FROM: Ubick, D., P. Paquin, P.E. Cushing, and V. Roth (eds). 2005. *Spiders of North America: an identification manual*. American Arachnological Society. 377 pages.

Chapter 40

MYSMENIDAE

5 genera, 6 species

Lara Lopardo
Jonathan A. Coddington

Similar families —

Anapidae (p. 64), Symphytognathidae (p. 226), Theridiidae (p. 235), Theridiosomatidae (p. 244).

Diagnosis —

This orbicularian family can be distinguished by the ventral, subapical, sclerotized spot on the femur of at least leg I on both sexes (Fig. 40.8); a prolateral clasping spine on male metatarsus or tibia I (or both) (Figs. 40.3, 40.5, 40.7); apically twisted cymbium and long embolus on male palps (Griswold *et al.* 1998, Schütt 2003); spinnerets near the genital opening; and elevated carapace.

Characters —

body size: males 0.5-1.4 mm; females 0.8-2.0 mm.

color: abdomen dark (orange in *Maymena*) with yellowish dots or other distinct pattern (Figs. 40.1, 40.4, 40.6). Legs usually with stripes of contrasting colors, uniform in *Maymena* and *Parogulnius hypsigaster* Archer 1953. Sternum usually yellowish, dark in *Mysmenopsis* and *Trogloneta paradoxa* Gertsch 1960a, and carapace orange (except *Mysmenopsis* dark; and *Trogloneta paradoxa* with two darker spots). The abdomen in *Trogloneta paradoxa* has a white pattern posteriorly (Fig. 40.4).

carapace: carapace short and high (as long as wide and high); remarkably high in males of *Microdipoena* and *Trogloneta*, with the eyes grouped in a tubercle, and the clypeus concave (Figs. 40.4, 40.6).

sternum: sternum convex in lateral view in most mysmenid species. Sternum usually truncated posteriorly, pointed in *Maymena*.

eyes: eight eyes in two rows; eyes white except AME.

chelicerae: cheliceral basal segment not tapering. Tiny denticles on cheliceral furrow (difficult to see).

legs: prograde, tarsi with three claws. Males have one prolateral clasping spine on mid metatarsus I, and/or one or two on distal tibia I (Figs. 40.3, 40.5, 40.7).

abdomen: globose, except in *Trogloneta paradoxa*, which is pointed posteriorly (Fig. 40.4).

spinnerets: six spinnerets with small, fleshy colulus.

respiratory system: diverse but poorly studied in the family: *Microdipoena* with two vestigial book lungs and two independent posterior tracheal spiracles; *Calodipoena* and *Mysmenopsis* with two anterior spiracles open to tracheae joined by a transverse duct and two posterior tracheal spiracles connected transversely in an atrium (Forster 1959); *Maymena* with two anterior book lungs and one posterior tracheal spiracle (Gertsch 1960a); the respiratory system of *Trogloneta* is unknown.

genitalia: entelegyne; ***female*** epigynum weakly sclerotized in *Microdipoena guttata* Banks 1895d, *Parogulnius hypsigaster* and *Calodipoena incredula* Gertsch & Davis 1936; a sclerotized plate is present in *Trogloneta paradoxa*, *Mysmenopsis cymbia* (Levi 1956a), and *Maymena ambita* (Barrows 1940)(Fig. 40.11). A finger-like scape extends posteriorly in *Calodipoena incredula* and *Parogulnius hypsigaster* (Fig. 40.12); ***male*** palp is complex, embolus long and usually coiled (Fig. 40.9), can be distally twisted as in *Maymena ambita* and *Microdipoena guttata* (Figs. 40.2, 40.10, respectively); cymbium with lobes or apophyses related to the embolus. Conductor and median apophysis absent (Coddington 1990).

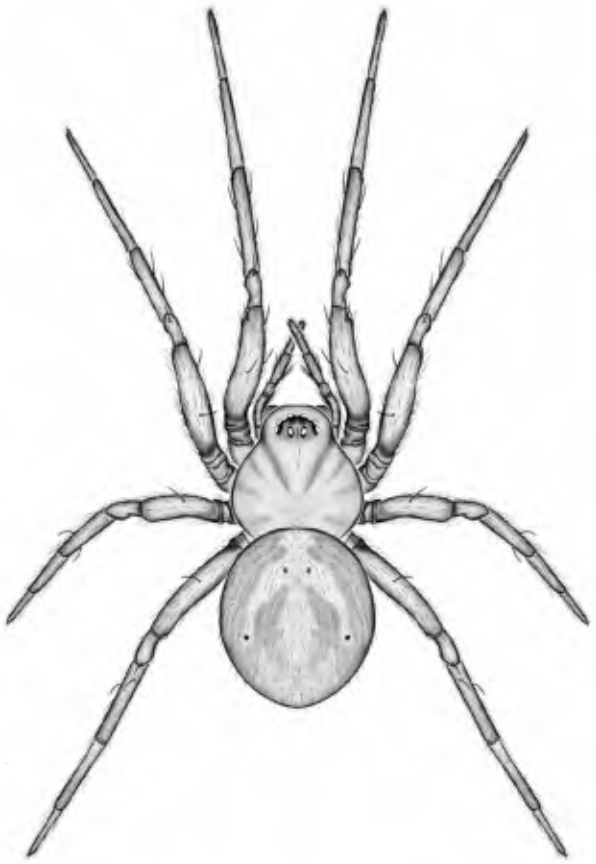


Fig. 40.1 *Maymena ambita* (Barrows 1940)

Distribution —

Mysmenids have been poorly collected. *Maymena ambita* has been reported only from Southeastern USA, although the genus also occurs in Central and Northern South America. *Microdipoena guttata* is widespread throughout Eastern USA, and Central and South America, but the rest of *Microdipoena* species occur mainly in Africa. *Calodipoena incredula* occurs in Texas and Florida, the Bahamas, and Cuba, and the genus has been reported from Central America and Africa. *Mysmenopsis cymbia* occurs only in Florida, other *Mysmenopsis* species are Neotropical. *Trogloneta* (including *Parogulnius*) is widespread in the Northern Hemisphere, *Trogloneta paradoxa* occurs in western USA (California, Utah, and Oregon) and western Canada (British Columbia; R. Bennett, pers. comm.), and *Parogulnius hypsigaster* has been reported only from Alabama.

Natural history —

Mysmenids mainly occur in leaf litter and other cryptic places in very humid habitats. North American web-spinning species seem to prefer the interstices of leaf litter and like habitats, i.e. small cavities perhaps 5-10cm in diameter (depending on the size of the spider) created by the top layer of leaves. The cavities usually open to the air on one side, and the webs presumably trap prey entering or leaving such cavities in the leaf litter or detritus. *Trogloneta paradoxa* has been reported from ground detritus, fir needles, and *Neotoma* (bushytail woodrat) midden (Gertsch 1960a). *Maymena ambita* was also collected from pine needles (Barrows 1940), broadleaf forest leaf litter and caves (Coddington, pers. obs.). *Microdipoena guttata* was found under dead leaves in dry woods (Banks 1895d, Levi 1956a), and at edges of swamps (Bishop & Crosby 1926). *Calodipoena incredula* has been collected in the soil (Levi 1956a). Many species of *Mysmenopsis* are kleptoparasites on the webs of other spiders (Platnick & Shadab 1978a), but the natural history of *Mysmenopsis cymbia* is still unknown. Mysmenid web architecture is known for a few species of *Maymena*, *Mysmena*, and *Microdipoena guttata*. Kleptoparasitic species are not known to build webs of their own and some have lost the ability to spin the sticky silk characteristic of orbweaving spiders. *Mysmena* species build highly derived three-dimensional orb webs, with a proliferation of out-of-plane radii that result in a characteristic spherical web (Fig. 40.13, Forster 1959). The out-of-plane radii result from the failure of the animal to remove radial lines constructed during exploration of the web site. Orbweavers normally retain only the exploratory lines that fall roughly in a plane. Standard frame and radius construction result in further eccentric radii, but sticky spiral construction is very irregular, resulting in a rind or layer of sticky silk spanning just the perimeter of the web. Radii near the hub are bare of sticky spiral attachments, so that if the outer sticky layer is perforated, the spherically symmetric radial lines are revealed (Fig. 40.14). The web of *Microdipoena guttata* is similar to that of *Mysmena* species (Fig. 40.15). In contrast, *Maymena ambita* and Central American *Maymena* webs are mainly planar but the hub is distorted upwards by one to several out-of-plane radial lines that attach to substrate above the web (Fig. 40.16). During sticky spiral construction, *Maymena* occasionally exit on these eccentric radii to make the next attachment, which results in sporadic sticky silk segments rising vertically out of the plane of the web. Presumably these eccentric sticky elements allow the web to catch more horizontally flying prey. The webs also contain "accessory radii" that are spun after completion of the sticky spiral but before the hub is remodeled. Accessory radii are easily distinguished because the sticky spiral contacts but does not "kink" at the junction with accessory radii (because there is no attachment), whereas the sticky spiral does kink when crossing true radii constructed during the exploration of the web site, or during frame or radius construction (Coddington, pers. obs.). Anapids make similar webs, not only in structure but also in the behavior used to construct the webs (Coddington 1986b, Eberhard 1987a, Griswold *et al.* 1998).

Taxonomic history and notes —

Mysmenidae was first described as the group Mysmeneae within the Theridiidae (Simon 1922, 1926), and comprised only three genera: *Mysmena* Simon 1894a, *Cepheia* Simon 1894a and *Trogloneta* Simon 1922. The group was diagnosed mainly on the absence of female palpal claws, the voluminous male bulb with long embolus, the globular or conical abdomen with sparse, rather long hairs, and the inferior tarsal claws as long as the superior claws. Petrunkevitch (1928b) united Simon's Mysmeneae and Theonoeae in the subfamily Mysmeninae, thus adding six genera to the original group: *Epectlina* Simon 1895a, *Epectlinula* Simon 1903d, *Iardinis* Simon 1899a, *Mysmenopsis* Simon 1897d, *Synaphris* Simon 1894a, and *Theonoe* Simon 1881a. Forster (1959) transferred *Mysmena* (and consequently the entire subfamily) from the Theridiidae to the Symphytognathidae. Unaware of Forster's change, Gertsch (1960a) independently transferred Mysmeninae from the Theridiidae to the Symphytognathidae, and proposed new diagnostic features for the mysmenines, none of which are considered reliable by contemporary workers (e.g., size of the spiders from small to minute, with or without book lungs, pedipalps present and of normal size in females, lack of comb in the hind tarsi, and metatarsi longer or of equal size than tarsi). In 1977, Forster and Platnick concluded that the mysmenids were sufficiently distinct from the Symphytognathidae to warrant family rank. A year later, Platnick & Shadab (1978a) provided a diagnosis of the Mysmenidae, although based only on genera from the New World. Wunderlich (1986) (*contra* Forster & Platnick 1977) defended the monophyly of Symphytognathidae *sensu* Forster (1959), and split the mysmenids into two subfamilies: Mysmeninae and Synaphrinae. Two higher level phylogenetic analyses have included mysmenids. In an analysis of orbicularian relationships, Griswold *et al.* (1998) included two mysmenid genera: *Mysmena* and *Maymena*. Schütt (2003) included three mysmenid genera (*Trogloneta*, *Microdipoena* and *Cephieia*) in her study of symphytognathid relationships, and raised Synaphrinae to family level. Marusik & Lehtinen (2003) independently raised Synaphrinae to family rank based on morphology. Mysmenidae currently comprises 91 described species in 22 genera (Platnick 2005).

The monotypic genus *Parogulnius* Archer 1953 is troublesome. It was first described in Theridiosomatidae, but Gertsch (1960a) synonymized it with the mysmenid *Trogloneta*. Brignoli (1970b) rejected the synonymy, thus restoring it to theridiosomatids. Coddington (1986a) stated that it certainly was not a theridiosomatid, but left it *incertae sedis*. *Parogulnius hypsigaster* exhibits some diagnostic features of Mysmenidae and many of *Trogloneta*. We agree with Gertsch's synonymy and so include it here, keeping in mind that its placement is still dubious. In the following it will key out to *Trogloneta*.

Genera —

Calodipoena Gertsch & Davis 1936, *Maymena* Gertsch 1960a, *Microdipoena* Banks 1895d, *Mysmenopsis* Simon 1897d, *Trogloneta* Simon 1922

40.13

40.14

40.15

40.16

Key to genera — North America North of Mexico

1 AME equal to or larger than ALE (Figs. 40.3, 40.7), abdomen globose **2**

— AME smaller than ALE (Fig. 40.5), one ventral sclerotized spot on femur I in both sexes, and high concave clypeus (Fig. 40.4) and long prolateral clasping spine on distal end of middle third of metatarsus I in males (Fig. 40.5) ..... ***Trogloneta***

Div. 2 species — **Dist.** *Trogloneta paradoxa* Gertsch 1960a: CA, UT and OR, n to BC and *Parogulnius hypsigaster* Archer 1953: AL — **Refs.** Archer 1953, Gertsch 1960a, Brignoli 1970b, 1980j — **Note** see Taxonomic history and notes for the generic placement of *Parogulnius hypsigaster*

2(1) One ventral sclerotized spot on femora I and II at least in females (Fig. 40.8) (difficult to see in *Mysmenopsis*), female genitalia not extended posteriorly, embolus surrounding tegulum in ventral view (Figs. 40.2, 40.10) **3**

— One ventral sclerotized spot on femur I in both sexes, female genitalia with finger-like posteriorly extended scape (as in Fig. 40.12), male with prolateral clasping spine on distal end of middle third of metatarsus I and embolus spirally coiled from center of tegulum in ventral view (Fig. 40.9) ..... ***Calodipoena***

Div. 1 species: *Calodipoena incredula* Gertsch & Davis 1936 — **Dist.** TX and FL — **Refs.** Gertsch & Davis 1936, Brignoli 1980j, Baert 1984a

3(2) Prolateral distal clasping spine on tibia I in males present, metatarsal clasping spine can be absent; chelicerae strong, longer than height of clypeus; embolus twisted distally **4**

— Prolateral clasping spine on tibia I in males absent, only on metatarsus I; female chelicerae small, shorter than height of clypeus ..... ***Mysmenopsis***

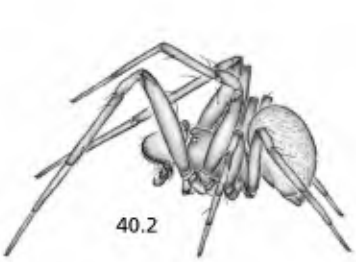
Div. 1 species: *Mysmenopsis cymbia* (Levi 1956a) — **Dist.** known only from FL — **Refs.** Gertsch 1960a, Platnick & Shadab 1978a, Brignoli 1980j

4(3) One very strong distal prolateral clasping spine on tibia I, arising from a spur (Fig. 40.3); metatarsal clasping spine absent; both sexes with one ventral sclerotized spot on femora I and II (the second lighter, Fig. 40.8) ..... ***Maymena***

Div. 1 species: *Maymena ambita* (Barrows 1940) — **Dist.** KY to AL, GA and VA — **Refs.** Gertsch 1960a, Brignoli 1980j

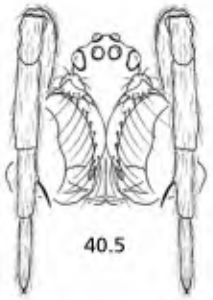
— Two distal prolateral clasping spines on tibia I and one metatarsal clasping spine basally on middle third (Fig. 40.7); females with one ventral sclerotized spot on femora I and II (equally sclerotized) and males with one weakly sclerotized femoral spot on femur I only; clypeus very high and concave in males (Fig. 40.6) .... ***Microdipoena***

Div. 1 species: *Microdipoena guttata* Banks 1895d — **Dist.** e USA, MA, NY, NJ, MO e to NC, se to FL — **Ref.** Brignoli 1980j



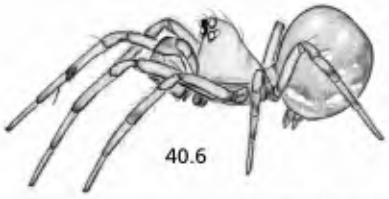
40.2

40.3



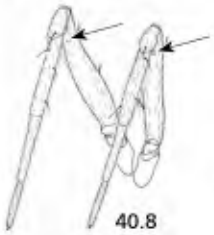
40.5

40.4



40.6

40.7

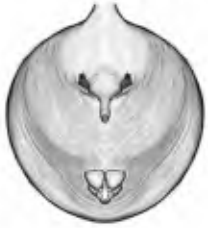


40.8

40.9

40.10

40.11



40.12