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in the spider wasps *Entypus unifasciatus* (Say)
and *Tachypompilus ferrugineus* (Say)
(Hymenoptera: Pompilidae)

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Abstract. Geography and host spider family are strongly linked in the spider wasps (Hymenoptera: Pompilidae) *Entypus unifasciatus* (Say) and *Tachypompilus ferrugineus* (Say) (rusty spider wasp) when 2031 host spider locality records from the years 1918–2020 are mapped. *Entypus unifasciatus* lycosid host records are plentiful from 43–44° N in the U.S. to northern Mexico. *Tachypompilus ferrugineus* lycosid host records are numerous from southern Ontario and New England to Mexico east of the Rocky Mountains. Most *E. unifasciatus* and *T. ferrugineus* pisaurid host records are from the SE U.S. Trechaleid host records for *E. unifasciatus* and *T. ferrugineus* are predominant in southern Mexico and Central America, while ctenid host records for these species are prevalent in northern South America. All *E. unifasciatus* sparassid host records are from extreme SW U.S. and Mexico, whereas *T. ferrugineus* sparassid host records are scattered from Texas, Florida and Puerto Rico to Panama. Lycosidae are the predominant host spider family in the Americas for *E. unifasciatus* (80.3%) and *T. ferrugineus* (67.4%) followed by Pisauridae (5.4%, 21.7%), Trechaleidae (4.8%, 6.8%), Ctenidae (4.6%, 1.8%), and Sparassidae (4.3%, 1.5%). Lycosidae and Pisauridae are overrepresented in this study as the vast majority of host records (87.8%) are from the U.S. and Ontario, Canada where such species are abundant. Trechaleidae and Ctenidae are grossly underrepresented as host records from Mexico, Central America and South America are scarce (12.2%). Zoropsidae/Miturgidae and Zoropsidae/Agelenidae are atypical host families for *E. unifasciatus* (0.3%, 0.3%) and *T. ferrugineus* (0.4%, 0.4%), respectively. *Rabidosa rabida* (Walckenaer) (Lycosidae) (rabid wolf spider) is the predominant host spider species for both *E. unifasciatus* (56.8%) and *T. ferrugineus* (58.3%).

Key words. Lycosidae, Pisauridae, Trechaleidae, Ctenidae, Sparassidae, Zoropsidae, Agelenidae, Miturgidae, *Rabidosa rabida*.

Introduction

Spider wasps (Pompilidae), as the name implies, hunt, immobilize by stinging, and stock their nest cells each with a paralyzed spider bearing the wasp's egg on its abdomen. After subduing the host spider, the female wasp places it in a previously prepared cell (Pepsini, Ageniellini, Pompilini [*Arachnospila arcta* [Cresson]]), confiscates the spider's own burrow for use as a nest-cell (Pepsini, Aporini, Pompilini), or, using rake-spines on the forelegs, excavates a burrow in the substrate for use as a nest (Pompilini). The wasp's egg hatches in a few days and the larva easily penetrates the spider's thin abdominal cuticle with its mandibles. The wasp larva consumes the edible portions of the host spider, grows relatively rapidly over several days, constructs a parchment-like cocoon, pupates, and emerges as an adult several weeks or a year later (Kurczewski and Edwards 2012). The spider is usually the same size as the wasp, albeit often much heavier in wet weight (Kurczewski and Kiernan 2015). Spider wasp and host spider cohabit the same area—on the ground or vegetation, near the spider's web, or, rarely, along a body of water. Spider wasps can arbitrarily be sorted into species that are oligophagous, polyphagous or intermediate in host specificity (Evans and Yoshimoto 1962; Kurczewski and Kurczewski 1968). For example, *Anoplius cleora* (Banks) (Pompilini), a rather large species, is host-specific on the beach wolf spider *Arctosa littoralis* (Hentz) (Lycosidae) while *An. depressipes* Banks, another rather large species, captures semi-aquatic *Dolomedes* Latreille and *Pisaurina* Simon fishing spiders (Pisauridae) on or near water (Evans and Yoshimoto 1962; Kurczewski and Kiernan 2015). Many small and moderate size pompilids such as *Priocnemis cornica* (Say) and *Anoplius marginatus* (Say), in contrast, are strongly polyphagous and stock their cells with a dozen or more families of unrelated spiders (Kurczewski and Kiernan 2015; Kurczewski et al. 2017).

Entypus unifasciatus (Say) (Pepsini) and *Tachypompilus ferrugineus* (Say) (Pompilini), the subjects of this study, demonstrate size-equivalent capture of predominantly cursorial-hunting families of Lycosoidea (Lycosidae, Trechaleidae, Pisauridae, Ctenidae) and, in the process, illustrate distinct geographic variation in host spider family selection across North America and northern South America. A wealth of data gathered over a century definitively links host spider family selection and geography in these two spider wasp species when their host record locations are plotted on a map. This relationship is strengthened further when the historical data are combined with an immense amount of 21st century photographic information from 188 internet websites.

Entypus unifasciatus and *Tachypompilus ferrugineus* are rather large (adults are ± 20 mm in body length), brightly colored, easily recognizable, wide-ranging American spider wasp species. *Entypus unifasciatus* is black with yellow/orange antennal flagella and mostly black to mainly orange wings, wing color varying with geographic region (Townes 1957). Individuals from humid continental/subtropical eastern United States have black wings with a large subapical orange patch (Fig. 1–2), while those from semiarid/desert and tropical wet/dry regions of western United States, Mexico, Central America, Colombia and Venezuela have orange wings with the base and apex narrowly to moderately infusate (Fig. 3–6). *Entypus unifasciatus* occurs from southern Ontario and New England westward to extreme southern Oregon and southward through North America to Colombia and Venezuela (Banks 1945, 1946; Townes 1957; Krombein 1979; Fernández 2000; Cambra-Torok et al. 2004; Horta Vega et al. 2009; Corro-Chang and Cambra-Torok 2011; M. B. Buck, Royal Alberta Museum, Edmonton, AB, 2017 pers. comm.; A. M. R. Bennett, Canadian National Collection of Insects, Ottawa, ON, 2018 pers. comm.; S. M. Paiero, University of Guelph, Guelph, ON, 2018 pers. comm.; C. S. Ferguson, Southern Oregon University, Ashland, OR, 2019 pers. comm.). *Entypus unifasciatus* reportedly occurs farther southward in South America (Townes 1957), although its identification there remains questionable (Roig-Alsina 1981). *Entypus unifasciatus* may not occur farther northward in the Pacific Northwest as its natural host spider species are absent, rare or scarce. Host records and online visual images for *E. unifasciatus* from the treeless Great Plains, dense forest of the Appalachian Region, and extensively sandy soils of the South Atlantic coastal region and peninsular Florida are scant (Townes 1957; Leavengood et al. 2011).

Entypus unifasciatus occurs in dry, open habitats—overgrown fields, woodland edges, thinly dispersed woodland and savanna in southern Ontario and eastern U.S., arid quasi-desert and sparse scrubland/grassland in western U.S. and northern Mexico, and fields, savanna, open woodland and woodland borders in southern Mexico, Central America, Colombia and Venezuela (Townes 1957; Evans and Yoshimoto 1962; Kurczewski and Edwards 2012; Kurczewski and Kiernan 2015; Kurczewski et al.

2017, in prep.). The nest entrance is a wasp-modified hole in the ground concealed among rocks or other irregularities in the soil such as crevices and entangled rootlets (McCormac 2009; Taulman 2017). Each cell in the multi-celled nest is excavated prior to prey search and capture. The wasp usually grasps the immobilized spider's pedipalp or, less commonly, chelicera with her mandibles and drags the relatively heavy prey backwards on the ground, dorsal side upward, to her nest. Prey transport is often lengthy, cumbersome, and involves circumventing various obstacles on rough terrain (McCormac 2009; Taulman 2017; Dodge 2019).

Tachypompilus ferrugineus is castaneo-ferruginous with a variable amount of black on the head, thorax and abdomen, and fuliginous wings that reflect violet (Evans 1950, 1966). Individuals from humid continental/subtropical/tropical wet regions of North America and South America have black markings on the head, thorax and abdomen while those from semiarid/desert/tropical dry regions are entirely or mainly castaneo-ferruginous (Fig. 7–12). *Tachypompilus ferrugineus bicolor* (Banks), a melanistic variant from Hispaniola and Puerto Rico, has much black on the body and coxae, ferruginous metasoma and legs, and fuliginous wings (Evans 1966; Waichert et al. 2012). *Tachypompilus ferrugineus* occurs from southern Ontario and New England southward and westward through the U.S., Mexico and Central America into South America, mainly east of and including the Rocky Mountains, and in Hispaniola and Puerto Rico (Evans 1950, 1966; Krombein 1979; Colomo de Correa 1987 [1985]; Genaro 1995; Fernández 2000; Cambra-Torok et al. 2004; Horta Vega et al. 2009; Corro-Chang and Cambra-Torok 2011; Waichert et al. 2012; A. M. R. Bennett, 2018 pers. comm.; M. B. Buck, 2017 pers. comm.; S. M. Paiero, 2018 pers. comm.; C. Waichert, Vila Velha University, Vila Velha, Brazil, 2019 pers. comm.; Kurczewski et al. in prep.). Host records for *T. ferrugineus* south of the northernmost tier of countries in South America are exceedingly rare (Evans 1966; Colomo de Correa 1987 [1985]; C. Waichert 2019 pers. comm.). *Tachypompilus ferrugineus* is essentially replaced in the western U.S. by *T. unicolor unicolor* (Banks) and *T. u. cerinus* Evans (Evans 1966; Wasbauer and Kimsey 1985).

Tachypompilus ferrugineus often uses man-made structures for nesting sites. Nest-cells are found in rock piles, openings in stone and concrete walls and fences, exteriors of stone and wooden buildings, and beneath buildings, cemetery monuments and fallen billboards in sandy, gravelly and loamy soils or artificial composite (Evans 1950; Strandtmann 1953; Evans and Yoshimoto 1962; Kurczewski 1989, 1990, 2010; Kurczewski and Edwards 2012; Kurczewski and Kiernan 2015; Kurczewski et al. 2017, in prep.). The prey-deposition chamber of *T. ferrugineus* is merely a shallow concave depression in loose soil or powdered substrate material in which a single paralyzed spider is placed and wasp's egg laid on the host spider's abdomen (Strandtmann 1953; Kurczewski et al. in prep.). Unlike *E. unifasciatus*, the nest-cell of *T. ferrugineus* is not excavated by the wasp until after the spider is captured and immobilized. Transport of the spider to the nest is the same as for *E. unifasciatus*, the wasp usually grasping a pedipalp or chelicera with her mandibles and dragging the relatively heavy prey backwards, dorsal side upward, on the ground and, sometimes, up a vertical man-made surface—an often long and cumbersome process over and around various obstacles.

The purpose of this paper is to research, map and discuss geographic variation in host spider family selection of *E. unifasciatus* and *T. ferrugineus*. Both species, especially *T. ferrugineus*, occur across a broad range of habitats with different conditions of climate, soil, vegetation, and host spider availability. In these broadly defined regions the predominant and subordinate host spider families are Lycosidae (wolf spiders; Fig. 1, 4, 7) and Pisauridae (fishing or nursery-web spiders; Fig. 2, 8, 9) in eastern U.S. and Ontario, Canada; Lycosidae and Sparassidae (giant crab or huntsman spiders, Fig. 3) in western U.S. and Mexico; and Trechaleidae (banana spiders; Fig. 6, 11), Ctenidae (wandering spiders; Fig. 5, 12), Lycosidae and Sparassidae in southern Mexico, Central America and South America (Kurczewski et al. in prep.). Zoropsidae (false wolf spiders)/Miturgidae (prowling spiders) and Zoropsidae/Agelenidae (funnel-web or grass spiders, Fig. 10) are unusual host spider families for *E. unifasciatus* and *T. ferrugineus*, respectively, in temperate and tropical North America.

Materials and Methods

In total, 2031 host records (*E. unifasciatus*, 669; *T. ferrugineus*, 1362) were located, examined and charted for the two spider wasp species over a period of 19 years (2002–2020). Spider wasp literature

and insect museum host records were searched and cataloged. Thirty-one papers and online descriptions published over more than a century (1918–2019) contained pertinent host spider information for *E. unifasciatus* and/or *T. ferrugineus* (see Literature Cited). Because of their rather large size and visual attractiveness, adults of both spider wasp species are frequently seen and, in the 21st century, often photographed. Photographic images and videos of females of the two species with immobilized host spiders were located on 188 online websites, downloaded, and the information cataloged. Many of the visual host records are from national parks and preserves; state, county and local parks; and, heavily populated metropolitan areas where camera phones are in nearly constant use.

Neither wasp nor spider were identified to genus or species in many of the online visual examples. The first author identified to genus and species both highly distinct spider wasp taxa. The third and fourth authors and other arachnologists identified host spider family, genus and/or species (see Acknowledgments). Country, state, province, region, department, arrondissement, district, county, municipality, parish and locality, where known, along with host spider family of the wasp-spider association were categorized and tabulated (Tables 1, 2). Using information from Tables 1 and 2, the second author created host spider family geographic distribution maps for the two spider wasp species (Fig. 13, 14) by (1) downloading a Natural Earth II color relief map from <http://www.shadedrelief.com/natural2/index.html>; (2) using Adobe Photoshop, cropped the maps to the appropriate areas, deleting the ocean color and smallest islands; and (3) imported the relief map into Adobe Illustrator, thereby producing structural layers for (a) [hidden] county outlines, (b) host locality dot symbols, (c) legend text; and (d) Texas and Florida outline enlargements (Fig. 14). The fifth author used Symbiota Collections of Arthropods Network (SCAN), a comprehensive online database of predominantly North American arthropod collections and observations to create Fig. 15, 16 (maps). Geographic distribution information from 39 host spider species of *E. unifasciatus* and *T. ferrugineus*, including ~9040 records from 27 insect museums and BugGuide.net and iNaturalist.org online images, comprised the database for the two maps.

The following 48 insect collections and museums provided host spider and wasp geographic distribution information for this publication:

Archbold Biological Station Insect Collection
Brigham Young University Bean Science Museum
California Academy of Sciences
Canadian National Collection of Insects, Arachnids and Nematodes
Carnegie Museum of Natural History
Chicago Academy of Sciences
Colorado State University Department of Zoology and Entomology
Cornell University Department of Entomology and Limnology
Denver Museum of Nature and Science
Field Museum of Natural History Collection of Insects, Arachnids, and Myriapods
Florida State Collection of Arthropods
Instituto de Biología, UNAM, Mexico
Lyman Entomology Museum of McGill University
Milwaukee Public Museum
Montana State University Department of Zoology and Entomology
Museum of Comparative Zoology, Harvard University
Museum of Southwestern Biology, Division of Arthropods
New Mexico State Collection of Arthropods
Northern Arizona University, Colorado Plateau Museum of Arthropod Diversity
Oklahoma State University, The Sam Noble Museum
Oregon State University Arthropod Collection
Royal Alberta Museum
Royal British Columbia Museum
Royal Ontario Museum
Southern Oregon University Insect Collection
State of Oregon Department of Agriculture
State University of New York College of Environmental Science and Forestry Insect Collection

Texas Tech University, Invertebrate Zoology Collection
United States National Museum
Universidad Nacional de Colombia, Instituto de Ciencias Naturales
Universidad de la Habana
University of Alaska Museum
University of British Columbia, Spencer Entomological Collection
University of California–Berkeley, Essig Museum of Entomology
University of California–Davis, Bohart Museum of Entomology
University of Costa Rica Insect Museum
University of Georgia Department of Entomology
University of Guelph Centre for Biodiversity Genomics
University of Idaho Department of Entomology
University of Kansas, Snow Entomological Museum
University of Michigan Museum of Zoology
University of Panama Insect Collection
University of Puerto Rico Invertebrate Collection
University of Wisconsin Department of Entomology
University of Wyoming Department of Entomology
Utah State University Department of Zoology
Vila Velha University, Brazil Insect Collection
Washington State University Department of Entomology

Results

The vast majority of host records (1784/2031, 87.8%) are from North America north of Mexico. *Entypus unifasciatus* and *T. ferrugineus* stocked their nest-cells mainly (1966/2031, 96.8%) with adult or subadult female cursorial-hunting Lycosidae, Trechaleidae, Pisauridae and Ctenidae, all in the superfamily Lycosoidea (Griswold 1993; Polotow et al. 2015; Piacentini and Ramirez 2019). Lycosidae is the predominant host spider family in the Americas for *E. unifasciatus* (537/669, 80.3%) and *T. ferrugineus* (918/1362, 67.4%; Tables 1, 2; Fig. 13, 14). *Rabidosa rabida* (Walckenaer) (Lycosidae) comprised more than half of all host records for both species: *E. unifasciatus*, 380/669, 56.8%; *T. ferrugineus*, 794/1362, 58.3%. Species of Pisauridae are also captured by *E. unifasciatus* (36/669, 5.4%) and *T. ferrugineus* (295/1362, 21.7%) in eastern U.S. and Ontario, Canada (Tables 1, 2; Fig. 13, 14). Of 331 pisaurid host records for both species, 321 (97.0%) are for the arboreal *Dolomedes albineus* Hentz and semi-woodland *D. tenebrosus* Hentz. Most pisaurid host records for *E. unifasciatus* (29/36, 80.6%) and *T. ferrugineus* (235/295, 79.7%) are from SE U.S. Trechaleidae (*Cupiennius* Simon) (32/79, 40.5%) and Ctenidae (mainly *Phoneutria* Perty) (31/79, 39.2%) are the predominant *E. unifasciatus* host spider families in southern Mexico, Central America and northern South America but represent only 4.8% (32/669) and 4.6% (31/669), respectively, of the total host records for this species due to scarce information from tropical America (Tables 1, 2; Fig. 13, 14). Trechaleidae (*Cupiennius*) (93/144, 64.6%) and Ctenidae (mainly *Phoneutria*) (25/144, 17.4%) are also the prevalent host spider families in that region for *T. ferrugineus* but account for only 6.8% (93/1362) and 1.8% (25/1362), respectively, of the total host records for this species because of scant information from tropical America (Tables 1, 2; Fig. 13, 14). Sparassidae comprised only 1.5% (20/1362) and 4.3% (29/669) of the total host records for *T. ferrugineus* and *E. unifasciatus*, respectively (Tables 1, 2; Fig. 13, 14). Zoropsidae (2/669, 0.3%) and Miturgidae (2/669, 0.3%) are unusual host families for *E. unifasciatus* (Table 1, Fig. 13). Zoropsidae (6/1362, 0.4%) and Agelenidae (5/1362, 0.4%) are atypical host families for *T. ferrugineus* (Table 2, Fig. 14).

Entypus unifasciatus and *T. ferrugineus* provision their nests mostly with the same or related species of predominantly lycosoid spiders (U.S. unless indicated otherwise): ***Entypus unifasciatus***: LYCOSIDAE—*Arctosa littoralis*, *Hogna antelucana* (Montgomery), *H. baltimoriana* (Keyserling), *H. carolinensis* (Walckenaer), *H. carolinensis* species group, *H. coloradensis* (Banks), *H. lenta* (Hentz), *H. sp.* (MEXICO), *Lycosa* spp. (COLOMBIA), *Rabidosa punctulata* (Hentz), *R. rabida*, *R. santrita* (Chamberlin and Ivie), *Rabidosa* sp. (MEXICO), *Schizocosa maxima* Dondale and Redner, *S. mccooki*

(Montgomery), *Tigrosa annexa* (Chamberlin and Ivie), *T. aspersa* (Hentz), *T. georgicola* (Walckenaer), *T. grandis* (Banks), *T. helluo* (Walckenaer), *T. spp.* (MEXICO, COLOMBIA), unidentified Lycosidae spp. (MEXICO, COLOMBIA); TRECHALEIDAE–*Cupiennius coccineus* F. O. P.-Cambridge (COSTA RICA, PANAMA), *C. getazi* Simon (NICARAGUA, COSTA RICA, PANAMA), *C. salei* (Keyserling) (MEXICO), *C. spp.* (COSTA RICA); PISAURIDAE–*Dolomedes albineus* Hentz, *D. scriptus* Hentz, *D. tenebrosus* Hentz; CTENIDAE–*Ancylometes bogotensis* (Keyserling) (PANAMA, COLOMBIA), *A. sp.* (VENEZUELA), ?*Tenus* spp. (MEXICO, COSTA RICA), ?*Kiekie* sp. (COSTA RICA), *Phoneutria boliviensis* (F. O. P.-Cambridge) (COSTA RICA, PANAMA, COLOMBIA), *P. fera* Perty (COLOMBIA), *P. spp.* (COSTA RICA, COLOMBIA), unidentified Ctenidae sp. (MEXICO); ZOROPSIDAE–*Zorocrates fuscus* Simon (MEXICO), *Zorocrates* sp. (MEXICO); MITURGIDAE–*Syspira* sp.; SPARASSIDAE–*Olios giganteus* Keyserling (MEXICO), *Curicaberis* sp. (MEXICO, COSTA RICA); ***Tachypompilus ferrugineus***: LYCOSIDAE–*Hogna antelucana*, *H. baltimoriana*, *H. carolinensis*, *H. carolinensis* species group, *H. coloradensis*, *H. lenta*, *H. lenta* species group, *H. miami* (Wallace), *H. osceola* (Gertsch and Wallace), *H. timuqua* (Wallace), *H. sp.* (MEXICO), *Lycosa* sp. near *impavida* Walckenaer, *Lycosa* sp. (MEXICO), *Rabidosa carrana* (Bryant), *R. punctulata*, *R. rabida*, *R. santrita* (MEXICO), *Schizocosa avida* Walckenaer, *S. mccooki*, *S. sp.*, *Tigrosa annexa*, *T. aspersa*, *T. georgicola*, *T. grandis*, *T. helluo*, unidentified Lycosidae spp. (MEXICO, BELIZE, EL SALVADOR, COLOMBIA, GUYANA); TRECHALEIDAE–*Cupiennius coccineus* (COSTA RICA, PANAMA), *C. getazi* (COSTA RICA, PANAMA), *C. salei* (MEXICO, NICARAGUA, COSTA RICA), *C. spp.* (COSTA RICA, PANAMA); PISAURIDAE–*Dolomedes albineus*, *D. scriptus*, *D. tenebrosus*, *D. vittatus* Walckenaer, *D. sp.*, *Pisaurina mira* (Walckenaer); CTENIDAE–*Ancylometes bogotensis* (HONDURAS), ?*Kiekie* sp. (COSTA RICA), *Phoneutria boliviensis* (PANAMA, COLOMBIA), *P. fera* (FRENCH GUIANA), *Phoneutria* sp. (ECUADOR), unidentified Ctenidae spp. (COSTA RICA, GUYANA, SURINAME, BRAZIL); ZOROPSIDAE–*Zorocrates unicolor* (Banks) (MEXICO), *Zorocrates* sp. (MEXICO, GUATEMALA, COSTA RICA); AGELENIDAE–*Agelenopsis aperta* Gertsch (MEXICO), *A. ?naevia* (Walckenaer), *Agelenopsis* sp.; SPARASSIDAE–*Heteropoda venatoria* Linnaeus (MEXICO, NICARAGUA), *Neostasina bicolor* (Banks) (DOMINICAN REPUBLIC, PUERTO RICO), *Olios giganteus* (MEXICO), *Curicaberis* spp. (MEXICO, PANAMA).

Discussion

Entypus unifasciatus and *Tachypompilus ferrugineus* have adapted structurally, especially colorwise, and ecologically to the different environmental conditions of the various geographic areas they inhabit. Both species have retained their basic nesting patterns in these regions but have modified their hunting and prey capture accordingly to conform to the evasive and defensive comportment of the particular host spider families. Both species capture and immobilize vagrant, cursorial hunting, mainly lycosoid spiders of their own body size that they encounter in their hunting arenas. Spider body size is highly important in host selection. The host spider is relatively large and equivalent in body length to the wasp, albeit usually much heavier in wet body weight (Kurczewski and Kiernan 2015). It must be large enough to provide sufficient nourishment for the developing wasp larva. The burrowing lycosid genus *Geolycosa* Montgomery, although appropriate in size and phylogeny, is not included among the host spiders of *E. unifasciatus* or *T. ferrugineus* as their characteristically deep, straight vertical burrows are not part of the wasps' hunting locale.

Entypus Dahlbom is restricted to the Western Hemisphere and has about 30 species (Roig-Alsina 1981, Townes 1957), of which the majority capture and stock Lycosidae in their multi-celled nests (Janvier 1930; Townes 1957; Krombein 1979; Roig-Alsina 1981; Contreras 2017.). In addition to Lycosidae there are single host records of *Syspira* sp. (Miturgidae) and *Zorocrates fuscus* (Zoropsidae) for *E. aratus* (Townes) (Kurczewski et al. in prep.); unidentified Ctenidae species for *E. ferruginipennis* (Haliday) (Kurczewski et al. in prep.); *Dolomedes tenebrosus* (Pisauridae) for *E. fulvicornis* (Cresson) (Kurczewski et al. 2017); and, unidentified species of Sparassidae and Ctenidae for unidentified *Entypus* spp. (Kurczewski et al. in prep.). *Entypus unifasciatus* provisions its nests predominantly with Lycosidae and, much less so, Trechaleidae, Pisauridae, Ctenidae and Sparassidae based on abundant U.S. and sparse tropical America host information (Table 1, Fig. 13). The dry, open habitat of *E. unifasciatus* in southern Ontario, U.S.

and northern Mexico is conducive to providing a plentiful supply of relatively large, often adult or sub-adult female wolf spiders. Seasonal synchronicity in host spider adulthood and adult wasp emergence solidifies this predator-prey relationship. The ground-searching hunting behavior of *E. unifasciatus* is in harmony with the vagrant terrestrial activity of host Lycosidae species. Trechaleidae and Ctenidae are the prevalent host spider families of *E. unifasciatus* in southern Mexico/Central America and northern South America, respectively (Table 1, Fig. 13). They are the dominant, appropriate size cursorial spiders in those regions. The number of *E. unifasciatus* host records for Pisauridae and Sparassidae is far less than for Lycosidae as these families have fewer species and are habitat limited (Platnick 2014). The vast majority of pisaurid host records for *E. unifasciatus* are from SE U.S., while all sparassid host records for this species are from extreme SW U.S. and Mexico (Table 1, Fig. 13). *Syspira* Simon (Miturgidae) and *Zorocrates* Simon (Zoropsidae) are unusual host genera for *E. unifasciatus* in southwestern U.S. and Mexico, respectively (Table 1, Fig. 13).

Unlike some other areas of North America relatively large (body length >15 mm) actual and potential host spider species of Lycosidae, Trechaleidae, Pisauridae, Ctenidae, Zoropsidae, Agelenidae, Miturgidae, and Sparassidae are absent, rare or scarce in the Pacific Northwest (Fig. 15, 16). *Lycosa* Latreille, *Rabidosia* Roewer, *Sosippus* Simon, and *Tigrosa* Brady (Lycosidae); *Cupiennius* (Trechaleidae); *Dolomedes* and *Pisaurina* (Pisauridae), except for the aquatic *D. triton* (Walckenaer); *Ancylometes* Bertkau, *Ctenus* Walckenaer, *Kiekie* Polotow and Brescovit, and *Phoneutria* (Ctenidae); *Zorocrates* (Zoropsidae); *Agelenopsis* Giebel (Agelenidae); and *Syspira* (Miturgidae) are absent from Oregon, Washington and British Columbia (Carico 1973; Olmstead 1975; Peck 1981; Dondale and Redner 1990; Brady and McKinley 1994; Brady 2007, 2012; Platnick and Ubick 2007; Whitman-Zai et al. 2015; Piacentini and Ramirez 2019). The absence, rarity or scarcity of such host spider species in this region may limit the northward dispersal of *E. unifasciatus* whose northernmost reported and unreported localities are Canby, Modoc County, CA (Townes 1957); Redding, Shasta County, CA (J. Foster, Redding, CA, 2019 pers. comm.); and Medford and Brownsboro, Jackson County, OR (C. S. Ferguson, 2019 pers. comm.). Only four appropriate-size, host lycosid species of *E. unifasciatus* are found in the Pacific Northwest. *Hogna carolinensis* is rare in Oregon (Dondale and Redner 1990) but is a known host of *E. unifasciatus* in the SW U.S. (Kurczewski et al. 2017, in prep.). *Schizocosa maxima* is known from a single locality record in Oregon: Celilo Falls, Wasco County (Dondale and Redner 1978) and is a host spider for *E. unifasciatus* in California (2 records; Kurczewski and Edwards 2012, F. E. Kurczewski 2019 pers. observ.). *Arctosa littoralis*, a rare host lycosid species of *E. unifasciatus* (Kurczewski et al. in prep.), is relatively common in Oregon on sandy soils near water (Dondale and Redner 1983), a highly atypical hunting locale for *E. unifasciatus*. *Schizocosa mccoocki* is scarce to common in the Pacific Northwest and would be the most likely host species for *E. unifasciatus* in that region. There are 11 records of this wasp-spider host association from California and Mexico (Kurczewski and Edwards 2012; F. E. Kurczewski 2019 pers. observ.; Kurczewski et al. in prep.).

Tachypompilus Ashmead has 14 species in the Americas (Evans 1950, 1966; Colomo de Correa 1987; Fernández 2000). Host selection in this genus is more diverse than in *Entypus*. In South America *Tachypompilus banksi* Colomo de Correa, *T. erubescens* (Taschenberg), *T. pallidus* (Banks), and *T. xanthopterus* (Rohwer) provision with Sparassidae and *T. mendozae* is mainly host specific on Lycosidae and, rarely, stocks Ctenidae (Genise 1983; Martins 1991; Kurczewski et al. in prep.). In North America *T. unicolor unicolor* preys on Lycosidae and Sparassidae while *T. u. cerinus* captures Lycosidae, Trechaleidae, Ctenidae, Zoropsidae and Sparassidae (Kurczewski and Edwards 2012; Kurczewski et al. 2017, in prep.). *Tachypompilus ferrugineus* provisions its nests mostly with the same genera and species of Lycosidae, Trechaleidae, Pisauridae, Ctenidae, Zoropsidae and Sparassidae as *E. unifasciatus*. The factors of predator-prey association involving size equivalence, cohabitation and seasonal synchronicity of wasp and host spider for *E. unifasciatus* apply also to *T. ferrugineus* in its predominant use of adult, mainly female Lycosidae in southern Ontario, U.S. and northern Mexico. The more frequent capture of *Dolomedes* (Pisauridae) by *T. ferrugineus* results from wasp and spider cohabitation in moist, predominantly deciduous woodland (Table 2, Fig. 14). Trechaleidae and Ctenidae are the prevalent host spider families of *T. ferrugineus* in and near the tropical rainforests of southern Mexico/Central America and South America, respectively (Table 2, Fig. 14). Meager use of Sparassidae as prey in SW U.S. and Mexico by *T. ferrugineus* is connected with limited wasp distribution in arid quasi-desert and sparse scrubland/

grassland–habitat frequented by *E. unifasciatus* and *Olios giganteus* (Sparassidae) (Table 1, 2; Fig. 13, 14). Zoropsidae (*Zorocrates*) and Agelenidae (*Agelenopsis*) are atypical host families for *T. ferrugineus* (Table 2, Fig. 14). Unlike other host spider families of *T. ferrugineus*, Agelenidae do not wander but remain in/on their funnel-web to capture prey. Barthélémy (2010) reported Agelenidae as an “unusual” host for the congener *T. analis* (Fabricius) in Hong Kong and described the wasp’s search on the spider’s web, pursuit of the spider off its web, and subsequent capture on the ground.

Summary

Entypus unifasciatus and *Tachypompilus ferrugineus* stock their nest-cells with a single immobilized, often adult or subadult female cursorial-hunting spider belonging mainly to the superfamily Lycosoidea.

Lycosidae are the predominant host spider family for *Entypus unifasciatus* and *Tachypompilus ferrugineus* in the Americas based on extensive U.S. host records.

Entypus unifasciatus captures a larger percentage of Lycosidae than *Tachypompilus ferrugineus* resulting from a high degree of cohabitation in dry overgrown fields, savanna, thinly dispersed woodland and woodland edges.

Tachypompilus ferrugineus preys on a larger percentage of Pisauridae than *Entypus unifasciatus* based on cohabitation in moist, mainly deciduous woodland.

Entypus unifasciatus and *Tachypompilus ferrugineus* capture a relatively high percentage of Ctenidae and Trechaleidae in southern Mexico, Central America and northern South America but an overall equally low percentage of these families in the Americas due to scarce host records from the tropics.

Entypus unifasciatus captures a larger percentage of Sparassidae than *Tachypompilus ferrugineus* in SW U.S. and Mexico where *E. unifasciatus* and giant crab spiders are common inhabitants but *T. ferrugineus* has a limited distribution and is sparsely represented.

Zoropsidae (*Zorocrates*) is an unusual host spider family for *Entypus unifasciatus* and *Tachypompilus ferrugineus* in SW U.S., Mexico and Central America.

Agelenidae (*Agelenopsis*) are an atypical host spider family for *Tachypompilus ferrugineus* in western U.S. and Mexico, the funnel-web perhaps acting as an initial deterrent to capture.

Miturgidae (*Syspira*) are an unusual host spider family for *Entypus unifasciatus* in SW U.S. and, likely, Mexico.

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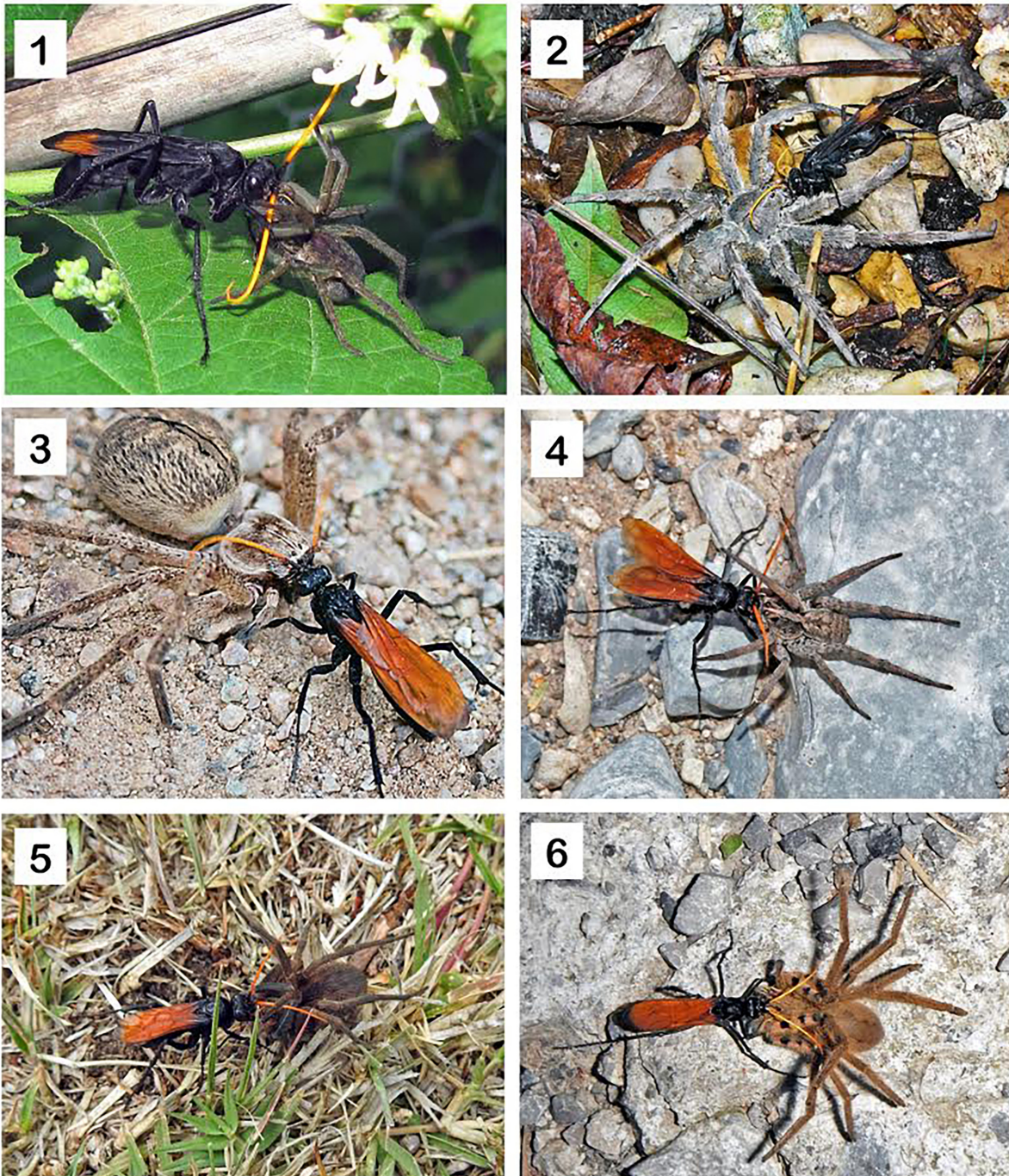
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Figures 1–6. *Entypus unifasciatus*. **1)** *Entypus unifasciatus unifasciatus* (Say), female, with immobilized *Hogna* sp., subadult female (Lycosidae), Clark County, IN. Photograph © David Brown. **2)** *Entypus unifasciatus unifasciatus*, female, with immobilized *Dolomedes albineus* (Pisauridae) (light morph), adult female, Acadiana Park Nature Station, Lafayette, Lafayette Parish, LA. Photograph © James Beck. **3)** *Entypus unifasciatus cressoni* (Townes), female, with immobilized *Olios giganteus* (Sparassidae), adult female, Gilbert Riparian Reserve, Maricopa County, AZ. Photograph © Kelly Gibson. **4)** *Entypus unifasciatus cressoni*, female, with immobilized *Tigrosa* sp. (Lycosidae), adult or subadult female, Santa Elena Canyon, Chihuahua State, Mexico. Photograph © Aaron Balam. **5)** *Entypus unifasciatus cressoni*, female, with immobilized ?*Ctenus* sp. (Ctenidae), adult female, Amozoc, Puebla State, Mexico. Photograph © Luis Fuentes. **6)** *Entypus unifasciatus cressoni*, female, with immobilized *Cupiennius salei* (Trechaleidae), adult or subadult female, Zihuateutla, Bosque Mesófilo Xecotepec, Puebla State, Mexico. Photograph © A. D. Hernández-Saint Martin.



Figures 7–12. *Tachypompilus ferrugineus*, **7)** Female with immobilized *Rabidosa rabida* (Lycosidae), adult female, Meadowlands Nature Area, Bergen County, NJ. Photograph © Natalie Gregorio. **8)** Female with immobilized *Dolomedes albineus* (light morph) (Pisauridae), adult female, Wolfskin District, Oglethorpe County, GA. Photograph © Wayne Hughes. **9)** Female with immobilized *Dolomedes albineus* (dark morph) (Pisauridae), adult or subadult female, Azle, Tarrant County, TX. Photograph © Tracey Fandre. **10)** Female with immobilized *Agelenopsis ?naevia* (Agelenidae), adult female, Mansfield, Tarrant County, TX. Photograph © Don McMillan. **11)** Female with immobilized *Cupiennius coccineus* (Trechaleidae), adult female, Rancho Naturalista, Cartago Province, Costa Rica. Photograph © Debbie Hall. **12)** Female with immobilized *Phoneutria boliviensis* (Ctenidae), adult female, Playa Paunch near Bluff Beach, Isla Colón, Bocas del Toro Province, Panama. Photograph © Ray Hamilton.

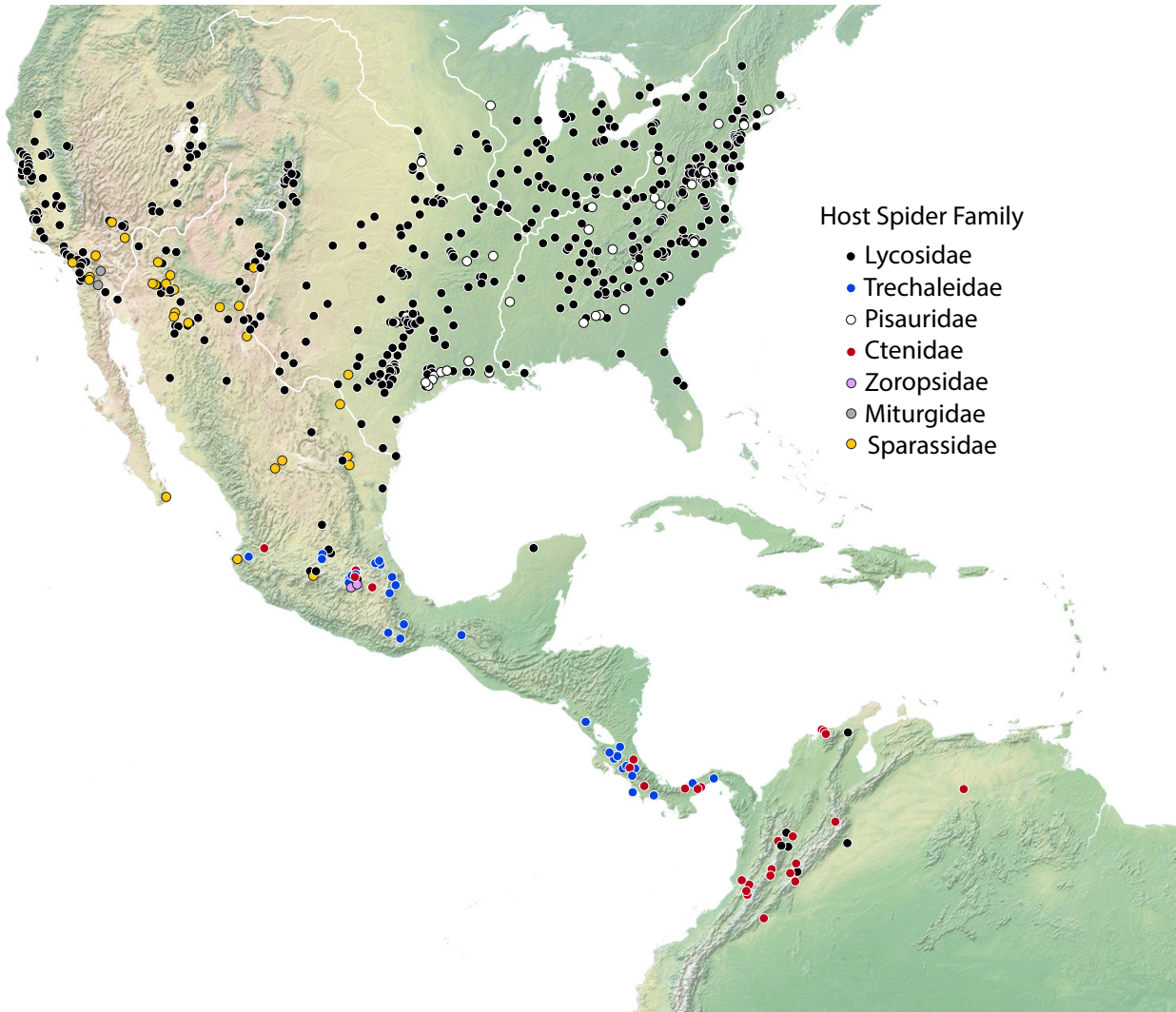


Figure 13. Host spider family localities for *Entypus unifasciatus*.

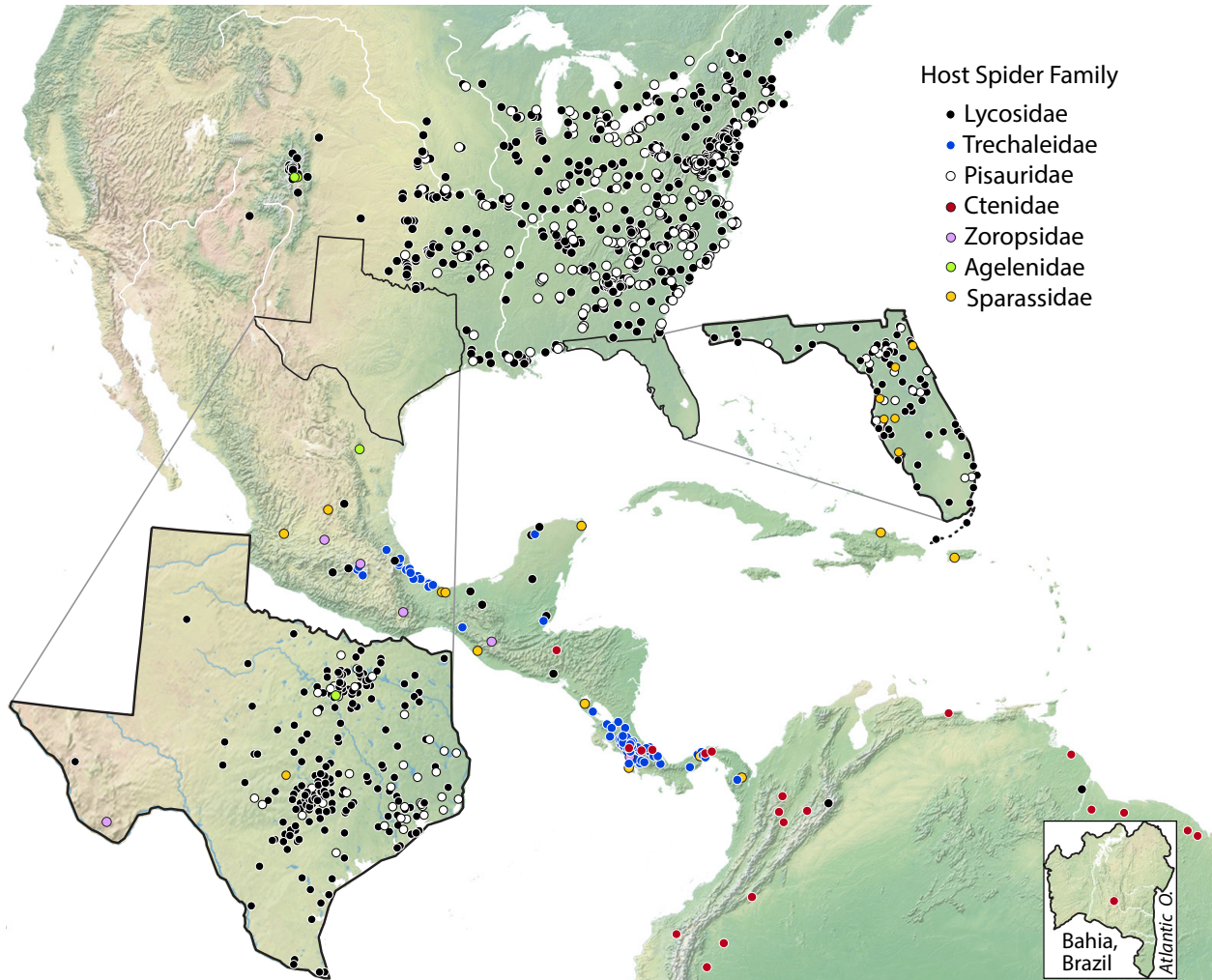


Figure 14. Host spider family localities for *Tachypompilus ferrugineus*.

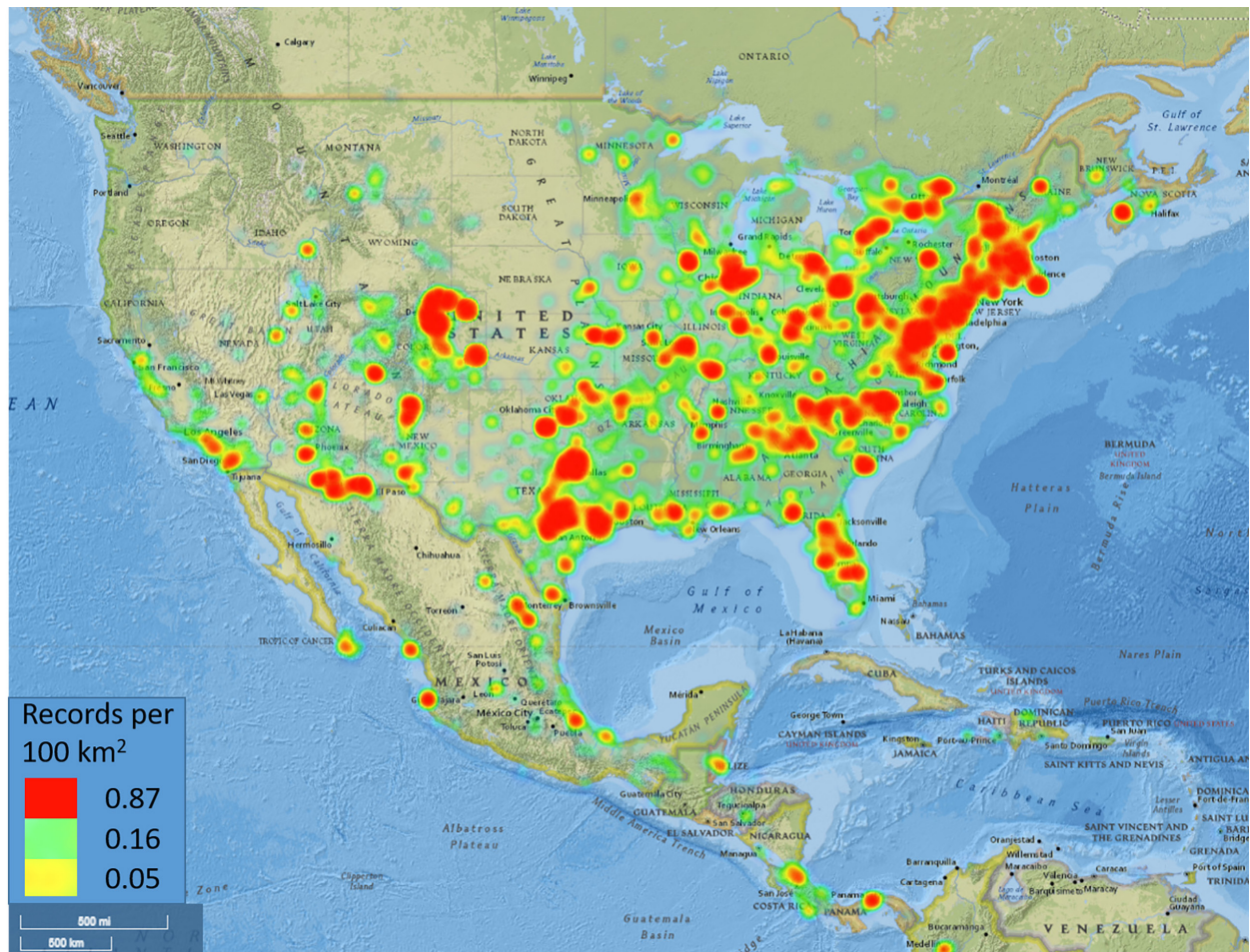


Figure 15. Combined geographic distribution of 39 host species of Lycosidae, Trechaleidae, Pisauridae, Ctenidae, Zoropsidae, Agelenidae and Sparassidae for *Entypus unifasciatus* and *Tachypompilus ferrugineus* based on ~9040 SCAN collection records and online images. Northwestern Mexico is undersampled and Colorado is oversampled on this map. Note scarcity of records from the Pacific Northwest.

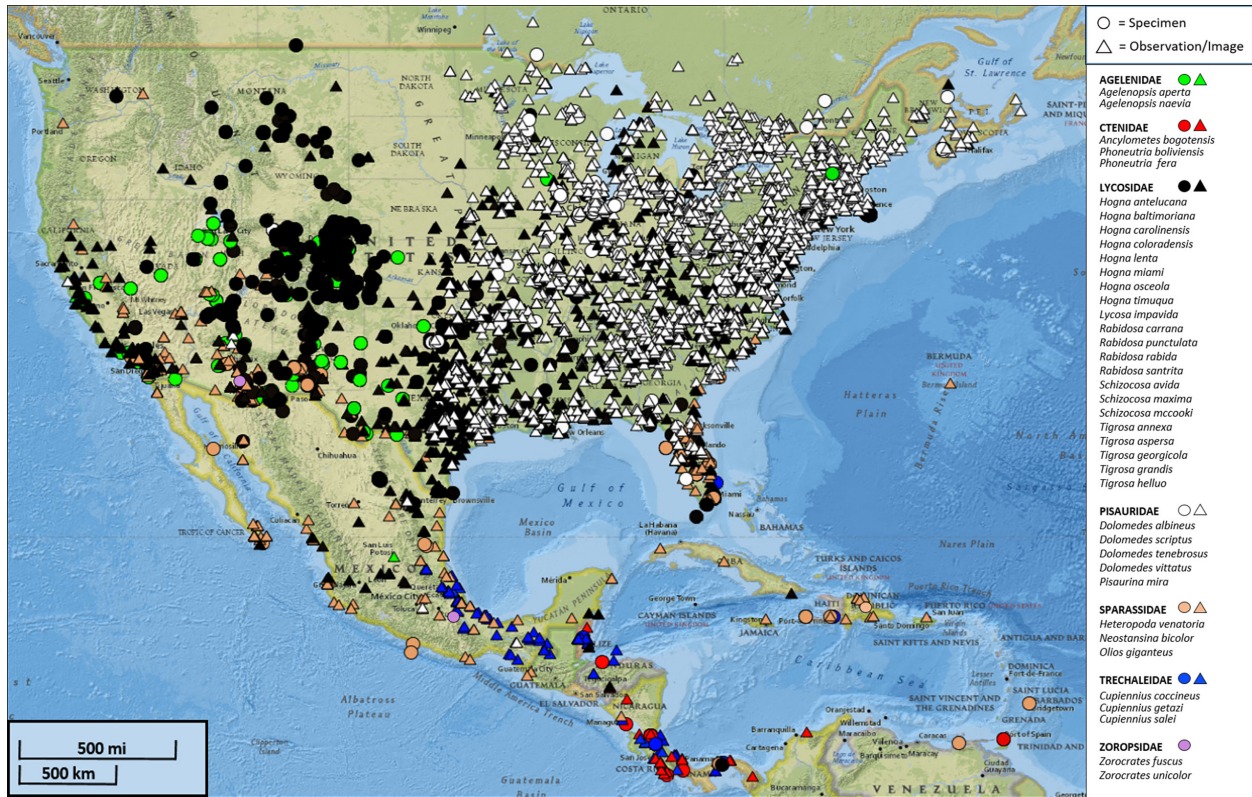


Figure 16. Localities of 39 host species of Lycosidae, Trechaleidae, Pisauridae, Ctenidae, Zoropsidae, Agelenidae and Sparassidae for *Entypus unifasciatus* and *Tachypompilus ferrugineus* based on ~9040 SCAN collection records and online images. Northwestern Mexico is undersampled and Colorado is oversampled on this map. Note scarcity of records from the Pacific Northwest.

Table 1. Host spider family records for *Entypus unifasciatus*. Host spider family records are arranged regionally and alphabetically by country, state, district, province, department or county, and locality. Abbreviations for host spider families: L, Lycosidae; T, Trechaleidae; P, Pisauridae; C, Ctenidae; Z, Zoropsidae; M, Miturgidae; S, Sparassidae. Numbers in parentheses represent the number of host spider family records per locality.

This table is based on the following references and communications: Cambra-Torok (2017, pers. comm.); Cambra-Torok et al. (2004); Darby (2017); Dodge (2019); Evans and Yoshimoto (1962); Hurd and Wasbauer (1956); Krombein (1979); Kurczewski (2010); Kurczewski and Edwards (2012); Kurczewski et al. (2017, in preparation); Kurczewski and Kiernan (2015); McCormac (2009); Taulman (2017); Townes (1957); Wasbauer and Powell (1962); 27 insect collection records and 188 online websites.

State	County etc.	Locality	Family	State	County etc.	Locality	Family
AL	Auburn	Auburn	P	AZ	Mohave	Kingman	L
AL	Cullman	Logan	L	AZ	Pima	Green Valley	S
AL	DeKalb	Little River Canyon Preserve	L	AZ	Pima	Tucson	L
AL	Lauderdale	Anderson	L	AZ	Pima	Tucson	S
AL	Lee	Auburn	P	AZ	Pinal	Apache Junction	S
AL	Madison	Madison	L	AZ	Pinal	Maricopa City	L
AL	Montgomery	Montgomery	L	AZ	Pinal	Queen City	L
AL	Montgomery	Montgomery	P	AZ	Pinal	Sun Tan Valley	L
AL	Shelby	Pelham	L	AZ	Santa Cruz		L
AL	Tuscaloosa	Tuscaloosa	L	AZ	Santa Cruz	Patagonia	L
AR	Benton	Bella Vista	L	AZ	Yavapai	Horseshoe Reservoir	S
AR	Benton	Springdale	L	AZ	Yavapai	Montezuma Castle Monument	S
AR	Faulkner	Conway	L (2)	AZ	Yavapai	Prescott Valley	L
AR	Faulkner	Vilonia	L	CA	Alameda	Fremont, Lake Elizabeth	L (3)
AR	Garland	Hot Springs	L	CA	Colusa	Williams	L
AR	Marion	Lead Hill	L	CA	Contra Costa	Antioch	L
AR	Newton		P	CA	Contra Costa	Concord	L
AR	Prairie	DeValls Bluff	L	CA	Contra Costa	Danville	L
AR	Pulaski	Little Rock	L	CA	El Dorado	Placerville	L
AR	Sharp	Evening Shade	P	CA	Fresno	Coalinga	L
AR	Washington	War Eagle Creek	L	CA	Fresno	Fresno	L
AZ	Cochise	Bonnie Blink, Sierra Vista	L	CA	Imperial	Ocotillo	M
AZ	Cochise	San Pedro River, NE of Sierra Vista	L	CA	Kern	Bakersfield	L (2)
AZ	Cochise	Southwest Research Station	L	CA	Kings	Hanford	L
AZ	Cochise	Tombstone	S	CA	Los Angeles	Manhattan Beach	L
AZ	Coconino	Flagstaff	L	CA	Los Angeles	Santa Clarita	L
AZ	Coconino	Williams	L	CA	Los Angeles	Santa Monica	L
AZ	Maricopa	Fountain Hills	S	CA	Orange	Capistrano Beach	S
AZ	Maricopa	Gilbert	S	CA	Orange	Carbon Canyon Regional Park	L
AZ	Maricopa	Gilbert Riparian Reserve	S	CA	Placer	Newcastle	L
AZ	Maricopa	Mesa	L	CA	Riverside	Mecca	M
AZ	Maricopa	Phoenix	L	CA	Riverside	Palm Springs	L
AZ	Maricopa	Tolleson	S	CA	Riverside	Perris	L
				CA	Riverside	Riverside	L

State	County etc.	Locality	Family
CA	Riverside	Temecula	L
CA	Sacramento	Folsom	L
CA	Sacramento	Sacramento	L
CA	San Bernardino	Victorville	L
CA	San Bernardino	Yucca Valley	S
CA	San Diego	Anza-Borrego Desert State Park	S
CA	San Diego	Chula Vista	L
CA	San Diego	Guajome Regional Park	L
CA	San Diego	Julian	S
CA	San Diego	Mission Trails Regional Park	L
CA	San Francisco	San Francisco Bay	L
CA	San Luis Obispo	Atascadero	L
CA	San Luis Obispo	Montana de Oro State Park	L
CA	San Luis Obispo	Paso Robles	L
CA	San Luis Obispo	San Luis Obispo	L
CA	San Luis Obispo	Templeton	L
CA	San Mateo	Portola Valley	L
CA	San Mateo	Redwood City	L
CA	Santa Barbara	Los Padres National Forest	L
CA	Santa Barbara	Santa Barbara	L
CA	Santa Clara	Joseph D. Grant County Park	L
CA	Santa Clara	Los Altos	L
CA	Santa Clara	Milpitas	L (2)
CA	Santa Clara	Morgan Hill	L
CA	Santa Clara	San Jose	L
CA	Shasta	Redding	L
CA	Solano	Suisun/Fairfield	L (2)
CA	Sonoma	Santa Rosa	L
CA	Sonoma	Sonoma	L
CA	Stanislaus	Turlock	L
CA	Tulare	Tulare	L
CA	Tulare	Visalia	L
CO	Arapahoe		L
CO	Broomfield	Broomfield	L (2)
CO	El Paso	Cheyenne Mountain State Park	L

State	County etc.	Locality	Family
CO	El Paso	Colorado Springs	L
CO	Fremont	Cañon City	L
CO	Jefferson	Denver	L (5)
CO	Jefferson	Golden	L
CO	Jefferson	Westminster	L (2)
CO	La Plata	Durango	L (2)
CO	Larimer	Fort Collins	L
CO	Larimer	Loveland	L
CO	Weld	Hudson	L
CO	Weld	Longmont	L
CT	New Haven	New Haven	L
CT	New London	Gales Ferry	P
DE	Kent	Dover	L
DE	Kent	Frederica	L
DE	New Castle	Bear	L
FL	Brevard	Titusville	L
FL	Duval	Jacksonville	L (2)
FL	Leon	Tallahassee	L
FL	Seminole	Sanford	L
GA	Athens-Clarke	Athens	P
GA	Athens-Clarke	Athens	L (2)
GA	Bartow	White	L
GA	Catoosa	Ringgold	L
GA	Cobb	Powder Springs	L
GA	Dawson	Dawsonville	L
GA	Douglas	Douglasville	L
GA	Haralson	Waco	L
GA	Macon-Bibb	Macon	P
GA	Muscogee	Columbus	L
GA	Paulding	Dallas	L
GA	Richmond	Augusta	L
GA	Rockdale	Conyers	L
GA	Walker	Rossville	L
IA	Black Hawk	Waterloo	L
IA	Johnson	Iowa City	L
IA	Linn	Cedar Rapids	L
IA	Plymouth	Broken Kettle Wildlife Refuge	L
IA	Polk	Ankeny	L
IA	Polk	Des Moines	L
ID	Bannock	Pocatello	L
ID	Franklin	Weston	L
IL	Adams	Payson	L
IL	Champaign	Champaign	L

State	County etc.	Locality	Family
IL	Coles	Charleston	L
IL	Cook	Chicago	L
IL	Cook	Glenview	L
IL	DuPage	Winfield	L
IL	Edgar		L
IL	LaSalle	Ottawa	L
IL	Macon	Decatur	L (2)
IL	McDonough	Colchester	L
IL	Tazewell	Pekin	L
IL	Union	Jonesboro	L
IL	Wayne	Fairfield	L
IL	Will	Matteson	L
IL	Williamson	Marion	L
IN	Clark		L (2)
IN	Jackson	Muscatatuck Wildlife Refuge	L
IN	Monroe	Bloomington	L
IN	Newton		L
IN	Vigo		L
IN	Warrick	Newburgh	L
IN	Wayne	North Judson	L
KS	Butler	Towanda	L (2)
KS	Ford	Dodge City	L
KS	Johnson	Lenexa	L
KS	Douglas	Lawrence	L
KS	Leavenworth	Leavenworth	L
KS	Lyon	Emporia	L
KS	Pawnee	Larned	L
KS	Riley	Manhattan	L
KS	Sedgwick	Wichita	L (4)
KS	Shawnee	Topeka	L (2)
KS	Sumner	Wellington	L
KS	Wyandotte	Kansas City	L
KY	Adair	Columbia	P
KY	Allen	Scottsville	L
KY	Calloway	Murray	L
KY	Christian	Hopkinsville	L
KY	Franklin	Frankfort, Cove Spring Park	P
KY	Kenton	Crescent Springs, Fort Mitchell	L
KY	LaRue	Mount Sherman	L
KY	Lawrence	Louisa	L
KY	Shelby	Shelbyville	L

State	County etc.	Locality	Family
LA	Beauregard	De Ridder	P
LA	Calcasieu	Lake Charles	L
LA	Calcasieu	Woodlawn	L
LA	East Baton Rouge	Baton Rouge	L
LA	Lafayette	Acadiana Park Nature Station	P
LA	Lafayette	Lafayette	L
LA	Orleans	New Orleans	L
MA	Plymouth	Brockton	L
MD	Baltimore	Baldwin	L
MD	Charles	Indian Head	L
MD	Frederick	Tuscarora	L
MD	Howard	Waterloo Park	L
MD	Montgomery	Great Falls Park, Potomac	P
MD	Montgomery	Silver Spring	L
MD	Prince George's	Bowie	L
MD	Prince George's	Patuxent River Park	L
MD	Prince George's	Riverdale Park	L
MD	Wicomico	Salisbury	L
MI	Genesee	Montrose	L
MI	Kalamazoo	Portage	L
MI	Kent	Grand Rapids	L
MI	Macomb	Utica	L
MI	Muskegon	Muskegon	L
MI	Ottawa		L
MI	Tuscola	Caro	L
MI	Wayne	Grosse Ile	L
MO	Boone	Columbia	L (2)
MO	Buchanan	St. Joseph	L
MO	Cole	Jefferson City	L (2)
MO	Greene	Springfield	L
MO	Callaway	New Bloomfield	L
MO	Franklin		L
MO	Jackson	Kansas City	L
MO	Jasper	Carthage	L
MO	Miller	Brumley	L
MO	Saint Charles	Wentzville	L
MO	Scott	Caney Creek	L
MO	St. Louis	Powder Valley Nature Center, Kirkwood	L

State	County etc.	Locality	Family
MS	Bolivar	Dahomey National Wildlife Refuge	P
MS	DeSoto	Olive Branch	L
NC	Alamance	Snow Camp	L
NC	Buncombe	Asheville	L (2)
NC	Buncombe	Barnardsville	L
NC	Buncombe	Weaverville	L
NC	Cabarrus	Concord	L
NC	Caswell		L
NC	Chatham	Pittsboro	L
NC	Cumberland	Fayetteville	L (2)
NC	Davidson	Lexington	L
NC	Durham	Chapel Hill	L (2)
NC	Durham	Durham	P (2)
NC	Gaston	High Shoals	L
NC	Gates	Corapeake	L
NC	Henderson	Flat Rock	L
NC	Johnston	Micro	L
NC	Madison	Marshall	L
NC	Mecklenburg	Charlotte	L
NC	Mecklenburg	Davidson	L
NC	Mecklenburg	Mount Holly	L
NC	Orange	Chapel Hill	L (2)
NC	Randolph	Liberty	L
NC	Wake	Apex	L
NC	Wake	Raleigh	L
NC	Warren		L
NC	Watauga	Boone, Turtle Island Preserve	L
NC	Yancey	Burnsville	L
NE	Douglas	Boys Town	L
NE	Douglas	Omaha	L (3)
NE	Johnson	Tecumseh	L
NE	Lancaster	Lincoln	L
NE	Sarpy	Bellevue, Fontenelle Forest	L (2)
NE	Sarpy	Bellevue, Fontenelle Forest	P
NJ	Cape May	Cape May	L
NJ	Gloucester	Gloucester	L
NJ	Hunterdon	Flemington	L
NJ	Hunterdon	Hampton	L
NJ	Mercer	Lawrence Township	L
NJ	Mercer	Trenton	L
NJ	Middlesex	New Brunswick	L

State	County etc.	Locality	Family
NJ	Somerset	Bedminster Township	L
NJ	Somerset	Hillsborough Township	L
NJ	Somerset	Negri-Nepote Grassland Preserve	L (3)
NJ	Union	Mountainside	L
NM	Bernalillo	Albuquerque	L
NM	Bernalillo	Albuquerque	S
NM	Curry	Clovis	L
NM	Doña Ana	Mesilla	L
NM	Doña Ana	White Sands Monument	L
NM	Grant	Pinos Altos	S
NM	Los Alamos	Bandelier National Monument	L
NM	Luna	Deming	L
NM	Otero	Chaparral	L
NM	Otero	Tularosa	L
NM	Rio Arriba	Cañones	L
NM	Sandoval	Bernalillo	L
NM	Santa Fe	Edgewood	L
NM	Santa Fe	Santa Fe	L
NM	Sierra	Caballo	S
NM	Socorro	Cibola National Forest	L
NM	Socorro	San Antonio	L
NV	Clark	Clark County Wetlands Park	L
NV	Clark	Las Vegas	L (2)
NV	Clark	Moapa, Warm Springs Natural Area	L
NV	Clark	Searchlight	S
NV	Nye	Pahrump	L
NV	Nye	Pahrump	S
NV	Washoe	Reno	L
NV	Washoe	Sparks	L
NY	Columbia		L
NY	Columbia	Kinderhook	L
NY	Monroe	Fairport	L
NY	Onondaga	Syracuse, Onondaga Hill	L
NY	Orange	Huguenot	L
NY	Putnam		L
NY	Richmond	Staten Island	L
NY	Rockland	Nyack to Haverstraw Trail	P
NY	Suffolk	Oakdale	L
NY	Tompkins	Ithaca	L

State	County etc.	Locality	Family
NY	Ulster	Kingston	L
NY	Westchester	Peekskill	L
OH	Franklin	Columbus	L
OH	Franklin	Groveport	L
OH	Fulton	Wauseon	L
OH	Gallia		L (2)
OH	Hamilton	Cincinnati	L (2)
OH	Lorain	Oberlin	L
OH	Lucas	Kitty Todd Nature Preserve	L
OH	Lucas	Toledo	L (2)
OH	Montgomery	Dayton	L
OH	Montgomery	Vandalia	L (2)
OH	Scioto	Shawnee State Forest, Nile Twp.	L
OH	Summit	Akron	L
OH	Summit	Cuyahoga Falls	L
OK	Canadian	Yukon	L
OK	Cleveland	Norman	L (3)
OK	Cleveland	Oklahoma City	L (3)
OK	Harper	Laverne	L
OK	McCurtain	Bethel	L
OK	Oklahoma	Choctaw	L
OK	Osage	Fairfax	L
OK	Pottawatomie	Shawnee	L
OK	Texas	Texhoma	L
OK	Tulsa	Owasso	L
PA	Adams		L
PA	Allegheny	Pittsburgh	L (3)
PA	Butler	Butler	L
PA	Crawford	Meadville	L
PA	Erie	Erie, S City Limit	L
PA	Erie	North East	L
PA	Erie	Wintergreen Gorge Cemetery	L
PA	Franklin	Chambersburg	L
PA	Lackawanna	Scranton	P
PA	Lancaster	Lititz	L
PA	Lebanon	Cold Spring Township	L
PA	Montgomery	Lansdale	L
PA	Montgomery	Oreland	L
PA	Washington	Eighty Four	P
PA	Westmoreland	Roaring Run Natural Area	L

State	County etc.	Locality	Family
SC	Blythewood		L
SC	Charleston	Ravenel	L
SC	Greenville	Greenville	P
SC	Greenwood	Greenwood	L
SC	Kershaw	Elgin	P
SC	Lexington	Lexington	L
SC	Oconee	Sumter National Forest	L
TN	Blount	Maryville	L
TN	Coffee	Manchester	L
TN	Cumberland	Crossville	L
TN	Cumberland	Cumberland Mountain State Park	L
TN	Davidson	Nashville	L
TN	DeKalb	Smithville	L
TN	Knox	Knoxville	P
TN	Overton	Standing Stone State Park	L
TN	Sequatchie	Dunlap	L
TN	Sullivan	Kingsport	L
TN	Sumner	Hendersonville	L
TX	Bandera	Bandera	L (2)
TX	Bell	Belton	L
TX	Bexar	Live Oak, City Park	L
TX	Bexar	San Antonio	L (2)
TX	Blanco	Blanco	L (2)
TX	Bowie	New Boston	L
TX	Brewster	Alpine	L (2)
TX	Burnet	Highland Haven	L
TX	Caldwell	Fentress	L
TX	Cameron	Sabal Palm Sanctuary	L
TX	Cherokee	Jacksonville	L
TX	Collin	McKinney	L
TX	Collin	Princeton	L
TX	Coryell	Gatesville	L
TX	Dallas	Cedar Hill State Park	L
TX	Dallas	Coppell, Andy Brown Park	L
TX	Dallas	Dallas	L
TX	Dallas	Garland	L
TX	Dallas	Sunnyvale	L
TX	Denton	Denton	L
TX	Denton	Lewisville	P
TX	Denton	Little Elm	L
TX	Edwards		S

State	County etc.	Locality	Family
TX	Ellis	Midlothian	L
TX	El Paso	El Paso	L (3)
TX	Fort Bend	Cinco Ranch	P
TX	Fort Bend	Richmond	L
TX	Fort Bend	Sugar Land	P
TX	Gaines	Seagraves	L
TX	Grayson	Eisenhower State Park	L
TX	Guadalupe	Seguin	L
TX	Hardin	Lumberton	L
TX	Hardin	Saratoga	P
TX	Harris	Baytown	P
TX	Harris	Houston	P
TX	Harris	Humble, Jesse H. Jones Park	P
TX	Harris	Katy	L
TX	Harris	Spring	L
TX	Harris	Tomball	L
TX	Harrison	Latex	L
TX	Hays	Hays	L
TX	Hays	San Marcos	L
TX	Hidalgo	Edinburg	L
TX	Hill	Hillsboro	L
TX	Hunt	Quinlan	L
TX	Jeff Davis		L
TX	Kendall	Comfort	L
TX	Kendall	Kendalia	L
TX	Kimble	South Llano River State Park	L
TX	Lampasas	Kempner	L
TX	Liberty	Big Thicket	P
TX	Lubbock	Lubbock	L (2)
TX	McLennan	Waco	L (2)
TX	Menard	Menard	L
TX	Montgomery	Montgomery	L
TX	Montgomery	Willis	L
TX	Nacogdoches	Nacogdoches	L
TX	Nueces	Corpus Christi	L
TX	Parker	Cool	L
TX	Parker	Weatherford	L
TX	Presidio	Chinati Mountains Natural Area	L
TX	Smith	Tyler	L
TX	Tarrant	Colleyville	L (2)
TX	Tarrant	Fort Worth, Arcadia Trail Park	L (4)

State	County etc.	Locality	Family
TX	Taylor	Abilene	L (2)
TX	Travis	Austin	L (4)
TX	Travis	Austin, Crystal Downs Cove	L
TX	Travis	Spicewood, Pace Bend Park	L
TX	Uvalde	Uvalde, Cooks Slough Nature Park	L (2)
TX	Val Verde	Del Rio	L
TX	Ward	Wickett	L
TX	Webb	Laredo	L
TX	Wichita	Wichita Falls	L
TX	Williamson	Georgetown	L (2)
TX	Williamson	Round Rock	L
TX	Wilson	Floresville	L
UT	Cache	Logan	L
UT	Davis	Wasatch-Cache National Forest	L
UT	Garfield	Bryce Canyon National Park	L
UT	Juab	Nephi	L
UT	Millard	Kanosh	L
UT	Salt Lake	Salt Lake City	L (2)
UT	Summit	Park City	L
UT	Tooele	Erda, N of Tooele	L
UT	Utah	Provo	L
UT	Wasatch	Heber City	L
UT	Washington	Springdale, Zion National Park	L
UT	Washington	St. George	L (4)
UT	Washington	Washington	L (2)
VA	Albemarle	Charlottesville	L (2)
VA	Augusta	Fishersville	L
VA	Augusta	Shenandoah National Park	L
VA	Botetourt	Eagle Rock	L
VA	Buchanan	Grundy	L
VA	Chesterfield	Richmond	L (2)
VA	Chesterfield	Huguenot	L
VA	Clarke	Berryville	L
VA	Fairfax	Alexandria	L
VA	Fairfax	Chantilly	L
VA	Fairfax	Great Falls Park	L
VA	Fairfax	Lorton	L
VA	Frederick	Winchester	L
VA	Greenville	Skippers	L

State	County etc.	Locality	Family
VA		Hampton	L
VA	Hanover	Montpelier	L
VA	Henrico	Glen Allen	L
VA	Loudon	Leesburg	L
VA	Loudon	Sterling	L
VA	Montgomery	Blacksburg	L
VA	Montgomery	Radford, Wildwood Park	L
VA	Prince William	Bristow	L
VA	Prince William	Ocoquan Bay National Wildlife Reserve	L
VA	Prince William	Prince William Forest Park	L
VA	Pulaski	Draper	L
VA	Rappahannock	Sperryville	P
VA	Rockingham	Dayton	L
VA	Rockingham	Rockingham	L
VA	Shenandoah	Woodstock	L
VT	Addison	Middlebury	L
WI	Dane	Madison	L
WI	La Crosse	Onalaska	P
WI	Milwaukee	Milwaukee	L
WV	Berkeley	Martinsburg	L
WV	Braxton	Flatwoods	L
WV	Cabell	Green Bottom Wildlife Area	L
WV	Greenbrier	Ronceverte	P (2)
WV	Kanawha	Charleston	L
WV	Monongalia	Morgantown	L
WV	Morgan	Hancock	L
WV	Nicholas	Kessler's Cross Lanes	P
WV	Putnam	Hurricane	L
WV	Randolph	Elkins	L
WV	Upshur	Ruraldale	L
Canada	Ontario	Guelph	L
Canada	Ontario	Kingsville	L (3)
Canada	Ontario	Niagara Falls	L
Canada	Ontario	Pelee Island	L
Canada	Ontario	Toronto, East York Borough	L
Mexico	Baha California N	Mexicali	L
Mexico	Baha California Sur	Parque Nacional Cabo Pulmo	S
Mexico	Chihuahua	Ciudad Juárez	S
Mexico	Chihuahua	Namiquipa, Cruces	L

State	County etc.	Locality	Family
Mexico	Chihuahua	Manuel Benavides	L
Mexico	Chiapas	Chiapa de Corzo	T
Mexico	Coahuila	Ocampo	L
Mexico	Coahuila	Zaragoza	S
Mexico	Durango	Ciudad Lerdo	S
Mexico	Durango	Parque Estatal Cañón de Fernández	S
Mexico	Guanajuato	Celaya	T (2)
Mexico	Jalisco	Mascota	T
Mexico	Jalisco	Tequila	C
Mexico	Jalisco	Yelapa	S
Mexico	México	Bosque de Tlalpan, Mexico City	T
Mexico	México	Mexico City	L
Mexico	México	Mexico City	Z (2)
Mexico	México	Santa María, Apaxco	T
Mexico	México	Santa María, Apaxco	C
Mexico	México	Tepotztlán	T
Mexico	México	Tepotztlán, San Mateo Xoloc	C
Mexico	México	Tlalnepantla de Baz	T
Mexico	Michoacán	Morelia	L
Mexico	Michoacán	Morelia	S
Mexico	Michoacán	Morelia	L
Mexico	Morelos	Tepotztlán	Z
Mexico	Nuevo León	Montemorelos	S
Mexico	Nuevo León	Monterrey, Guadalupe	S
Mexico	Nuevo León	Monterrey, Parque Ecológico Chipinque	S
Mexico	Oaxaca	Huautla de Jiménez Municipality	T
Mexico	Puebla	Amozoc de Mota	C
Mexico	Puebla	Cuatinchán	T
Mexico	Puebla	Zihuateutla	T
Mexico	Puebla	Near Zihuateutla	T
Mexico	Querétaro	El Llano	L
Mexico	Querétaro	Saldarriaga	L
Mexico	San Luis Potosi	San Luis Potosi	L
Mexico	Sonora	Cajon Bonito, Rancho El Pinito	L
Mexico	Sonora	Nogales	L
Mexico	Sonora	Rancho Las Anitas	L
Mexico	Sonora	San Luis Rio Colorado	L
Mexico	Tamaulipas	Ejido El Ebano	L
Mexico	Veracruz	Coatepec	T

State	County etc.	Locality	Family
Mexico	Veracruz	Orizaba	T
Mexico	Veracruz	Xico	T
Mexico	Yucatán	Mérida	L
Nicaragua	Managua	Chiltepe Peninsula Reserve	T
Costa Rica	Alajuela	Los Chiles	T
Costa Rica	Cartago	Paraíso	C
Costa Rica	Cartago	Trey Rios	T
Costa Rica	Guanacaste	Nuevo Arenal	T
Costa Rica	Limón	Suerre	C
Costa Rica	Puntarenas	Las Cruces Biological Station	C
Costa Rica	Puntarenas	Monteverde Cloud Forest	T
Costa Rica	Puntarenas	Monteverde Biological Reserve	T (5)
Costa Rica	Puntarenas	Parque Nacional Corcovado	T
Costa Rica	San José	San Isidro	T
Costa Rica	San José	San José	T
Costa Rica	San José	San Marcos	T
Panama	Chiriquí	Boquet	T
Panama	Colón	Donoso	C
Panama	Colón	Villa Guadalupe	T
Panama	Panamá	Chorrera, Rio Perequete	C
Panama	Panamá	Panama City	T
Panama	Panamá	Sorá	C
Colombia	Antioquia	Cisneros	C
Colombia	Antioquia	Envigado	L

State	County etc.	Locality	Family
Colombia	Antioquia	Guarne	L
Colombia	Antioquia	Retiro	L
Colombia	Antioquia	Valle de Aburrá	C
Colombia	Boyacá	Villa de Leyva	L
Colombia	Capital	Bogotá	L
Colombia	Capital	Bogotá	C
Colombia	Cundinamarca	Pasca	C
Colombia	Cundinamarca	San Antonio del Tequendama	C
Colombia	Cundinamarca	Villa de San Diego de Ubaté	C
Colombia	Huila	Tarqui	C
Colombia	La Guajira	Fonseca	L
Colombia	Magdalena	Ciudad Perdida	C (2)
Colombia	Magdalena	Minca	C
Colombia	Magdalena	Santa Marta	C (2)
Colombia	Quinidío	Calarcá	C
Colombia	Risaralda	Pereira City	C (2)
Colombia	Santander	Barichara	C
Colombia	Valle del Cauca	Cali	C
Colombia	Valle del Cauca	Dagua	C
Colombia	Valle del Cauca	La Castilla	C
Colombia	Valle del Cauca	Reserva Natural de San Cipriano	C
Venezuela	Guárico	Masaguaral Biological Reserve	C

Table 2. Host spider family records for *Tachypompilus ferrugineus*. Host spider family records are arranged regionally and alphabetically by country, region, district, arrondissement, state, province, department, municipality, county or parish, and locality. Abbreviations for host spider families: L, Lycosidae; T, Trechaleidae; P, Pisauridae; C, Ctenidae; Z, Zoropsidae; A, Agelenidae; S, Sparassidae. Numbers in parentheses represent the number of host spider family records per locality.

This table is based on the following references and communications: Allred (2009); Cambra-Torok et al. (2004); Chiri (2017); Evans (1950, 1951); Evans and Yoshimoto (1962); Krombein (1979); Kurczewski (1981, 1989, 1990, 2010); Kurczewski and Edwards (2012); Kurczewski et al. (2017, in preparation); Kurczewski and Kiernan (2015); Kurczewski and Kurczewski (1968, 1973); Rau (1922); Rau and Rau (1918); Strandtmann (1953; Waichert (2019, pers. comm.); Wahis (1993); Wasbauer (1982); Wasbauer and Kimsey (1985); Wilson and Pitts (2007); 27 insect collection records and 188 online websites.

State	County etc.	Locality	Family
AL	Baldwin	Meaher State Park	P
AL	Crenshaw	Dozier, Patsaliga River Tract	P
AL	Crenshaw	Luverne	P
AL	DeKalb	Mentone	L
AL	Elmore	Eclectic	P
AL	Jackson	Scottsboro	L
AL	Jackson	Scottsboro	P
AL	Jefferson	Birmingham	L (3)
AL	Lauderdale	Anderson	P
AL	Lee	Auburn	L
AL	Madison	Huntsville	P
AL	Mobile	Mobile	L
AL	Mobile	Mobile	P
AL	Mobile	Saraland	L
AL	Montgomery	Montgomery	L (6)
AL	Montgomery	Montgomery	P
AL	Tuscaloosa	Tuscaloosa	L (2)
AL	Tuscaloosa	Northport	P
AR	Baxter	Norfolk Lake	P
AR	Benton	Springdale	L
AR	Benton	Rogers	P
AR	Carroll	Berryville	L
AR	Craighead	Jonesboro	L (2)
AR	Craighead	Jonesboro	P
AR	Faulkner	Conway	L
AR	Faulkner	Conway	P
AR	Faulkner	Vilonia	L
AR	Garland	Hot Springs	L
AR	Johnson	Hagarville	L
AR	Johnson	Ozark National Forest	P
AR	Lonoke	Cooper Lake, Kia Kima Reservation	P
AR	Newton		L
AR	Phillips	Lexa	L

State	County etc.	Locality	Family
AR	Pulaski	Little Rock	P
AR	Pulaski	Sherwood	P
AR	Searcy	Ozark Mountains	L
AR	Sebastian	Barling	L
AR	Washington	Fayetteville	L
CO	Arapahoe	Cherry Creek Lake Recreation Area	L
CO	Arapahoe	Littleton	L
CO	Boulder	Boulder	L (6)
CO	Boulder	Boulder	A
CO	Boulder	Eldorado Springs	L (2)
CO	Boulder	Longmont	L
CO	Boulder	Lyons	L (2)
CO	Boulder	North Boulder	L
CO	Boulder	South Mesa Trail	L
CO	Denver	Denver	L (2)
CO	El Paso	Colorado Springs	L
CO	Jefferson	Golden	L (2)
CO	Jefferson	Golden	A
CO	Jefferson	Red Rocks Park	L (2)
CO	La Plata	Durango	L
CO	Larimer	Bobcat Ridge Natural Area	L
CO	Larimer	Fort Collins	L
CT	Fairfield	Westport	P
CT	New Haven	Hamden	L
CT	New Haven	Seymour	L
CT	New London	Ledyard	L
CT	New London	Mystic	P
DC	District of Columbia	Washington	P
DE	Kent	Dover	P
DE	New Castle	Bear	L
DE	New Castle	Middletown	L
FL	Alachua	Archer	L

State	County etc.	Locality	Family
FL	Alachua	Archer	P
FL	Alachua	Gainesville	P (14)
FL	Alachua	Gainesville	L (8)
FL	Alachua	Hawthorne	L
FL	Alachua	High Springs	P
FL	Alachua	Newberry	L
FL	Bay	Lynn Haven – Youngstown	P
FL	Bradford	Brooker	L
FL	Bradford	Starke	L
FL	Broward	Coral Springs	L
FL	Broward	Fort Lauderdale	P
FL	Broward	Weston	P
FL	Charlotte	Lemon Bay Conser- vancy Preserve	L
FL	Citrus	Hernando	L
FL	Citrus	Homosassa	L
FL	Clay	Keystone Heights	P
FL	Clay	Orange Park	L
FL	Collier	Naples	L
FL	Dade	Homestead	L
FL	Dixie	Old Town	L
FL	Duval	Jacksonville	L (3)
FL	Duval	Jacksonville	P
FL	Escambia	Pensacola	L
FL	Gilchrist	Trenton	P
FL	Hamilton		L
FL	Hernando	Spring Hill	S
FL	Highlands	Archbold Biological Station	L (2)
FL	Hillsborough	Plant City	S
FL	Hillsborough	Ruskin	L
FL	Indian River	Vero Beach	L
FL	Lake	Lady Lake	L
FL	Lee	Lehigh Acres	L
FL	Leon	Felkel	P
FL	Levy	Cedar Keys Wildlife Reserve	L (3)
FL	Levy	Chiefland	P
FL	Liberty	Bristol, Apalachicola National Forest	L
FL	Manatee	Sun City	L
FL	Manatee	Terra Ceia Preserve	L
FL	Marion	Ocala	L (3)
FL	Marion	Ocala	S

State	County etc.	Locality	Family
FL	Marion	Silver Springs	P
FL	Martin	Palm City	L
FL	Miami-Dade	Miami	L
FL	Monroe	Big Pine Key	L (2)
FL	Monroe	Lignumvitae Botanic State Park	L
FL	Monroe	Tavernier	L
FL	Okaloosa	Crestview	L
FL	Okaloosa	Destin	L
FL	Okaloosa	Fort Walton Beach	L
FL	Okeechobee	Okeechobee	L
FL	Orange	Apopka	L (2)
FL	Orange	Apopka	P
FL	Orange	Belle Isle	P
FL	Orange	Ocoee	L
FL	Orange	Orlando	L (2)
FL	Osceola	Kissimmee	L
FL	Palm Beach	Lake Worth	L
FL	Palm Beach	Boca Raton	L
FL	Pasco	Dade City	P (2)
FL	Pasco	Elfers	P
FL	Pinellas	Largo	P
FL	Pinellas	St. Petersburg	L
FL	Pinellas	Tierra Verde, Fort De Soto Park	S
FL	Polk	Davenport	L
FL	Polk	Lakeland	L
FL	Polk	Loughman	L
FL	Putnam	Ocala National Forest	L
FL	Putnam	Ordway-Swisher Biological Station	L
FL	Sarasota	North Port	S
FL	Seminole	Little Big Econ State Forest	L
FL	St. Johns	Crescent Beach	S
FL	St. Johns	St. Augustine	L
FL	St. Johns	St. Augustine Beach	L
FL	St. Lucie	Port St. Lucie	L (2)
FL	Volusia	Deltona	L
FL	Volusia	New Smyrna Beach	P (2)
FL	Wakulla	Crawfordville	L
GA	Athens-Clarke	Athens	P (2)
GA	Athens-Clarke	Athens	L
GA	Athens-Clarke	Athens, Ben Burton Park	P

State	County etc.	Locality	Family
GA	Bulloch	Portal	L
GA	Butts	Jackson	P
GA	Camden	Kingsland	L
GA	Carrroll	Bowdon	L
GA	Chatham	Savannah	P (2)
GA	Cherokee	Holly Springs	L
GA	Cobb	Austell	L
GA	Cobb	16 km NW Atlanta	P
GA	Cobb	Marietta	L
GA	Coffee	Nicholls	L
GA	Crawford	Roberta	L
GA	Decatur	Bainbridge	L
GA	DeKalb	Stone Mountain Park	P
GA	Dougherty	Albany	L
GA	Douglas	Winston, Moccasin Lake	L
GA	Fannin	Blue Ridge	P
GA	Fayette	Fayetteville	L
GA	Floyd	Rome	P
GA	Fulton	Atlanta	L (3)
GA	Fulton	Atlanta	P (2)
GA	Fulton	College Park	L
GA	Glynn	Brunswick	P (2)
GA	Glynn	Jekyll Island	P
GA	Gwinnett	Peachtree Corners	P
GA	Hall	Gainesville	P
GA	Harris		P
GA	Harris	Hamilton	P
GA	Henry	Hampton	L
GA	Lanier	Lakeland	L
GA	Laurens	Rentz	P
GA	McDuffie	Thomson	P
GA	Morgan	Madison	L
GA	Muscogee	Columbus	L
GA	Newton	Covington	L (3)
GA	Oglethorpe	Wolfskin District	P
GA	Oglethorpe	Wolfskin District	L
GA	Richmond	Augusta	L
GA	Richmond	Augusta	P
GA	Tift	Tifton	L
GA	Walker	Chickamauga	L (2)
GA	Walton	Social Circle	L
IA	Mills	Glenwood	L
IA	Polk	Des Moines	L

State	County etc.	Locality	Family
IA	Polk	Johnston	P (2)
IA	Scott	Davenport	L
IA	Sioux	Orange City	L
IA	Woodbury	Sloan	L
IL	Champaign	Champaign	L
IL	Cook	Chicago	L
IL	Cook	Evanston	L
IL	Cook	Homewood – Flossmoor	L
IL	Crawford	Robinson	L
IL	Henry	Coal Valley	L
IL	Iroquois	Sheldon	L
IL	Lake	Long Grove	L
IL	Lake	Waukegan	L
IL	Peoria	Peoria Heights	L
IL	Stark	Wyoming	L
IL	Union	Wolf Lake	P
IL	Washington	Nashville	L
IL	White	Norris City	L
IL	Whiteside	Rock Falls	L
IN	Clark	Jeffersonville	L
IN	Decatur	Greensburg	L
IN	Delaware	Muncie	L
IN	Floyd	New Albany	L
IN	Greene	Bloomfield	L
IN	Henry	Middletown	L
IN	Howard	Kokomo	L (2)
IN	Marion	Indianapolis	L (2)
IN	Monroe	Hindustan	P
IN	Monroe	Van Buren Township	L
IN	Owen	Spencer	P
IN	Warrick	Newburgh	L
IN	Wayne	North Judson	L
KS	Brown	Powhattan	L
KS	Butler	Andover City	L
KS	Butler	Augusta	L
KS	Cowley	Winfield	L
KS	Douglas	Lawrence	L
KS	Gray		L
KS	Johnson	Lenexa	L
KS	Leavenworth	Leavenworth	L
KS	Ottawa		L
KS	Pottawatomie	Blackjack Creek	L
KS	Pottawatomie	Blackjack Creek	P

State	County etc.	Locality	Family
KS	Pottawatomie	Manhattan	L(2)
KS	Riley	Konza Prairie Biological Station	L
KS	Saline	Salina	L
KS	Sedgwick	Clearwater	L
KS	Sedgwick	Wichita	L (7)
KS	Shawnee	Flint Hills	L
KS	Shawnee	Tecumseh	L
KS	Shawnee	Wakarusa	L
KY	Bullitt	Clermont, Bernheim Research Forest	P
KY	Bullitt	Shepherdsville	L
KY	Calloway	Murray	L
KY	Casey	Liberty	L
KY	Christian	Hopkinsville	P
KY	Christian	Hopkinsville	L
KY	Christian	Oak Grove	L
KY	Edmonson	Brownsville	P
KY	Floyd		L
KY	Jefferson	Louisville	L (4)
KY	Lincoln	Eubank	L
KY	Marshall	Benton	L
KY	McCreary	Stearns	L
KY	Meade	Payneville	L
KY	Mercer	Harrodsburg	L
KY	Powell	Stanton	P
KY	Warren	Bowling Green	L
LA	Ascension	Prairieville	P
LA	Beauregard	De Ridder	L
LA	Beauregard	Longville	L
LA	Calcasieu	Lake Charles	P
LA	De Soto	Logansport	L
LA	E Baton Rouge	Baton Rouge	L
LA	Jefferson	Gretna	L
LA	Jefferson	Kenner	L
LA	Jefferson Davis	China	L
LA	Natchitoches	Natchitoches	P
LA	Orleans	New Orleans	L (3)
LA	St. James	Vacherie	L
LA	St. Landry	Lawtell	L
LA	St. Tammany	Mandeville	L
LA	Tangipahoa	Hammond	L
LA	Vermilion	Maurice	L

State	County etc.	Locality	Family
MA	Berkshire	Stockbridge	L
MA	Dukes	Oaks Bluffs	L
MA	Essex	Amesbury	L
MA	Middlesex	Hopkinton	P
MA	Middlesex	Malden	L
MA	Norfolk	Charlestown	L
MA	Suffolk	Brighton/Boston	L
MD	Allegany	Rocky Gap State Park	L (2)
MD	Anne Arundel	Fairhaven	L
MD	Anne Arundel	Glen Burnie	L
MD	Anne Arundel	Pasadena, Fort Smallwood Park	L
MD	Baltimore	Baltimore	L (2)
MD	Baltimore	Baltimore	P
MD	Baltimore	Owing Mills	L
MD	Baltimore	Reisterstown	L
MD	Baltimore	White Marsh	L
MD	Calvert	Lusby	L
MD	Caroline		L
MD	Carroll	Keymar	P
MD	Cecil	Charlestown	P
MD	Cecil	Elkton	L
MD	Cecil	Fair Hill	P
MD	Frederick	Frederick	L (2)
MD	Frederick	Frederick	P
MD	Frederick	Myersville	P
MD	Frederick	Thurmont	L
MD	Harford	Aberdeen	L
MD	Harford	Bel Air	L
MD	Harford	Jarrettsville	L
MD	Howard	Elkridge	P
MD	Howard	Woodstock	L
MD	Montgomery	Great Falls Park	P
MD	Montgomery	Olney	P
MD	Montgomery	Silver Spring	L
MD	Prince George's	Bowie	L
MD	Prince George's	Laurel	L
MD	Prince George's	Temple Hills	P
MD	Queen Anne's	Kent Island	L
MD	Queen Anne's	Stevensville	P
MD	St. Mary's	California	L

State	County etc.	Locality	Family
MD	Washington	Hagerstown	L (2)
MD	Wicomico	Salisbury	L
ME	Penobscot	Bangor	L
ME	Somerset	Fairfield	L
MI	Allegan	Allegan	L
MI	Cass	Cassopolis	L
MI	Clinton	East Lansing	L
MI	Genesee	Flushing	L
MI	Kalamazoo	Kalamazoo	P
MI	Kent	Lowell	P
MI	Kent	Sparta	P
MI	Macomb	Clinton	P
MI	Macomb	Sterling Heights	L
MI	Monroe	Dundee	L
MI	Muskegon	Muskegon	L
MI	Oakland	Northville	P
MI	Oakland	White Lake	P
MI	St. Joseph	Three Rivers	P
MI	Washtenaw	Ann Arbor	P
MI	Washtenaw	Ypsilanti	L
MI	Wayne	Livonia	P
MN	Dakota	Katherine Ordway Natural Area	P
MN	Hennepin	Minneapolis	L
MO	Andrew	Savannah	L (5)
MO	Boone	Harrisburg	L
MO	Boone	Columbia	L
MO	Cape Girardeau	Jackson	L
MO	Cole	Jefferson City	P
MO	Douglas	Zenda	L
MO	Gasconade	Owensville	L
MO	Greene	Springfield	L (2)
MO	Jackson	Kansas City	L (2)
MO	Jasper	Carl Junction	L
MO	Jefferson	Arnold	L (4)
MO	Lafayette	Odessa	L
MO	Osage	Westphalia	P
MO	Platte	Platte Woods, Weatherby Lake	P
MO	St. Charles	Wentzville	L
MO	St. Louis	Kirkwood	L
MO	St. Louis	St. Louis	P
MO	St. Louis	St. Louis	L (3)

State	County etc.	Locality	Family
MS	Jackson	Ocean Springs	L
MS	Lee/Prentiss	Baldwyn	L
MS	Lee	Longville	P
MS	Lee	Tupelo	P
MS	Oktibbeha	Longview	P
MS	Pearl River	Picayune	P
MS	Prentiss	Marietta	P
MS	Washington	Greenville	L
NE	Douglas	Omaha	L (2)
NE	Douglas	Omaha	P (2)
NE	Lancaster	Firth	L
NE	Lancaster	Hickman	L
NE	Lancaster	Lincoln	L
NE	Sarpy	Bellevue	P
NE	Scotts Bluff	Scottsbluff	L
NC	Alamance	Burlington	L
NC	Alamance	Snow Camp	L
NC	Beaufort	Belhaven	L
NC	Brunswick	Bald Head Island	P
NC	Brunswick	Leland	L
NC	Brunswick	Shalotte	P
NC	Buncombe	Asheville	L
NC	Buncombe	Weaverville	L
NC	Cabarrus	Concord	L
NC	Cabarrus	Kannapolis	L
NC	Caldwell	Granite Falls	L
NC	Carteret	Pine Knoll Shores	P
NC	Chatham	Pittsboro	P
NC	Chatham	Jordan Lake State Forest	P
NC	Cumberland	Eastover	L
NC	Cumberland	Fayetteville, Cape Fear River	P
NC	Dare	Buxton, Hatteras Island	L
NC	Dare	East Lake	P
NC	Dare	Nag's Head	L
NC	Dare	Nag's Head	P (2)
NC	Davidson	Lexington	L
NC	Durham	Durham	L
NC	Durham	Durham	P (2)
NC	Franklin	Youngsville	L
NC	Gates	Corapeake	L
NC	Guilford	Greensboro	P

State	County etc.	Locality	Family
NC	Guilford	Oak Ridge	L (2)
NC	Henderson	Flat Rock	L
NC	Henderson	Flat Rock	P
NC	Henderson	Hendersonville	L
NC	Lincoln	Lincolnton	L (3)
NC	Madison	Marshall	L
NC	McDowell	Nebo. Lake James State Park	P
NC	Mecklenburg	Charlotte	L (2)
NC	Mecklenburg	Huntersville	L
NC	Mecklenburg	Mint Hill	P
NC	Moore	Southern Pines	P
NC	New Hanover	Wilmington	L (3)
NC	New Hanover	Wilmington	P (2)
NC	Onslow	Hubert	P
NC	Onslow	Jacksonville	L
NC	Orange	Cedar Grove	L
NC	Orange	Chapel Hill	L (4)
NC	Pasquotank	Elizabeth City	L
NC	Pender	Hampstead	P
NC	Robeson	Lumberton	P
NC	Stanly	Locust	L
NC	Swain	Bryson City	L
NC	Wake	Apex	L (3)
NC	Wake	Fuquay-Varina	L
NC	Wake	Holly Springs	P
NC	Wake	New Hill, Harris Lake	L
NC	Wake	Raleigh	P
NC	Wake	William B. Umstead State Park	P
NC	Wake	Wendell	P
NC	Watauga	Blowing Rock	P
NH	Hillsborough	Bedford	L
NJ	Atlantic	Egg Harbor Township	L
NJ	Atlantic	Elwood	L
NJ	Atlantic	Mullica Township, E of Hammonton	L
NJ	Bergen	Meadowlands Nature Area	L (2)
NJ	Bergen	Rochelle Park	L
NJ	Bergen	Wallington	P
NJ	Burlington	Browns Mills	L (2)
NJ	Burlington	Chatsworth	P
NJ	Burlington	Columbus	L
NJ	Burlington	Kinkora	L

State	County etc.	Locality	Family
NJ	Burlington	Medford	P
NJ	Burlington	Marlton	P
NJ	Camden	Collingswood	P
NJ	Cape May	Cape May	L
NJ	Cape May	Tuckahoe	L
NJ	Gloucester	West Deptford Township	L
NJ	Hunterdon	Annandale	L
NJ	Hunterdon	Flemington	L
NJ	Hunterdon	Raritan Township	L
NJ	Mercer	Ewing Township	P
NJ	Mercer	Titusville	L
NJ	Middlesex	Edison	L (2)
NJ	Middlesex	Old Bridge	L
NJ	Monmouth	Cream Ridge	L
NJ	Monmouth	Matawan	L (3)
NJ	Monmouth	Red Bank	L
NJ	Morris	Budd Lake	L
NJ	Morris	Succasunna	L
NJ	Ocean	Barnegat Light	L
NJ	Somerset	Somerset near Highland Park	L
NJ	Warren	Asbury	L
NJ	Warren	Mansfield	L
NY	Albany	Cohoes	L
NY	Allegany	Alfred	L
NY	Broome	Endicott	L
NY	Broome	Vestal	P
NY	Cayuga	Auburn	L
NY	Chautauqua	Jamestown	L
NY	Columbia	Livingston	P
NY	Duchess	Tivoli	L
NY	Genesee	LeRoy	L
NY	Monroe	Webster	P
NY	Montgomery	Amsterdam	P
NY	Onondaga	Jamesville, Clark Reservation	L (2)
NY	Onondaga	Syracuse, Oakwood Cemetery	L (8)
NY	Otsego	Mount Vision	L
NY	Saratoga	Lake Luzerne	L
NY	St. Lawrence	Cranberry Lake Biological Station	P
NY	Suffolk	Fort Salonga, near Smithtown	P

State	County etc.	Locality	Family
NY	Suffolk	Sayville	L
NY	Tompkins	Ithaca	L
NY	Tompkins	Lansing	L
NY	Warren	North Creek	L
NY	Warren	Queensbury	L (2)
OH	Adams	Edge of Appalachia Preserve	L
OH	Ashtabula	Geneva	P
OH	Ashtabula	North Kingsville	P
OH	Athens	Athens	L (2)
OH	Clark	Springfield	L
OH	Cuyahoga	Bay Village	P
OH	Cuyahoga	Cleveland	P
OH	Cuyahoga	Broadway Heights	L
OH	Franklin	Columbus	L
OH	Franklin	Dublin	L
OH	Fulton	Delta	L
OH	Fulton	Wauseon	L
OH	Gallia		L
OH	Hamilton	Cincinnati	L (2)
OH	Hamilton	Cincinnati	P (2)
OH	Harrison	Adena	L
OH	Huron	Norwalk	P
OH	Jefferson	Jefferson State Park	P
OH	Lake	North Madison	L
OH	Lake	Painesville	L
OH	Licking	Newark	L
OH	Mercer	Fort Recovery	L
OH	Montgomery	Moraine	P
OH	Ottawa	Marblehead	P
OH	Ottawa	Oak Harbor	P
OH	Portage	Ravenna	L
OH	Ross	Chillicothe	P
OH	Scioto	Shawnee State Forest	P
OH	Summit	Twinsburg	P
OK	Bryan	Durant	L
OK	Canadian	El Reno	L
OK	Cleveland	Lexington Wildlife Mgt. Area	L
OK	Cleveland	Norman	L (2)
OK	Comanche	Wichita Mountains Wildlife Refuge	L
OK	Creek	Stroud	L
OK	Garvin	Paoli	P

State	County etc.	Locality	Family
OK	Garvin	Paul's Valley	L
OK	Latimer	Wilburton	P
OK	Lincoln	Prague	L (2)
OK	Logan	Guthrie	P
OK	Marshall	Kingston	L
OK	Marshall	Willis	L
OK	Mayes	Pryor	L
OK	Noble	Red Rock	L
OK	Oklahoma	Newalla	L
OK	Oklahoma	Oklahoma City	L (3)
OK	Rogers	Claremore	L
OK	Rogers	Inola	L
OK	Sequoyah	Vian	L
OK	Tulsa	Broken Arrow	L
OK	Tulsa	Skiatook	L
OK	Tulsa	Tulsa	L (3)
OK	Wagoner	Broken Arrow	L
OK	Wagoner	Stonebluff	L
PA	Allegheny	Clairton	L
PA	Allegheny	Monroeville	L
PA	Allegheny	Pittsburgh	L
PA	Allegheny	Pittsburgh	P
PA	Allegheny	Sewickley	L
PA	Armstrong	Kittanning	L
PA	Beaver	Beaver	L
PA	Bedford	Schellsburg	L
PA	Berks	Blue Marsh Lake	L
PA	Berks	Reading	L (2)
PA	Bucks	Buckingham	P
PA	Bucks	Haycock Township	L
PA	Bucks	Pipersville, Ralph Stover State Park	L
PA	Bucks	Quakertown	L (2)
PA	Centre	State College	L
PA	Chester	Phoenixville	L
PA	Chester	Phoenixville	P
PA	Erie	Presque Isle State Park	L
PA	Erie	Presque Isle State Park	P
PA	Fayette	Dawson	P
PA	Fayette	Redstone Township	L
PA	Lebanon	Annville	L
PA	Lehigh	Allentown	L

State	County etc.	Locality	Family
PA	Lycoming	Williamsport	L
PA	Philadelphia	Philadelphia	P
PA	Washington	Charleroi	L
PA	Washington	Coal Center	L
PA	Westmoreland	Champion, Roaring Run Park	L
PA	Westmoreland	Irwin	L
PA	Wyoming	Mehoopany	L
PA	York	Fawn Grove	L
RI	Newport	Sachuest Point Wildlife Refuge	L
SC	Aiken	Aiken	L
SC	Anderson	Belton	L
SC	Anderson	Honea Path	L
SC	Beaufort	Fripp Island	P
SC	Beaufort	Lady's Island	L
SC	Charleston	Charleston	P
SC	Charleston	Edisto Island	L
SC	Charleston	Ravenel	P (2)
SC	Charleston	Seabrook Island	L
SC	Cherokee	Chesnee	L
SC	Chester	Chester	P
SC	Dorchester	Summerville	L (2)
SC	Florence	Coward	L
SC	Georgetown		L
SC	Greenville	Duncan	L
SC	Greenville	Greenville	P
SC	Horry	Myrtle Beach	L
SC	Oconee	Seneca	P
SC	Orangeburg	Orangeburg	L
SC	Orangeburg	Santee	P (2)
SC	Pickens	Pickens	P
SC	Richland	Columbia	L
SC	Richland	Columbia	P (3)
SC	Richland	Harbison State Forest	P
SC	Sumter	Rembert	L
SC	York	Rock Hill	P
TN	Anderson	Claxton	P
TN	Bedford	Unionville	L
TN	Carter	Elizabethton	L
TN	Cocke	Cosby	P
TN	Davidson	Brentwood	L
TN	Davidson	Nashville	L (6)
TN	Dickson	Dickson	L

State	County etc.	Locality	Family
TN	Knox	Knoxville	P
TN	Montgomery	Clarksville	L
TN	Sevier	Gatlinburg, Elkmont Campground	L
TN	Sevier	Sevierville	P
TN	Shelby	Memphis	L
TN	Smith	Chestnut Mound	L
TN	Smith	Enigma	L
TN	Sullivan	Kingsport, Warriors' Path State Park	L
TN	Sumner	Hendersonville	P
TN	Unicoi	Unicoi	P
TN	Washington	Jonesborough	L
TN	Washington	Watauga	L
TN	Williamson	Spring Hill	L
TN	Wilson	Lebanon	L (2)
TN	Wilson	Mount Juliet	P
TX	Anderson	Tennessee Colony	L
TX	Atascosa	Pleasanton	L
TX	Atascosa	Poteet	L
TX	Bastrop	Bastrop	L (2)
TX	Bastrop	Elgin	L
TX	Bastrop	Red Rock	L
TX	Bastrop	Red Rock	P
TX	Bastrop	String Prairie	L
TX	Bell	Killeen, Fort Hood	L
TX	Bell	Salado	L
TX	Bell	Temple	L
TX	Bexar	Adkins	L
TX	Bexar	Converse	L
TX	Bexar	Helotes	L
TX	Bexar	Mitchell Lake Nature Center	L
TX	Bexar	San Antonio	L (12)
TX	Bexar	Von Ormy	L
TX	Blanco	Blanco	L (4)
TX	Blanco	Johnson City	L
TX	Blanco	Round Mountain	L
TX	Bowie	Nash	L
TX	Brazoria	Brazoria	L
TX	Brazoria	Freeport	L
TX	Brazoria	Pearland	P
TX	Brazos	Bryan	L
TX	Brazos	College Station	L (3)

State	County etc.	Locality	Family
TX	Brewster	Terlingua, Big Bend National Park	Z
TX	Brown	Brownwood, Brownwood State Park	L (2)
TX	Burnet	Lake Travis	L
TX	Caldwell	Lockhart	L (3)
TX	Caldwell	Luling	L
TX	Caldwell	Pettytown	L
TX	Cameron	Brownsville	L
TX	Cameron	South Padre Island	L
TX	Chambers	Lake Charlotte	P
TX	Collin	Fairview	P
TX	Collin	Lavon, Lavonia Park	L
TX	Collin	McKinney	L
TX	Collin	Nevada	L (2)
TX	Collin	Princeton	L
TX	Collin	Wylie	L (2)
TX	Comal	Canyon Lake	L
TX	Comal	New Braunfels	P
TX	Comal	Spring Branch	L
TX	Comanche	Comanche	L
TX	Cooke	Gainesville	P
TX	Dallas	Dallas	L (6)
TX	Dallas	Garland	L
TX	Dallas	Garland	P (2)
TX	Dallas	Irving	L
TX	Dallas	Lancaster	L
TX	Dallas	Grand Prairie	L
TX	Denton	Bartonville	L
TX	Denton	Denton	L (2)
TX	Denton	Flower Mound	L
TX	Denton	Grapevine Lake	L
TX	Denton	Little Elm	L
TX	Ellis		L
TX	Ellis	Ferris	L
TX	Ellis	Waxahachie	L
TX	Fannin	Big Tussle	L
TX	Fannin	Honey Grove	L
TX	Fayette	La Grange	L
TX	Fayette	Round Top	L
TX	Fayette	Warrenton	L
TX	Fayette	West Point	L
TX	Fort Bend	East Bernard	L
TX	Fort Bend	Fresno	L

State	County etc.	Locality	Family
TX	Fort Bend	Needville, Brazos Bend State Park	P
TX	Fort Bend	Needville, Brazos Bend State Park	L
TX	Franklin	Winnsboro	L
TX	Galveston	Galveston	L
TX	Galveston	Pelican Island	L
TX	Galveston	Santa Fe	L
TX	Gillespie	Fredericksburg	L
TX	Gonzales	Gonzales	L (2)
TX	Grayson	Denison	L (2)
TX	Grayson	Gunter	L
TX	Gregg	White Oak	L (2)
TX	Grimes	Navasota	L
TX	Guadalupe	Seguin	L
TX	Hale	Plainview	L
TX	Hamilton	Hamilton	L (3)
TX	Hardin	Lumberton	P
TX	Harris	Baytown	L
TX	Harris	Houston	L (17)
TX	Harris	Houston	P (4)
TX	Harris	Huffman	L
TX	Harris	Humble, Jesse H. Jones Park	L
TX	Harris	Humble, Jesse H. Jones Park	P
TX	Harris	Katy	L (2)
TX	Harris	La Porte	P (2)
TX	Harris	Spring	L (2)
TX	Harris	Tomball	P
TX	Haskell	O'Brien	L
TX	Hays	Driftwood	L
TX	Hays	Dripping Springs	L
TX	Hays	Hays	L
TX	Hays	Henly, near Dripping Springs	L
TX	Hays	Kyle	L
TX	Hays	San Marcos	L (5)
TX	Hays	Wimberley	L (3)
TX	Hidalgo	McAllen	L
TX	Hidalgo	Pharr	L
TX	Hill	Hillsboro	L
TX	Houston	Grapeland	L
TX	Hunt	Royse City	P
TX	Hunt	Wolfe City	L

State	County etc.	Locality	Family
TX	Jasper	Martin Dies Jr. State Park	L
TX	Jeff Davis	Valentine	L
TX	Jefferson	Beaumont	P
TX	Jim Wells	Sandia	L
TX	Johnson	Joshua	L
TX	Kaufman	Scurry	L (2)
TX	Kerr	Kerrville	L
TX	Kerr	Kerrville, Ingram	P (2)
TX	Kerr	Kerr Wildlife Management Area	P
TX	Kimble	Junction	L
TX	Kleberg	Riviera	L
TX	Lampasas	Lampasas	L (3)
TX	Lampasas	Lometa	L
TX	Lasalle	Cotulla	L
TX	Lavaca	Hallettsville	L
TX	Lee	Fedor	L
TX	Lee	Lexington	L
TX	Lee	Lexington	P (2)
TX	Liberty	Big Thicket	P
TX	Liberty	Dayton	P
TX	Liberty	Hardin	L
TX	Liberty	Liberty	P
TX	Live Oak	Sandia	L
TX	Llano	Enchanted Rock State Natural Area	S
TX	Madison	Madisonville	L
TX	McCulloch	Melvin	L
TX	McLennan	Waco	L (4)
TX	McLennan	Waco, North Lake	L
TX	Medina	Devine	L
TX	Medina	Natalia	L
TX	Milam	Milano	P
TX	Milam	San Gabriel	L
TX	Montgomery	Conroe	L
TX	Montgomery	Montgomery	L
TX	Montgomery	Montgomery	P (2)
TX	Nacogdoches	Nacogdoches	L
TX	Nacogdoches	Nacogdoches	P
TX	Nueces	Corpus Christi	L (3)
TX	Orange	North Orange	P
TX	Palo Pinto	Santo	L
TX	Parker	Aledo	L

State	County etc.	Locality	Family
TX	Parker	Azle	L (2)
TX	Parker	Springtown	L (3)
TX	Parker	Springtown	P
TX	Polk	Livingston	P
TX	Refugio	Bayside	L
TX	Rockwall	Fate	L
TX	Rockwall	Rockwall	L (2)
TX	Rockwall	Royse City	L
TX	Sabine	Hemphill	P (2)
TX	San Augustine	Sabine National Forest	P
TX	San Patricio	Portland	L
TX	Schleicher	Eldorado	L
TX	Smith	Bullard	P
TX	Smith	Tyler	L
TX	Somervell	Dinosaur Valley State Park	P
TX	Somervell	Glen Rose	L
TX	Tarrant	Arlington	L (2)
TX	Tarrant	Azle	P
TX	Tarrant	Bedford	L
TX	Tarrant	Fort Worth, Arcadia Trail Park	L (11)
TX	Tarrant	Fort Worth	P (3)
TX	Tarrant	Grapevine	L
TX	Tarrant	Lake Worth	L
TX	Tarrant	Mansfield	L (3)
TX	Tarrant	Mansfield	A (2)
TX	Tarrant	North Richland Hills	P
TX	Tarrant	Rendon	L (2)
TX	Tarrant	Southlake	L
TX	Taylor	Potosi	L
TX	Titus	Mount Pleasant	L
TX	Tom Green	San Angelo	L
TX	Travis	Austin	L (29)
TX	Travis	Austin	P (6)
TX	Travis	Highland Lakes, Lake Travis	L
TX	Travis	Liberty Hill	L (2)
TX	Travis	Manchaca	L
TX	Travis	McKinney Falls State Park	L
TX	Travis	Pflugerville	L
TX	Travis	San Leanna	L
TX	Travis	Southland Oaks	L

State	County etc.	Locality	Family
TX	Travis	Sunset Valley	L (2)
TX	Travis	Walter E. Long Lake	L
TX	Tyler	Colmesneil	L
TX	Tyler	Woodville	P
TX	Upshur	Gladewater	L
TX	Upshur	Longview	L
TX	Victoria	Mission Valley	P
TX	Victoria	Victoria	L
TX	Walker	Huntsville	L (2)
TX	Webb	Laredo	L
TX	Wichita	Wichita Falls	L (2)
TX	Williamson	Cedar Park, Muir Lake Trail	L
TX	Williamson	Georgetown	L (5)
TX	Williamson	Hutto	L
TX	Williamson	Jarrell	L
TX	Williamson	Pflugerville	L
TX	Williamson	Round Rock	L
TX	Williamson	Taylor	L
TX	Wilson	Calaveras	L
TX	Wilson	Graytown	L
TX	Wise		L (2)
TX	Wise	Boyd	L
VA	Alleghany	Covington	P
VA	Arlington	Arlington	P
VA	Buckingham	Rosney	L
VA	Chesterfield	Chester	L
VA	Chesterfield	Midlothian	P
VA	Chesterfield	North Chesterfield	L
VA	Fairfax	Chantilly	P
VA	Fairfax	Herndon	L
VA	Floyd	Pizzaro	L
VA	Halifax	Alton	L
VA	Henry	Bassett	L
VA	Highland		L
VA	Lee	Ewing	L
VA	Louisa	Mineral	P
VA	Montgomery	Christiansburg	P
VA	Montgomery	Radford, Wildwood Park	P
VA	Prince Edward	Green Bay	P
VA	Prince William	Ocoquan Bay National Wildlife Reserve	P
VA	Prince William	Quantico	P

State	County etc.	Locality	Family
VA	Rockbridge	Lexington, Boxerwood Nature Center	P
VA	Rockingham	Harrisonburg	L
VA	Fairfax	Clifton	P
VA	Fairfax	Vienna	L
VA	Fairfax	Wayneood/Fort Hunt	P
VA		Alexandria	P (2)
VA		Hampton	P
VA		Harrisonburg	L
VA		Newport News	L
VA		Richmond	P
VA		Virginia Beach	L
VA		Virginia Beach	P (2)
VA		Winchester	L (2)
VA		Winchester	P
VA	King William		L
VA	Washington	Damascus	L
VA	Wise	Giles	L
VA	York	Yorktown	P (2)
VT	Chittenden	Colchester	L
VT	Chittenden	Shelburne	P
VT	Grand Isle	Grand Isle	L
VT	Washington	Montpelier	L
VT	Windsor	Weathersfield	L
WV	Barbour	Phillipi	L
WV	Berkeley	Martinsburg	L
WV	Clay	Wallback	P
WV	Greenbrier	Ronceverte	L
WV	Harrison	Bridgeport	P
WV	Jefferson	Harpers Ferry	L
WV	Jefferson	Shepherdstown	L
WV	Mercer	Bluefield	P
WV	Monroe	Union	L
WV	Upshur	Ruraldale	L (2)
WV	Wood	Williamstown	L
WI	Dane	Madison	L
WI	Dane	Madison	P
WI	Dunn	Menomonie	L
WI	Milwaukee	Milwaukee	L
WI	Ozaukee	Riveredge Nature Center	P
WI	Sauk	Baraboo, Devil's Lake State Park	L
WI	Sauk	Baraboo, Devil's Lake State Park	P

State	County etc.	Locality	Family
WI	Vernon	Ontario	L
WI	Waukesha	Delafield	L
WI	Waukesha	Oconomowoc	L
Canada	Ontario	Brockville	P
Canada	Ontario	Dundas	L
Canada	Ontario	Elgin County, St. Thomas	L
Canada	Ontario	Essex County, Kingsville	L (2)
Canada	Ontario	Fort Erie	L
Canada	Ontario	Hamilton, Dundurn Castle	P
Canada	Ontario	Hastings County, Belleville	L
Canada	Ontario	Kincardine	L
Canada	Ontario	Markham	P
Canada	Ontario	Niagara Falls	L
Canada	Ontario	Pelee Island	P
Canada	Ontario	Port Weller East	L
Canada	Ontario	St. Williams Conservation Reserve	L
Mexico	Campeche	Calakmul	L
Mexico	Chiapas	Cacahoatán	S
Mexico	Chiapas	Villa Corzo	T
Mexico	Chiapas	Yajalón	L
Mexico	Guanajuato	Celaya	Z
Mexico	Jalisco	Guadalajara	S
Mexico	México	Acoxta, Tlalpan	T
Mexico	México	Mexico City	T
Mexico	México	Mexico City	Z
Mexico	México	Toluca	L
Mexico	Michoacán	Ceibas De Trujillo	L
Mexico	Morelos	Atlatlahucan	T
Mexico	Nuevo León	Santiago	A
Mexico	Oaxaca	San Pablo Etla	Z
Mexico	Puebla	Cuetzalan del Progreso	T
Mexico	Quintana Roo	Cancún	S
Mexico	San Luis Potosí	Guadalcázar	L
Mexico	San Luis Potosí	Pedro Montoya	S
Mexico	Tabasco	Villahermosa, Centro	L
Mexico	Veracruz	Alvarado	T
Mexico	Veracruz	Alvarado, Lomas del Estero	T
Mexico	Veracruz	Boca del Rio	T

State	County etc.	Locality	Family
Mexico	Veracruz	Catemaco	T
Mexico	Veracruz	Coatepec	T
Mexico	Veracruz	Coatzacoalcosa	S
Mexico	Veracruz	Cosoleacaque, Estero del Pantano	S
Mexico	Veracruz	Playa de Vacas-Medellin	T
Mexico	Veracruz	Reservade la biosfera Los Tuxtlas	T
Mexico	Veracruz	16 km N of Sontecomapan	T
Mexico	Veracruz	City of Veracruz	T (3)
Mexico	Veracruz	City of Veracruz	T
Mexico	Veracruz	Xalapa-Enríquez	T (5)
Mexico	Veracruz	Xico	T
Mexico	Yucatán	Mérida	L
Mexico	Yucatán	Mérida	T
Mexico	Yucatán	Telchac Puerto	L
Belize		W of City of Belize	L
Belize	Toledo	Punta Gorda	T (2)
Dominican Republic	Puerto Plata	Altamira	S
Puerto Rico	Guayanilla		S
Guatemala	Huehuetenango	San Pedro Soloma	Z
Honduras	Santa Bárbara	Las Vegas	C
El Salvador			L
Nicaragua	Managua	Managua	S
Nicaragua	Rivas	Ometepe Biological Field Station	T
Costa Rica	Alajuela	Alajuela	T
Costa Rica	Alajuela	Bijagua, 26 km S of Upala	T
Costa Rica	Alajuela	Upala	T
Costa Rica	Cartago	Cartago	T
Costa Rica	Cartago	Paraíso	C
Costa Rica	Cartago	Refugio de Vida Silvestre La Marta	T
Costa Rica	Cartago	Turrialba, Rancho Naturalista Lodge	T (2)
Costa Rica	Cartago	Turrialba, Santa Teresita	T (2)
Costa Rica	Cartago	Verbena	T (2)
Costa Rica	Heredia	Chilamate	T

State	County etc.	Locality	Family
Costa Rica	Heredia	Puerto Viejo de Sarapiquí	T
Costa Rica	Heredia	La Selva Biological Station	T (4)
Costa Rica	Limón	Amistad National Park	T
Costa Rica	Limón	Braulio Carrillo National Park	T
Costa Rica	Limón	Cahuita National Park	T (2)
Costa Rica	Limón	Guapiles	T (2)
Costa Rica	Limón	Puerto Limón	T (2)
Costa Rica	Limón	Puerto Viejo de Talamanca	T (2)
Costa Rica	Limón	Rios Tropicales Lodge	T
Costa Rica	Puntarenas	Campanario Biological Station	S
Costa Rica	Puntarenas	Corcovado National Park	T (3)
Costa Rica	Puntarenas	Coto Brus	T
Costa Rica	Puntarenas	Golfo Dulce Forest Reserve	T
Costa Rica	Puntarenas	Las Cruces Biological Station	T (3)
Costa Rica	Puntarenas	Monteverde	T (2)
Costa Rica	Puntarenas	Oso Peninsula	T
Costa Rica	Puntarenas	Uvita	T
Costa Rica	Puntarenas	Uvita	Z
Costa Rica	San José	Platanillo Community Center	T
Costa Rica	San José	San Isidro de El General	T
Costa Rica	Talamanca	Talamanca Mountains	T (4)
Costa Rica	Talamanca	Yorquin Indigenous Reserve	C
Panama	Bocas del Toro	Isla Bastimento	T (3)
Panama	Bocas del Toro	Isla Bastimento, Bluff Beach	T (2)
Panama	Bocas del Toro	Isla Bastimento, Laloma Lodge	T
Panama	Bocas del Toro	Isla Bastimento, Old Bank	T (2)
Panama	Bocas del Toro	Isla Colón	C (2)
Panama	Bocas del Toro	S shore of Dolphin Bay	T

State	County etc.	Locality	Family
Panama	Chiriquí	Boquete	T (2)
Panama	Coclé	El Valle de Antón	T
Panama	Colón	Galeta Island Protected Landscape	T
Panama	Colón	Gamboa	C
Panama	Colón	Gamboa	T (2)
Panama	Colón	Rio Frijoles	T
Panama	Colón	San Lorenzo Protected Forest	T
Panama	Darién	Darién Nacional Parque	T (2)
Panama	Darién	Darién Nacional Parque	S
Panama	Panamá	Cocobolo Nature Reserve	C
Panama	Panamá	Isla Barro Colorado	S (2)
Panama	Panamá	Panama City	T
Colombia	Antioquia	Girardota	C
Colombia	Antioquia	Reserva Natural Rio Claro	C
Colombia	Antioquia	Reserva La Selva de Ventanas	C
Colombia	Boyacá	Villa de Leyva	L
Colombia	Boyacá	Villa de Leyva	C
Colombia	Huila	Tarqui	C
Venezuela	Capital	Caracas	C
Ecuador	Napo	Tena, Puerto Misahualli	C
Ecuador	Pichincha	Nanegal	C
Ecuador	Sucumbos	Nueva Loja	C
Guyana	Barima-Waini	Mabaruma	C (4)
Guyana	Demerara-Berbice	Iwokrama Research Centre	C
Guyana	Demerara-Mahaica	Vicinity of Georgetown	L
Suriname	Sipaliwini	Paloemeu	C
French Guiana	Cayenne	Kourou	C
French Guiana	Cayenne	Régina, Les Nouragues Nature Reserve	C
Brazil	Bahia	Rio de Contas	C