

New records and notes on the distribution of aquatic insects (Coleoptera, Hemiptera) in southeastern Arizona

MATTHEW R. PINTAR^{1,*}

¹*Institute of Environment, Florida International University, Miami, FL 33199*

ABSTRACT.—Aquatic insects were collected from Arizona during 2022, and museum specimens and observations posted to online platforms were reviewed to support new records. Notes and records are provided for 8 species of aquatic Coleoptera and Hemiptera. Three species are reported for the first time from the United States in Arizona: *Hydaticus rimosus* (Dytiscidae), *Neobidessus youngi* (Dytiscidae), and *Rhagovelia ignota* (Veliidae). Two additional species are new state records for Arizona: *Copelatus debilis* (Dytiscidae) and *Meridiorhantus calidus* (Dytiscidae). Distributional notes are provided for *Abedus breviceps* (Belostomatidae) and *Rhagovelia choreutes* (Veliidae). A form of *Copelatus distinctus* (Dytiscidae) with greatly reduced striae is illustrated.

RESUMEN.—Los insectos acuáticos fueron recolectados de Arizona durante 2022 y los especímenes de museos y las observaciones publicadas en plataformas de internet fueron revisados para apoyar nuevos registros. Se proporcionan notas y registros sobre ocho especies acuáticas de Coleoptera y Hemiptera. Tres especies se reportan por primera vez en los Estados Unidos en Arizona: *Hydaticus rimosus* (Dytiscidae), *Neobidessus youngi* (Dytiscidae), y *Rhagovelia ignota* (Veliidae). Dos especies adicionales son nuevos registros estatales para Arizona: *Copelatus debilis* (Dytiscidae) y *Meridiorhantus calidus* (Dytiscidae). Se proporcionan notas de distribución para *Abedus breviceps* (Belostomatidae) y *Rhagovelia choreutes* (Veliidae). Se ilustra una forma de *Copelatus distinctus* (Dytiscidae) con estrías muy reducidas.

Freshwater ecosystems contain an incredible diversity of animals, including a wide array of insect taxa (Balian et al. 2008). Aquatic insects of the orders Coleoptera (beetles) and Hemiptera (Heteroptera; true bugs) have been extensively studied in North America, but as with most taxa, the depth of the published literature is often taxon- and region-specific (e.g., Polhemus 1997, Larson et al. 2000, Stevens and Polhemus 2008). There are always more opportunities for studying the ecology, distribution, and systematics of these taxa.

Southeastern Arizona sits at the convergence of the Sierra Madre Occidental and the Sonoran and Chihuahuan deserts, which has made it the focus of numerous efforts to search for and catalog biodiversity (Van Devender et al. 2013), though invertebrates have been historically underrepresented relative to other taxa (Moore et al. 2013). This region, referred to as the Madrean Sky Islands, broadly spans the convergence of the Nearctic and Neotropical realms, so species native to the neotropics may occur here regu-

larly or as vagrants. Documenting the occurrence of species now is important for understanding changes to populations and distributions as environmental conditions change (Strayer and Dudgeon 2010).

METHODS

During October 2022, I searched in southeastern Arizona for potential records of the tropical water strider genus *Limnogonus* Stål, 1868 following the discovery that 2 species occurred in Florida and no authors had previously appropriately documented their occurrence anywhere in the continental United States (Pintar unpublished data). I did not find any *Limnogonus* during this trip, but given recent findings of new records of other species in Florida (Pintar and Keller 2020, Pintar 2023), I collected a wide range of aquatic Coleoptera and Heteroptera to see whether any specimens represented new distributional records. Collecting efforts were focused on Coronado National Forest land, with

*Corresponding author: matthew.pintar@gmail.com

additional sampling or surveying at state parks and wildlife management areas, Bureau of Land Management land, and some private nature preserves. I supplemented collecting efforts by examining specimens in museum collections and reviewing observations on BugGuide (<https://bugguide.net>) and iNaturalist (<https://www.inaturalist.org>) to further document the distribution of a few species. Some specimens of observations first posted to BugGuide or iNaturalist were later provided to me. Voucher specimens have been deposited at the University of Arizona Insect Collection, Tucson, Arizona (UAIC); the University of Texas Insect Collection, Austin, Texas (UTIC); the National Museum of Natural History, Smithsonian Institution, Washington, District of Columbia (USNM); and the Texas A&M University Insect Collection, College Station, Texas (TAMUIC). In addition to the previous 4 museum collections, abbreviations for sources of material examined are BugGuide (BG); Gillette Museum of Arthropod Diversity, Colorado State University, Fort Collins, Colorado (CSUC); iNaturalist (INAT); and Matthew R. Pintar personal collection (MRPC).

SPECIES ACCOUNTS

COLEOPTERA

Copelatus debilis Sharp, 1882

MATERIAL.—ARIZONA: *Santa Cruz County*: Las Lagunas de Anza [31.3901°N, 110.9553°W; 1112 m], 16 October 2022, M.R. Pintar with net (UAIC: 1♀).

DISTRIBUTION.—Southern Arizona and southern Texas in the United States; Mexico, Central America (Young 1963, Arce-Pérez and Roughley 1999).

REMARKS.—This is a new state record for Arizona. One female (Fig. 1A) was found at Las Lagunas de Anza, a nature preserve in Nogales 6.4 km north of the United States–Mexico border. The closest published records are from Sinaloa, >500 km to the south (Young 1963). In the United States, *C. debilis* occurs in southern Texas (Young 1963). See remarks under *C. distinctus*.

Copelatus distinctus Aubé, 1838

MATERIAL.—ARIZONA: *Cochise County*: Stream below Parker Canyon Dam [31.4247°N, 110.4587°W; 1614 m], 15 October 2022, M.R. Pintar with net (UAIC: 2♂ [including specimen with greatly reduced striae]; UTIC: 1♂, 2♀). *Additional material*: I collected this species at

8 other sites in Cochise, Pima, and Santa Cruz counties.

DISTRIBUTION.—Arizona, New Mexico, and western Texas in the United States; Mexico (Young 1963, Arce-Pérez and Roughley 1999).

REMARKS.—This species is common in southern Arizona. At the collection locality noted in the material above, 5 individuals were taken: 3 males and 2 females. One of the males exhibited considerable reduction in the elytral striae to the extent that there were only 5 nearly complete striae and 1 partial stria (Fig. 1C). The other 2 males had 10 striae, but alternating striae were reduced (Fig. 1D); the females possessed all 10 striae. This is perhaps the most extreme example of the reduction and fragmentation of elytral striae Young (1963) mentioned that he observed in specimens from Jalisco. I could not discern any differences in genital structure between these males and those from other localities. Superficially, specimens with greatly reduced striae may appear similar to *C. debilis* (Fig. 1A), or if striae are moderately reduced, *C. chevrolati* Aubé, 1838 (Fig. 1B). Existing keys (e.g., Young 1963, Larson et al. 2000) rely on an exact number of striae for identification. However, *C. distinctus* (5.8–6.5 mm) with reduced striae are easily separable from *C. debilis* (3.7–4.1 mm) by differences in size. *Copelatus chevrolati* is similar in size to *C. distinctus*, and differences may be more difficult to discern. From specimens I have seen, in *C. distinctus* the 2 striae closest to the suture are not the first to be totally lost (which would produce an appearance similar to *C. chevrolati*), but rather the innermost stria remains at least partially visible as the alternating striae are reduced. In *C. chevrolati*, the innermost striae are either greatly reduced (typically in eastern populations) or absent (western populations; considered different subspecies), while alternating striae are truncated apically and can be somewhat to extensively reduced as is common in *C. distinctus*, but I have not seen specimens where alternating striae are essentially absent in *C. chevrolati*. In both species, reduction of striae seems to occur predominantly in males.

Hydaticus rimosus Aubé, 1838

MATERIAL.—ARIZONA: *Santa Cruz County*: Las Lagunas de Anza [31.3905°N, 110.9560°W; 1112 m], 17 July 2022, S. Vitanza at light (UAIC: 1♂). Las Lagunas de Anza [31.3901°N, 110.9553°W; 1112 m], 16 October 2022, M.R.

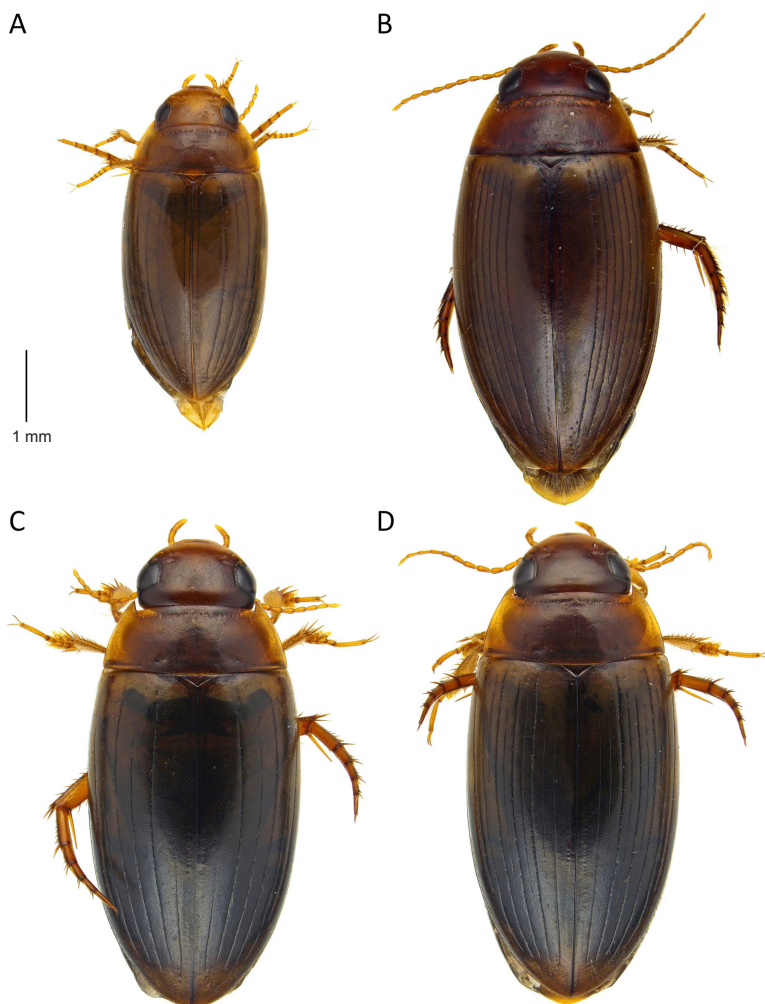


Fig. 1. Dorsal habitus photos of *Copelatus* from the southwestern United States: **A**, *C. debilis* female from Las Lagunas de Anza. **B**, *C. chevrolati renovatus* Guignot, 1952 from Travis County, Texas. **C**, *C. distinctus* male exhibiting greatly reduced elytral striae, from below Parker Canyon Dam. **D**, *C. distinctus* male with moderately reduced striae, from below Parker Canyon Dam. Photographs by Salvador Vitanza.

Pintar with net (TAMUIC: 1♀; USNM: 1♂; MRPC: 1♂). Peña Blanca Lake [31.3993°N, 111.0886°W; 1170 m], 16 October 2022, M.R. Pintar with net (UTIC: 1♀).

DISTRIBUTION.—Southeastern Arizona, United States; Mexico to Costa Rica, the Bahamas, and Cuba (Roughley and Pengelly 1981, Megna et al. 2019).

REMARKS.—This is a new country record for the United States and a new state record for Arizona (Fig. 2). The closest known record of *H. rimosus* to this location was >500 km to the south in Sinaloa (Arce-Pérez and Roughley 1999). Due to this species' similarity to *H.*

bimarginatus (Say, 1830), Young (1954) erroneously recorded *H. rimosus* from Florida, but Florida's proximity to the known range of *H. rimosus* (Bahamas, Cuba) means it may one day be found there as well (Roughley and Pengelly 1981, Epler 2010).

Meridiorhantus calidus (Fabricius, 1792)

MATERIAL.—ARIZONA: *Santa Cruz County*: Coronado National Forest, Peña Blanca Lake [31.3990°N, 111.0888°W; 1170 m], 7 November 2022, T. Boehmer (UAIC: 1♀).

DISTRIBUTION.—Southern New York to Florida and eastern/southern Texas in the United States;



Fig. 2. Dorsal habitus of an adult male *Hydaticus rimosus* from Las Lagunas de Anza, Nogales, Arizona. Photograph by Salvador Vitanza.

Mexico, Central America, the Antilles, and a large portion of South America (Zimmerman and Smith 1975, Balke et al. 2002).

REMARKS.—This is a new state record for Arizona. The closest known localities to this site for *M. calidus* were recorded by Zimmerman and Smith (1975) in southern Sonora and northern Baja California.

Neobidessus youngi (Leech, 1948)

MATERIAL.—ARIZONA: *Pima County*: Canoa Ranch Rest Area (northbound) Hwy. 19 [31.7652°N, 111.0347°W; 912 m], 4 October 2019, S. Vitanza at light (BG: 1). *Santa Cruz County*: Peña Blanca Lake [31.3997°N, 111.0889°W; 1179 m], 2 June 2020, S. Vitanza at light (BG: 1).

DISTRIBUTION.—Southeastern Arizona, United States; Baja California, Sinaloa, and Sonora, Mexico (Young 1977).

REMARKS.—This is a new country record for the United States and a new state record for Arizona. *Neobidessus youngi* (Fig. 3) is the third species of *Neobidessus* recorded in the United States: *N. pullus* (LeConte, 1855) is widespread in the southeastern states and *N. pulloides* Young, 1977 is found in parts of Texas. While no specimens were collected, *N. youngi* has distinctive hind trochanters that are produced into a conical point (Fig. 3; Young 1977). I expect that an additional record posted to iNaturalist from Saguaro National Park, Pima County, is also *N. youngi*, but it could not be verified as no ventral photos were taken.

HEMIPTERA

Abedus breviceps Stål, 1862

MATERIAL.—ARIZONA: *Graham County*: Gila River [32.8933°N, 109.4786°W; 955 m], 14 October 2022, M.R. Pintar with net (UAIC: 1♂). *Yavapai County*: Verde River [34.7652°N, 112.0362°W; 1017 m], 7 January 2022, M.R. Pintar with net (UTIC: 1♀; MRPC: 3♀). NEW MEXICO: *Sierra County*: Seco Creek, 25 mi W Williamsburg, 9 August 1990, R. Durfee (CSUC: 1). *Additional material*: Specimens in UAIC from the following localities in Arizona: Guadalupe River, Cochise County; Salt River, Gila County; Tonto Creek, Gisela, Gila County; Lower Eagle Creek, Greenlee County; Oak Creek, Yavapai County; Spring Creek, Yavapai County; Verde River, Yavapai County.

DISTRIBUTION.—Arizona, southwestern New Mexico, and the Trans-Pecos region of western Texas in the United States; Mexico (Fig. 4).

REMARKS.—As discussed by Bogan et al. (2013), Menke (1960, 1977) considered this species to occur in a disjunct population in the Verde River drainage of central Arizona, with the populations occurring in the Big Bend region of Texas representing the northern limit of a more continuous distribution throughout much of Mexico. The findings of Bogan et al. (2013), my recent collection of an individual from the Gila River in Graham County, and the UAIC specimens from elsewhere in the state indicate that *A. breviceps* may occur throughout the canyons of the mountainous transition zone between the Colorado Plateau to the north and the Basin and Range Province to the south, forming a more continuous distribution through-

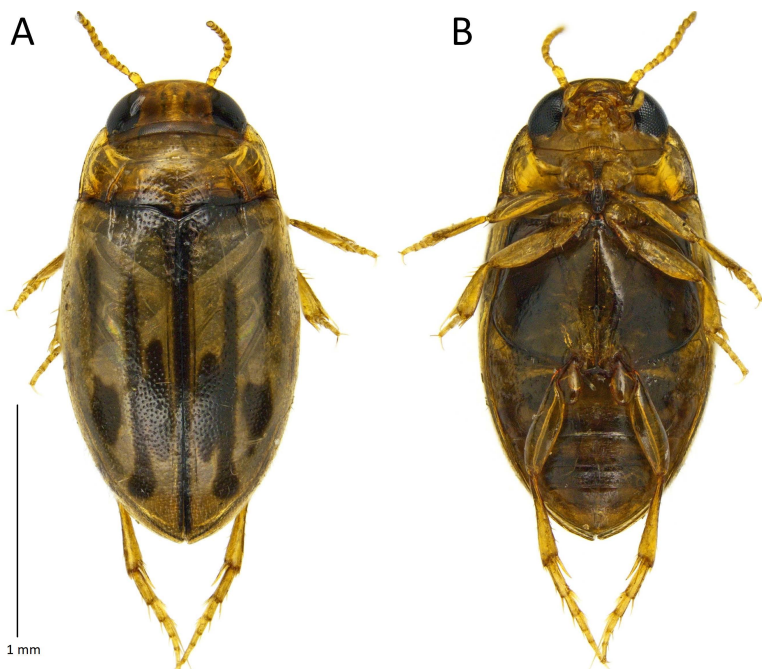


Fig. 3. Photographs of an adult *Neobidessus youngi* from Pima County, Arizona. **A**, Dorsal habitus. **B**, Ventral habitus. Photographs by Salvador Vitanza.

out its range. There is also an isolated population in Boucher Canyon of Grand Canyon National Park (Stevens and Polhemus 2008).

I could not definitively determine the locality of a specimen in UAIC from “Guadalupe River, Cochise County.” The most appropriate location based on the label might be Guadalupe Canyon in the southeastern corner of the county and state (Fig. 4), but this canyon does not have a permanently flowing stream. The USNM specimen labeled from “Cherryville” was previously the only known occurrence of *A. breviceps* in New Mexico (Menke 1960, 1977); a specimen in CSUC from Sierra County is the second record in New Mexico. *Abedus breviceps* appears to occur primarily in permanently flowing streams and rivers, in contrast to the other common species in Arizona, *A. herberti* Hidalgo, 1935, which typically occurs in smaller streams throughout the region that are either disconnected from larger rivers or may seasonally cease surface flow and remain restricted to disconnected pools.

Rhagovelia choreutes Hussey, 1925

MATERIAL.—ARIZONA: *Graham County*: Gila River [32.8933°N, 109.4786°W; 955 m],

14 October 2022, M.R. Pintar with net (UAIC: 1♂; MRPC: 1♂).

DISTRIBUTION.—Northern Mexico and southern United States (northern Florida to the southeastern border of California; Fig. 4).

REMARKS.—In Arizona, this species was first known from the Verde River drainage in Yavapai County (Polhemus 1997). Stevens and Polhemus (2008) reported specimens in the Arizona State University collection from Pima and Santa Cruz counties, but the Pima County specimen(s) could not be located. Records in the Arizona State University collection determined by C.L. Smith were from Monkey Spring, Santa Cruz County (6 specimens) and below the Granite Reef Dam on the Salt River in Maricopa County (1 specimen); I did not inspect these specimens. The occurrence of *R. choreutes* in the Gila River, Salt River, and Monkey Spring indicate that *R. choreutes* may be more widespread in Arizona and New Mexico than currently known.

Rhagovelia ignota Drake and Harris, 1933

MATERIAL.—ARIZONA: *Santa Cruz County*: Santa Cruz River, Rio Rico [31.4683°N, 110.9918°W; 1044 m], 16 October 2022, M.R. Pintar with net (USNM: 1♂).

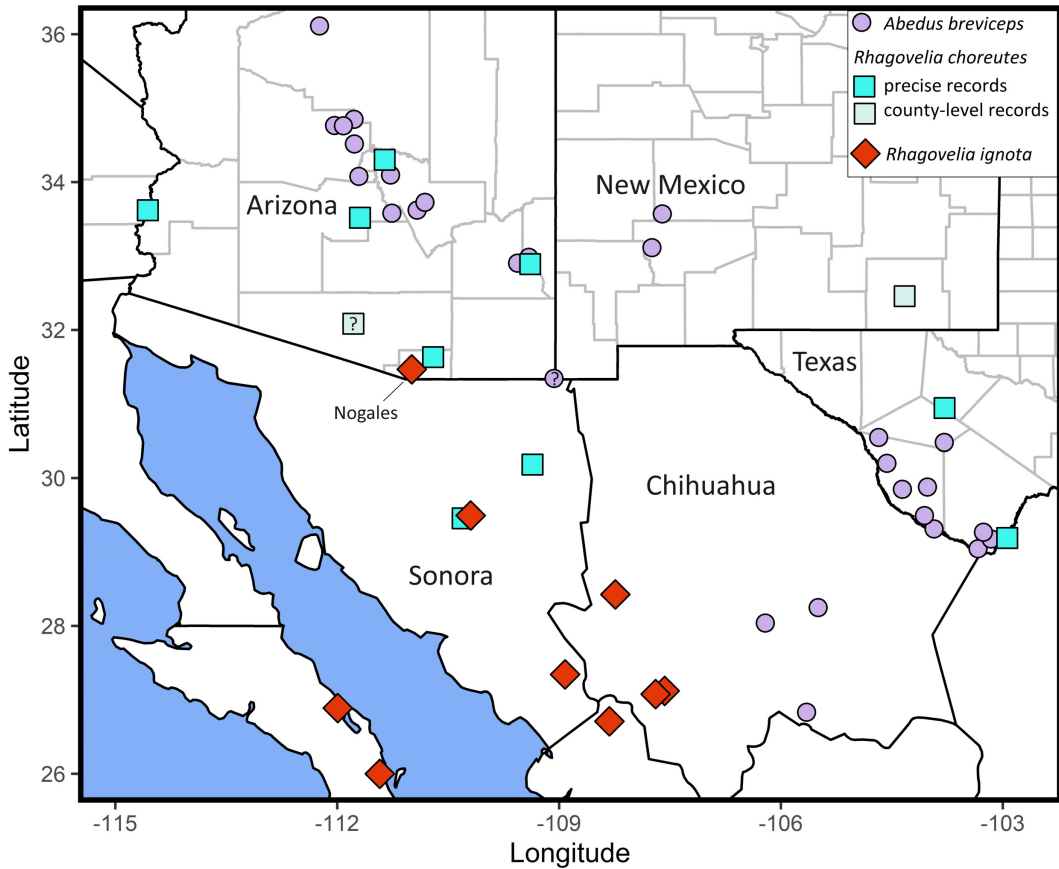


Fig. 4. Map illustrating the distribution in the southwestern United States and northwestern Mexico of the 3 species of Heteroptera with records described here: *Abedus breviceps*, *Rhagovelia choreutes*, and *Rhagovelia ignota*. Points include records by Polhemus (1997) and Stevens and Polhemus (2008) for *Rhagovelia*, and by Menke (1960, 1977), Bogan et al. (2013), and Stevens and Polhemus (2008) for *A. breviceps*. The map does not encompass the entire range of any of the species. Question marks (?) indicate records for which specimens could not be located or the locality is uncertain and estimated.

DISTRIBUTION.—Southeastern Arizona, United States; Mexico to Honduras (Fig. 4).

REMARKS.—This is a new country record for the United States and a new state record for Arizona. A single macropterous male (Fig. 5A) was found in the Santa Cruz River among *R. distincta* Champion, 1898. This is the twelfth species of *Rhagovelia* and the third member of the *spinigera* group to be documented in the United States along with *R. choreutes* (see above) and *R. novahispaniae* D. Polhemus, 1997 (known in the United States only from the Devil’s River area of Texas) (Polhemus 1997). A fourth species in the *spinigera* group, *R. formosa* Bacon, 1956 occurs as far north as Sonora and may eventually be found in Arizona (Polhemus 1997). *Rhagovelia ignota* males are distin-

guished from other species in the *spinigera* group and all other species of *Rhagovelia* known in the United States by their swollen first genital segment (Fig. 5B) and deeply concave abdominal segment VII (Polhemus 1997).

SUMMARY AND CONCLUSION

All the species that are new state records for Arizona are species known to occur in western Mexico throughout most of the Sierra Madre Occidental but not the interior higher, more arid Mexican Plateau. Four of the new state records were found within a short distance of the United States–Mexico border in or near Nogales (Fig. 4); only *N. youngi* was found farther north in Pima County. Beginning at the Tumacacori



Fig. 5. Photographs of an adult male *Rhagovelia ignota* from the Santa Cruz River, Arizona. **A**, Dorsal habitus (photograph by Salvador Vitanza). **B**, Lateral perspective of genital segment (photograph by MRP).

Highlands northwest and west of Nogales, there is a nearly continuous chain of lower-lying mountains ranging to the south and southeast, which contrasts with the more dramatic elevational and spatial separation between the sky islands in the rest of southeastern Arizona. The numerous constructed ponds (“tanks”) that dot the landscape throughout the Tumacacori Highlands and into Mexico may provide a landscape conducive to dispersing insects and shifting ranges of aquatic taxa. Within the area around Nogales, Las Lagunas de Anza is one of the largest wetlands and also sits at a relatively low elevation compared to the ponds in the surrounding ranges. Documenting species occurring in the region and those previously recorded

in natural history collections is important to understanding shifting distributions of species as the climate changes (Kharouba et al. 2019). With a gradually warming climate, additional records of species that occur in northwestern Mexico might be expected to occur in Arizona in the future, and southeastern Arizona remains the region where new records may be most likely to be first encountered.

ACKNOWLEDGMENTS

Collection access and specimen deposition were facilitated by Crystal Cooke (CSUC), Gene Hall (UAIC), Tom Henry (USNM), Ed Riley (TAMUIC), and Alex Wild (UTIC). I appreciate Salvador Vitanza for photographing my specimens and users of iNaturalist and BugGuide for making valuable observations. I particularly appreciate the permission to collect at Las Lagunas de Anza, where several of these records were observed. Collecting was conducted in Coronado National Forest under Special Use Permit #2268 and in Arizona state parks under permit #2022-0001. A grant from the *Western North American Naturalist* supported collecting efforts.

LITERATURE CITED

- ARCE-PÉREZ, R., AND R.E. ROUGHLEY. 1999. Lista anotada y claves para los Hydradephaga (Coleoptera: Adephaga: Dytiscidae, Noteridae, Haliplidae, Gyrrinidae) de México. *Dugesiana* 6:69–104.
- BALIAN, E.V., H. SEGERS, C. LÉVÊQUE, AND K. MARTENS. 2008. The freshwater animal diversity assessment: an overview of the results. *Hydrobiologia* 595:627–637.
- BALKE, M., R. ROUGHLEY, W. SONDERMANN, AND P. SPANGLER. 2002. Diving beetles of the genus *Rhantus* in Costa Rica: taxonomy and biogeography, with notes on South American species (Coleoptera: Dytiscidae). *Studies on Neotropical Fauna and Environment* 37: 263–271.
- BOGAN, M.T., O.G. GUTIÉRREZ-RUACHO, J.A. ALVARADO-CASTRO, AND D.A. LYTLE. 2013. New records of *Martarega*, *Graptocorixa*, and *Abedus* (Heteroptera: Notonectidae, Corixidae, Belostomatidae) from northwestern Mexico and Arizona, including the first record of *Graptocorixa emburyi* in the United States. *Southwestern Naturalist* 58:494–497.
- EPLER, J.H. 2010. The water beetles of Florida: an identification manual for the families Chrysomelidae, Curculionidae, Dryopidae, Dytiscidae, Elmidae, Gyrrinidae, Haliplidae, Helophoridae, Hydraenidae, Hydrochidae, Hydrophilidae, Noteridae, Psephenidae, Ptilodactylidae and Scirtidae. Florida Department of Environmental Protection, Tallahassee, FL. iv + 399 pp.
- KHAROUBA, H.M., J.M.M. LEWTHWAITE, R. GURALNICK, J.T. KERR, AND M. VELLEND. 2019. Using insect natural history collections to study global change

- impacts: challenges and opportunities. *Philosophical Transactions of the Royal Society B: Biological Sciences* 374:20170405.
- LARSON, D.J., Y. ALARIE, AND R.E. ROUGHLEY. 2000. Predaceous diving beetles (Coleoptera: Dytiscidae) of the Nearctic Region, with emphasis on the fauna of Canada and Alaska. National Research Council of Canada, Ottawa, ON.
- MEGNA, Y.S., M. BALKE, R. APENBORN, AND L. HENDRICH. 2019. A review of Peruvian diving beetles of the genus *Hydaticus* Leach, 1817, with description of *Hydaticus (Prodatiscus) panguana* sp. nov. and notes on other Neotropical species (Coleoptera: Dytiscidae). *Zootaxa* 4615:113–130.
- MENKE, A.S. 1960. A taxonomic study of the genus *Abedus* Stål (Hemiptera, Belostomatidae). University of California Publications in Entomology 16:393–440.
- MENKE, A.S. 1977. Synonymical notes and new distribution records in *Abedus* (Hemiptera, Belostomatidae). *Southwestern Naturalist* 22:115–123.
- MOORE, W., W.M. MEYER III, J.A. EBLE, K. FRANKLIN, J.F. WIENS, AND R.C. BRUSCA. 2013. Introduction to the Arizona Sky Island Arthropod Project (ASAP): systematics, biogeography, ecology, and population genetics of arthropods of the Madrean Sky Islands. Pages 144–168 in G.J. Gottfried, P.F. Ffolliott, B.S. Gebow, L.G. Eskew, and L.C. Collins, editors, *Merging science and management in a rapidly changing world: Biodiversity and Management of the Madrean Archipelago III and 7th Conference on Research and Resource Management in the Southwestern Deserts*, 2012 May 1–5; Tucson, AZ. Proceedings RMRS-P-67. USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO. 593 pp.
- PINTAR, M.R. 2023. Two new records of aquatic Hemiptera (Belostomatidae, Mesoveliidae) from southern Florida, with keys to the genera *Belostoma* Latreille, 1807 and *Mesovelia* Mulsant and Rey, 1852 in Florida and the northern Caribbean. *Aquatic Insects* 44:36–51.
- PINTAR, M.R., AND J.L. KELLER. 2020. First record of *Hydrophilus ensifer* Brullé (Coleoptera: Hydrophilidae) in the continental United States. *Coleopterists Bulletin* 74:696–698.
- POLHEMUS, D.A. 1997. Systematics of the genus *Rhagovelia* Mayr (Heteroptera: Veliidae) in the western hemisphere (exclusive of the *angustipes* complex). Entomological Society of America, Lanham, MD.
- ROUGHLEY, R.E., AND D.H. PENGELLY. 1981. Classification, phylogeny, and zoogeography of *Hydaticus* Leach (Coleoptera: Dytiscidae) of North America. *Quaestiones Entomologicae* 17:249–314.
- STEVENS, L.E., AND J.T. POLHEMUS. 2008. Biogeography of aquatic and semiaquatic Heteroptera in the Grand Canyon Ecoregion, southwestern USA. *Monographs of the Western North American Naturalist* 4:38–76.
- STRAYER, D.L., AND D. DUDGEON. 2010. Freshwater biodiversity conservation: recent progress and future challenges. *Journal of the North American Benthological Society* 29:344–358.
- VAN DEVENDER, T.R., S. AVILA-VILLEGAS, M. EMERSON, D. TURNER, A.D. FLESCHE, AND N.S. DEYO. 2013. Biodiversity in the Madrean Archipelago of Sonora, Mexico. Pages 10–16 in G.T. Gottfried, P.F. Ffolliott, B.S. Gebow, L.G. Eskew, and L.C. Collins, editors, *Merging science and management in a rapidly changing world: Biodiversity and Management of the Madrean Archipelago III and 7th Conference on Research and Resource Management in the Southwestern Deserts*, 2012 May 1–5; Tucson, AZ. Proceedings RMRS-P-67. USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO. 593 pp.
- YOUNG, F.N. 1954. The water beetles of Florida. University of Florida Press, Gainesville, FL.
- YOUNG, F.N. 1963. The Nearctic species of *Copelatus* Erichson (Coleoptera: Dytiscidae). *Quarterly Journal of the Florida Academy of Sciences* 26:56–77.
- YOUNG, F.N. 1977. Predaceous water beetles of the genus *Neobidessus* Young in the Americas north of Colombia (Coleoptera: Dytiscidae: Hydrophilinae). *Occasional Papers of the Museum of Zoology University of Michigan* 681:1–24.
- ZIMMERMAN, J.R., AND R.L. SMITH. 1975. The genus *Rhan-tus* (Coleoptera: Dytiscidae) in North America. Part I. General account of the species. *Transactions of the American Entomological Society* 101:33–123.

Received 12 September 2023

Revised 8 November 2023

Accepted 15 November 2023

Published online 5 March 2024