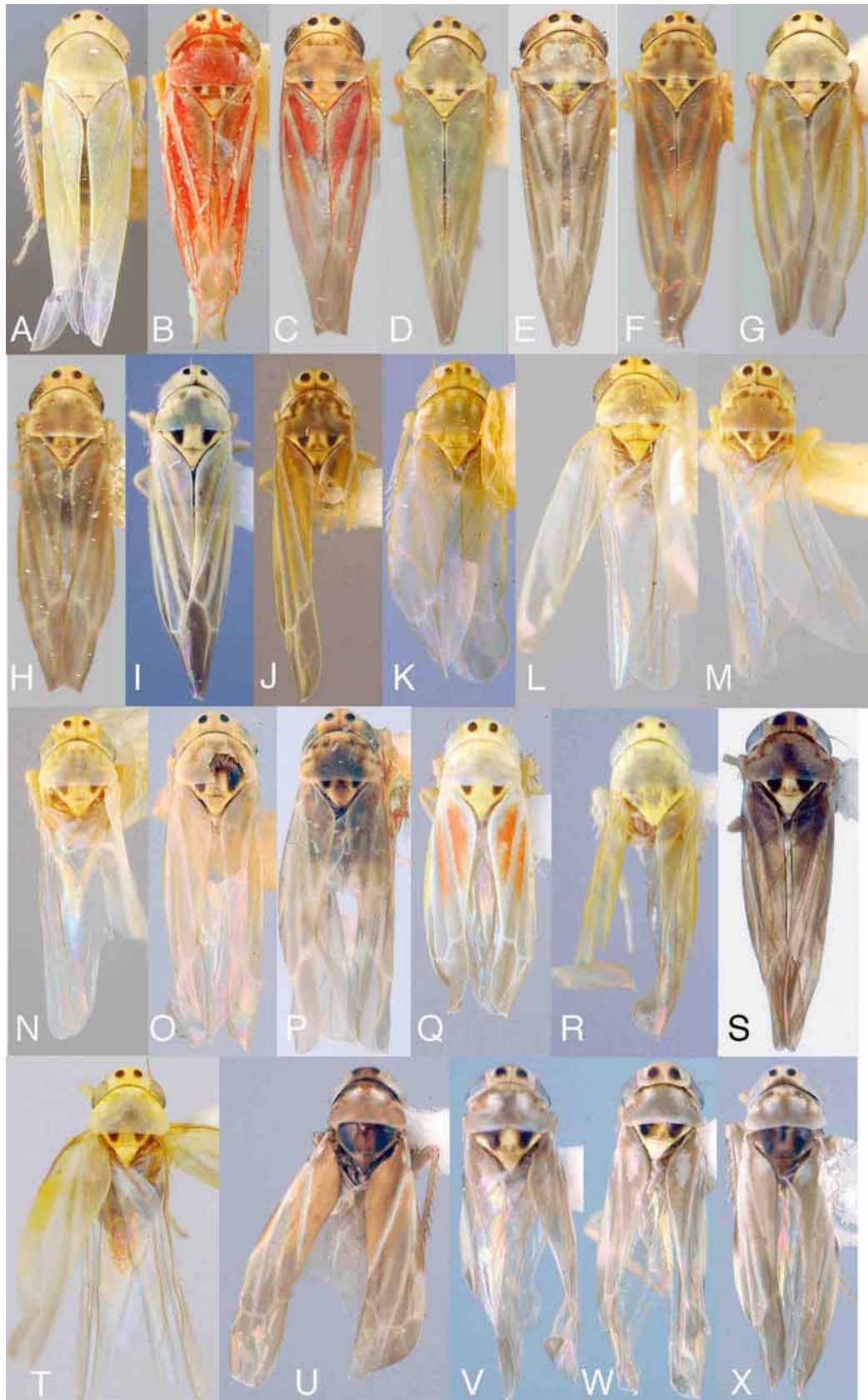


FIGURE 1. *Neozygina* dorsal habitus. A, *N. abluta*, holotype female; B, *N. apacha*; C, *N. balli*, holotype male; D, *N. ceonothana*; E, *N. davisii*; F, *N. huachucana*, holotype male; G, *N. penapacha*, holotype male; H, *N. quadricornis*; I, *N. antlera*, holotype male; J, *N. chiapensis*, holotype male; K, *N. hondurensis*, holotype male; L, *N. mandibulata*, holotype male; M, *N. obsoleta*, holotype male; N, *N. potosiensis*, holotype male; O, *N. sonorensis*, holotype male; P, *N. sordida*, holotype male; Q, *N. veracruzensis*, holotype male; R, *N. zapatai*, holotype male; S, *N. argentiniensis*, holotype male; T, *N. abancayensis*, holotype male; U, *N. asymmetrica*, holotype male; V, *N. expanda*, holotype male; W, *N. forcipata*, holotype male; X, *N. retrorsa*, holotype male.

***Neozygina huachucana* (Beamer)**

(Figs. 1F, 2O–Q)

Erythroneura huachucana Beamer, 1934c: 287

Zygina huachucana, Young, 1952: 75

Neozygina huachucana Dietrich & Dmitriev, 2006: 148

Notes. Beamer (1934) recorded *Ceanothus fendleri* Gray as the host plant of this species.

Distribution. USA: Arizona.

***Neozygina penapacha* (Beamer)**

(Figs. 1G, 2R–T)

Erythroneura apacha Beamer, 1930b: 431 (preoc. by *E. apacha* Baker, 1925b)

Erythroneura penapacha Beamer, 1941a: 18 (*nomen novum*)

Zygina penapacha, Young, 1952: 75

Neozygina penapacha, Dietrich & Dmitriev, 2006: 148

Notes. This species closely resembles *N. huachucana*, but differs in having the apex of the aedeagus angulate in posterior view and the distal processes longer. Also, the dorsal pygofer appendage is distinctly curved mesally in dorsal view (nearly straight in *N. huachucana*). The length of the dorsal appendage of the pygofer and of the basal aedeagal processes vary intraspecifically.

Distribution. Mexico: Coahuila, Guerrero, Jalisco. USA: Arizona, Texas.

***Neozygina quadricornis* (Beamer)**

(Figs. 1H, 2U–W)

Erythroneura quadricornis Beamer, 1930b: 431

Zygina quadricornis, Young, 1952: 75

Neozygina quadricornis, Dietrich & Dmitriev, 2006: 148

Distribution. USA: Texas.

New species

North America

***Neozygina antlera* n. sp.**

(Figs. 1I, 3A–C)

Diagnosis. Length of male 3.2 mm. Ground color stramineous, infused with brown; apex of anteclypeus, lateral margins of frontoclypeus, mesepisternum, mesonotal triangles, and abdominal terga dark brown. Male pygofer (Fig. 3A) with dorsal appendage arising near apex, slender, nearly straight, irregularly serrate dorsally; ventral appendage moderately long, slender, curved dorsomesad; lobe between appendages narrow, acute, well sclerotized. Aedeagus (Figs. 3B, C) with preatrium absent; shaft slender, tubular, straight through most of length in lateral view; without basal processes; distal processes arising preapically laterad of gonopore, long, extended ventrolaterad and curved anterad, bifid distally with ventral branch shorter than dor-

sal branch; apex compressed, acuminate; gonopore preapical on posterior surface.

Material examined. Holotype male, MEXICO: Chiapas, rt. 195 km#31, 10km NE Chiapa de Corzo, 1000m, 16°49'N, 92°58'W, 4 November 2001 (C.H. Dietrich, vacuum, 01-051-03) [INHS]. Paratype: 1 male, MEXICO: San Luis Potosi, Tamazunchale, 2 November 1945 (DeLong, Hershberger, Elliot) [INHS].

Note. This species resembles *N. ceonothana*, but differs in having the aedeagal shaft recurved rather than sigmoid in lateral view and the processes branched. The specific name refers to the antlerlike distal processes of the aedeagus.

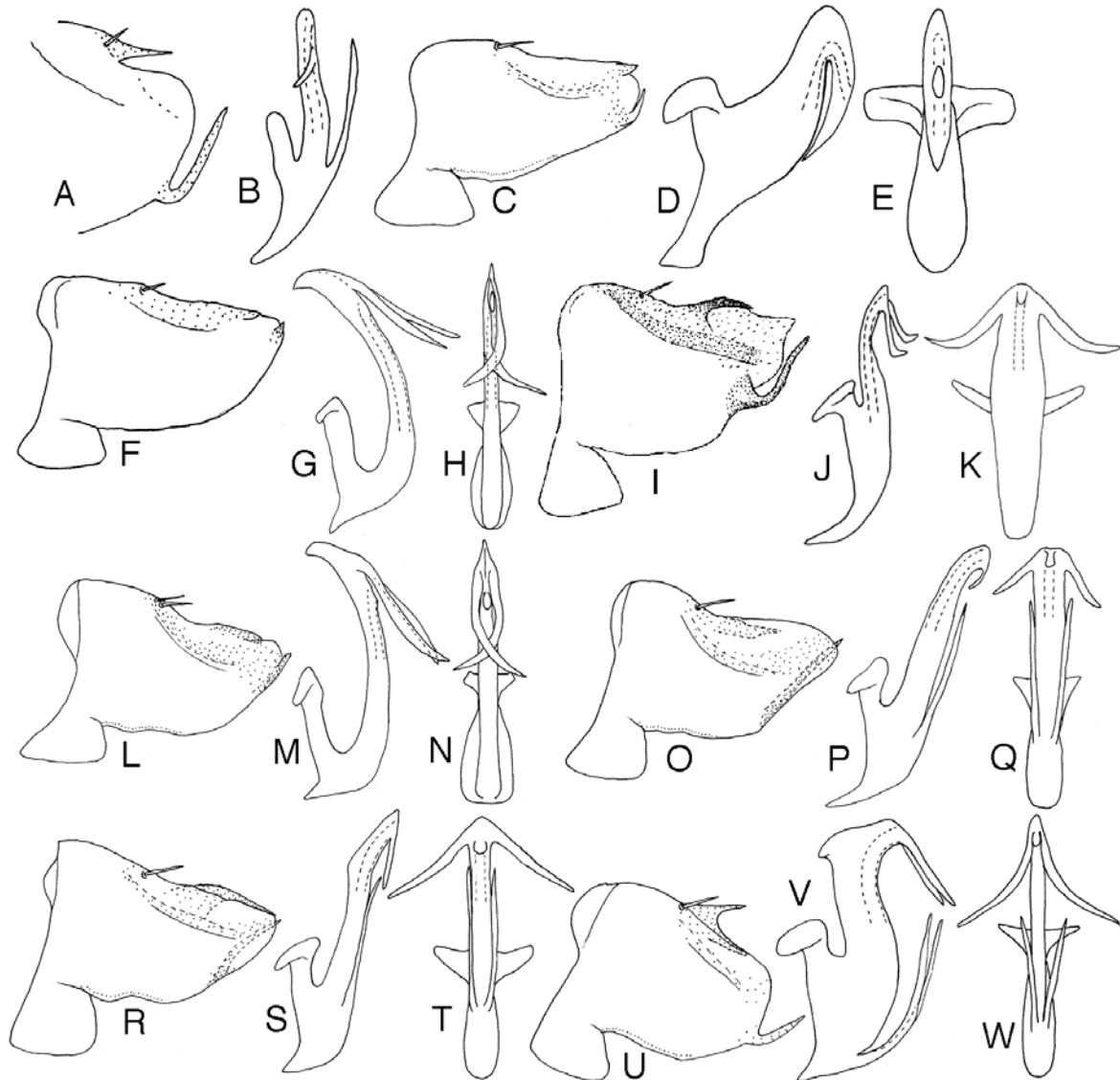


FIGURE 2. Previously described *Neozygina* spp., male pygofer (A, C, F, I, L, O, R, U) and aedeagus in lateral (B, D, G, J, M, P, S, V) and posterior (E, H, K, N, Q, T, W) views. A–B, *N. abluta*; C–E, *N. apacha*; F–H, *N. balli*; I–K, *N. ceonothana*; L–N, *N. davisi*; O–Q, *N. huachucana*; R–T, *N. penapacha*; U–W, *N. quadricornis*.

***Neozygina chiapensis* n. sp.**

(Figs. 1J, 3D–F)

Diagnosis. Length of male 3.1 mm. Ground color stramineous, heavily mottled with brown; anteclypeus, mesonotal triangles, scutellum apex, mesosternum, and abdominal terga dark brown; pronotum with extensive symmetrical brown markings anteriorly; forewing without distinct markings. Male pygofer (fig. 3D) with dor-

sal appendage arising near midlength, short, tapered, curved mesad; ventral appendage long, slender, extended dorsomesad and crossing midline; lobe between appendages broadly rounded, weakly sclerotized near margin. Aedeagus (Figs. 3E, F) with preatrium nearly as long as shaft; shaft broad basally, slender and curved dorsad distally, with pair of slender posterolaterally directed spines arising adjacent to dorsal apodeme, apex with pair of short laterally directed processes; gonopore apical.

Material examined. Holotype male, MEXICO: Chiapas, rt. 195 km#31, 10 km NE Chiapa de Corzo, 1000m, 16°49'W, 92°58'W, 4 November 2001 (C.H. Dietrich, vacuum, 01-051-03) [INHS].

Note. This species is somewhat similar to *N. quadricornis* in coloration, but is readily distinguished by the distinctive aedeagus. The specific name refers to the Mexican state where the type specimen was collected.

Neozygina hondurensis n. sp.

(Figs. 1K, 3G–I)

Diagnosis. Length of male 2.5 mm. Ground color stramineous infused with brown; apex of anteclypeus, lateral margins of frontoclypeus, mesonotal triangles, mesepisternum, and abdominal terga brown. Male pygofer (Fig. 3G) with dorsal appendage arising near base, large, elongate, slightly arcuate, extended to pygofer apex; ventral appendage preapical, slender, extended dorsomesad; lobe between appendages broadly rounded, uniformly sclerotized. Aedeagus (Figs. 3H, I) with preatrium absent; shaft slender, tubular, weakly recurved, with median longitudinal carina anteriorly; subbasal processes elongate, close to shaft throughout length, extended to shaft apex; apex acuminate; gonopore preapical on posterior surface.

Material examined. Holotype male, HONDURAS: Coyoles, 25 November 1948 (E.C. Becker, at light) [INHS]. Paratype: 1 male, HONDURAS: 12 km W Olanchito, 24–25 May 1949 (E.C. Becker) [INHS].

Note. This species resembles *N. quadricornis* externally, but differs in having the aedeagal shaft very slender and lacking distal processes. The specific name refers to the country where the type series was collected.

Neozygina mandibulata n. sp.

(Figs. 1L, 3J–L)

Diagnosis. Length of male 3.8 mm. Ground color stramineous infused with brown; face and sternum pale; mesonotal triangles and abdominal terga brown. Male pygofer (Fig. 3J) with dorsal appendage arising near midlength, bifid, arms divergent at right angle, dorsal arm short and relatively wide, ventral arm elongate and serrate dorsally, extended beyond pygofer apex and curved mesad; ventral appendage arising preapically, very large, slender, areolate, curved dorsomesad; lobe between appendages rounded, weakly sclerotized. Aedeagus (Figs. 3K, L) with preatrium well developed, shorter than shaft; shaft compressed, in lateral view broadly U-shaped, with pair of short retrorse preapical spines and pair of long basolateral processes slightly divergent from shaft distally, not extended to shaft apex; apex bluntly rounded; gonopore arising preapically on posterior margin.

Material examined. Holotype male, MEXICO: Guerrero, Chilpancingo, 25 October 1941 (DeLong, Good, Caldwell, Plummer) [INHS].

Note. This species has a branched dorsal pygofer appendage similar to that of *N. quadricornis*, but differs in having the aedeagal shaft evenly recurved in lateral view and the distal processes very short. The specific name refers to the jawlike dorsal pygofer appendage.

***Neozygina obsoleta* n. sp.**

(Figs. 1M, 3M–N)

Diagnosis. Length of male 3.1 mm (approximate; forewings of holotype missing). Coloration and markings as in *N. chiapensis*. Pygofer (Fig. 3M) with dorsal appendage obsolete, reduced to heavily sclerotized ridge that extends half distance to apex; ventral appendage arising near apex, short, slender, extended posterad the abruptly bent dorsad; distal lobe narrow, weakly sclerotized dorsally. Aedeagus (Fig. 3N) with preatrium short; shaft in lateral view relatively broad and compressed basally with small dorsal teeth, gradually narrowed to midlength, distal half slender, tubular, strongly arcuate, with slender unpaired ventral preapical process; gonopore apical; apex with large unpaired distal spine extended ventrad.

Material examined. Holotype male, MEXICO: Guerrero, Iguala, 11 September 1939 (D. M. DeLong) [INHS].

Notes. Placement of this species in *Neozygina*, despite the absence of a dorsal appendage on the male pygofer, is justified by the presence of macrosetae on the dorsal margin of the pygofer and by the coloration, which is indistinguishable from that of many other members of the genus. The aedeagus is unique among known species of the genus in having unpaired apical and preapical posterior spines. The specific name refers to the obsolete dorsal pygofer appendage.

***Neozygina potosiensis* n. sp.**

(Figs. 1N, 3O–Q)

Diagnosis. Length of male 2.8 mm. Coloration as described for *N. mandibulata*. Male pygofer (Fig. 3O) with dorsal appendage large, resembling that of *N. hondurensis*, but not extended to pygofer apex; ventral appendage arising at apex, relatively short, slender, extended posteromesad; lobe between appendages concave, weakly sclerotized. Aedeagus (Figs. P, Q) without preatrium; shaft short, tapered in lateral view; apex distad of gonopore compressed and attenuate; subbasal processes closely paralleling shaft in lateral view, weakly divergent in posterior view, extended 2/3 distance to shaft apex; apex compressed, bluntly rounded; gonopore preapical on posterior surface.

Material examined. Holotype male, MEXICO: San Luis Potosi, Valles, 24 September 1941 (DeLong, Good, Caldwell, Plummer) [INHS].

Note. This species is similar to *N. hondurensis*, but differs in having the aedeagal shaft compressed distally and the subbasal processes much shorter than the shaft. The specific name refers to the Mexican state where the holotype was collected.

***Neozygina sonorensis* n. sp.**

(Figs. 1O, 3R–T)

Diagnosis. Length of male 2.7 mm. Coloration as described for *N. antlera*. Pygofer (Fig. 3R) with dorsal appendage arising near midlength, short, broadened medially, serrate dorsally, not extended to pygofer apex; ventral appendage arising preapically, relatively short, slender, curved dorsomesad; lobe between appendages narrowly rounded, weakly sclerotized. Aedeagus (Figs. 3S, T) with preatrium short; shaft slender, tubular, nearly straight; subbasal processes arising near shaft midlength, long, slender, closely parallel to shaft, extended ca. 2/3 distance to shaft apex; apex in posterior view broad, rounded, with pair of long ventrolaterally directed processes arising from lateral flange; gonopore apical.

Material examined. Holotype male, MEXICO: Sonora, Hacienda Naynari, 19 March 1927 (A. Dampf, M.B.209) [INHS].

Note. This species resembles *N. penapacha*, but differs in having the aedeagal shaft straight, the distal processes more robust, and the apex in posterior view broadly rounded rather than angulate. The specific name refers to the Mexican state where the holotype was collected.

***Neozygina sordida* n. sp.**

(Figs. 1P, 3AA)

Diagnosis. Length of male 2.9–3.5 mm, female 3.5 mm. Dull yellow mottled with brown, without areas of red pigmentation. Pygofer (as in Fig. 3X) with dorsal appendage arising near midlength, bifid with arms widely divergent in lateral view, dorsal arm extended posterodorsad, ventral arm longer and more slender, extended along pygofer margin, not reaching apex; ventral appendage arising preapically, long, slender, curved dorsomesad; lobe between appendages broadly rounded, weakly sclerotized near apex. Aedeagus (Fig. 3AA) with preatrium short; shaft strongly compressed, in lateral view very broad, rectangular, gonoduct extended along posterior margin throughout length; apex broadly humped; distal processes arising adjacent to gonopore, extended ventrolaterad and curved mesad; paired ventral processes extended posterodorsad, weakly divergent from shaft and each other, apices overlapping those of distal processes.

Material examined. Holotype male, MEXICO: Guerrero, Iguala, 25 October 1941 (DeLong, Good, Caldwell, Plummer) [INHS]. Paratypes: 1 male, MEXICO: Oaxaca, rt. 190 km#180, La Reforma, 800m, 16°23'56"N, 95°46'29"W, 7 November 2001 (C.H. Dietrich, sweeping, 01-056-03); 1 male, 2 females, MEXICO: Durango, El Salto, 9 June 1964 (L. A. Kelton) [CNC].

Note. This species resembles *N. quadricornis* in having a similarly bifurcated dorsal pygofer appendage, but differs in the shape of the aedeagus, which is much broader, lacks an anteroapical lobe, and has the distal processes curved ventromesad rather than ventrolaterad.

***Neozygina veracruzensis* n. sp.**

(Figs. 1Q, 3U–W)

Diagnosis. Length of male 2.5 mm. Ground color stramineous infused with brown; anteclypeus and abdominal terga brown; crown spots, mesonotal triangles, and mesosternum dark brown; forewing with red longitudinal streak in clavus and another along vein Cu in basal half. Pygofer (Fig. 3U) with dorsal appendage arising near apex, very slender, straight, not reaching distal margin; ventral appendage short, relatively broad, extended dorsomesad then curved dorsolaterad; lobe between appendages narrowly rounded, well sclerotized except near margin. Aedeagus (Figs. 3V, W) with shaft narrowly J-shaped, apex compressed, falcate in lateral view; distal processes arising distad of gonopore, sinuately curved posteroventrad, crossing each other medially near apex.

Material examined. Holotype male, MEXICO: Veracruz, rt. 180, km#31, 17 km NW Alvarado, 0m, 18°50'N, 95°58'W, 28 October 2001 (C.H. Dietrich, sweep/vac, 01-036-01) [INHS].

Notes. The type series was collected by vacuuming and sweeping low-growing sand dune vegetation along the Gulf Coast of Veracruz, Mexico. The male genitalia of this species resemble those of *N. balli* Beamer, but the dorsal pygofer appendage is much more slender and elongate, the ventral appendage is longer, and the aedeagal shaft is much longer and nearly straight through most of its length. The coloration of the new species is also distinctive. The forewing of *N. veracruzensis* has reddish streaks only along vein Cu and in the clavus; *N. balli* has more extensive areas of reddish pigment covering nearly the entire basal half of the wing.

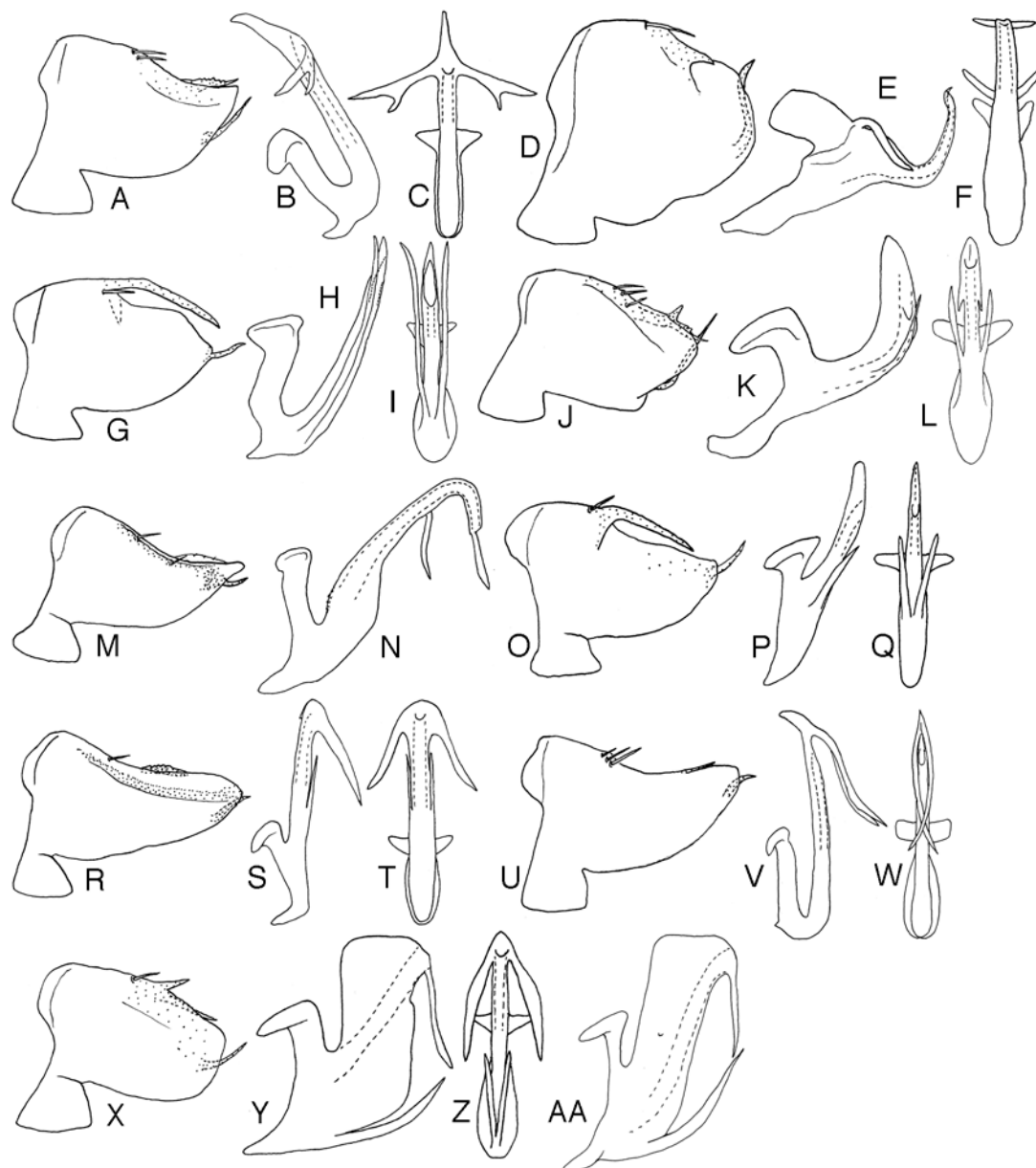


FIGURE 3. New North American spp. of *Neozygina*, male pygofer (A, D, G, J, M, O, R, U, X), aedeagus in lateral (B, E, H, K, N, P, S, V, Y, AA) and posterior (C, F, I, L, Q, T, W, Z) views. A–C, *N. antlera*; D–F, *N. chiapensis*; G–I, *N. hondurensis*; J–L, *N. mandibulata*; M–N, *N. obsoleta*; O–Q, *N. potosiensis*; R–T, *N. sonorensis*; U–W, *N. veracruzensis*; X–Z, *N. zapatai*; AA, *N. sordida*.

***Neozygina zapatai* n. sp.**

(Figs. 1R, 3X–Z)

Diagnosis. Length of male 2.7 mm. Overall color pale yellow, apex of anteclypeus, mesonotal triangles, and abdominal terga brown; crown spots relatively small. Male pygofer and genitalia as described for *N. sordida* except aedeagus with gonoduct in lateral view extended diagonally across shaft.

Material examined. Holotype male, MEXICO: Jalisco, ca. La Huerta, 480m, 19°27'47"N 104°39'13"W, 16 Oct 2001 (S. H. McKamey, *et al.*, fogging 3-FH) [INHS]. Paratypes: 3 males, same data except fogging 2, 2-BL, 2-FL [INHS].

Note. This species resembles *N. quadricornis* and *N. sordida* in having a similarly bifurcated dorsal pygofer appendage, but differs in its smaller size, paler coloration, and in the structure of the aedeagus, which has the gonoduct extended diagonally across the shaft rather than parallel to the posterior margin. This species is named in memory of Emiliano Zapata Salazar (1879–1919), hero of the Mexican Revolution.

South America

Neozygina abancayensis n. sp.

(Figs. 1T, 4A–C)

Diagnosis. Length of male 3.1 mm. Ground color stramineous, infused with brown; anteclypeus, lateral margin of frontoclypeus, mesonotal triangles, mesosternum, and abdominal terga brown; forewing without distinct markings. Male pygofer (Fig. 4A) with dorsal appendage arising near base, slender, acuminate, elevated and slightly arched above margin, in dorsal view curved slightly laterad, extended to apex of pygofer; ventral appendage arising preapically, well developed, extended dorsomesad. Aedeagus (figs. 4B, C) with preatrium short; shaft slightly compressed, in lateral view sinuate, with pair of subbasal dorsal teeth; paired subbasal processes approximately half length of shaft, divergent from shaft in lateral view, divergent from each other in posterior view at ca. 45° angle; paired distal processes arising near apex, moderately long, slender, extended ventrolaterad; gonopore apical.

Material examined. Holotype male, PERU: Abancay, 8 July 1960 (J. Salazar and H. Fernandez, on sugar cane) [NCSU]. Paratype: 1 male, same data [NCSU].

Note. This is the only known South American *Neozygina* species that lacks an emarginate aedeagal apex. The specific name refers to the type locality.

Neozygina argentinensis n. sp.

(Figs. 1S, 4D–F)

Diagnosis. Length of male 2.6–2.9 mm, female 2.8–3.3 mm. Ground color stramineous, heavily marked with brown; dorsum mostly brown; temporal sutures white; mesonotum except basal triangles yellow; forewing brown, veins and costal brochosome field pale; mesepisternum and abdominal sternites mostly brown. Male pygofer (Fig. 4D) with dorsal appendage arising near base of lobe, slightly elevated above margin, straight in lateral and dorsal view, extended nearly to apex of pygofer; ventral appendage arising preapically, well developed, extended dorsomesad. Aedeagus (Figs. 4E, F) with preatrium absent; shaft tubular, in lateral view slender, nearly straight through most of length; paired subbasal processes approximately half length of shaft, slender, straight, close to each other throughout length, divergent from shaft in lateral view; distal processes arising slightly basad of gonopore, moderately long, slender, curved ventromesad; apex bifid, forming pair of short somewhat flattened processes curved dorsolaterad; gonopore apical.

Material examined. Holotype male, ARGENTINA: Catamarca, 2km N Belén, Quebrada Belén at dam, 3,590ft., 27.6159°S, 67.0130°W, 17/19-X-1997 (M.E. Irwin, F. D. Parker, S. Roig, Malaise trap in dry hillside ravine, MEI 97-39) [INHS]. Paratype: 1 female, same data [INHS]. Additional material: 2 males, 2 females, CHILE: Los Andes, V Region & Reg. Metropolitana, Santiago, June–July 2003 (José Mondaca, in traps) [all INHS].

Notes. This species differs from other South American *Neozygina* in having the distal projections of the aedeagus curved away from the midline. The specimens from Chile are paler in color and have the aedeagal processes more slender than those from Argentina, but are tentatively considered conspecific.

Neozygina asymmetrica n. sp.

(Figs. 1U, 4G–I)

Diagnosis. Length of male 3.4 mm. Ground color stramineous, heavily marked with brown; dorsum including crown and mesonotum mostly brown; head with genae, median area of frontoclypeus, and lateral margin of crown pale; forewing brown, veins pale. Male pygofer (Fig. 4G) with dorsal appendage arising near base, nearly straight, tapered, apex bifid, not extended to apex of pygofer; ventral appendage arising preapically, short, extended dorsomesad. Aedeagus (Figs. 4H, I) with preatrium absent; shaft tubular, in lateral view sinuate; paired subbasal processes extended nearly to apex, approximately paralleling shaft in posterior view, divergent from shaft in lateral view; distal processes arising laterad of gonopore, moderately short, slender, extended ventrolaterad; apex emarginate, with median dorsal spine extended dorsolaterad to left; gonopore apical.

Material examined. Holotype male, PERU: Madre de Dios, Rio Tambopata Res., 30 km (air) SW Pto. Maldonado, 290m, 12°50'S, 069°17'W, 14 September 1984 (Smithsonian Institution Canopy Fogging Project, T. E. Erwin, *et al.*, 01/02/54) [USNM].

Notes. This species differs from other South American *Neozygina* in having the dorsal pygofer appendage bifid and the aedeagus with an asymmetrical unpaired distal spine. The specific name refers to the asymmetrical aedeagus.

Neozygina expanda n. sp.

(Figs. 1V, 4J–K)

Diagnosis. Length of male 2.6 mm, female 3.1 mm. Closely resembling *N. argentiniensis*, but differing as follows: pygofer with dorsal appendage extended to apex; aedeagal shaft (Figs. 4J, K) in lateral view more strongly divergent from dorsal apodeme and with posterior margin evenly curved, processes formed by bifid apex strongly expanded and convergent distally.

Material examined. Holotype male, ARGENTINA: La Rioja, Dept. Famatina, 10 km N Famatina, Hwy. 40, Sierra de Toro Negro, 4,450ft., 28.9591°S, 67.4705°W, 15/20 October 1997 (M.E. Irwin, F. D. Parker, S. Roig, Malaise trap, MEI 97-35) [INHS]. Paratype, 1 female, same data [INHS].

Note. The specific name refers to the expanded aedeagal apex, which distinguishes this species from other South American *Neozygina*.

Neozygina forcipata n. sp.

(Figs. 1W, 4L–M)

Diagnosis. Length of male 2.5 mm, female 2.6 mm. Closely resembling *N. expanda*, but differing as follows: pygofer with dorsal appendage extended half way to apex of lobe; aedeagal shaft with distal processes formed by bifid apex much smaller and narrower; dorsal margin with pair of small teeth near base.

Material examined. Holotype male, ARGENTINA: La Rioja, Dept. Rosario Peñaloza, east base Sierra Argañaraz, 2,000ft., 31.2210°S, 66.7276°W, 11 October 1997 (M.E. Irwin, F. D. Parker, S. Roig, Malaise trap in wet spot in wash, MEI 97-26) [INHS]. Paratype: 1 female, same data [INHS].

Note. This species closely resembles *N. expanda* but has the distal projections of the aedeagus much more slender. The specific name refers to the forcipate aedeagal apex.

Neozygina retrorsa n. sp.

(Figs. 1X, 4N–P)

Diagnosis. Length of male 2.9 mm, female 3.1 mm. Closely resembling *N. argentiensis*, but differing as follows: male pygofer (Fig. 4N) with ventral spine more elongate, strongly curved dorsad and only slightly mesad; aedeagus (Figs. 4O, P) without basal processes, shaft very narrowly U-shaped in lateral view, apex in posterior view with pair of short forcipate distal processes and pair of retrorse lateral preapical spines, sinuate in lateral view.

Material examined. Holotype male, ECUADOR, Orellana, Transect Ent. 1km S Onkonegare Camp, Reserva Etnica Waorani, 00°39'10"S, 076°26'00"W, 12 February 1999 (T. L. Erwin, *et al.*, fogging terra firme forest, lot#1023) [USNM]. Paratypes: 1 male, same data except lot#1027, 12 February 1999; 1 male, same data except lot#1560, 21 June 1996; 2 females, same data except lot#1440, 7 February 1996 [USNM, INHS].

Note. This species differs from other South American *Neozygina* in having the aedeagus without paired basal processes and a distal pair of retrorse spines, upon which the specific name is based.

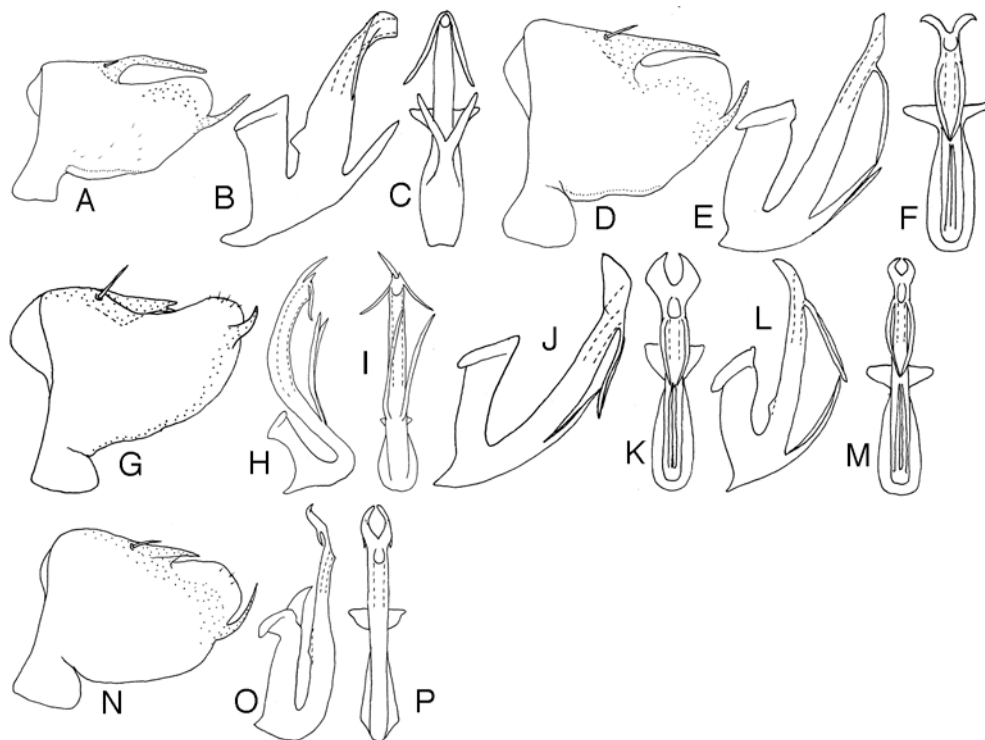


FIGURE 4. New South American spp. of *Neozygina*, male pygofer (A, D, G, N), aedeagus in lateral (B, E, H, J, L, O) and posterior (C, F, I, K, M, P) views. A–C, *N. abancayensis*; D–F, *N. argentiensis*; G–I, *N. asymmetrica*; J–K, *N. expanda*; L–M, *N. forcipata*; N–P, *N. retrorsa*.

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