

Ophiogomphus smithi in Northeast Iowa

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Introduction:

Ophiogomphus smithi was established as a species and named in 2004 by Ken Tennessen and Tim Vogt. Prior to being officially recognized as a species, *O. smithi* was associated with *O. aspersus* as it would key to that species in Needham and Westfall (1955), later Needham, Westfall, and May (2000), but it did not match the species description for *aspersus*.

The genus was first found in Iowa in 1977 based on a nymph taken from the Turkey River at Motor Mill in Clayton Co. by Steve Hummel. It was tentatively keyed to *carolus*, but could very well have been either *rupensulensis* or *smithi* as *rupensulensis* and *carolus* are separated in the key in Needham and Westfall based on a minor difference in antennal segment 3, while those two species are separated from *aspersus* (*smithi*?) in the previous couplet on a minor difference in the lateral abdominal appendages. The following year a second *Ophiogomphus* nymph was taken, again by Steve Hummel, from the Maquoketa River at Joy Spring in Clayton county and keyed to *aspersus* (*smithi*?).

Prior to 2004 the only confirmed *Ophiogomphus* known to exist in Iowa was *O. rupensulensis*. *O. rupensulensis* was first found in IA from the Volga River ne of Fayette, Fayette Co., in June, 1978 by Steve Hummel. It has subsequently been reported from Howard Co. in 1996, Fayette Co. in 1999 & 2000 by Bob Cruden, Winneshiek Co in 2003 by Steve Hummel and 2008 by MJ Hatfield, and Allamakee Co. in 2007 by MJ Hatfield.

Bob Cruden first found what is now *O. smithi*, but at the time he identified as *O. aspersus*, in 1995 along Spring Creek in Buchanan Co. In 1999 he found it in Black Hawk Co., also along Spring Creek, as well as in Benton Co. on Prairie Creek. All these were adults. Todd Hubbard found nymphs in two locations: in 2004 in Fayette Co., and in 2005 in Delaware Co.

A survey of odonates, with especial concentration on *Ophiogomphus smithi*, was conducted during the summer of 2011 in the Iowa counties of Allamakee, Winneshiek, Clayton, Fayette, Bremer, Black Hawk, Buchanan, Delaware, Linn, Benton, and Tama. Field work was conducted between June 7 and September 5. Heavy rains and high water levels in June and July hampered the field work. Many streams were unsafe for wading and aquatic sampling during this time.

Methods:

A combination of aerial netting and aquatic dip netting was used during the survey. At least one voucher was taken at each site where *O. smithi* were found.

Aerial netting consisted of walking and wading in what appeared to be suitable habitat, a combination of wading streams and walking through lowland and upland areas. A number of zygopteran and anisopteran odonates were captured with a small number taken representing new county records within the survey area. Aerial netting produced one adult specimen of *O. smithi*.

Aquatic dip net sampling proved to be much more productive. Dip netting consisted of placing the dip net vertically against the stream bottom perpendicular to the current. The substrate was disturbed by kicking to dislodge aquatic insects which were carried into the net by the stream current. The most productive areas were close to the waters edge in shallow water, mostly within a meter of the waters edge in water from 5 cm to 25 cm in depth.

Habitat:

Adult odonata, especially the Anisoptera can fly great distances from the nymphal habitat. I believe that was the case with the one adult that was located since no nymphs were found in the stream adjacent to where the adult was found.

Most of the nymphs were found in shallow water close to the shore, often along the edges of islands in the larger streams. Sampling in areas with a mud / silt substrate was futile as were areas consisting of pure sand. Mud / silt & sand combinations were no better. Large gravel and cobble also were not productive for *O. smithi*. *O. smithi* was found in areas of a sand and small gravel (generally no larger than 1 to 2 cm) mix. *O. smithi* was never found in areas with algae, even if the substrate mix was correct.

Low, clear water conditions were of great importance in order to see what the substrate was. High, muddy water conditions made work virtually impossible during parts of June and July.

Identification:

In ne Iowa only two *Ophiogomphus* species are known – *smithi* and *rupensulensis*. *O. severus*, a western species has been found in the loess hills in Plymouth Co. Recently there have been as yet unconfirmed reports of *O. westfalli* in central Iowa.

It is quite easy to identify the adults of these two ne Iowa species and separate them from each other. *Smithi* has more pronounced brown shoulder stripes while these strips are fainter in *rupensulensis*. The abdominal patterns are quite different. In *smithi* the abdomen is dark brown to black with prominent yellow spear point markings on the dorsal surface while in *rupensulensis* the abdomen is a pale brown with indistinct dark brown to black markings.



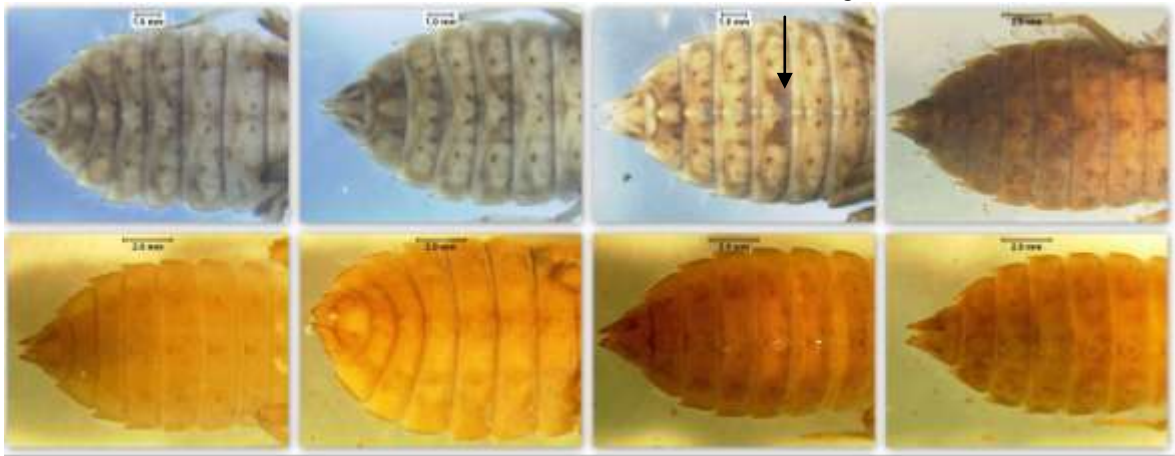
O. rupensulensis



O. smithi

The nymphs can be separated from other gomphid nymphs by having divergent wing pads, a trait shared only with *Erpetogomphus* (not found in Iowa) and *Progomphus* (found in Iowa, but having the base of the middle legs close together). *Smithi* is separated from *rupensulensis* by having a dark double triangle shaped area on the dorsum of abdominal segment 6, lacking in *rupensulensis*.

Dark mark, seg 6



Top O. smithi, bottom O. rupensulensis

provided by and adapted from William Smith

Survey Results:

Approximate locations of specimens (nymphs) are indicated by arrows on the photographs.

Ophiogomphus smithi sites:

Site OSS01: 6/7/2011. Prairie Creek, ne Vinton, Benton Co., sec 2 Taylor TWP (T85N, R10W, sec 2), N 42° 11.787' W91° 58.693'. Stream Width – 8.2 m, Clarity - 60+ cm. Substrate – sand / gravel mix with some larger rocks, no algae. Date 6/7/2011. One *O. smithi* nymph was found. This is the same stream on which B. Cruden reported an adult on 7/1/1999, but his report was in sec 11 (down stream) and was reported as *Ophiogomphus aspersus*.



Other species present included *Boyeria vinosa* (nymph), *Calopteryx aequabilis* (adult), *C. maculata* (adult), and *Ischnura verticalis* (adult – observed).

Steve and Marcia Hummel

Site OSS02: 6/17/2011. Maquoketa River @ Joy Springs Co. Pk., w Strawberry Point, Clayton Co., sec 19 Cass TWP (T91N, R6W, sec 19), N42° 40.596' W91° 35.806'. Stream width - 4.15 m, Clarity - 60+ cm. Substrate – sand / gravel, rock. One *O. smithi* adult was captured along the trail between the river and an old sand pit. A return visit to this location on 6/23/2011 failed to find any *O. smithi* nymphs (or any other gomphids) in the stream. There was algae present on the rocks, and in most areas that were checked there was very little sand. This would indicate that the adult captured here was either from farther upstream or down stream, or perhaps even a different stream, but didn't emerge in this area. This site represents a new county for *O. smithi* in Iowa.



Other species present included *Calopteryx aequabilis* (adult), *C. maculata* (adult), *Argia fumipennis* (adult), the rest are pond species from the sand pit – *Epitheca cynosura* (adult), *E. princeps* (adult), *Libellula pulchella* (adult), and *Plathemis lydia* (adult).

Steve Hummel and Bill Desmarais

Site OSS03: 6/23/2011. Turkey River @ Fort Atkinson, Winneshiek Co., sec 8 Washington TWP (T96N, R9W, sec 8), N43° 08.809 W 91° 55.827'. Stream width – 50 m (bank to bank including islands, Clarity – 34 cm. Substrate included large rocks with abundant sand and gravel along the shore and edges of the islands. 20+ nymphs were found here around the edge of the large island under and downstream from the highway bridge. This was the most productive site found during the survey. This represents a new county record for *O. smithi* in Iowa.





Other species present included (all nymphs) *Ophiogomphus rupensulensis*, *Gomphus graslinellus*, *Stylurus amnicola*, and *Argia moesta*.

G. graslinellus and *S. amnicola* were new records for Winneshiek Co.

Steve Hummel and Ken Tennessen.

Site OSS04: 6/23/2011. Turkey River @ A46 w Ridgeway down stream from bridge, Winneshiek Co., sec 21 Lincoln TWP (T98N, R10W, sec 21), N43° 17.942' W92° 02.177'. Stream width – 22.3 m, Clarity – 60+ cm. Substrate – sand / gravel mix with pockets of silt. Stream was divided with 2 islands. Three *O. smithi* nymphs were found here.



Other species present included (all nymphs) *Gomphus quadricolor* (from silt), *Gomphus fraternus*, *Ophiogomphus rupensulensis*, and *Macromia illinoiensis*.

G. quadricolor and *M. illinoiensis* are new records for Winneshiek Co.

Steve Hummel and Ken Tennessen.

Site OSS05: 6/23/2011. Volga River @ IA 13, Osborne, Clayton Co., sec 9 Cox Creek Twp (T92N, R5W, sec 9), N 42° 47.724' W 91° 26.494'. Stream width – 40 m (bank to bank including island), Clarity – 25 cm. Substrate – sand / gravel, rock, and mud. 1 *O. smithi* nymph was found here along e side of island down stream from the bridge.



Other species present included (all nymphs) *Ophiogomphus rupensulensis*, *Gomphus externus* (?), and *Stylurus spiniceps*.

S. spiniceps is a new record for Clayton Co.

Steve Hummel and Ken Tennessen.

OSS06: 6/24/2011. South Fork of the Maquoketa River @ IA 187 n of Lamont, down stream from bridge, Buchanan Co., sec 14 Madison TWP (T90N, R7W, sec 14), N42° 36.822' W91° 38.796'. Stream width – 8 to 15 m, Clarity – 40 cm. Substrate – gravel bar / sand. Gravel bar on inside of bend. A dozen nymphs were found in an area of about 1 m². Outside this small area no nymphs could be found.



Other species present included *Ophiogomphus rupensulensis*, which is a new record for Buchanan Co.

Steve Hummel and Ken Tennessen.

OSS07: 6/24/2011. Honey Creek @ 180th St, upstream of bridge, ne of Manchester. Delaware Co., sec 9 Delaware TWP (T89N, R5W, sec 9), N42° 31.675' W91° 26.491'. Stream width – 20 m, Clarity – 50 cm. Substrate – sand, gravel, cobble & silt. *O. smithi* was found on edge of small island.



Other species present included *Calopteryx maculata*, *Ophiogomphus rupensulensis*, and *Plathemis lydia*.

O. rupensulensis is a new record for Delaware Co.

Steve Hummel and Ken Tennessen.

OSS08: 9/5/2011. Bear Creek V71 & 180th St. Benton Co., sec 14 Harrison TWP (T86N, R9W, sec 14), N42° 15.819' W91° 59.149'. Stream width – 6 m, Clarity – 60+ cm. Substrate – small gravel w/ sand, some silt. From a bar on edge of creek. One *Ophiogomphus smithi* nymph.



No other species were seen or taken at this location.

Steve and Marcia Hummel.

Other new county record not associated with *O. smithi* sites:

Ischnura posita. Allamakee Co. 8/6/2011. Yellow River @ Volney Park Canoe Access. Volney. Sec 13 Franklin TWP (T96N, R5W, sec 13), N43° 7.828' W91° 22.571'.

Gomphus vastus. Black Hawk Co. 6/28/2011. West Fork of the Cedar River @ Thunder Woman Park. Finchford. Sec 6 Washington TWP (T90N, R14W, sec 6), N42° 37.882' W92° 32.347'.

Stylurus amnicola. Bremer Co. 6/29/2011. Baskins Run @ Hilton Ave & 220th St. Waverly. Sec 32 Warren TWP (T92N, R13W, sec 32), N42° 43.811' W 92° 24.290'.

Macromia illinoensis. Buchanan Co. 6/11/2011. Buffalo Creek @ Buffalo Creek Access. Winthrop. Sec 1 Liberty TWP (T88N, R8W, sec 1), N42° 28.037' W91° 42.985'.

Enallagma signatum. Fayette Co. 6/16/2011. Volga River @ Twin Bridges Co. Pk. Maynard. Sec 35 Center TWP (T93N, R9W, sec 35), N42° 48.096' W91° 52.757'.

Streams that have potential for *O. smithi*:

While this summer offered few opportunities to survey on the Upper Iowa River it has great potential. During the survey *O. rupensulensis* was often found with *O. smithi*. *O. rupensulensis* has been found in the Upper Iowa at Bluffton, below the upper dam downstream from Decorah, and at the INHF's Heritage Valley Preserve in Allamakee Co. *O. smithi* could be found throughout much of the Upper Iowa, possibly as far upstream as the Lime Springs area in Howard County.

The Turkey River would seem to hold great potential for additional populations of *O. smithi*. The greatest concentration of *O. smithi* nymphs were found at Fort Atkinson. Sampling at Elgin was not productive, the gravel was too large and there were many larger rocks and algae was present throughout the rock and gravel areas. However, where the correct habitat can be found it would certainly be worth checking. From the Cresco area in Howard Co. to the Elkport Garber area in Clayton Co. may prove to have good populations of *O. smithi*.

The Yellow River should be given more attention. While nothing was found in the area of Sixteen, the Volney area looked better.

The Volga River did have one site with *O. smithi*. *O. rupensulensis* has been found at two locations – Twin Bridges Co. Pk. n of Maynard and downstream of Fayette. It should have potential from upstream of Fayette to its confluence with the Turkey River at Elkport and Garber.

The Maquoketa is another river that could hold *O. smithi*. Floating from the Backbone St. Pk. area down through Manchester. *O. smithi* has been found on two tributaries as well as an adult on the Maquoketa itself.

It would seem that canoeing or kayaking these streams would be a good approach to reaching the more remote areas and would allow access to a great deal of appropriate habitat.

Buffalo Creek from Winthrop down to the Anamosa area could be another promising stream when water levels are low enough to expose areas with a sand / gravel mix. In Linn Co. Big Creek might have *smithi*. Todd Hubbard collected an *Ophiogomphus* nymph from this stream at Secrist Rd. A couple of areas in the Bertram area looked like appropriate habitat, but sampling at IA 13 did not produce any *O. smithi*.

Basically any stream of about 10 m or greater width with a sand / gravel (1 to 2 cm) substrate could have *O. smithi*. This set of characteristics is no guarantee that it will be present, as we found repeated during this survey. If not present there is little chance of finding nymphs.

Streams that appear to have little potential for *O. smithi*:

Any stream that lacks deposits areas of a sand / gravel mix, or has algae, or is mostly silt can be eliminated from consideration for *O. smithi*. Trout streams also seem unlikely, *O. smithi* seems to need warmer water and a slower current. Also, any stream where livestock has access to the stream did not have *O. smithi*.

While there wasn't time to look at every stream, the streams in Tama Co., western Benton Co., and sw Black Hawk (area south and west of the Cedar River) that were checked: West Fork of the Cedar, Beaver Creek, Black Hawk Creek, Miller Creek, Wolf Creek, Salt Creek, Deer Creek, Spring Creek, Pratt Creek, and Stein Creek, mostly had mud and silt bottoms, very little sand and gravel. Very few odonates of any kind were seen along these streams.

North and east of the Cedar River is where all *O. smithi* have been found, but there were many streams in this area that lacked proper habitat. Some of the streams that were checked that did not have *O. smithi* even though appropriate habitat was present (Buffalo Ck. in Buchanan Co., Maquoketa R. in Delaware Co., Crystal Ck. In Linn Co., Otter Ck. In Buchanan Co., Brush Cr. In Fayette Co., Quarter Section Run in Bremer Co., Baskins Run in Bremer Co., Horton Cr. in Bremer Co.). There were many streams in this area that did not appear to have good habitat (silt, exposed bedrock, rocky beds, livestock access, etc.). This category included streams such as Little Turkey R. in Fayette Co., upper reaches of Buffalo Cr. in Buchanan Co., Elk Run Cr., Virden Cr., Poyner Cr., and Indian Cr., all in Black Hawk Co., East and West Branches of Blue Cr., East and West Otter Cr., and Indian Cr., all in Linn Co.

Summary:

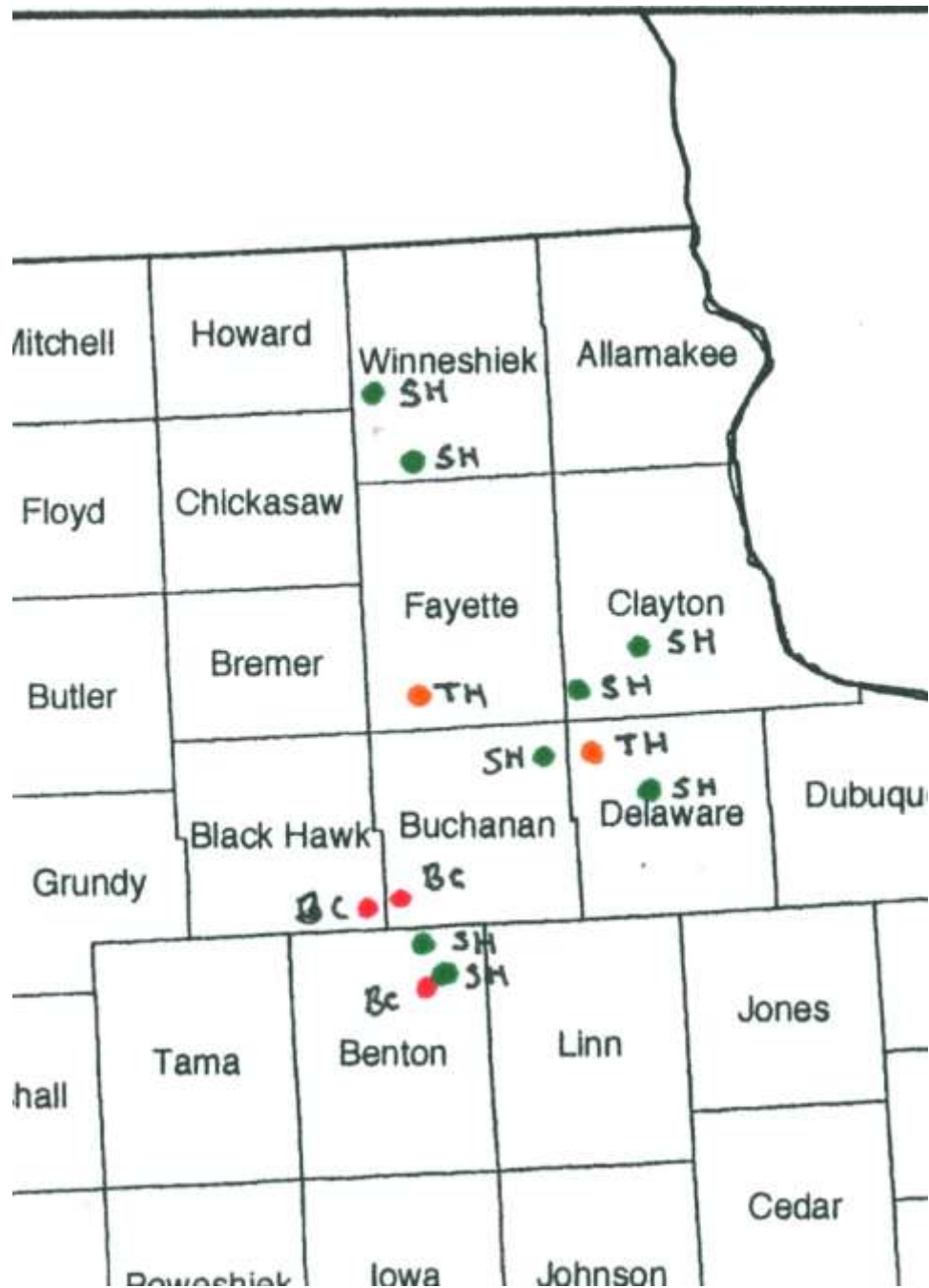
At the start of this survey *O. smithi* was known from only five sites in Iowa. Three of these were records of adults (Benton, Black Hawk, and Buchanan Co's) found by Bob Cruden and two were records of nymphs (Fayette and Buchanan Co's) found by Todd Hubbard. During this survey eight additional sites were found (two in Benton Co., one in Buchanan Co., two in Winneshiek Co., two in Clayton Co., and one in Delaware Co.). The Winneshiek and Clayton Co. records represent new counties for the species range in Iowa.

All *O. smithi* sites are north and east of the Cedar River. Five of the present sites are small tributaries on the Cedar within 10 miles of the river. All nymphs were found in area with a mix of sand and small gravel, often along the edges of islands in the rivers. A few were found in sand / gravel bars along the stream edge. All nymphs were in shallow water (5 to 20 cm).

Among the species associated with *O. smithi*, *O. rupensulensis* occurred with *smithi* at five of the eight sites. However, *O. rupensulensis* has also been found in areas that lack the substrate necessary for *O. smithi*, such as coarser gravel and algae.

Distribution map:

Ophiogomphus smithi sites in Iowa, Sept, 2011



Key:

Red dot w/ BC = Bob Cruden

Orange dot w/ TH = Todd Hubbard

Green dot w/ SH = Steve Hummel

References:

Needham, James G. and Minter J. Westfall. 1955. A Manual of the Dragonflies of North America (Anisoptera). University of California Press. Berkeley. 615 pp.

Tennessee, K. J. and T. E. Vogt. 2004. *Ophiogomphus smithi* N. Sp. (Odonata: Gomphidae) From Wisconsin and Iowa. Proc Entomol. Soc. Wash. 106(3). 540 – 546.