

The Great Lakes Entomologist

Volume 54
Numbers 3 & 4 - Fall/Winter 2021 *Numbers 3 &
4 - Fall/Winter 2021*

Article 8

December 2021

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Recommended Citation

Freese, Edwin L. and Chordas, Stephen W. 2021. "Annotated checklist of the Notonectidae (Hemiptera: Heteroptera) or "Backswimmers" of Iowa," *The Great Lakes Entomologist*, vol 54 (2)
Available at: <https://scholar.valpo.edu/tgle/vol54/iss2/8>

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Annotated Checklist of the Notonectidae (Hemiptera: Heteroptera) or “Backswimmers” of Iowa

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Abstract

A review of the Notonectidae or backswimmers (Hemiptera: Heteroptera) of Iowa is presented. New state records for *Buenoa macrotibialis* Hungerford, *Buenoa scimitra* Bare, *Notonecta insulata* Kirby, *Notonecta irrorata* Uhler, and *Notonecta lunata* Hungerford are included.

Keywords: Notonectidae, backswimmers, new state records, Iowa

The backswimmer family Notonectidae (Hemiptera: Heteroptera) is represented by 35 species in North America north of Mexico (Polhemus and Polhemus 1988) with 11 of those species known from the Midwest states of Iowa, Illinois, Minnesota, Missouri, South Dakota, and Wisconsin (Froeschner 1962, Polhemus and Polhemus 1988).

There are very few records of Iowa Notonectidae species in the published literature. Herbert Osborn (1892) published the first article containing two species from Iowa one of which is now excluded from the listing (Truxal 1953, Polhemus and Polhemus 1988). Jose Rollin de la Torre-Bueno (1905), Edward P. Van Duzee (1917), Herbert B. Hungerford (1919, 1934), and John T. Polhemus and Dan A. Polhemus (1988) listed only one species each (*Notonecta undulata* Say) but no new state records. John T. Polhemus (1997) added *Buenoa margaritacea* Torre-Bueno and Eric Larsen (2000) added *Buenoa confusa* Truxal to the state list. No new species have been added to the Iowa fauna since 2000.

The intent of this study was to update the checklist of Iowa Notonectidae. Based on distribution records in the 1988 catalog by Henry and Froeschner a few more species may eventually be collected in Iowa.

Methods

Initially this checklist began with the Notonectidae species listed for Iowa by Osborn (1892) and Polhemus and Polhemus (1988). Journal articles, books, and internet sources were searched for published

records, specimen data, assistance with synonyms, biological information, and help with identifications; we also searched Biodiversity Heritage Library (<https://www.biodiversitylibrary.org>). We follow the taxonomy and arrangement of subfamilies, genera, and species as given in the catalog of Heteroptera or True Bugs by Henry and Froeschner (1988, 1992). Any taxonomic changes since 1988 will be noted in the checklist.

Backswimmers were collected in the field from 2011 through 2020. During daylight hours specimens were collected with a dip net from rivers, streams, ponds, and marshes. At night a light source was used to attract specimens. The majority of field collected specimens were identified by the author (SWC).

Two state insect collections were perused for backswimmer specimens from Iowa. The Iowa State University insect collection (ISIC), Ames, Iowa, was surveyed thanks to permission from Gregory W. Courtney. The Iowa Wesleyan University insect collection (IWUC), also known as the Iowa Insect Survey Collection (Jaques 1932, 1934), Mt. Pleasant, Iowa was searched thanks to permission from Donald Wick, Dolores P. Wilson, and Rosemary Peck. One specimen from the Iowa Wesleyan insect collection was forwarded to Daniel R. Swanson (Department of Entomology, University of Illinois at Urbana-Champaign, Urbana) for identification.

A few records were located on the website of the State Hygienic Laboratory (SHLC), University of Iowa, Iowa City

(<https://www.shl.uiowa.edu/env/limnology/heteroptera.xml>) (C. Todd Hubbard, pers. comm., January 2016).

Collection - Collector Codens.

ELF/C = Edwin L. Freese collector/ collection, Adel, Iowa

ISIC = Iowa State University Insect Collection, Ames, Iowa

IWUC = Iowa Wesleyan University Insect Collection, Mt. Pleasant, Iowa

JTPC = John T. Polhemus collection, Colorado Entomological Museum, Boulder, Colorado

OSUC = Ohio State University Insect Collection, Columbus, Ohio

SHLC = State Hygienic Laboratory Insect Collection, University of Iowa, Iowa City, Iowa

SWC = Stephen W. Chordas III, Ohio State University, Columbus, Ohio

TAMUIC = Texas A & M University Insect Collection, College Station, Texas

Results

A total of eight species of Notonectidae or backswimmers are herein reported from Iowa in the following listing. Previously only four species had been published from Iowa (Osborn 1892; Torre-Bueno 1905; Van Duzee 1917; Hungerford 1919, 1934; Polhemus and Polhemus 1988; Polhemus 1997; Larsen 2000) with one of those species now being excluded from the Iowa list as most likely misidentified (*Buenoa platynemis*; see Truxal 1953 and Polhemus and Polhemus 1988). We report five species as new Iowa state records (*Buenoa macrotibialis* Hungerford, *Buenoa scimitra* Bare, *Notonecta irrorata* Uhler, *Notonecta insulata* Kirby, and *Notonecta lunata* Hungerford).

All located references are listed for each species which contained an Iowa record or specimen data. Codens for collections having specimens from Iowa are given next with quantity of specimens in that collection given in brackets.

Specimen label data are presented for new Iowa state records, oldest or earliest collected Iowa specimens located in collections, and or specimens that represent collecting in Iowa over the decades. If more than one specimen per collection date, the quantity is given in brackets.

Notonectidae or “Backswimmers” of Iowa

Hemiptera Linnaeus, 1758

Heteroptera Latreille, 1810

Family **Notonectidae** Latreille, 1802

Subfamily **Anisopinae** Hutchinson, 1929

Buenoa Kirkaldy, 1904

Buenoa confusa Truxal, 1953

Larsen 2000:126 (Jemmerson Slough, 3 Km WNW of Spirit Lake, Dickinson Co., Iowa, [no date], Eric Larsen).

Specimen label data: no specimens were located in collections or in the field during this study.

Buenoa macrotibialis Hungerford, 1924

NEW STATE RECORD: Ames, Story Co., Iowa, 24 July 1924, Halbert M. Harris (ISIC); Ames, Iowa, July 1925, H. M. Harris (ISIC) (Fig. 1)

Buenoa margaritacea Torre-Bueno, 1908

Polhemus 1997: 307 (Ledges State Park, Boone Co., Iowa, 28 March 1946, John T. Polhemus [JTPC]; Ledges State Park, 22 September 1960, Joseph C. Schaffner [TAMUIC]; Clay Co., East of Peterson, Iowa, 2 August 1975, J. T. Polhemus [JTPC]; Story Co., 20 September 1945, J. T. Polhemus [JTPC]); Larsen 2000: 126 (Springville, Linn Co., Iowa, [no date], Eric Larsen); ISIC [16]; IWUC [1]; ELFC [7]

Specimen label data: Ames, Story Co., Iowa, 24 July 1924, H. M. Harris (ISIC); Britt, Hancock Co., Iowa, 19 May 1928, G. Stuart Walley, determined G.S.W. (ISIC); Ames, Iowa, 23 May 1947, Dick D. Millspaugh, determined Millspaugh 1947 (IWUC); Sharon Bluffs State Park, Appanoose Co., Iowa, 12 July 2018, UV-light, ELF, determined SWC 2021 (ELFC); RR Adel, Dallas Co., Iowa, 12 July 2019 [6], UV-light, ELF, determined SWC 2021 (ELFC)

Buenoa scimitra Bare, 1925

NEW STATE RECORD: Jewell, Hamilton Co., Iowa, 10 July 1926, Halbert M. Harris (ISIC) (Fig. 2)

Subfamily **Notonectinae** Latreille, 1802

Tribe Notonectini Latreille, 1802

Notonecta Linnaeus, 1758

Subgenus *Notonecta* Linnaeus, 1758

Notonecta irrorata Uhler, 1879

NEW STATE RECORD: Sugar Creek, Tipton, Cedar Co., Iowa, 23 August 2001, hand-picked, Todd Hubbard (SHLC); Yellow River

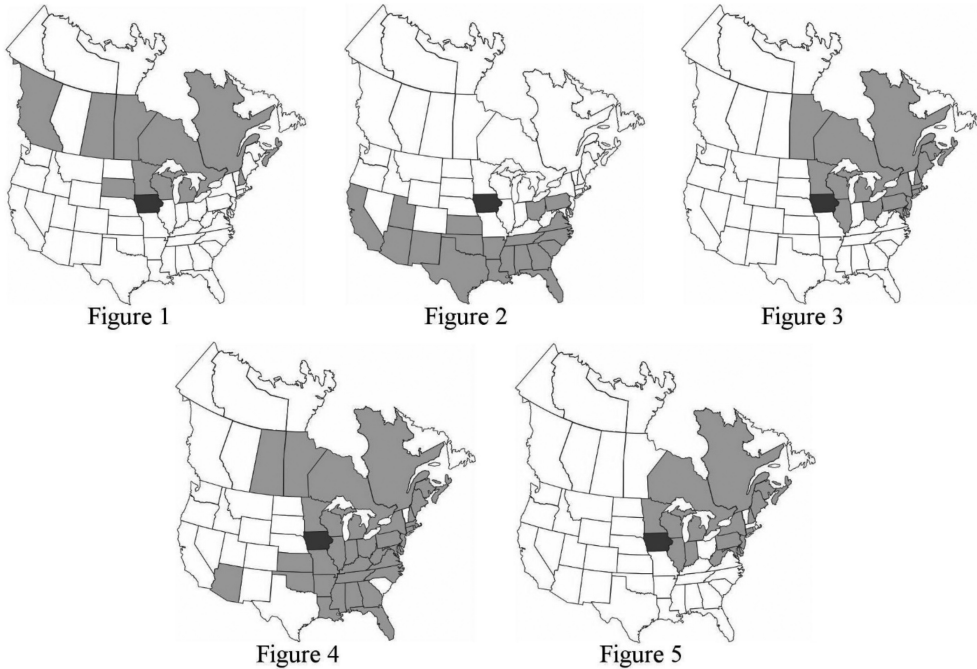


Figure 1–5: Distribution, north of Mexico, of the five new records of Notonectidae for Iowa (dark shading = new Iowa state record; light shading = previously reported records) *Buenoa macrotibialis* (Figure 1); *Buenoa scimitra* (Figure 2); *Notonecta insulata* (Figure 3); *Notonecta irrorata* (Figure 4); *Notonecta lunata* (Figure 5).

State Forest, Allamakee Co., Iowa, 9 July 2005, UV-light, Doug A. Veal, determined SWC 2011 (OSUC) (Fig. 3)

Subgenus *Paranecta* Hutchinson, 1929

Notonecta insulata Kirby, 1837

NEW STATE RECORD: Ames, Story Co., Iowa, 11 May 1960, S. Medina Gand, determined S. Medina 1960 (ISIC) (Fig. 4)

Notonecta lunata Hungerford, 1926

NEW STATE RECORD: Mt. Pleasant, Henry Co., Iowa, 7 November 1929 [2], Parks, determined Daniel R. Swanson 2013 (IWUC) (Fig. 5)

Notonecta undulata Say, 1832

Osborn 1892: 125 (common); Torre-Bueno 1905: 153 (Ames); Van Duzee 1917: 451; Hungerford 1919: 169, 1934: 122 (Ames, 11 October 1924, Halbert M. Harris); Polhemus and Polhemus 1988: 540; ISIC [74]; IWUC [12]; SHLC [1]; ELFC [10]

Specimen label data: Ames, Iowa, [no date], Herbert Osborn (ISIC); Ames, Iowa, 9 July 1928, [3] H. M. Harris (ISIC);

Mt. Pleasant, Henry Co., Iowa, 22 October 1924, [no collector] (IWUC); Mt. Pleasant, Iowa, 26 October 1930, Russell (ISIC); Clear Lake, Cerro Gordo Co., Iowa, 2 October 1942, Carvalho (ISIC); Ames, Iowa, 23 May 1947, Dick D. Millspaugh, determined Millspaugh 1947 (IWUC); Puckerbrush Access, Dallas Co., Iowa, 30 January 2012, Raccoon River swimming between ice and shoreline, ELF, determined SWC 2012 (ELFC); Voas Nature Area, Dallas Co., Iowa, 13 March 2012, 19 November 2015 [6], 26 October 2016, dip-net small cattail marsh, ELF, determined SWC 2012, 2015, 2018 (ELFC)

Excluded Species

Buenoa platycnemis (Fieber, 1851)

This species was listed from Iowa by Osborn (1892: 125) as *Anisops platycnemis*. Polhemus and Polhemus (1988: 535) and Truxal (1953: 1423) discuss that this species is often incorrectly identified and is a mostly Neotropical species. Thus this species is excluded from the Iowa list.

Discussion

The vegetation of Iowa or in other words the habitats utilized by Notonectidae or backswimmers in Iowa has changed considerably since European settlement with a large portion of the Iowa landscape being converted to agricultural lands, including thousands of acres of marshes and small lakes which were drained, while at the same time the state's rivers, streams, and lakes were altered by dams, channelization, siltation, and pollution (Bishop 1981; Bishop et al. 1998; Jungst et al. 1998; Cruden and Gode 1998, 2000; Mutel 2008). Iowa had been a mixture of pothole marshes, tallgrass prairie, oak savanna, woodland, and forest (Madson 1982, Nuzzo 1986, Bishop et al. 1998, Jungst et al. 1998, Mutel 2008). This ecological community was actually quite young when compared to the geological timescale with glacial retreat and subsequent climate changes happening in the last 10,000 years (Ross 1970, Cruden and Gode 2000, Ratcliffe and Paulsen 2008). The net effect has been a huge loss of habitat for wildlife and in this case habitat for Iowa's aquatic insects.

Another change in the opposite direction has also been slowly occurring over recent decades, with more acreage being set aside as city, state, and county parks, state forests, state preserves, and state and federal wildlife management areas (Bishop 1981; Bishop et al. 1998; Jungst et al. 1998; Smith 1998; Cruden and Gode 1998, 2000; Mutel 2008). In addition there are now many farm ponds, quarries, and borrow pits that now store water which attract aquatic organisms (Cruden and Gode 1998, 2000; Mutel 2008; Foltz 2009). Here the net effect is a gain for aquatic insects.

Anyone traveling around Iowa should then notice that a large portion of the state is currently used for agricultural purposes, especially row-crops. And in general wet areas such as pothole marshes and small lakes are either absent, limited in size, or human managed in many of these agricultural areas. Human alterations of rivers and streams should also be evident as reservoirs behind dams and straightened channelized streams. Overall the state's aquatic habitats are now fewer and often degraded from pre-settlement days (Mutel 2008). When the original habitat has been so altered by human usage, some species become rare or extinct, and other species that seem to prefer or adapt well to disturbances increase (Schwert 1996, Cruden and Gode 2000, Foltz 2009, Wagner 2020).

Eight species of Notonectidae or backswimmers are now known from Iowa. Of these only three species were collected

in Iowa since the year 2000. Two of these species were encountered multiple times and at several locations and currently appear to be common in Iowa: *B. margaritacea* and *N. undulata*. Osborn (1892) also listed *N. undulata* as "common" in Iowa back in the late 1800s. The third species has so far only been reported in recent decades from eastern Iowa: *N. irrorata*.

The other five species are currently known from Iowa by only one or a few specimens collected in Iowa. The majority of these species are also represented by specimens collected many decades ago. These specimen numbers and years of collection indicate these five species were present in Iowa decades ago but may now be either absent or rare today. Human disturbance and habitat loss may be the factor in these species not being collected in recent decades and during this survey. A thorough survey of Iowa in the future may determined the answer.

Acknowledgments

We thank the following who contributed to this study: Doug A. Veal, Mary Jane Hatfield, John Pearson, Loren Lown, Becky Heth, Erin Nielson, and Laura Hanson. Also thank you to Daniel R. Swanson (Department of Entomology, University of Illinois at Urbana-Champaign, Urbana, Illinois) for his determination of a specimen. A special thank you goes to Gregory W. Courtney for access to the Iowa State University insect collection, Ames, Iowa (ISIC); and Donald Wick, Delores P. Wilson, and Rosemary Peck for access to the Iowa Wesleyan University insect collection, Mt. Pleasant, Iowa (IWUC); and to Christopher Todd Hubbard for forwarding specimen records from the State Hygienic Laboratory insect collection, Iowa City, Iowa (SHLC). Thank you also to all the creators and contributors to Biodiversity Heritage Library (<https://www.biodiversitylibrary.org>). Also, a thank you to anonymous reviewers for making this a better article.

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