April 2011

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Status of Zygiella and Parazygiella (Araneae: Araneidae) in the Great Lakes States

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Abstract

A confusing nomenclatural history has resulted in the persistence of the idea that Parazygiella montana (C. L. Koch, 1834), a Palearctic species of orbweaver (Araneae: Araneidae), occurs in the Great Lakes states. I discuss this nomenclatural history and report upon all available material from the Great Lakes states to show that P. montana has never been recorded from the region, and that all previous records of Zygiella/Zilla montana refer to a native species, Zygiella nearctica Gertsch, 1964. Although Z. nearctica has been collected from mainland Michigan and Wisconsin historically, all post 1960 records of this species are from islands in Lakes Michigan and Superior. This suggests that changes on the mainland (perhaps due to introduced species) may have resulted in the decline of Z. nearctica in this region.

Zygiella is a genus of small to medium-sized (total body length 2.5-10.0 mm, Gertsch 1964, Levi 1974) orbweaving spiders (Family Araneidae) that are noted for weaving “incomplete” orbwebs, without silk in a sector equal to several radii (Gertsch 1964). This “free sector” is apparently an adaptation allowing the spider quick access to the web from a protected retreat; Zygiella species usually remain in a retreat during the day (and sit at the web’s hub at night) but will enter the web in daytime to subdue struggling prey (Grasshoff and Edmunds, 1979).

There are currently 11 named species in the genus Zygiella (6 Palearctic, 1 Holarctic, 1 Nearctic, and 1 Oriental in distribution; Platnick, 2010). Additionally, Wunderlich (2004) transferred three species formerly placed in Zygiella to the genus Parazygiella, including one Nearctic, one Palearctic, and one with Holarctic distribution (Platnick 2010). North America is presently host to both native and introduced species of Zygiella and Parazygiella. The native species are P. dispar (Kulczynski, 1885), occurring in Siberia and Japan as well as coastal California to Alaska; P. carpenteri Archer, 1951 from California, Oregon, and Washington; and Zygiella nearctica Gertsch, 1964, from the northern nearctic region (discussed below). Z. atrica (C.L. Koch, 1845) and Z. x-notata (Clerck, 1757) have apparently been introduced from Europe (Gertsch 1964).

In our list of 900 species documented from the Great Lakes states of Illinois, Indiana, Ohio, Michigan and Wisconsin (Sierwald et al. 2005), we noted that 25 (~2.8%) were demonstrably non-native. One of the species we discussed (pp. 121-122) was Parazygiella montana (C. L. Koch, 1834), which at that time was placed as Zygiella. We correctly noted that P. montana is native to European mountains at elevations above 1,000 meters, and it has been reported from Wisconsin and Michigan. But we also stated that “the species is also reported from Maine, North Carolina, and The Adirondacks and White Mountains.” This was not properly cited, but seems to refer to Levi’s (1974) distribution of

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Z. dispar, under which Levi included North American records of Z. montana. It appears we erroneously attributed these records to Z. montana. Since we were also aware of the existence of voucher specimens labeled Z. montana from Michigan and Wisconsin, we concluded that “there seems to be little doubt that Z. montana is established in both Michigan and Wisconsin.” Sierwald et al. (2005) lists one native Zygiella species, Z. nearctica, from Michigan based on literature records (Bixler 1967, Drew 1967, Snider 1991) and a record of a voucher at Milwaukee Public Museum (MPM). P. montana is recorded from Michigan (Chickering 1934, Snider 1991) and Wisconsin (in Levi and Field 1954 and a voucher specimen from MPM).

However, understanding the nomenclatural history of the group (discussed below) shows that old records of Zygiella/Zilla montana are likely to be Zygiella nearctica. Also, during the course of various research projects, the author has collected many thousands of spiders belonging to hundreds of species in Wisconsin and Michigan, and these collections did not include any specimens of Z. montana. However, during a survey of Saint Martin’s Island off Michigan’s upper peninsula mainland, I collected a number of individuals of Zygiella, but they were the native species Z. nearctica. I began to suspect that perhaps the two species remain confused in the literature. However, even though Z. nearctica and P. montana were confused in the past, it was still possible that P. montana had been introduced into the New World, so I have reexamined all available voucher specimens originally identified as Z. montana.

Objectives of this paper were to 1) evaluate evidence for the existence of P. montana in the Great Lakes region, and 2) evaluate the status of Z. nearctica in the Great Lakes region, based on all existing records for the species.

Parazygiella montana does not exist in the Great Lakes States. In the description of Z. nearctica, Gertsch (1964) noted that the species was long confused with the European species Z. montana. This started with a misidentification by Emerton (1884), who was long followed by other workers. As presently delimited, the two species can be differentiated by details in the male and female genitalia (Levi 1974). Z. nearctica is also smaller in size, lighter in color, and has a pale stripe on a dark sternum that is lacking in P. montana specimens (Gertsch 1964).

Zygiella nearctica was synonymized with Z. dispar by Levi (1974), but this synonymy was rejected by Dondale et al. (2003), stating that Gertsch (1964) provided numerous characters to separate the northern and eastern species Z. nearctica from the Pacific coastal species Z. dispar. In his review of the genus, Levi (1974) makes no mention of Z. montana being introduced into North America, stating only that it is distributed in the Alps above 1,000 meters in elevation, usually at 1,300-1,800 meters.

Material examined and determinations. Using Gertsch (1964), Levi (1974) and additional illustrations in Paquin and Dupérré (2003), I re-examined all available specimens of Zygiella from the Great Lakes states, except for those already examined by the authorities W. J. Gertsch and H. W. Levi, which are held in the Museum of Comparative Zoology (MCZ) at Harvard (discussed below). There is no North American material identified as P. montana in the MCZ collection (L. Leibensperger, pers. comm.). All MCZ material has been determined by Levi as Z. nearctica, not P. montana. Abbreviations: ARC, Albert J. Cook Arthropod Research Collection, Michigan State University; MLD, collection of author; MPM, Milwaukee Public Museum.

Specimen from Winnebago County, WI. Originally from Oshkosh Museum, Ralph N. Buckstaff collection: 1st label (pencil): “F1618 Buckstaff; Oshkosh, WI.” 2nd label (ink, different handwriting): “Zygiella mantana [sic] 9.11 1954” [I assume this is determination date, not collection date. No collector is listed.]. MPM. Det. M. Draney 2009: Penultimate instar male. Not Zygiella/Parazygiella.
Specimen is too large (body size 12 mm; other examined specimens are ca. 4.5 mm). Specific determination is problematic with immatures, but dorsal and ventral abdominal markings look like *Larinioides*, prob. *L. cornutus* (Clerck, 1757) a holarctic species that is very common in Wisconsin (author’s personal observation).


Examination of available material leaves little doubt that Great Lakes region specimens identified as *Zygiella montana* are either *Z. nearctica* or (as in the case of the “Buckstaff” MPM specimen, above) just misidentifications. The two additional published records known to me include a female from Trout Lake, Vilas Co., WI, Sept. 6 1932 (Field 1938, Levi and Field 1954. I have been unable to locate this specimen), and a record from Grand Marais, Alger Co., MI, 9 July 1932 (Chickering 1934). This specimen and four additional records from Michigan that I was previously unaware of are housed at the Museum of
Comparative Zoology, Harvard University (L. Leibensperger, pers. comm.). All of these have “nearctica” det. labels by the Zygiella revisor H. W. Levi, and I did not feel it necessary to re-examine them: 1) The Alger Co. specimen was in a vial with a second label, with 4 specimens total. The second vial reads Pictured Rocks, Michigan [also in Alger Co.], 26 June 1932; 2) Emmet Co., MI, Goodheart. No date. A.M. Chickering Coll.; 3) Detroit, MI [probably Wayne Co.], 7 August 1942 Coll. G. Struphal (?) name unclear); 4) MI, Keweenaw Co., Isle Royale, 11 July 1938, A. M. Chickering Coll. All of these records were originally cited as Zilla montana, a name predating Zygiella F. O. P-Cambridge, 1902.

This case is illustrative of a fundamental asymmetry inherent in faunal lists: It is much more difficult to remove a species record than to include it initially. A conservative approach to new faunistic records is thus warranted, and only well-documented and unambiguous instances should be included in such lists.

Status of Zygiella nearctica in the Great Lakes states. Zygiella nearctica is fairly widespread through the northern Nearctic region. In addition to the Wisconsin and Michigan records mentioned above, Gertsch (1964) reports the species from the northeastern United States (Maine, New Hampshire, Vermont, New York, Maryland, West Virginia, Virginia, and North Carolina) and the northern Rocky Mountain states (Montana, Wyoming, and Colorado) as well as across Canada (Yukon, British Columbia, Alberta, Manitoba, Ontario, Quebec, and Nova Scotia; also reported from Saskatchewan, New Brunswick, Labrador, and Newfoundland in Paquin et al. 2010). It is known from a variety of habitats, including “bushes and trees”, rocks and cliffs, and on man-made structures such as bridges, houses, and barns (Gertsch 1964).

It is of some note that all recent (post 1960) records of Z. nearctica from the Great Lakes region are from islands in Lakes Michigan and Superior, whereas the older (pre 1940) records are, with one exception, all mainland records. This species has probably never been particularly common or conspicuous in the Great Lakes region, but it is an open question as to whether the species has recently been in decline. It is possible that competition or predation from some non-native species (which has not yet colonized these lake islands) has resulted in a recent decline in the species on the mainland. If the species does occur on the mainland in our region, I predict it would most likely be collected from cliff-like habitats near the lakes, such as the Niagara Escarpment on the lake Michigan shore in Door County, Wisconsin or at Pictured Rocks National Lakeshore on the Lake Superior shore in Alger County, Michigan (which is likely the habitat that yielded Chickering’s 1932 specimens). Only further collecting can shed light on these questions.

Acknowledgments

I especially wish to thank Martha Luber Pelrine (Sister Bay, WI) and her husband for inviting us to her family’s property on St. Martin’s Island, for transportation to and from the island, and for their hospitality. I also thank Gary Fewless (UW-Green Bay) and Mike Grimm (TNC-Door Peninsula) for advice and assistance before the trip and in the field. Thanks to Joan Jass (Milwaukee Public Museum), Gary L. Parsons (Albert J. Cook Arthropod Research Collection), Michigan State University, and Laura Leibensperger (Museum of Comparative Zoology) for loan of specimens and access to specimen data, to my colleagues D. E. Bixler, F. A. Coyle, and J. L. Kaspar, for answering my queries about Zygiella, and to Scott Cross, Oshkosh Public Museum, for information about R. N. Buckstaff. Thanks to Vicki Medland for comments on earlier drafts.
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