

OCCASIONAL PAPERS OF THE MUSEUM OF
ZOOLOGY
UNIVERSITY OF MICHIGAN

ANN ARBOR, MICHIGAN

ARCHILESTES NEBLINA, A NEW DAMSELFLY
FROM COSTA RICA, WITH COMMENTS ON THE
VARIABILITY OF *A. LATIALATUS* DONNELLY
(ODONATA: LESTIDAE)

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Selys (1862) described *Lestes exoletus* and placed *Lestes grandis* Rambur in a new subgenus, *Archilestes*. Since then, four more species have been described: *A. californica* McLachlan 1895, *A. tuberalatus* (Williamson 1921), *A. regalis* Gloyd, 1944, and *A. latialatus* Donnelly 1981. Williamson proposed two new genera, *Cyptolestes* and *Superlestes*, for *Lestes tuberalatus* and *L. exoletus*, respectively, but Gloyd (1980) considered Williamson's genera synonyms of *Archilestes*. Donnelly (1981) considered *Cyptolestes* a subgenus of *Archilestes*, because his new species, *A. latialatus*, has several venational characters in common with *A. tuberalatus*. Gloyd (1980) characterized *Archilestes* by the large, laminate, boot-shaped posterior hamules of the males, and by the few large teeth on the valves of the ovipositor of the females. However, the female of *A. latialatus* has several small teeth on the ovipositor similar to those of *Lestes* (Donnelly, 1981), and at least one *Lestes*, *L. spumarius* Selys, has a boot-shaped posterior hamule similar to *Archilestes*. Thus, size and robustness appear to be the only morphological characters which separate the two genera. As Gloyd (1980) stated, venational characters that originally distinguished *Archilestes* from

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Lestes have proven unsatisfactory for recently described species.

I describe two males of a new species of *Archilestes* from Costa Rica whose characters currently place them in *Archilestes*. The discovery of the female and the inclusion of other yet to be described species of *Archilestes* from the neotropical region may show an overlap in other characters with *Lestes*, and the two genera may have to be synonymized.

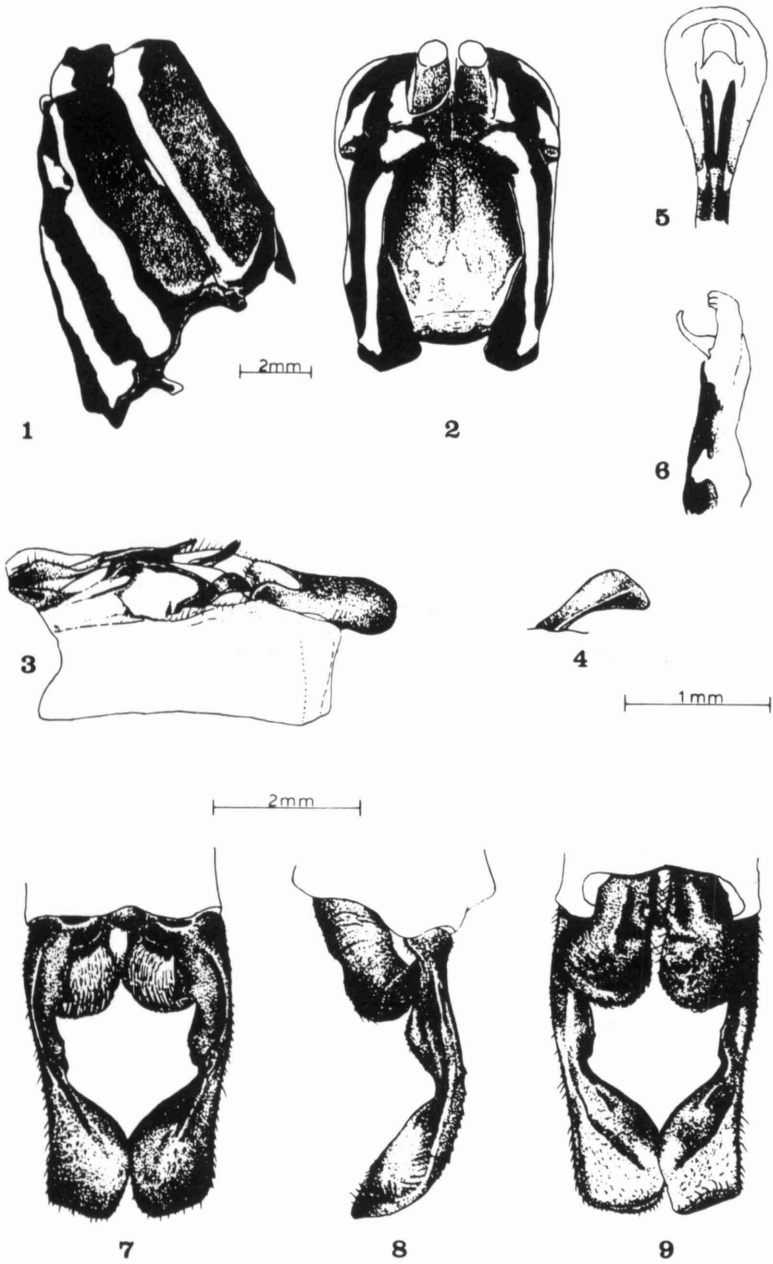
Archilestes neblina n. sp.

Figs. 1-9.

HOLOTYPE MALE.—Head: Labium ochre (light brownish yellow), base of mandibles pale blue, tips black; labrum glossy pale blue, becoming darker ventrally, margin rimmed with a thin black line; clypeus black with irregularly shaped ivory spot in medial area of anteclypeus, small pale spots at lateroventral corners; genae pale light blue; frons, vertex, antennae, rear of head, except for transverse pale ochreous line, matte black; a slight metallic green luster on frons and vertex.

Thorax: Prothorax matte black except for irregular pale brown spot on lateral margin of median lobe and epimeron; fine white hairs on lateral margins of medial lobe; posterior lobe slightly convex, entire. Pterothorax (Fig. 1) matte black with narrow pale ochreous humeral stripe extending mesally just below black antealar sinus. Fine ochreous line on middorsal carina; most of mesepisternum dark metallic green merging to black toward middorsal carina. Mesepimeron dark metallic green bordered by matte black, especially ventrally; small pale ochreous spot on middle of thorax just posterior to first pleural suture. Remainder of thorax ochreous yellow except for following black areas: anterior portion of mesinfra- and metinfraepisternum; broad stripe on second lateral suture; margin of spiracle;

Figures 1-9. *Archilestes neblina*, holotype male: 1, pterothorax, lateral view; 2, the same, ventral view; 3, ventrolateral view of abdominal segment 2 showing anterior and posterior hamules; 4, right posterior hamule, lateral view; 5, penis, ventral view; 6, penis, lateral view; 7, abdominal appendages, dorsal view; 8, the same, lateral view; 9, the same, ventral view.



narrow line anterior to spiracle turning ventrally and expanding to wide triangular spot; posterior margin of metepimeron broadening to large triangular spot posterodorsally. Metasternum (Fig. 2) mostly matte black with white pruinosity along median line, a small black projection extending anterolaterally and almost touching lower part of black line on second lateral suture; posterior part of metasternum pale ochreous yellow, white pruinosity lightly covering base of metasternum. Top of thorax and alar plates pruinose blue.

Coxae pale ochreous with broad black stripe laterally, legs entirely black except for faint yellow posterior lines at base of femora, inferior tooth of tarsal claw shorter than superior.

Wings hyaline, slightly smoky toward tips, venation black, pterostigma dark brown, surmounting 5 crossveins in forewings, 6 and 4 in hind wings. First antenodal space 4.7 mm, third antenodal space 7.5 mm (1.6 times first). Postnodal crossveins in forewing 18–20, in hind wing 18–19, R_3 arising from R_2 just distal to first postnodal crossvein in both fore- and hind wings; proximal side of quadrangle 0.9mm, of posterior side 2.1 mm, of anterior side 1.0 mm; wings petiolated to Ac. Broadening ratio (length of distal vein of marginal cell posterior to subtriangle in hind wing relative to that of forewing) (see Donnelly 1981) 1.03 (1.04 in paratype); elongation ratio of first post-quadrangular cell (relative lengths of anterior to distal vein of that cell, (Donnelly 1981) 1.31 to 1.43 (1.36–1.43 in paratype).

ABDOMEN.—Segment 1 dark metallic green on dorsum, a large roughly rectangular ochreous yellow spot on sides, ventral margin with matte black spot as large as yellow spot above, a small ochreous spot at anteroventral margin of sides; segment 2 dark metallic green above becoming black toward sides, small ochreous yellow spot at posterolateral margin just anterior to transverse carina; segments 3–10 dark metallic green merging to black on sides with narrow ochreous line bordering ventral margin. Sternite 1 dark ochreous with irregular black spot at anterior and posterior margins, entire surface with light covering of white pruinosity. Anterior hamule (Fig. 3) pale ochreous

yellow bordered by black ventrally; posterior hamule (Fig. 4) black, boot-shaped, with a longitudinal ridge. Penis (Figs. 5,6) ovate in ventral view with ventral arm (Fig. 6) strongly deflected from penis tip. Superior abdominal appendages (Figs. 7, 8) black, about twice as long as segment 10, with large subbasal tooth and large truncate foliate tips curved posteroventrally. Tips of superior appendages in ventral view with mesal margin forming an inflated oval (Fig. 9), remainder of appendage planar with posterior margin irregularly curved ventrally like the margin of a dead, dry leaf. Inferior appendages about a third as long as superiors, tips almost spherical in ventral view, cup-shaped in dorsal view, interior of cup silvery-white, covered with long anterodorsally-pointing setae.

MEASUREMENTS (mm).—(Holotype in parentheses). Length of abdomen (excluding appendages) 55 (55); superior appendages 3.7–3.8 (3.7); inferior appendages 1.2–1.5 (1.2); hind wing 42 (42); pterostigma, forewing 2.8–3.0 (3.0), hind wing 2.9–3.0 (2.9).

Paratype male similar to holotype except for minor size differences.

Female unknown.

Holotype Male: Costa Rica, San José Prov., small stream near Hacienda Zurqui and Finca La Reina on Hwy. 220, NE of San José, elev. 1500m, 13 August 1979, collected by Rosser W. and Jo A. Garrison. Paratype male with same data except 16 August 1979. Holotype #100376 in U.S. National Museum, paratype in author's collection.

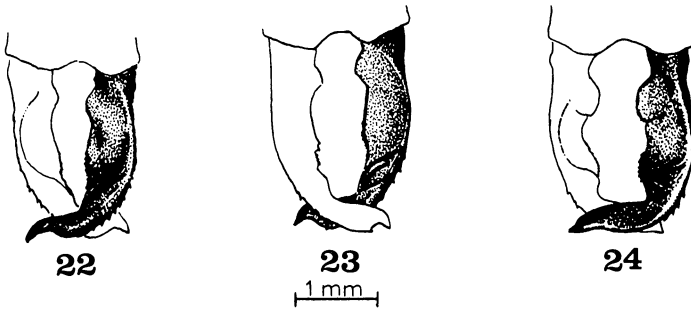
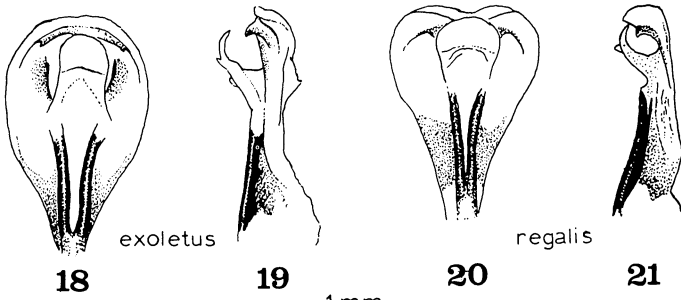
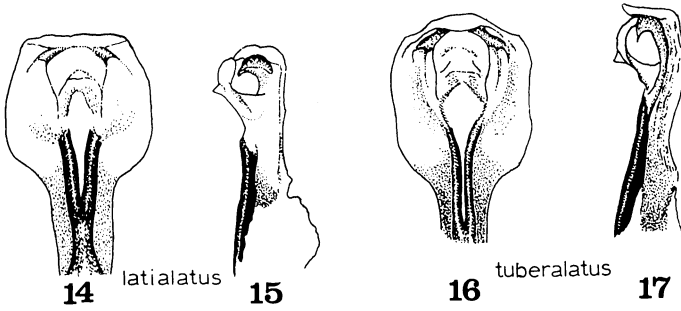
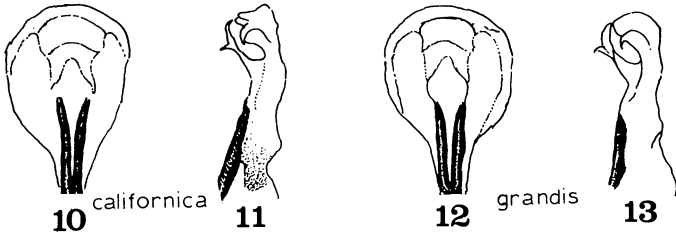
The two *Archilestes neblina* were taken on twigs overhanging a small stream by the Carretera Carrillo (Route 220), NE of San José. The locality may be found on the Carrillo Quadrangle of the 1:50,000 series topographic maps prepared by the Instituto Geografico Nacional de San José, Costa Rica. The surrounding countryside was mostly open, highly disturbed and grazed by cattle. The road intersects two small streams which are bordered by seemingly natural vegetation. The streams were mostly shaded and most of our collecting was done in light drizzle and heavy mist, interspersed with occasional periods of sunshine. The surrounding fields were wet and contained small puddles.

Other Odonata found at the streams and nearby were: *Cora skinneri* Calvert, *Hetaerina cruentata* (Rambur), *H. majuscula* Selys, *Heteragrion majus* Selys, *Anisagrion allopterum* Selys, *Argia chelata* Calvert, *A. extranea* (Hagen), *A. medullaris* Hagen, *A. terira* Calvert, *Aeschna cornigera* Brauer, *Coryphaeschna luteipennis* (Burmeister), *Cannaphila vibex* Hagen, and *Erythrodiplax abjecta* (Rambur). The specific name *neblina* comes from the Spanish word for mist, a condition characteristic of the high regions of Costa Rica.

DIAGNOSIS.—*Archilestes neblina* is the largest species of its genus known (abdomen and appendages = 58.7–58.8 mm), surpassing *A. exoletus* (50.5–55.0 mm), *A. latialatus* (52.0–58.8 mm), *A. tuberalatus* (51–54 mm), and *A. regalis* (50.8–53.4 mm). *Archilestes neblina* is easily distinguished from all other *Archilestes* species by the broad, foliaceous shape of the superior caudal appendages (Figs. 7–9). Only the appendages of *A. tuberalatus* (see Williamson, 1921, Plate II, Figs. 10, 11) are similar, but they are not as broad or foliaceous. *Archilestes neblina* differs from *A. regalis* in the origin of R_3 to R_2 . In *A. regalis*, R_3 arises from R_2 at the third or fourth postnodal crossvein in both wings, but the same vein arises just beyond the first postnodal crossvein in both wings in *A. neblina*. *Archilestes neblina* is also more heavily marked with black on the pterothorax than *A. regalis* (Figs. 1, 2; Gloyd, 1944).

I examined males of all seven currently described species of *Archilestes*. Their penes place them into four groups on the basis of shape of that organ in ventral view. In the first group, *A. californica* (Figs. 10–11) and *A. grandis* (Figs. 12–13), the penis is only a little longer than wide and almost circular. These structures seem to be essentially identical in both species. In the second group, the penes are square-like with rounded corners in

Figures 10–24. Male structures of *Archilestes*: 10–21, ventral and lateral views of penes; 22–24, dorsal views of male abdominal appendages; 10–11, *Archilestes californica*, male. California: Solano Co.; 12–13, *A. grandis*, male. Venezuela: Miranda State; 14–15, *A. latialatus*, male. Mexico: Veracruz; 16–17, *A. tuberalatus*, male. Venezuela: Aragua State; 18–19, *A. exoletus*, male. Argentina: Misiones Province; 20–21, *A. regalis*, male. Mexico: San Luis Potosi; 22, *A. latialatus*, paratype. Guatemala: Alta Verapaz Province; 23, *A. latialatus*. Mexico: Veracruz; 24, *A. latialatus*. Costa Rica: Alajuela Province.



A. latialatus (Figs. 14-15) and *A. tuberalatus* (Figs. 16-17). The sides of the penis are parallel in *A. tuberalatus* but are slightly convergent in *A. latialatus*. In the third group, the penes of *A. exoletus* (Figs. 18-19) and *A. neblina* (Figs. 5-6) are ovate, and in each species the ventral arm does not touch the penis tip (Figs. 6, 19), but the latter condition may be the result of post-mortem changes. The penis of *A. neblina* is more elongated than that of *A. exoletus*. In the fourth group, consisting only of *A. regalis*, the penis is cordate with the distal edge emarginate. The penes may be more variable than shown here, since most species are known from few specimens.

The following key should allow separation of males of *Archilestes*:

1. Marginal cell posterior to subtriangle in hindwing enlarged at border so that anal border of wing is strongly convex (Williamson 1921, Fig. 1; Donnelly 1981, Figs. 3, 5). Broadening ratio (length of distal vein of marginal cell posterior to subtriangle in hind wing relative to that of forewing) 1.23 or more (subgenus *Cyptolestes*) 2
- 1'. Marginal cell posterior to subquadrangle in hind wing not greatly enlarged at border, anal border of wing gently convex (Williamson 1921, Fig. 2); broadening ratio 1.20 or less (subgenus *Archilestes* s.s.) 3
- 2(1). Tip of superior appendage blunt, truncate (Fig. 11; Williamson 1921); R_3 arising from R_2 before third postnodal crossvein in forewing; states of Aragua and Carabobo, Northern Venezuela *tuberalatus*
- 2'. Tip of superior appendage acute (Figs. 22-24); R_3 arising from R_2 at or, more often, beyond third postnodal crossvein in forewing; southern Mexico to Costa Rica *latialatus*
- 3(1'). Vein R_3 arising from R_2 beyond second postnodal crossvein in both fore- and hind wings 4

- 3'. Vein R_3 arising at or before second postnodal crossvein in both wings 5
- 4(3). Vein R_3 arising at or before fourth postnodal crossvein in both wings; pterothorax largely pale with no metallic green stripes; Southern Brazil, Northern Argentina *exoletus*
- 4'. Vein R_3 arising from R_2 before fourth postnodal crossvein in both wings; pterothorax with broad stripe of metallic green on mesepimeron and mesepisternum (Gloyd 1944, Fig. 1); Northeastern Mexico .. *regalis*
- 5(3). Posterior half of superior appendages greatly expanded, truncate and leaf-like in appearance (Figs. 7, 9); large species, abdomen excluding appendages 55 mm, hind wing 42 mm; Costa Rica *neblina*
- 5'. Posterior half of superior appendages linear, similar in width to basal half of appendages (Pritchard and Smith* 1956, Fig. 4.62); smaller species, abdomen excluding appendages less than 50 mm, hind wing less than 40 mm 6
- 6(5). Inferior abdominal appendages parallel-sided (Pritchard and Smith 1956, Fig. 4.62), mesepimeral stripe never metallic; Washington, Oregon, California, Baja California *californica*
- 6'. Inferior abdominal appendages divergent, not parallel-sided (Pritchard and Smith 1956, Fig. 4.62); dark mesepimeral stripe often metallic green; United States south to Colombia and Venezuela *grandis*

*The sequence of authors is Pritchard and Smith in the table of contents and on the dust jacket, but as Smith and Pritchard on page 106. According to L.K. Gloyd (pers. comm, 17 Aug. 1981), who asked R.F. Smith about the sequence of authorship, the senior author should be A.E. Pritchard.

VARIABILITY IN *A. LATIALATUS*

During this study, I received from Dennis Paulson two specimens of an *Archilestes* from Costa Rica which he thought represented an undescribed species. These males were similar to *A. latialatus*, described thereafter, but differed from that species in possessing a distinct rounded median lobe at the base of the superior caudal appendages (Fig. 24). Through the kindness of Thomas Donnelly, I received one paratype male *A. latialatus* from Guatemala, and Enrique Gonzales Soriano lent me one male *A. latialatus* from Veracruz, Mexico. I compared the Guatemalan and Veracruz males and original description with the Costa Rican specimens. Except for the median lobe, the Costa Rican males do not vary more from the description than the Guatemalan paratype male does from the Veracruz male. The Costa Rican and Mexican specimens have a yellow lateral longitudinal stripe instead of the two small apical spots on abdominal segment two of the paratype and holotype of *A. latialatus* (Donnelly 1981). The length of the hind wing from base to nodus, expressed as percent of total wing length, is 33% in the Costa Rican and Veracruz specimens, 34% in the Guatemalan paratype. The mesepimeral metallic green stripe is diminished in one of the Costa Rican males and in the Veracruz specimen. These differences are minor and are within the scope of individual variation.

Johnson (1975) illustrated and discussed the variability of the superior caudal appendages of another lested, *Lestes sigma* Calvert. The basal median tooth appears as a sharp, pointed tooth or as a rounded lobe, a character that "equals differences between lested species." The basal median lobe of *A. latialatus* is more pronounced in the Veracruz specimen (Fig. 23) than in the paratype male (Fig. 22), and the difference shown by the Costa Rican males (Fig. 24) can probably be ascribed to geographic variation.

OTHER *ARCHILESTES* EXAMINED

A. californica: California: Solano Co., end of Bucktown Rd., 5 mi. W of Vacaville, 18 Oct. 1975 (1 ♂); Stanislaus Co., Del

Puerto Cyn. at N fork of Del Puerto Creek, about 14 mi. S of Patterson, 16–19 Sept. 1978 (2 ♂) all collected by R.W. and J.A. Garrison.

A. exoletus: Argentina: Prov. Misiones, Desedo, 12 Nov. 1979 (2 ♂) collected by R. Foerster.

A. grandis: Arizona: Pima Co., Florida Cyn., Santa Rita Mtns., 11 June 1978 (1 ♂) collected by J.E. Hafernik, Jr.; Texas: Uvalde Co., Frio River at rest area, just N of Garner State Park, 23 July 1977 (1 ♂); Mexico: Veracruz, Rio Metlac about 3.5 km. WNW of Fortin, 900 m, 10 Aug. 1976 (1 ♂); Venezuela: Miranda State, Quebrada Pasaquire, just N of El Marques, Caracas, 900–1040 m, 18 and 26 Sept. 1980 (9 ♂) all collected by R.W. and J.A. Garrison.

A. latialatus: Mexico: Veracruz, Laguna Emilia, 20 June 1971 (1 ♂) collected by R. Novelo; Guatemala: Alta Verapaz, Minas de Oxec, 10 km ESE of Cababon, 200 m, 12–14 June 1977 (1 ♂, paratype) collected by T. Donnelly; Costa Rica: Alajuela Prov., stream 7.3 mi SE San Ramon, 2900 ft., 19 June 1967 (1 ♂); Cartago Prov., stream at Pavones, 2800 ft., 2 Aug. 1966 (1 ♂) all collected by D.R. Paulson.

A. regalis: Mexico: San Luis Potosi, Rancho Quemado, route 85, km 353, near Tamazunchale, 5 Aug. 1966 (1 ♂) collected by O.S. Flint, Jr.

A. tuberalatus: Venezuela: Aragua State, Rancho Grande, 1000 m, 15 Dec. 1961 (1 ♂) collected by J. Racenis.

ACKNOWLEDGMENTS

I thank Dr. Thomas W. Donnelly, State University of New York, Binghamton; Mrs. Leonora K. Gloyd, University of Michigan, Ann Arbor; and Dr. Dennis R. Paulson, University of Washington, Seattle, for criticizing the manuscript. Drs. Donnelly, Paulson, Gerhard Jurzitza, Oliver S. Flint, Jr., and Lic. Enrique Gonzales and Lic. Jurg DeMarmels kindly provided me with other *Archilestes* specimens for this study. Dr. and Mrs. John E. Hafernik provided pleasant company during our trip to Costa Rica. To all these people, and especially to my wife Jo, who typed the manuscript and provided helpful suggestions, I extend my sincere thanks.

LITERATURE CITED

- DONNELLY, T.W. 1981. A new species of *Archilestes* from Mexico and Central America, with further notes on the status of *Cyptolestes* Williamson (Odonata: Lestidae). Fla. Entomol., 64:412-417.
- GLOYD, L.K. 1944. A new species of *Archilestes* from Mexico (Odonata: Lestinae). Occ. Pap. Mus. Zool. Univ. Mich., 483:1-4.
- . 1980. The taxonomic status of the genera *Superlestes* and *Cyptolestes* Williamson, 1921. (Odonata: Lestidae). Occ. Pap. Mus. Zool. Univ. Mich., 694:1-3.
- JOHNSON, C. 1975. Variability in the damselfly, *Lestes sigma* Calvert (Zygoptera: Lestidae). Texas J. Sci., 26(1-2):165-169.
- McLACHLAN, R. 1895. Some new species of Odonata of the "Legion" *Lestes*, with notes. Ann. Mag. Nat. Hist., (6)16:19-28.
- PRITCHARD, A.E. AND R.F. SMITH. 1956. Odonata. pp. 106-153 in Usinger, R.L., ed., Aquatic insects of California. Univ. Calif. Press, ix-508 pp.
- SELYS-LONGCHAMPS, E. DE. 1862. Synopsis des Agrionines, 2me legion: *Lestes*. Bull. Acad. Roy. Belg., Ser. 2, 13:287-338 (1-54 sep.).
- WILLIAMSON, E.B. 1921. Two new neotropical genera of Lestinae (Odonata). Occ. Pap. Mus. Zool. Univ. Mich., 96:1-9.

Accepted for publication July 15, 1982