

First records for the jumping spiders *Heliophanus kochii* in the Americas and *Myrmarachne formicaria* in New York State (Araneae: Salticidae)

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Abstract: The first record in the western hemisphere is reported for the jumping spider genus *Heliophanus* (Araneae, Salticidae). It is based on a single male of *Heliophanus kochii* Simon, 1868, collected in a residence in the metropolitan Buffalo area of western New York State in late May 2014. In addition, the first documented record in New York State for an introduced ant like jumping spider, *Myrmarachne formicaria* (De Geer, 1778), is provided from August 2006, just five years after it was first reported in the western hemisphere from northeastern Ohio in August 2001. All 29 specimens of *Myrmarachne formicaria* collected since 2006 were inside or immediately outside buildings at nine sites in five municipalities of metropolitan Buffalo, suggesting that this introduced salticid has become synanthropic in the New World.

Key words: Europe, introduction, vouchers

The genus *Heliophanus* C.L. Koch, 1833, comprises 163 nominal species and four subspecies of jumping spiders (World Spider Catalog 2016). These taxa are distributed in the Afrotropical, Australian, Palearctic, Saharo-Arabian, and the Sino-Japanese zoogeographic realms (Holt *et al.* 2013; Metzner 2015; World Spider Catalog 2016). Eleven species of *Heliophanus* occur in Europe (Roberts 1995).

Although widespread in Africa, Australia, Europe, and Asia, no species of *Heliophanus* previously have been reported from the Nearctic, Panamanian, and Neotropical zoogeographic realms (Holt *et al.* 2013; Richman, Cutler, and Hill 2012; World Spider Catalog 2016). Here we report the first record of the genus *Heliophanus* in the Americas, based on a single male of *Heliophanus kochii* Simon, 1868, collected in a residence in the Buffalo metropolitan area of western New York State (Figure 1). The habitus of the male and morphology of the male pedipalp were concordant with the illustrations and photos in Metzner (2015) and Prószyński (2015). Collection data for this single specimen are as follows: USA: New York: Erie County, Village of Depew, at kitchen sink in house, 2235 hours, 28 May 2014, Gerard N Hubert [one male]. This specimen has been deposited as a voucher in the Florida State Collection of Arthropods, Gainesville.

Heliophanus kochii is a Palearctic species distributed from the Canary Islands, Morocco, Azores, Portugal, and Netherlands east to Israel, Azerbaijan, Kazakhstan, and Russia (Metzner 2015). Roberts (1995) describes the habitat and behavior of six European species of *Heliophanus*, not including *H. kochii*, as follows: “The majority of species occur on low vegetation, being found in the undergrowth in poor weather but very active near the top of plants in sunshine.” Roberts (1995) does not include peridomestic or synanthropic situations in the habitat information that he provides for those six European species of *Heliophanus*.



Figure 1. Male *Heliophanus kochii*. **A**, Dorsal. **B**, Palp retrolateral. **C**, Palp ventral.

Occupants of the residence where the single male of *Heliophanus kochii* was collected had no history of prior travel outside of the United States. The owner of this residence works in a warehouse that stocks carpeting and other flooring materials, so one possible scenario is that this spider hitchhiked in flooring materials shipped from the native range of this species (e.g., Germany is the source of one vinyl floor covering stocked in the warehouse), and the warehouse worker may have inadvertently transported it to his residence. Another adventive salticid that is native to Europe and Asia, *Myrmarachne formicaria*, has been collected twice in the same warehouse - see label data below.

The only ornamental or house plant that had been introduced into the residence about the time that *Heliophanus kochii* was collected was an “African violet,” but most likely it was grown locally, *i.e.*, in or near western New York State. In any event, introduction via commercial goods or live plant material are speculative mechanisms of transport only; a definitive explanation for how a Palearctic jumping spider, *H. kochii*, came to be found in a residence in western New York State is lacking. Currently no evidence is available to answer the question regarding the presence or absence of a reproducing population of *H. kochii* at the collection site.

The genus *Myrmarachne* MacLeay, 1839, comprises 223 nominal species and five subspecies of jumping spiders (World Spider Catalog 2016). These taxa are widely distributed in all zoogeographic realms, with the greatest species diversity in Indonesia, India, China, Philippines, and Malaysia (Holt *et al.* 2013; Metzner 2015; World Spider Catalog 2016). If one excludes *Myrmarachne albocincta* (C. L. Koch, 1846), which is probably a synonym of *Sarinda hentzi* (Banks, 1913) [Richman, Cutler & Hill 2011], the only species of *Myrmarachne* which occurs in North America north of Mexico is the introduced ant like jumping spider, *Myrmarachne formicaria* (De Geer, 1778).

Myrmarachne formicaria is native to the Palearctic and Sino-Japanese zoogeographic realms (Holt *et al.* 2013; World Spider Catalog 2016). It is widely distributed in a temperate belt across the Palearctic from Canary Islands, Azores, Great Britain (very local in the south & east of England), and Norway, east to Russia, Japan, and China (Metzner 2015; Prószyński 2015; Roberts 1995). This species apparently was introduced accidentally to the Nearctic zoogeographic realm, and was first recorded from a residence in Trumble County, Ohio, on 16 August 2001 (Bradley *et al.* 2006; Ubick *et al.* 2005). By 2004, Bradley *et al.* (2006) reported that this introduced species occupied a span of over 60 km in three counties in northeastern Ohio, and they suggested that the species might be expanding its range.

A photograph of a male of *Myrmarachne formicaria* that had been taken 15 August 2011 in Amherst, Erie County, NY (on a picnic table) is posted at the arthropod photo and information sharing site, BugGuide.net (Bartlett 2016). The photo was attributed to “jonmark nailor” and the species determination was made in 2011 by G. B. Edwards (GBE). A note dated 17 August 2011 that is appended to the relevant web page at BugGuide.net cites a personal communication from GBE to Kevin Pfeiffer stating that this European species had also spread to Pennsylvania and New York. We are not aware, however, that voucher specimens have been deposited in a museum collection to document the range expansion of this introduced salticid into NY and PA. In addition, the earliest specimens reported below predate the BugGuide photo by five years, indicating an earlier range expansion into NY.

Here we document the occurrence of 29 specimens of this interesting ant like salticid from nine sites in five municipalities in the Buffalo metropolitan area of Erie County, western New York State. Male and female habitus, and morphology of the male pedipalp and female epigynum (Figure 2) were concordant with the illustrations or photos in Metzner (2015), Roberts (1995), and Prószyński (2015). Nine specimens designated below by a single asterisk (*) have been deposited as vouchers at the Florida State Collection of Arthropods, Gainesville. Nine specimens designated by double asterisks (**) have been deposited as vouchers at the American Museum of Natural History, New York City. The 11 specimens not asterisked have been deposited in the NYS Department of Health’s Western Region Arthropod Collection housed at SUNY Buffalo State.

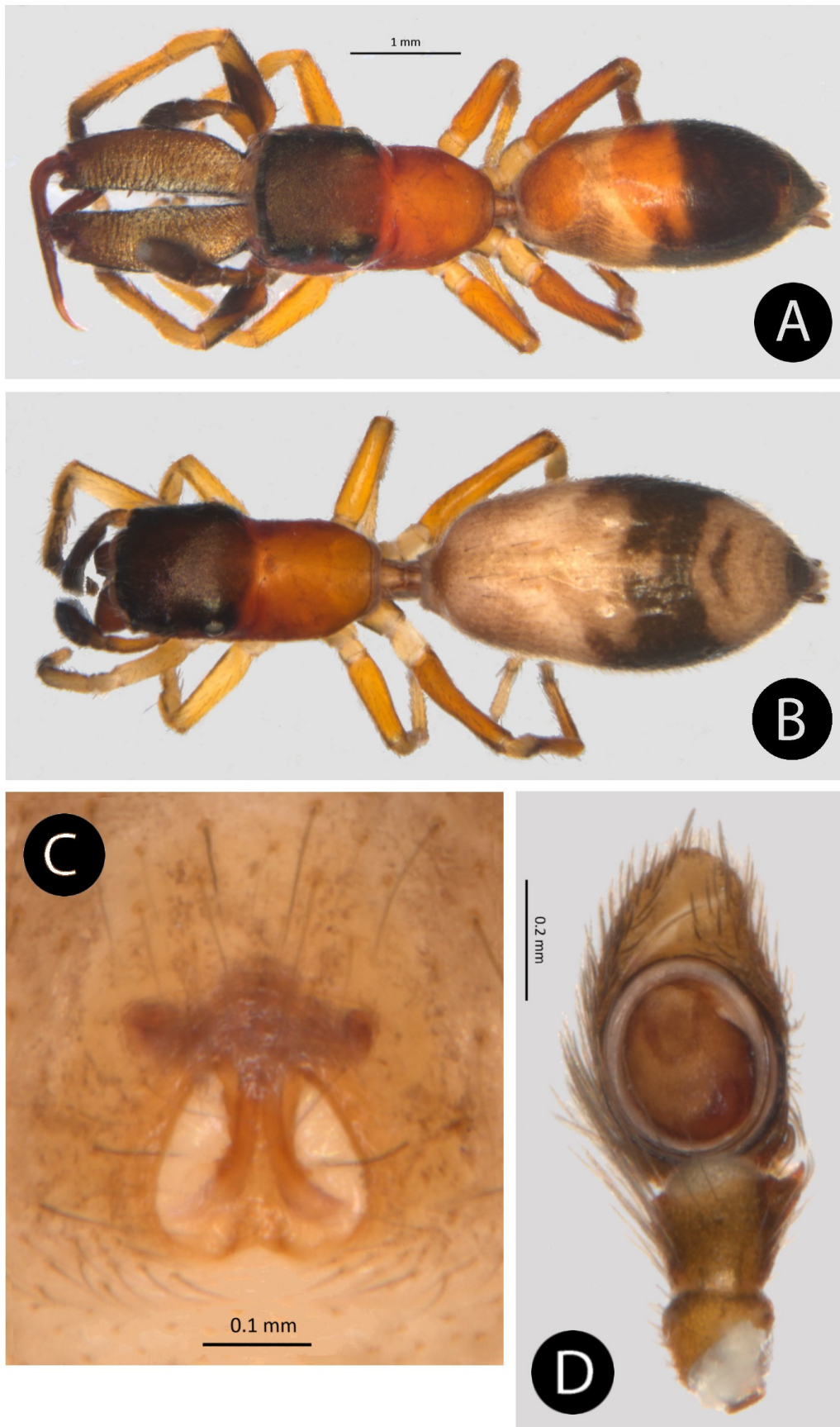


Figure 2. *Myrmarachne formicaria*. **A**, Male dorsal. **B**, Female dorsal. **C**, Female epigyne ventral. **D**, Male palp ventral.

Collection data for the 29 specimens that were examined are as follows:

- (1) City of Buffalo, Erie County Health Department, Environmental Health Office [on campus of the Erie County Medical Center]: Vector and Pest Control Laboratory, Bldg BB-122, on top of partition at end of lab bench, 1315 hours, 21 August 2006, Amanda Martelli [one male*]; on wall in staff kitchen, Room 157 (formerly BB-157 Clinical Center), 15 September 2010, Jeffrey Jurewicz [one male**]; dropped down on silken line from suspended ceiling onto head of adult male employee in hallway, 20 May 2011, Peter J Tripi [one male]; on wall in office, Room BB-167, 15 August 2011, Glenn Robert [one male]; Building BB, 03 October 2011, Glenn Robert [one male]; walking on linoleum floor in main hallway ~25 ft. from nearest exterior door, 0730 hours, 19 May 2015, Jeffrey Jurewicz [one male]; on outside of east-facing concrete block wall near east entrance door, 0835 hours, 04 June 2015, WK Gall [one female*]; in coffee cup on counter, Room 166, 05 June 2015, Glenn Robert [one female**].
- (2) City of Buffalo, SUNY Buffalo State, Science Building: On wall, north side of entrance door in Room 307C, 1050 hours, 24 August 2010, KJ Tober [one male*]; on upper cabinet (lip adjacent to track of sliding door) closest to window, Room 307C, 1110 hours, 13 September 2011, Keith J Tober [one male**]; on outside of door to 307C, 0900 hours, 23 August 2012, Keith J Tober [one male].
- (3) City of Buffalo, on door in office room of apartment (floor beginning to rot out/mold), 07 June 2014, Lee Ann Garozzo [two males: one male* and one male**].
- (4) City of Buffalo, Great Lakes Center Field Station of SUNY Buffalo State, Foot of Porter Avenue, on desk in Room 106, 1130 hours, 23 September 2013, Mark D Clapsadl [one male*].
- (5) Town of Cheektowaga, Maryvale Primary School, crawling on sink in classroom, Room 42, 08 June 2011, Renee Fuller [one male**].
- (6) Town of Cheektowaga, flooring materials distributor: dropping down on silken line from ~30' high ceiling inside warehouse, 0800 hours, 28 May 2015, Gerard N Hubert [one male*]; dropping down on silken line from ~30' high ceiling inside warehouse, 0730 hours, 30 May 2015 [same spot as 28 May 2015 collection], Gerard N Hubert [one female**].
- (7) Town of Hamburg, Erie County Fairgrounds, crawling down door at Erie County Health Department temporary office inside Grandstand Building, 1400 hours, 07 August 2012, Jeffrey Jurewicz [one immature male**].
- (8) Village of Lancaster [single family home]: On outside north-facing wall of detached garage, 1926 hours, 17 June 2014, WK & Jonathan S Gall [one male*]; on kitchen counter right of sink basin, 1714 hours, 08 August 2014, WK Gall [one immature*]; on outside of lower south-facing wall of house (on mineral siding) between basement entrance & back door, 1018 hours, 07 June 2015, WK Gall [one male**]; on upper back of lawn chair on concrete driveway directly in front of detached garage, 1703 hours, 11 June 2015, WK Gall [one male]; on child's plastic basketball backboard in driveway between detached garage & house, 1110 hours, 14 June 2015, WK & Jonathan S Gall [one male].
- (9) Town of West Seneca: In groove of ceiling tiles in family room of single family house, late AM/early PM, ca. late July 2012, Joseph S Sullivan [one male*]; on floor in family room of house, 1200 hours, 28 September 2013, JS Sullivan [one male**]; in dry utility plastic bucket on concrete patio directly behind (outside of) house, 1207 hours, 20 August 2014 (75°F, sunny), JS Sullivan [immature]; in kitchen of house, on framed picture on south wall, 1810 hours, 23 August 2014, JS Sullivan [one female]; walking across ceiling in kitchen of house, 1530 hours, 24 May 2015, JS Sullivan [one male]; on outside of storm door on west-facing side of house, 1330 hours, 03 August 2015, JS Sullivan [one male].

In the context of its European distribution, Roberts (1995) describes the habitat of *Myrmarachne formicaria* as “amongst low vegetation in a sunny position, under stones and amongst moss.” Since Roberts (1995) makes no mention of this jumping spider occurring in or around buildings in the south and east of England and northern Europe, it is interesting that the distributional records from northeastern Ohio (Bradley *et al.* 2006) and those we report here from western New York are all based on specimens collected in peridomestic settings. Thus it appears that this introduced salticid has become

synanthropic in the New World. In terms of habitat specificity, Metzner (2015, after Wiehle 1967) states that “Die Art scheint keine besonderen Standortansprüche zu stellen, ist aber an feuchteren Stellen häufiger zu finden” (The species appears to exhibit no particular habitat requirements, but is to be found more frequently in moist places).

An interesting behavioral observation made independently by two collectors (PJ Tripi and GN Hubert; see collections data above) was the propensity for *Myrmarachne formicaria* to drop down on silken lines from ceilings: one male from a hallway ceiling in a conventional office building, and one male and one female from a ca. 30 foot-high ceiling in a warehouse. Since all three observations occurred from 20-30 May (probably early in the mating season), and involved sexually mature individuals, it is possible that this behavior represented mate-seeking activity. Roberts (1995) provides indirect support for this supposition in his generalized discussion of spider reproductive behavior: “The male generally moults into maturity just before the female and may then seek out a mate by sensing her pheromones, which may be airborne or on draglines of her silk.”

Two or more specimens of *Myrmarachne formicaria* have been reported from five of the nine collection sites in western New York over periods ranging from one to ten years (mean four years), strongly suggesting the establishment of breeding populations there.

The apparent association of this ant like salticid with peridomestic situations in western New York may be an artifact of casual collections made in the human-modified environment. Focused or systematic surveys were not conducted in natural, less disturbed settings, nor on low vegetation near any of the collection sites. *Myrmarachne formicaria* actively forages during the day, prefers open sunny environments, and is conspicuous and distinctive (Bradley *et al.* 2006), thus adding to the likelihood that people would recognize it in both peridomestic and natural settings.

Acknowledgements

Richard A. Bradley of The Ohio State University at Marion confirmed the identification of the index specimen of *Myrmarachne formicaria* collected in 2006. We thank the following people for collecting specimens: Mark D. Clapsadl, Renee Fuller, Jonathan S. Gall, Lee Ann Garozzo, Gerard N. Hubert, Jeffrey Jurewicz, Amanda Martelli, Glenn Robert, Joseph S. Sullivan, Keith J. Tober, and Peter J. Tripi.

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ADDENDUM: CORRECTION DATED 1 SEP 2020 (NOT PART OF THIS PUBLICATION)

The third paragraph on page 3 states that:

This species apparently was introduced accidentally to the Nearctic zoogeographic realm, and was first recorded from a residence in Trumble County, Ohio, on 16 August 2001 (Bradley *et al.* 2006; Ubick *et al.* 2005).

"Trumble County," based on Bradley *et al.* (2006), is misspelled. The correct spelling should be "Trumbull County."