MESOAMERICANA
Revista Oficial de la Sociedad Mesoamericana para la Biología y la Conservación
Vol.28, No.2, septiembre 2026-febrero 2027, pp.10-16

ARTÍCULO CIENTÍFICO
Temática: Entomología
ISSN-L: 1659-319

A brief revision of the north american genus *arigomphus* needgmam, 1897 (odonata: anisoptera: gomphidae)

Una breve revisión del género norteamericano arigomphus needgmam, 1897 (odonata: anisoptera: gomphidae)

Manuel D. Barria[1 2]

Universidad de Panamá, Panamá

manuel.barriag@up.ac.pa https://orcid.org/0000-0002-7045-0707

INFORMACIÓN SOBRE EL ARTÍCULO

Recibido: 29 de abril 2026 | Aceptado: 03 julio 2026 |

DOI:https://doi.org/10.48204/j.mesoamericana.v28n2.a11298

Como citar este documento: Barria, M. D. (2026). A brief revision of the north American genus *Arigomphus* Needgam, 1897 (Odonata: Anisoptera: Gomphidae). *Mesoamericana,* 28(2):5-11

Autor corresponsal: Manuel David Barria. Universidad de Panamá. manuel.barriag@up.ac.pa

Contribución del autor: El autor de este trabajo declara haber participado en la realización de esta investigación, desde búsqueda de información, consulta de tipos, elaboración de planchas y redacción del artículo.

Editor: Dr. Alonso Santos Murgas

ABSTRACT. A morphological and taxonomic revision of the North American genus *Arigomphus* Needham is presented, with an emphasis on the generic delimitation and diagnostic characterization of its seven species. A detailed diagnosis is provided for the genus and for each species, based on external morphological characters of adults. Diagnostic characters relevant for species identification are illustrated using comparative figures.

KEYWORDS. abdomen, cerci, pond, hamulae, morphology, Nearctic.

RESUMEN. Se presenta una revisión morfológica y taxonómica del género norteamericano *Arigomphus* Needham, con énfasis en la delimitación genérica y la caracterización diagnóstica de las siete especies que lo conforman. Se incluye una diagnosis detallada para el género y para cada especie basada en caracteres morfológicos externos de adultos. Los caracteres diagnósticos relevantes para la identificación específica se ilustran mediante figuras comparativas.

PALABRAS CLAVE: abdomen, cercos, estanque, hámulas, morfología, neártico.

[1] Laboratorio de Artrópodos Venenosos, Museo de Invertebrados G. B. Fairchild de la Universidad de Panamá, Campus Dr. Octavio Méndez Pereira, Ciudad de Panamá, Panama; manuel.barriag@up.ac.pa
[2] Programa Centroamericano de Maestría en Entomología (PCMENT), Vicerrectoría de Investigación y Postgrado, Universidad de Panamá, Campus Dr. Octavio Méndez Pereira, Ciudad de Panamá, Panamá

MESOAMERICANA
Revista Oficial de la Sociedad Mesoamericana para la Biología y la Conservación

INTRODUCTION

The genus *Arigomphus* was proposed by Needham (1897) to replace the provisional name Orcus proposed by Cockerell (1895), due to the risk of homonymy with *Orcus* Culsant (Coleoptera: Coccinaelidae). Needham based the genus primarily on the species *Gomphus pallidus* Rambur, 1842, without explicitly designating it as the type species. During the first half of the 20th century, between approximately 1900 and 1950, some authors, including Needham himself, considered *Arigomphus* to be a subgenus within *Gomphus* (Kennedy 1917, Needham & Heywood 1929, Byers 1939, Walker 1953), maintaining a conservative view of its taxonomic status. Subsequently, more detailed morphological and ecological studies revealed clear and consistent differences that justified its revalidation as a genus (Needham *et al*. 2000). Recently, molecular and phylogenetic analyses confirmed that, to maintain monophyly within the tribe Gomphini, *Arigomphus* must be considered a valid genus, thereby avoiding the paraphyly of *Gomphus sensu lato* (Ware *et al*. 2017). *Arigomphus* species are found exclusively in North America, from southern Canada to the southeastern United States, with the greatest diversity recorded in the eastern and central regions of the country. They inhabit primarily lentic freshwater bodies such as lakes, ponds, lagoons, and slow-moving sections of rivers, preferably with sandy or muddy bottoms and moderate riparian vegetation. Unlike other gomphids associated with fast-flowing streams, *Arigomphus* larvae exhibit morphological and behavioral adaptations typical of calmer environments, such as shallow, warm water bodies (Needham *et al*. 2000). Adults are typically found perched on low vegetation or on the bare substrate near the water, being active during the day under sunny conditions. This set of ecological traits has been considered relevant in defining the genus and distinguishing it from other related groups within Gomphidae (Ware *et al*. 2017).

Materials and Methods

Photographs of type specimens from international collections were requested, and databases from various collections were also consulted. The following information is provided: the collection's acronym, the collection's name, the address, and the person who assisted in providing the photographs of the requested types.

CUIC	Cornell University Insect Collection, Ithaca, Nueva York, USA (Jason Dombroskie).
INHS	Illinois Natural History Survey Insect Collection, Illinois, USA (Michele M. Kohler).
MNHN	Muséum national d'Histoire naturelle, Paris, French.
BMNH	British Museum of Natural History, London, United Kingdom.
OSUC	The Ohio State University Collection, Ohio, USA.

The information on the labels is presented verbatim; double slashes "//" indicate different labels; label characteristics or details are presented in square brackets "[ ]"; the collection data detailed on the labels are enclosed in quotation marks (" "). The illustrations were created using Adobe Illustrator 2025 software. The photographs were processed and edited using Adobe Photoshop 2025.

Taxonomy

Order **Odonata** Fabricius, 1793
Suborder **Anisoptera** Selys, 1854
Family **Gomphidae** Rambur, 1842
Genus ***Arigomphus*** Needgam, 1897: 181

Type species. *Gomphus pallidus* Rambur, 1842: 163, designation by monotype.
Gomphus pilipes Hagen in Selys, 1858: 408–410. synonymy

Diagnosis. Head: Post frons approximately three times as wide as it is long (3:1); females lack prominent tubercles or a pyramidal projection on the posterior surface of the cephalic capsule; tubercles and a pyramidal projection are present in males. **Abdomen:** Average dorsal length of abdominal segment VIII approximately equal to that of

MESOAMERICANA
Revista Oficial de la Sociedad Mesoamericana para la Biología y la Conservación

segment IX; segments VII (S7) to IX (S9) of the male abdomen barely expanded; in the female, the subgenital plate measures between 1/4 and 2/5 of the length of the ninth sternite, is laterally convex, with parallel tips, generally blunt and contiguous. **Legs:** Metafemur approximately 1.1 times longer than the maximum width of the head and without unusually long spines. Nymphs with burrowing hooks on the protibiae. **Genitalia:** Male cerci generally straight in lateral view (slightly curved in *A. furcifer*), basolateral margin not keeled, frequently with a distinctive lateral angulation and/or a ventral spine or protuberance (absent or poorly developed in *A. lentulus*, *A. maxwelli*, and *A. villosipes*); anterior hamulae not clavate, each with a small terminal hook directed backward; first segment of the male genitalia elongated-pyramidal in shape, with a medioventral groove (penis receptor) extending across the posteroventral edge of the hood; in lateral view, the posterior margin of the vesicle is concave and the anterior margin has a strong constriction at the base of the hood (*sensu* Ware *et al*. 2017).

Etymology. *Arigomphus* is derived from the Greek "ari-" (ἀρι-), meaning "very" or "prominent," and "gomphos" (γομφος), meaning "mace" or "pin," thus meaning "with a prominent mace," a reference to the characteristic terminal expansion of the abdomen typical of the genus.

Distribution. *Arigomphus* is a genus from North America (Canada and USA).

Arigomphus cornutus (Tough, 1900)

Fig. 1a

Gomphus cornutus Tough, 1900: 17–18 (original combination).

Type Material. According to Tough (1900: 18), the specimens are housed at The Ohio State University (OSUC), USA.

Diagnosis. *Body length*: 40–44 mm. **Head:** Blue-green eyes; olive-green clypeus and frons with slight black tinging along the sutures; dark vertex. **Thorax:** Olive-green with thick, dark, distinct antehumeral bands; black thoracic sutures. **Abdomen:** Slender, straight; segments with a prominent dark dorsal pattern; male cerci with a broad, divergent, horn-shaped internal projection. **Legs:** Coxae, femora, and tibiae uniformly dark brown; tarsomeres black; bristles sparse.

Distribution. Widely distributed throughout the northern Midwest of the United States (Minnesota, Wisconsin, Michigan, Iowa, Illinois, Indiana, Ohio) and southern Ontario, Canada.

Biology. *Arigomphus cornutus* is commonly found in ponds with marshy shores, small lakes with wet vegetation, slow moving streams, and rivers.

Arigomphus furcifer (Hagen in Selys, 1878)

Fig. 1b

Gomphus furcifer Hagen in Selys, 1878: 458–459 (original combination).

Diagnosis. Body length: 38–41 mm. Head: Light green eyes; olive-green frons and labium; brown nape; black vertex. **Thorax:** Yellowish green with broad, dark antehumeral bands. **Abdomen:** Slender, segments 1–7 with a continuous dark dorsal band; cerci long, forked, with curved, diverging branches. **Legs:** Medium brown; tarsomeres dark; setae short.

Distribution. Widely distributed in the northeastern United States, in the states of New York, Massachusetts, Connecticut, Vermont, New Hampshire, Maine, and Pennsylvania, and, to a lesser extent, in New Jersey. Its range also includes southeastern Canada, particularly southern Quebec and Ontario (Nukela *et al*. 2003).

Biology. *Arigomphus lentulus* inhabits calm waters with floating and aquatic vegetation, ponds, and lakes surrounded by marshes and slow-moving streams. Adults hunt along forest edges, perching on the ground, rocks, and, occasionally, broad leaved vegetation. At breeding sites, males perch along the shore and on floating vegetation, such as water lilies. Females lay eggs by tapping the water with their abdomen (Nukela *et al*. 2003).

MESOAMERICANA
Revista Oficial de la Sociedad Mesoamericana para la Biología y la Conservación

Arigomphus lentulus (Needham, 1902)
Figs. 1c, 2

Gomphus lentulus Needham, 1902: 275–276 (original combination).
Gomphus subapicalis Williamson, 1914: 54–56. synonymy

Type material. Male (♂) holotype of *Gomphus lentulus* at INHS, labeled: "[yellow label with red border] Gomphus lentulus type [illegible text] // (QR code) INHS Insect Collection 1077288 // [red label] Type ♂ Gomphus lentulus Needham".

Diagnosis. Body length: 40–43 mm. Head: Bluish eyes; clypeus and frons medium green with a slight dark spot in the center of the clypeus; occiput brown. Thorax: Olive green with well-defined dark antehumeral lines; sutures clearly delineated. Abdomen: Broad and flattened; dark dorsal markings extending to the ninth segment; cerci straight, slightly divergent (Fig. 1c). Legs: Yellowish brown with black tarsomeres; short setae.

Distribution. *Arigomphus lentulus* is distributed in the southeastern United States, with records in the states of Florida, Georgia, South Carolina, Alabama, and Mississippi.

Biology. *Arigomphus lentulus* is associated with ponds, lagoons, marshes, and lower reaches of streams, with sandy or silty bottoms and abundant riparian vegetation. The larvae inhabit the soft substrate and develop in warm environments. Adults typically rest on low vegetation or directly on open ground; they are active during the warm months, with peak activity observed in spring and early summer. The territorial behavior of males has been poorly documented, and details regarding the duration of the larval cycle or reproductive preferences are unknown (Needham *et al*., 2000; Paulson 2011).

Remarks. Needham (1902) described this species based on a single male specimen collected by J. F. Garber from the Little Wabash River in southeastern Illinois (USA). Needham places *G. lentulus* (= *Arigomphus lentulus*) within the subgenus *Arigomphus*, noting that *G. pallidus* (= *Arigomphus pallidus*) is the species most morphological similar.

Arigomphus maxwelli (Ferguson, 1950)
Figs. 1d, 3

Gomphus maxwelli Ferguson, 1950: 93–96 (original combination).

Type material. Male holotype (♂) of *Gomphus maxwelli* deposited at CUIC, labeled: "Arigomphus group ♂ Gomphus maxwelli n.s. #1 Holotype 1950 Alt7. limosus not villosipes Hardin Co., Texas 11 V 40 R.E. Maxwell // [red label] HOLOTYPE Cornell U. No. 3100 // Gomphus maxwelli Ferguson HOLOTYPE No. 3100". 2 male paratypes of *Gomphus maxwelli* (♂♂) deposited at CUIC, labeled: (1♂) "Arigomphus group ♂ Gomphus maxwelli n.s. 1950 Hardin Co., Texas 11 V 40 #2 R.E. Maxwell // Gomphus maxwelli Ferguson PARATYPE No. 3100.1 // Gomphus Hardin Co 11 V 40 R.E. Maxwell 1ex Alice Ferguson // [light blue label] PARATYPE Cornell U. No. 3100.1 // [QR code] CUIC 000065418". (1♂) "(Gomphinae) maxwelli Gomphus lentulus ♂ Det. By A.M.F. 1944 Dallas, Denton, or Caddo Lake Texas 1938 – Spring (S.M.U. collection) //[QR code] CUIC 000065419".

Description. *Body length*: 40–43 mm. **Head:** Eyes green; frons and clypeus olive-brown; nape brown; vertex black. **Thorax:** Olive-green with thin, defined brown-black antehumeral bands; sutural bands light brown. **Abdomen:** More robust than in *A. pallidus*; abdominal segments with defined black markings; cerci straight, elongated, and slightly divergent, without sinuation. Legs. Uniform yellowish brown; tarsomeres black; setae visible but sparse.

Distribution. *Arigomphus maxwelli* is distributed throughout the south-central and southeastern United States, with records from Texas, Oklahoma, Arkansas, Louisiana, and Mississippi.

Biology. *Arigomphus maxwelli* inhabits muddy bottomed lakes, ponds, slow moving streams, and stagnant waters. Males perch on the shore or in low vegetation. They patrol at low altitude with their abdomen slightly turned upward. Females lay eggs by flying slowly over the water and tapping their abdomen against the surface to release the

MESOAMERICANA
Revista Oficial de la Sociedad Mesoamericana para la Biología y la Conservación

eggs. This species appears to tolerate degraded habitats better than most other *Arigomphus* species (Nukela *et al*. 2003).

Arigomphus pallidus (Rambur, 1842)

Fig. 1e

Gomphus pallidus Rambur, 1842: 163 (original combination).

Description. ***Body length*:** 39–42 mm. **Head:** Bright green eyes; occiput, frons, clypeus, and labrum pale green, unmarked; vertex black. **Thorax:** Pale green to yellowish-green, with diffuse pale brown antehumeral and sutural lines. **Abdomen:** Slender abdomen, thickening distally; first seventh segments pale green, with reduced or absent black spots; last abdominal segments testaceous brown; abdominal cerci subtriangular, with slightly sinuous lateral margins as in Fig. 2e. **Legs:** Coxa, femur, and tibiae dark brown; tarsomeres black; legs with short setae.

Distribution. *Arigomphus pallidus* is found in the southeastern United States (Alabama, North Carolina, South Carolina, Florida, Kentucky).

Biology. *Arigomphus pallidus* inhabits lakes, ponds, and calm bodies of water with vegetation. Its nymphs live partially buried in the soft substrate and are predators, as are the adults, which capture insects in flight. They are active from spring through early summer (Needham *et al*. 2000; Paulson 2011).

Remarks. Rambur described the species based on an unspecified number of specimens; it is presumed that the syntypes may be deposited at the MNHN (Muséum national d'Histoire naturelle, France), however, they could not be found in the collection's database.

Arigomphus submedianus (Williamson, 1914)

Fig. 1f

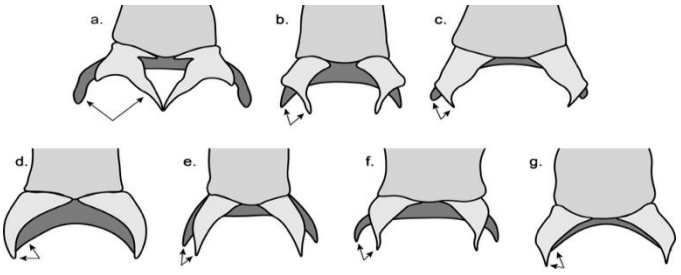
Gomphus submedianus Williamson, 1914: 56-57 (original combination).

Description. ***Body length*:** 38–41 mm. **Head:** Blue-green eyes; frons and clypeus light green with a faint brown spot in the center of the labrum; vertex black. **Thorax:** Pale green with visible submedian bands and complete, well-marked antehumeral lines. **Abdomen:** Slender, with black lateral markings and a broken dorsal line; cerci similar in shape to those of *A. pallidus*, but shorter and with black pigmented inner margins. **Legs:** Light brown; tarsomeres dark, setae fine.

Distribution. Widely distributed in the central and eastern United States. Its range extends from southern Ontario (Canada) south to Texas and Florida, and west to Nebraska and Kansas. It has been recorded in at least 20 states, including Ohio, Indiana, Illinois, Missouri, Kentucky, Tennessee, and the Carolinas.

Biology. *Arigomphus submedianus* inhabits still waters with soft bottoms; the larvae live buried in the substrate. Adults are active in spring and summer, resting on low vegetation or the ground near the water (Needham *et al*. 2000).

Figure 1.
Dorsal view of the abdominal cerci of Arigomphus species. a) A. cornutus. b) A. furcifer. c) A. lentulus. d) A. maxwelli. e) A. pallidus. f) A. submedianus. g) A. villosipes.



Arigomphus villosipes (de Selys, 1854)

Fig. 1g

Gomphus villosipes de Selys, 1854: 53 (original combination).

MESOAMERICANA
Revista Oficial de la Sociedad Mesoamericana para la Biología y la Conservación

Type specimen. Syntypes deposited in the Selys Collection at the BMNH.

Diagnosis. *Body length*: 40–44 mm. **Head:** Blue-green eyes; olive-green frons and clypeus; dark brown occiput; black vertex. **Thorax:** Brown with broad green dorsal stripes forming a "W" pattern; lateral margins grayish-green; antehumeral region and sutures well pigmented. **Abdomen:** Slender, with greenish-brown segments and dark dorsal spots; cerci thick, straight, slightly divergent; blackish with yellow dorsal stripes on S1–S7 (occasionally a small dorsal spot on S8 and/or S9), rust-colored on the sides of S8–S9, and mostly yellow on S10 and appendages. **Legs:** Legs notably hairy; femora with long, dense bristles, from which the name derives; tibiae with pale yellow stripes; tarsomeres black. Female similar to male but with more yellow on the lateral part of the abdomen.

Distribution. *Arigomphus villosipes* is found in the southeastern and south-central United States, with records from states such as Texas, Louisiana, Arkansas, Mississippi, Alabama, and Georgia.

Biology. It inhabits muddy-bottomed lakes, ponds, slow-moving streams, and stagnant waters. Males rest on the shore or in low vegetation. They patrol at low altitude with their abdomen slightly turned upward. Females lay eggs by flying slowly over the water and tapping their abdomen against the surface to release the eggs. This species appears to tolerate degraded habitats better than most other springtails (Nukela *et al*. 2003).

Remarks. The species was described based on an unspecified number of males and females from a locality identified only as "United States".

ACKNOWLEDMENTS

I thank to the Secretaría Nacional de Ciencia, Tecnología e Innovación de Panamá (SENACYT) for the financial support provided to the Programa Centroamericano de Maestría en Entomología (PCMENT) within which this work was developed.

To Dr. Enrique Medianero and Dr. Edwin Dominguez (Universidad de Panamá) for their comments and suggestions during the preparation of this work. To William Bayfield-Farrell (University of Minnesota Twin Cities, USA) for reviewing the English text.

Figure 2.
Male holotype of Gomphus lentulus Needham deposited at the INHS. Photographs courtesy of Michele M. Kohler (Illinois Natural History Survey Insect Collection, Illinois, USA).

Figure 3.
Male holotype of Gomphus maxwelli Ferguson deposited at CUIC. Photographs courtesy of Jason Dombroskie (Cornell University Insect Collection, USA).

MESOAMERICANA
Revista Oficial de la Sociedad Mesoamericana para la Biología y la Conservación

REFERENCES

Byers, C. F. (1939) A study of the dragonflies of the genus *Progomphus* (Gomphoides) with a description of a new species. Proceedings of the Florida Academy of Sciences, 4, 19–85.

Ferguson, A. (1950) *Gomphus maxwelli*, a new species of dragonfly from Texas (Odonata, Gomphinae, Group *Arigomphus*)., Field Laboratory 18 (2): 93–96, figs. 1–7.

Kennedy, C. H. (1917) Notes on the life history and ecology of the dragonflies (Odonata) of central California and Nevada. Proceedings of the United States National Museum, 52(2192), 483–635. https://doi.org/10.5479/si.00963801.52-2192.483

Needham, J. G. (1902) Three new Gomphines. The Canadian Entomologist 34: 275–278.

Needham, J. G., & Heywood, H. B. (1929) A handbook of the dragonflies of North America. Charles C. Thomas Publisher.

Needham, J. G., Westfall, M. J., & May, M. L. (2000) Dragonflies of North America (Rev. ed.). Scientific Publishers, Gainesville, Florida. 939 pp.

Nikula, B., Loose, J. L., & Burne, M. R. (2003) A Field Guide to Dragonflies and Damselflies of Massachusetts Natural Heritage and Endangered Species Program. Mass. Division of Fisheries & Wildlife. Boston, MA.

Paulson, D. R. (2011) Dragonflies and Damselflies of the East. Princeton University Press, Princeton, NJ. 538 pp.

Rambur, J. P. (1842) Histoire Naturelle des Insectes, Névroptères. Librairie encyclopédique de Roret. Fain et Thunot, Paris, pp. xviii + 534.

Selys-Longchamps, M. E., de. (1854) Synopsis des Gomphines. Bulletins de l'Académie royale des sciences, des lettres et des beaux-arts de Belgique, 21: 23–112.

Selys-Longchamps, M. E., de. (1878) Quatriemes additions au synopsis des Gomphines. Bulletins de l'Académie royale des sciences, des lettres et des beaux-arts de Belgique (2) 46: 408–471.

Tough, J. (1900) A new species of *Gomphus*. Occasional Memoirs of the Chicago Entomological Society, 1: 17–18.

Walker, E.M. (1958) The Odonata of Canada and Alaska, Vol 2. University of Toronto Press, Toronto, ON, 318 pp. https://doi.org/10.3138/9781442654198

Ware, J. L., Pilgrim, E., May, M. L., Donnelly, T. W., &

Tennessen, K. (2017). Phylogenetic relationships of North American Gomphidae and their close relatives. Systematic entomology, 42(2), 347–358. https://doi.org/10.1111/syen.12218

Williamson, E. B. (1914) *Gomphus pallidus* and two new related species. Entomological News, 25: 49–58.