Systematics of the spider genera *Mallos* and *Mexitlia* (Araneae, Dictynidae)

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This systematic study recognizes and describes 14 species of the genus *Mallos* O. Pickard-Cambridge, 1902 and three species of the genus *Mexitlia* Lehtinen, 1967. Three species of *Mallos*— *Mallos gertschi*, *Mallos chamberlini* and *Mallos macrolirus*—and one species of *Mexitlia*— *Mexitlia altima*—are newly described. *Mallos ghiggi* (Caporiacco, 1938) is considered a synonym of *Mexitlia grandis* (O. Pickard-Cambridge, 1896). *Mexitlia grandis* is considered the senior synonym of *Mexitlia avara* (Banks, 1898). Two species, *Mallos flavovittatus* (Keyserling, 1880) and *Mallos nigrescens* (Caporiacco, 1955) are removed from *Mallos*. The males of *Mallos kraussi* Gertsch, 1946 and *Mallos blandus* Chamberlin and Gertsch 1958, are described for the first time. A cladistic analysis based on 26 morphological characters produced a cladogram that supports the monophyly of *Mallos* and the validity of *Mexitlia*. This cladogram presents a phylogenetic framework for considering the evolution of social behaviour in *Mallos*.

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ADDITIONAL KEY WORDS:—social behaviour — phylogenetic reconstruction.
The family Dictynidae belongs to the ‘RTA’ clade of the Araneomorphae, a group distinguished by the presence of a retrolateral tibial apophysis on the male palpal tibia (Coddington & Levi, 1991). These small cribellate spiders are characterized by a uniserrate calamistrum, a cribellum that is usually undivided, terminal leg segments with a reduced number of trichobothria, and a male palp that lacks a median apophysis (Chamberlin & Gertsch, 1958). Lehtinen (1967) redefined Dictynidae to include a number of ecribellate spiders, and divided it into six subfamilies. The subfamilies Tricholathysinae and Dictyninae contain the largest number of genera and include those traditionally considered to be dictynids.

The family Dictynidae has a cosmopolitan distribution and contains 45 genera and more than 400 species. Although at present considered to be a member of the RTA clade (Coddington & Levi, 1991), Dictynidae has been identified as a potential sister group of the Orbiculariae, a clade that includes the orb weaving spiders (Coddington, 1989 & 1990). However, since Chamberlin & Gertsch’s (1958) thorough revision of the North American Dictynidae, the group’s systematics has received little attention. This study revises the species of the dictynid genera Mallos O. Pickard-Cambridge, 1902 and Mexitlia Lehtinen, 1967, assesses the validity of the genus Mexitlia, and reconstructs the phylogeny of these genera.

Octavius Pickard-Cambridge (1902) placed the genus Mallos in the family Dictynidae, subfamily Amaurobiinae. Since its description, four generic synonyms were subsequently used for one or more species of Mallos (O. Pickard-Cambridge, 1902; Banks, 1904; Simon, 1909; Chamberlin, 1919a). A number of Mallos species were described between 1902 and 1946 when Gertsch (1946) studied its taxonomy for the first time. This review included ten species, four newly described. In their revision of the North American Dictynidae, Chamberlin & Gertsch (1958) divided the genus into two species groups, the niveus group and the trivittatus group. This separation was based primarily on spider size and cephalothorax colouration. Lehtinen (1967) split the genus Mallos into two genera, Mallos and Mexitlia, along the lines of Chamberlin & Gertsch’s (1958) two species groups placing them in the subfamily Dictyninae. Mexitlia is composed of those larger species belonging originally to the trivittatus species group. Although based on spider size, reproductive features and cephalothorax colouration, this split has gained little acceptance. Additionally, Lehtinen (1967) himself expressed doubt about the monophyly of the genus Mallos.

Therefore, another objective of this study is to consider the monophyly and, hence, the validity of Mallos.

The genera Mallos and Mexitlia contain small spiders (body length 2.0–7.0 mm) that have an oval cribellum and rely on irregular cribellate webs for prey capture (Figs 1–3). At the onset of this revision, Mallos contained 15 species that ranged from the Pacific Northwest and Southwest of North America into South America, and Mexitlia contained two species found in southwestern North America and southern Mexico. Little is known of the natural history of most species of Mallos and Mexitlia. The exception, the quasisocial species, Mallos gregalis (Simon, 1909) and the communal species Mexitlia trivittata (Banks, 1901), have been extensively studied (Jackson, 1977, 1979, 1980, 1982; Burgess, 1983; Tietjen, 1980, 1982, 1986). This investigation is the first to propose a phylogeny for a spider group that contains quasisocial and communal species.

**NATURAL HISTORY**

Chamberlin & Gertsch (1958) briefly describe the dictynid web, locations of these webs, and summarize what is known of dictynid mating and maturation. However, little is known of the ecology and behaviour of most *Mallos* and *Mexitlia* species. This section describes the general habitats of *Mallos* and *Mexitlia* species, summarizes
Table 1. Approximate times of maturation and elevational distribution based on information from collection labels

<table>
<thead>
<tr>
<th>Mallos species</th>
<th>Months in which adults were collected</th>
<th>Elevation (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>margaretae</td>
<td>February</td>
<td>900</td>
</tr>
<tr>
<td>hesperius</td>
<td>January–November</td>
<td>600–2000</td>
</tr>
<tr>
<td>gregalis</td>
<td>July</td>
<td>1000–3000</td>
</tr>
<tr>
<td>bryanti</td>
<td>September–October</td>
<td>700–3000</td>
</tr>
<tr>
<td>dugesi</td>
<td>August–November</td>
<td>700–2000</td>
</tr>
<tr>
<td>kraussi</td>
<td>November–January</td>
<td>1300–2000</td>
</tr>
<tr>
<td>blandus</td>
<td>September–October</td>
<td>1200–2000</td>
</tr>
<tr>
<td>macrorus</td>
<td>(?)</td>
<td>1300</td>
</tr>
<tr>
<td>chamberlini</td>
<td>July</td>
<td>1300</td>
</tr>
<tr>
<td>gertschi</td>
<td>September–November</td>
<td>1300–1600</td>
</tr>
<tr>
<td>niveus</td>
<td>March–December</td>
<td>1000–2000</td>
</tr>
<tr>
<td>pallidus</td>
<td>year round</td>
<td>0–1200</td>
</tr>
<tr>
<td>mians</td>
<td>January–July</td>
<td>600–1500</td>
</tr>
<tr>
<td>pearvi</td>
<td>May–July</td>
<td>1000–2000</td>
</tr>
<tr>
<td>Mexitlia species</td>
<td></td>
<td></td>
</tr>
<tr>
<td>grandis</td>
<td>April–August</td>
<td>600–1000</td>
</tr>
<tr>
<td>trivittata</td>
<td>June–September</td>
<td>1300–3000</td>
</tr>
<tr>
<td>altima</td>
<td>April–August</td>
<td>900–3000</td>
</tr>
</tbody>
</table>

their times of maturation, geographic distributions, and characterizes the webs and web sites of Mallos and Mexitlia species from southwestern Arizona.

Distribution and habitat

The genera Mallos and Mexitlia have a more limited distribution than their cosmopolitan sister genera Dictyna Sundevall, 1883 and Emblyna Chamberlin, 1948. Mallos hesperius (Chamberlin, 1916), M. margaretae (Gertsch, 1946), M. gregalis, and M. kraussi (Gertsch, 1946) are found exclusively in the American tropics, whereas the remainder of the species are found in northern Mexico and the American Pacific and Southwest. Mallos pallidus (Banks, 1904) is found at low elevations on the southern coast of California, but other Mallos and Mexitlia appear to be restricted to higher elevations (Table 1).

Temperate zone species reach maturity in early fall, with the exception of the spiders in the subclade to which Mallos niveus O. Pickard-Cambridge, 1902 belongs. The latter either reach maturity throughout the year or during the late winter to early summer months. In contrast, tropical species mature very late in the year, or, in the case of M. hesperius, are mature throughout the year (see Table 1). A number of mature Mallos niveus females were collected during August of 1994. Two of these females produced three egg sacs each in the laboratory. These lenticular egg sacs had a diameter of 4–5 mm in size and were suspended in the female’s web. Each egg sac contained 8–10 eggs from which 0.88–0.90 mm long spiderlings emerged.

From July 23 to August 13, 1994 Mallos and a Mexitlia species were studied in (1) the area surrounding the American Museum of Natural History’s Southwestern Research Station (SWRS), in the Chiricahua Mountains of Southwestern Arizona (Cochise County), (2) the Santa Rita Mountains of Arizona, and (3) the Guadaloupe Mountains of Texas. At these sites, Mallos and Mexitlia species were found in habitats

classified as temperate Madrean Evergreen Woodland community (Brown, 1982). The arboreal fauna of this community consists mainly of Apache pine (*Pinus engelmannii*), alligator juniper (*Juniperus deppeana*), Arizona white oak (*Quercus arizonica*), and sycamore (*Platanus wrightii*) (Vinegar, 1975). The mean annual rainfall from 1974 to 1991 at SWRS was 55.9 cm (±0.695), with approximately 40% of this rainfall occurring during July and August. Temperatures at SWRS range from an average low of −4.9°C in January to an average high of 30.4°C in July (range based on minimum and maximum temperatures for each month, 1965–1989).

Within the Madrean Evergreen Woodland of Southwestern Arizona, *Mallos* and *Mexitlia* species were found on vegetation immediately adjacent to dry creek beds. These semi-riparian habitats experience water flow only during the rainy season of July and August when flash flooding is common. Despite careful searches no spiders were found more than about 15–20 metres from a creek bed. Additionally, searches were conducted in lowland desert areas. *Dictyna* species were the only dictynids found in this arid habitat.

**Web architecture**

A typical *Mallos* web consists of closely spaced pairs of non-sticky threads that radiate outward from a central point. Cribellar threads are deposited across these paired lines at regular intervals to form ladder-like units. In some cases a spider constructs a small silken retreat in the web. The webs are usually littered with the remains of consumed prey, dust, debris, and tangles of old cribellar threads. Although these webs have some degree of organization, the substrate appears to dictate the structure of the web. Because the webs of *Mallos* species are so plastic in form, it is nearly impossible to associate a particular web type with any one species. Figures 4–6 illustrate several of the webs observed.

The small webs of *Mallos niveus* were often found on the tips of dead *Quercus*
branches. However, in the same area, a number of *M. niveus* individuals were also collected from webs built in the tops of grasses. *Mallos bryanti* Gertsch 1946 and *M. dugesi* (Becker, 1886) webs were usually found only in the tops of grasses (e.g. Figs 4, 5). *Mallos blandus* (Chamberlin & Gertsch, 1958) and *M. pallidus* individuals were collected from webs built on the tops of *Quercus* leaves. Species of *Mallos* were easy to collect because when their web is disturbed they usually remain motionless. Perhaps this stationary behaviour, when associated with the accumulation of prey remains and other debris in the web, makes the spider more cryptic. As long as the spider remains still, potential predators cannot distinguish it from web debris. When *Mallos* and *Mexitlia* juveniles were collected and placed into small (4.5 cm × 4.5 cm × 2.0 cm) plexiglass containers, individuals constructed irregular sheet type webs, further demonstrating the plasticity of their web construction behaviour. Even adults accommodated their webs to these small containers and appeared to feed and behave normally.

In the Chiricahua Mountains, *Mexitlia trivittata*, a communal dictynid, was found in a large culvert through which East Turkey Creek passes. The inside corrugated walls of the culvert were covered with the webs of hundreds of *M. trivittata* individuals, and this colony has persisted at this site for a number of years. This culvert provides an ideal habitat for these spiders. It is damp and, therefore, must attract a number of flying insects. However, we observed that about 60% of the spiders were removed from the culvert by a flash flood. The webs of *M. trivittata* differed from those of *Mallos* species (Fig. 6) by having a number of long lines that radiated outward from their retreat. These lines consist of a support thread on which cribellar threads were deposited in a looped fashion reminiscent of *Miagrammopes* (Opell, 1990; Eberhard & Pereira 1993).

### MATERIAL AND METHODS

#### General

All measurements are in millimetres and were made with a dissecting microscope equipped with an ocular micrometer scale. Measurements of eye features and appendages were made at 50 × and are accurate to 0.02 mm. Number of individuals measured is given in parentheses after the heading Female or Male in each species description. Dorsal views of the spiders were illustrated with the aid of a camera lucida. Drawings of the male and female genitalia were made with the aid of a drawing grid. Epigyna were removed and cleared, first in 10% sodium hydroxide and then in clove oil, to resolve duct architecture. Illustrations of cleared female genitalia were made with a compound microscope fitted with a camera lucida. We prepared specimens for scanning electron microscope study by dehydrating them in ethanol, critical point drying, and sputter coating them with gold.

#### Abbreviations

Institutional

- AMNH – American Museum of Natural History; New York, New York
- BMNH – Natural History Museum; London, U.K.
A cladistic analysis of generic and species relationships was performed with the computer program PAUP (Phylogenetic Analysis Using Parsimony 3.0; Swofford, 1991). Character polarity was assessed by outgroup comparison. All binary characters were treated as reversible, multistate characters were treated as unordered and all characters initially received equal weights. Character evolution was investigated with the aid of MacClade Version 3.0 (Maddison & Maddison, 1992).

**CLADISTIC ANALYSIS**

**Outgroup choice**

Without knowledge of the dictynid generic relationships choice of an outgroup for *Mallos* and *Mexitlia* is problematic. Only a cladistic analysis of the dictynid genera would fully resolve this issue. However, Lehtinen (1967) places the genera *Tahuantina* Lehtinen, 1967 and *Marilynia* Lehtinen, 1967 into the same tribe of Dictyninae as *Mallos* and *Mexitlia*. The Dictyninae genus *Emblyna* also has features that suggest a more recent common ancestry with *Mallos* and *Mexitlia* (see explanation below). Therefore, we have chosen three outgroup genera for this study: *Tahuantina*, *Emblyna* Chamberlin, 1948, and the larger, widely distributed genus *Dictyna* Sundevall, 1833.

*Tahuantina* outgroup character states were scored from descriptions of the type species *T. zapfei* Lehtinen, 1967 described by Lehtinen (1967). As with the dictynid generic relationships, choosing species representatives of *Emblyna* and *Dictyna* independent of genus phylogenies is problematic. This is further confounded by our view that *Dictyna* is almost certainly polyphyletic, as many of the 'species' groups
Table 2. Character data matrix

<table>
<thead>
<tr>
<th>Species</th>
<th>Character states</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tahuantina</td>
<td>00011 00000</td>
</tr>
<tr>
<td>Dictyna</td>
<td>00011 00000</td>
</tr>
<tr>
<td>Emblyna</td>
<td>00000 00000</td>
</tr>
<tr>
<td>Mallos margaretae</td>
<td>??1?? 00000 01000</td>
</tr>
<tr>
<td>Dictyna</td>
<td>00000 00000</td>
</tr>
<tr>
<td>Emblyna</td>
<td>00000 00000</td>
</tr>
<tr>
<td>Mexitilia trivittata</td>
<td>11000 11100 01000</td>
</tr>
<tr>
<td>Mexitilia altima</td>
<td>??0?? 00000 01000</td>
</tr>
<tr>
<td>Mexitilia grandis</td>
<td>11000 11100 01000</td>
</tr>
</tbody>
</table>

...}

designated by Chamberlin & Gertsch (1958), and revised by Lehtinen (1967), may very well be monophyletic groups and thus valid genera. We chose Emblyna sublata Hentz, 1850 and Dictyna calcarata Banks, 1904 as their generic representatives. These species appear to be typical of the respective genera and are found in the American Southwest. Character states were scored from specimens we examined and species descriptions of Chamberlin & Gertsch (1958).

Characters

An analysis of 26 characters scored for 20 taxa (Table 2), 17 ingroup taxa and 3 outgroup taxa, produced the cladogram shown in Figure 7. The consistency index and retention index for the characters exhibiting homoplasy is given in Table 3. Table 4 lists the unambiguous character state changes for the cladogram in Figure 7. Character state 0 is the hypothesized plesiomorphic condition. Many quantitative morphological features were surveyed, however, only discrete characters proved to be useful in the cladistic analysis. The quantitatively evaluated features surveyed showed either considerable overlap and/or were correlated to change in some other feature. Characters of the female genitalia proved to be most useful. The characters and their respective states are defined as follows:

1. RTA of male palp; 0, present, 1, absent. Coddington & Levi (1991) consider the RTA of the male pedipalp to be a higher level synapomorphy among spiders and suggest that its function is to stabilize the palp during copulation. Huber (1995) demonstrates a functional correlation between the RTA and the lateral foveae of the female epigynum based on studies of Dictyna uncinata Thorell, 1856 and suggests
that this functional correlation may extend to other species within this genus. *Mallos* and *Mexitlia* species support this hypothesized correlation. Synapomorphies for these *Mallos* plus *Mexitlia* are the loss of the RTA of the male pedipalp and the loss of the lateral foveae of the epigynum.

2. Distal/lateral margin of male palp tibia; 0, without triangular projection, 1, with a triangular projection. A synapomorphy for the *Mexitlia* clade is the presence of a triangular projection (Fig. 103) on the distal/lateral margin of the male pedipalp. Given the absence of the RTA (character 1) and lateral foveae of the female epigynum, this structure in conjunction with the DiTA terminus may serve to orient the male palp along the rims of the epigynal bursae during copulation.

3. Guanine crystals; 0, not heavily deposited in the lateral margins of the carapace, 1. heavily deposited in the lateral margins of the carapace. A synapomorphy for the *Mallos* clade is the presence of extensive guanine deposits in the lateral margins of

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**Table 3.** Consistency (CI) and Retention (RI) indices for homoplasious characters

<table>
<thead>
<tr>
<th>Character</th>
<th>CI</th>
<th>RI</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td>5</td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td>13</td>
<td>0.50</td>
<td>0.85</td>
</tr>
<tr>
<td>14</td>
<td>0.67</td>
<td>0.83</td>
</tr>
<tr>
<td>19</td>
<td>0.50</td>
<td>0.67</td>
</tr>
<tr>
<td>20</td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td>22</td>
<td>0.50</td>
<td>0.50</td>
</tr>
</tbody>
</table>
The carapace. However, it appears that these have been derived independently in other dictynid genera (e.g. Nigma, Ajmonia, Anaxibia).

4. Embolus; 0, thick in diameter, 1, thin in diameter (Figs 11, 12). See explanation below.

5. Tip of embolus; 0, branched, 1, unbranched. (Figs 11, 12). The presence of a thick, apically branched embolus is hypothesized as plesiomorphic for Mexitilia, as Emblyna species are distinguished by Chamberlin & Gertsch (1958) as having a thick embolus with the apical portion divided. This character is potentially important, in that it could unite Mexitilia and Emblyna as sister taxa. This is contrary to Lehtinen’s (1967) placement of Mexitilia and Emblyna into different tribes within the dictynid subfamily Dictyninae. However, we believe that Lehtinen may have minimized the importance of these features of the male pedipalp. Additionally, scanning electron micrographs of the Mallos embolus (Fig. 12, structure T) show what may be a vestigial bifurcation of the embolus tip of some Mallos species.

6. Palpal femur; 0, without a lateral ridge, 1, with a lateral ridge (Figs 103, 109).

7. DiTA terminus shape; 0, small, rounded (e.g. Chamberlin & Gertsch, 1958 pl. 17, Fig. 1), 1, hatchet shaped (Fig. 103), 2, thin corkscrew (Fig. 32), 3, oval shaped (Fig. 83), 4, open C-shape (Fig. 39), 5, thick corkscrew (Fig. 73), 6, thin with small terminal, triangular tab. As with the triangular projection observed on the distal/lateral margin of the Mexitilia male pedipalp, the DiTA terminus of the Mallos male pedipalp may help to orient the palp during copulation in the absence of the retrolateral tibial apophysis.

8. Femur, leg I; 0, not thicker than patella in diameter, 1, thicker than patella in diameter.

9. Anterior spermatic lobe; 0, absent, 1, present.

10. Elongate anterior spermatic lobe; 0, absent, 1, present.

11. Coiled anterior spermatic lobe; 0, absent, 1, present.

12. Lateral foveae of epigynum; 0, present, 1, absent. See explanation, character 1.

13. Posterior duct of spermatica; 0, unbranched, 1, branched.
Figures 8, 9, 3, entire cribellum of *Mallos dugesi*; 9, divided cribellum of *Mallos niveus*.

14. Paired posterior spermathecal lobes; 0, absent, 1, present small in size (Fig. 51), 2, present large in size (Fig. 38).
15. Externally epigynal duct work; 0, not visible above the bursal opening, 1, visible above the bursal opening (Fig. 67).
16. Externally coiled epigynal ducts; 0, not visible between bursal openings, 1, visible between bursal openings (Fig. 92).
17. Number of spermathecal lobes; 0, one, 1, two posterior lobes 2, one posterior lobe, one anterior lobe, 3, one anterior lobe, two posterior lobes. Within *Mallos* there has been a trend towards more complex internal female genitalia (for detailed discussion see text). This could be quantified as the number of spermathecal branches or ‘lobes’. The plesiomorphic character state is one, with two and three lobes being more derived. However, in the *M. niveus* subclade two lobes would be homoplasious due to the loss of the bifurcation of the posterior lobe. The two spermathecae of *M. niveus* and *M. hystrix* are not homologous (see Fig. 7), therefore, we have scored the number of anterior and posterior lobes as two different character states.
18. Bursal openings; 0, not heavily scleritized, 1, heavily scleritized (Fig. 51).
19. Cribellum; 0, undivided, 1, divided. (Figs 8, 9)
20. Thoracic groove; 0, prominent, 1, weak.
21. Cheliceral colouration; 0, light, 1, black.
22. Cheliceral markings; 0, absent; 1, present- anterior surface with horizontal black stripe (Fig. 31).
23. Dorsal abdominal colouration; 0, Dark centre patch with pairs of spots down dorsal/ lateral surface (Fig. 104), 1, anterior anchor shaped mark (Fig. 41), 2, mottled colour pattern (Fig. 91) 3, chevron colour pattern (Fig. 35), 4, solid white with an anterior I-shaped mark (Fig. 64).
24. Median line on venter of abdomen; 0, present, 1, absent.
25. Cheliceral retromargin; 0, 0–1 tooth, 1, 2–3 teeth
26. Posterior eye row; 0, straight, 1, slightly recurved.

**DISCUSSION**

**Systematics**

Six equally most parsimonious cladograms with a consistency index (CI) of 0.84, a retention index (RI) of 0.92, and a length of 44 steps were obtained with the Branch and Bound algorithm of PAUP. The analysis was then repeated based on
characters reweighted using the Successive Character Weighting option. The weight assigned to each character was based on the rescaled consistency index of that character for all trees in memory (Swofford, 1991). This analysis produced six equally most parsimonious cladograms (CI=0.93, RI=0.96), identical in topology to the cladograms produced in the unweighted analysis. Figure 7 is a strict consensus tree of the six cladograms obtained from the unweighted analysis.

The six cladograms of equal length differed in their resolution of the *Mexitlia* clade (Fig. 7) and the outgroup taxa relative to each other. More resolved cladograms (not shown) united *Mexitlia grandis* (O. Pickard-Cambridge, 1896) and *Mexitlia trivittata* on the basis of character 2, a feature of the male palp. However, as *Mexitlia alta* is known only from females, this dichotomy does not seem justified. Additionally, these more resolved cladograms differentially united the outgroup taxa with each other. We have chosen to accept the strict consensus of the six cladograms, a tree with less resolution because: (1) we cannot rule out the possibility that character state 2 is actually a synapomorphy for the *Mexitlia* clade and (2) resolution of the outgroup taxa relationships is beyond the scope of this study.

This consensus cladogram (Fig. 7) supports the monophyly of the *Mallos-Mexitlia* clade. Synapomorphies of this clade are: (1) the loss of the RTA (character 1, state 1), (2) the loss of the lateral foveae of the epigynum (character 12, state 1), and (3) the increase in number of retromarginal teeth (character 25, state 2). Lehtinen’s (1967) hypothesis that *Mallos* is a polyphyletic genus is not supported, however, division of the genus into *Mallos* and *Mexitlia* is. The *Mexitlia* clade is supported by the presence of: (1) a triangular projection on the distal, retrolateral margin on the tibia of the male palp (character 2, state 1), (2) a lateral ridge on the femur of the male palp (character 6, state 1), and (3) a thickened femur of the first leg (character 8, state 1). The monophyly of *Mallos* is supported by the presence of guanine deposits in the lateral margins of the carapace. Based on features of the male pedipalp shared by *Emblyna* and *Mexitlia* (e.g. a thick, bifurcate embolus), *Emblyna* is the most likely outgroup to the *Mallos-Mexitlia* clade. Therefore, the loss of an unbranched embolus tip (character 5, state 1) and the presence of a thin embolus are also likely *Mallos* synapomorphies.

**Female genitalia**

Within *Mallos*, there is a trend towards a more complex internal female genitalia. *Mallos hesperius* and *M. margaretae*, sister species (component 4, Fig. 7) found exclusively in the Neotropics, have retained features we consider to be primitive in the dictynids. These include an unbranched, contiguous pair of spermethecal ducts (characters 9, 10, 11, 13 and 14) and a minute size (< 3.40 mm in length). The rest of the *Mallos* species are typically larger in size and have more complex, diverticulate spermethecal ducts. This genitalic pattern first appears in *M. gregalis* as a branched posterior spermethecal lobe. An anterior lobe is added in *M. blandus*. In *M. macrolirus* this anterior lobe is elongate, and in the remainder of the clade it is coiled. The *M. niveus-M. pearcei* subclade (component 12, Fig. 7) has only a single posterior spermethecal lobe, however, the lobe is long and convoluted. These differences in the internal ducts and spermethecae may serve as a postmating, prezygotic reproductive isolating mechanism in sympatric species.
Divided cribellum

The presence or absence of a median division of the cribellum has traditionally been an important character in the grouping of cribellate spiders (Lehtinen, 1967). In some families (e.g. Amaurobiidae, Filistatidae, and Dinopidae), all members have a divided cribellum, whereas in others (e.g. Hypochilidae and Uloboridae), all members have an undivided cribellum. However, the Mallos clade demonstrates the plasticity of this feature: species with both undivided (Fig. 8) and divided cribella (Fig. 9) are found within the same subclade. A synapomorphy for the M. gertschi-M. pearcei subclade (component 11, Fig. 7) is the divided cribellum (character 19). However, both M. mians and M. pearcei have regained an undivided cribellum. The inclusion of species with both types of cribella in the same subclade, suggests that the functional advantage of a divided cribellum may be minimal.

Social behaviour

Of the 105 recognized spider families (Platnick, 1993), only 11 contain species that display some degree of social behaviour (Burgess, 1978) and only six of these families (Avilés, 1993) contain genera with species that meet Kullman’s (1972) criteria for social ‘status’, or would be considered non-territorial permanently social by D’Andrea (1987). Kullman’s definition of a social spider (Foelix, 1982), and D’Andrea’s definition of non-territorial permanently social (Avilés, 1993), would be considered ‘quasisocial’ with respect to Michener’s (1969) classification of social stages (as summarized by Wilson, 1971). For spiders to exhibit true social behaviour (semisocial or eusocial), a reproductive division of labour among individuals of the same sex must exist, a phenomenon that has not been discovered in spiders (Avilés, 1993).

A number of studies have compared spider species with varying degrees of social interaction (e.g. Jackson, 1977, 1979, 1980, 1982). Many of these studies, particularly those of Jackson, have focused on dictynids, with an emphasis on the genus Mallos, as this genus is known to contain species that are asocial (M. niveus), communal (Mexitlia trivittata), and quasisocial (Mallos gregalis). If comparative studies are to be of maximum value, they must take into account the phylogenetic history of the taxa involved (Harvey & Pagel, 1991). With the cladogram of the genus Mallos, it is possible to test the hypothesis that the quasisocial state has evolved once in the genus Mallos and that less well developed social states reflect a transformational series leading to this state.

Figure 10 uses the character trace option of MacClade 3.0 (Maddison & Maddison, 1992) to map the known social behaviours of Mallos and Mexitilia species on the group’s phylogeny. The lack of a clear phylogenetic trend toward quasisocial behaviour in the genus Mallos shows that, within this genus, as within the Araneomorphae, this behaviour has evolved independently a number of times. Thus, caution should be used when drawing conclusions about the evolution of social behaviour from comparative studies of Mallos species.

KEY TO SPECIES OF MALLOS AND MEXITILIA

Females

1. Lateral margins of carapace with distinct white band (Figs 1, 2) Mallos (2)
   Lateral margins of carapace without distinct white band (Fig. 3) ........
   ................................................................. Mexitilia (15)
Figure 10. Cladogram of Mallos and Mexitlia species showing the social behaviours of each species. Numbers indicate: 1, collections have very few specimens per vials; 2, personal field observations; 3, Foelix, 1982; 4, Jackson, 1979; 5, Witt et al., 1978; 6, Jackson, 1977.

2(1). Abdominal colour pattern formed of alternating dark green and yellow chevrons (Fig. 35), transverse band on anterior surface of chelicerae (Fig. 31) ..................................................... 3
Abdominal colour pattern not formed of alternating dark green and yellow chevrons, anterior surface of chelicerae with or without transverse band

3(2). Posterior eye row recurved by 1/2 the diameter of PME, epigynal ducts unbranched (Fig. 29) ........................................ 4
Posterior eye row straight; epigynal duct with two large lobes (Fig. 38) typically found in large colonies ......................... gregalis

4(3). Epigynal bursae are separated by six times their diameter, epigynal ducts visible as two small circles in centre of epigynum (Fig. 28) ......... margaretae
Epigynal bursae separated by twice their diameter, epigynal ducts visible as a trapezoid in centre of epigynum (Fig. 32) ................. hesperius

5(2). Brown anchor shaped mark on dorsum of abdomen (Fig. 41), anterior surface of chelicerae with dark transverse band, epigynal duct with two large lobes ........................................ bryanti
Anterior surface of chelicerae without dark transverse band, epigynal ducts with two or three lobes, if bilobed, two small posterior lobes (Fig. 51) or one coiled anterior lobe and one elongate posterior lobe (Fig. 78) ....... 6

6(5). Epigynal duct with a small bifurcate posterior lobe, opening of epigynum heavily sclerotized (Fig. 51) ............................ 7
Epigynal duct trilobed, or if bilobed, anterior lobe coiled; epigynal opening not heavily sclerotized (Fig. 68) ............................. 8
7(6). Epigynum without distinct bursal rims, bursae open as a pair of dark anteriorly positioned spots (Fig. 50) ........................................... dugesi
Epigynum with distinct curved bursal rims that open laterally (Fig. 54) . . . .......................................................... kraussi
8(6). Epigynal duct with three lobes: one anterior lobe, coiled (Fig. 68) or uncoiled (Fig. 61), and two posterior lobes ........................................... 9
Epigynal duct with two lobes: one coiled anterior lobe and one elongate posterior lobe (Fig. 78) .................................................. 12
9(8). Cribellum divided (Fig. 9) ........................................... 10
Cribellum undivided (Fig. 8) ........................................... 11
10(9). Bursal rim U-shaped with opening directed anteriorly (Fig. 71) . . . gertschi
Bursal rim convex relative to centre of epigynum with short sclerotized ridge that runs parallel to the epigastric furrow (Fig. 67) .............. chamberlini
11(9). Abdomen uniformly white with I-shaped mark on cardiac region (Fig. 64), anterior lobe of epigynal duct elongate but uncoiled (Fig. 68) macrolirus
Abdomen with brown anchor shaped mark, anterior lobe of epigynal duct short and straight (Fig. 61) ........................................... blandus
12(8). Cribellum divided (Fig. 9) ........................................... 13
Cribellum undivided (Fig. 8) ........................................... 14
13(12). Bursal rims of epigynum concave, separated by 1.5 times their width, relative to centre of epigynum, enclosing a dark patch (Fig. 77); coiled anterior epigynal lobe horizontally oriented (Fig. 78), but not visible externally . . . .................................................................. niveus
Concave bursal rims of epigynum almost contiguous (Fig. 81); coiled anterior epigynal duct visible externally and vertically positioned . . . . pallidus
14(12). Lengths of epigynal bursae 1/2 that of epigynum, separated by twice their width (Fig. 92) ........................................... pearsiei
Lengths of epigynal bursae 1/3 that of epigynum, separated by 7 times their width (Fig. 87) ........................................... mians
15(1). Epigynal bursae almost contiguous, length of bursae greater than width (Fig. 105) .................................................. 16
Epigynal bursae separated by a small central scape, width of bursae greater than length (Fig. 100) ........................................... trivittata
16(15). Epigynal bursae extend to centre of epigynum, epigynal ducts separated medially by 1/2 their diameter (Fig. 98) .................. altima
Epigynal bursae extend to epigastric furrow, epigynal ducts nearly contiguous (Fig. 105) ........................................... grandis

Males

1. Embolus diameter small, embolus tip unbranched (Fig. 12) . . . Mallos (2)
Embolus diameter large, embolus tip bifurcate (Fig. 11) . . . Mexitlia (11)
2(1). DiTA terminus corkscrew shaped (Fig. 20) .................. 3
DiTA terminus C-shaped (Fig. 17), oval shaped (Fig. 19), curled (Fig. 79), or slender with triangular tab (Fig. 18) .................. 5
3(2). Total length less than 2.20 mm, posterior eye row recurved 1/2 the diameter of the PME .................................................. hesperius
Total length greater than 3.20 mm, posterior eye row straight .......... 4
4(3). DiTA terminus has a sharp point (Fig. 73), no sclerite under embolus base, chelicerae widely emarginated (bowed) (Fig. 70) ........... gertschi
DiTA terminus has a blunt end, rounded sclerite under lateral margin of embolus base (Fig. 62), chelicerae only slightly emarginated.

5(2). DiTA terminus abruptly bent and folded back over on itself to form a distinct curl (Fig. 79). .................. niveus
DiTA terminus C-shaped, oval shaped, or slender projection with distal triangular tab ...................................... 6

6(5). DiTA terminus oval shaped ........................................ 7
DiTA terminus slender projection with distal triangular tab ........ 9
DiTA terminus C-shaped ........................................ 10

7(6). Proximal/leading edge of DiTA terminus straight and oriented perpendicular to the long axis of the cymbium (Fig. 83). .......... pallidus
Proximal/leading edge of DiTA terminus rounded (Fig. 89) ......... 9

8(7). Tip of leading edge of DiTA terminus overlaps more proximal edge of terminus (Fig. 94) ................................................ pearcei
Tip of leading edge of DiTA terminus does not overlap more proximal edge of terminus (Fig. 89) .................................. mians

9(6). Brown anchor shaped mark on dorsum of abdomen (Fig. 40), anterior surface of chelicerae does not extend beyond clypeus .......... dugesi
Dorsum of abdomen solid greyish green, anterior surface of chelicerae extends beyond clypeus ..................... kraussi

10(6). Dorsum of abdomen with dark brown anchor-shaped mark, cephalic region has a wide, tan median line (Fig. 42) .................. bryanti
Dorsum of abdomen without dark brown anchor; carapace uniform in colour ........................................ gregalis

11(1). DiTA terminus runs parallel to length of cymbium (Fig. 102) .... trivittata
DiTA terminus nearly perpendicular to length of cymbium (Fig. 108) .......................................................... grandis

_Mallos_ O. Pickard-Cambridge, 1902
(Figs 27–95)

_Mallos_ O. Pickard-Cambridge, 1902, p. 308 (juvenile holotype BMNH, not examined).
_Dictynina_ Banks, 1904, p. 342.
_Coenothele_ Simon, 1909, p. 376.
_Dictynoides_ Chamberlin, 1919b, p. 243.

_Type Species_
_Mallos niveus_ O. Pickard-Cambridge, 1902, by original description.

_Diagnosis_. Like its sister genus, _Mexilia_, _Mallos_ is characterized by the loss of the male retrolateral tibial apophysis and the putative correlated loss of the lateral foveae of

In *Mexitlia* the embolus of the male palp is very thick and has a bifurcate tip (Fig. 11), whereas the embolus of *Mallos* males is much thinner and has an unbranched tip (Fig. 12). Additionally, both male and female *Mallos* species have a distinct, continuous, white band of guanine deposits circumventing the lateral margins of the carapace (Figs 1, 2). With the exception of four species, *M. margaretae*, *M. hesperius*, *M. gregalis*, and *M. macrolirus*, the female members of this genus all have a distinctive anchor-shaped mark on the anterior dorsal surface of the abdomen (Figs 1, 2).

**Female.** TL 2.08–6.64. CPW typically 3/5 CW. Thoracic groove, when evident, consists of shallow, bowl-shaped depression located just posterior to cephalic region. Carapace dark orange or brown, in most species clothed with 5 rows of thick white setae: three rows extending length of cephalic region, two additional rows located anterior laterally. Carapace usually uniform in colour, some species cephalic region with light median band. Distinct white band circumventing lateral margins of carapace.

PER straight, or, if recurved, only by 1/2 PME diameter. Borders of eyes with thin black border, few species with heavy black pigment. AME, ALE and PME round, equal in size, ALE usually oval, slightly larger than other eyes. AME-AME, ALE-AME, ALE-PME, separated by distance approximately equal to ALE diameter. ALE-PLE separated by 1/5 AME diameter. PME-PME, PME-PLE separated by approximately one PME diameter.

CLYP 1–2 times one AME diameter, covered in thick white setae. Cheliceral width approximately 1/2 CHEL. Chelicerae with 3 promarginal teeth, median tooth approximately 2 times larger than others, 2–3 small retromarginal teeth. Chelicerae usually unmarked, similar in colouration to carapace, some species with transverse anterior band or black coloration. Endites, sternum and labium light orange, tan, or brown. In some species labium noticeably darker in colour. Labium width equal to, or slightly greater than length. Endite width 1/2 length. Sternum oval with concave or straight anterior margin. Sternum width 0.24–1.00 × length.

Legs coloration variable, some species with distinct banding. Leg formula I-II-IV-III or I-IV-IV-III, with lengths of legs II, IV similar. Calamistrum uniserrate, measuring 2/3 META4. 2–3 trichobothria on dorsal surface of tarsus, 2 rows on dorsal surface of tibia.
Abdomen oval, dorsum of most species with brown anchor shaped mark or chevron colour pattern (Figs 1, 2). Cribellum undivided (Fig. 8) or divided medially by thin sclerotized ridge (Fig. 9). Epigynum lacks lateral foveae. Sclerotized rims of epigynal bursae directed medially or laterally. In most cases, epigynal ducts are visible externally. Internally, epigynal ducts either simple, unbranched or diverticulate. (Figs 13–15).

*Male.* TL 1.30–6.72. CPW 3/5 that of CW. Thoracic groove, located just posterior
to cephalic region like that of female. Carapace coloration, setal pattern like female. PER straight or recurved 1/2 diameter of PME. Eye pigmentation like female. Eyes equal in diameter, ALEs in some individuals slightly larger. AME-AME, AME-ALE, AME-PME, separated by AME diameter. ALE-PLE separated by 1/5 AME diameter. PME-PME, PME-PLE separated by one PME diameter.

CLYP 1–2 × one AME diameter. Chelicerae elongate, CHEL 2 × width. Anterior distal margin of chelicerae keeled in most species. Cheliceral emargination varies from widely emarginated to slightly emarginated. Some species anterior dorsal surface of chelicerae extends anterior to clypeus. Cheliceral dentition like females. Coloration of endites, sternum, and labium like females. Most species LABL equal to width, however, some individuals labium is longer than it is wide. Sternum oval, anterior margin straight or concave. Leg coloration like females. Leg formula as in female. Abdomen oval, coloured like female.

Features of male palp are illustrated in Figure 16. Palp lacks retrolateral tibial apophysis. Sclerites of the palp (Fig. 16) consist of a thin unbranched embolus (E) that originates from round or oval base (B) between 8:00 and 12:00 position and a Dictynid Tegular Apophysis (Coddington, 1990) (DiTA). DiTA comprises a conductor (C) and a terminus (T). While most features of male palp do not differ among
Mallos species, most species have distinct DiTA-T. Figures 17–20 illustrate the four basic types of DiTA-T: C-shaped (Fig. 17), elongate with triangular tip (Fig. 18), oval shaped (Fig. 19), and thick corkscrew shaped (Fig. 20). CYMBL 1.5–2.00 × longer than wide.

Distribution. American Pacific and Southwest, extending into Mexico and Central and South America (Figs 21–26).

Misplaced species. *Dictyna flavovittata* Keyserling, 1880, combined with *Dictyna novem-punctata* Simon, 1892 (female holotype, in MNHN, examined) and placed into *Mallos* by Lehtinen (1967) is probably a *Dictyna* species.

*Dictyna nigrescens* di Caporiacco, 1955 (female holotype from Venezuela, in MZU; examined) is probably an Amaurobiidae species.
Mallos margaretae Gertsch, 1946

Diagnosis. This species closely resembles its sister species, Mallos hesperius. Like the females of this species, they have a total length less than 3.40, a posterior eye row that is slightly recurved and dark eye borders, particularly those of the AMEs. The epigynum of both has a pair of centrally located, heavily sclerotized, spermathecae. The widely separated bursal openings of M. margaretae are reduced in size and are only slightly longer than wide (Fig. 20). Those of M. hesperius are longer than wide and are more closely spaced. Like species of Dictyna and Emblyna, the epigynal ducts appear externally as two dark circles between the bursae.

Female (1). TL 3.32, CL 1.09, CL 1.04 × width, CPW 0.57 × CW. Weakly developed thoracic groove, when evident, located just posterior to cephalic region, 0.83 × CL from anterior carapace margin. Carapace, uniform dusky tan. Most setae have fallen off the specimen, although it appears that this species has typical 5 narrow rows of thick white setae found in most Mallos species.

PER most individuals slightly recurved by one-half PME diameter. Borders of eyes, particularly AMEs with heavy black pigmentation. Eyes equal in diameter, ALEs slightly larger. ALEs separated by 0.30 diameter, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.33 ×, AME-ALE 1.00 ×, AME-PME 1.33 ×, ALE-PLE 0.33 ×. PLEs separated by 0.40 diameter, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.67, PME-PLE 1.67.

CLYP 1.33 × AME diameter. CHEL 6.00 × CLYP. CHEL 1.85 × width. Chelicerae with 3 small retromarginal teeth. Chelicerae have wide dark median transverse band on their anterior surfaces (Fig. 31). Labium slightly darker in colour than endites and sternum. Endites and sternum pale yellow. LABL 0.83 × width. ENDL 1.5 × width. STRL 0.74, 1.28 × width. Anterior margin of sternum slightly concave. Legs light yellow with no distinct banding pattern. Leg formula assumed to be I-II-IV-III (articles of LI missing), with leg II only slightly longer than leg IV. Lengths of Leg1 and LegIV articles: FEM1 1.34, FEM4 1.14, PAT4 0.36, TIB4 0.90, MET4 0.84, TAR4 0.46, CALM 0.70 times MET4.

ABDL 1.58 × width. Dorsum pattern very faded, appears to have been a chevron-like colour pattern, however, abdominal colour pattern illustrated as observed from preserved specimen (Fig. 27). Lateral surfaces of abdomen have dark stripe on anterior two thirds. Venter uniformly light yellow, lacking median line typical of most Mallos species. Cribellum undivided. Bursae situated anteriorly, their sclerotized rims widely separated, convex relative to centre of epigynum. Single pair of simple contiguous, heavily sclerotized spermathecae lie in centre of epigynum, are visible externally as two heavy dark circles (Figs 28, 29).

Distribution. Panama and Costa Rica

Material examined. COSTA RICA: San José, 3 ♀ (E. Schmidt, AMNH). PANAMA: El Volcán Chiriquí, 1 ♀ (26 Feb. 1936, W. J. Gertsch) AMNH.

*Mallos hesperius* (Chamberlin, 1916)

(Figs 30–34)

*Dictyna hespera* Chamberlin, 1916, p. 60, Fig. 6 (female holotype from San Miguel, Peru in MCZ, examined).

*Mallos apanus* Gertsch, 1946, pp. 8, 9, Figs 5, 6 (male holotype and female allotype from Apa, Paraguay, in AMNH, examined).

Diagnosis. Females similar to those of *M. margaretae*. The bursae of *M. hesperius* are longer than wide (Fig. 33), whereas, those of *M. margaretae* are equal in length and width. In many individuals the epigynal ducts appear externally as a dark trapezoid between the bursae. Males of this species are best identified by being less than 2.08 long, and having a thin corkscrew-shaped DITA-T (Fig. 32).

Female (7). TL 2.16–3.16, CL 0.80–1.10, CL 1.00–1.25 × CW, CPW 0.53–0.59 × CW. Weakly developed thoracic groove, when evident, located just posterior to cephalic region, 0.80–1.00 from anterior carapace margin. Carapace, uniform dusky tan, with 5 narrow rows of thick white setae; three rows extending length of cephalic region, two additional rows located anterior laterally.

PER most individuals slightly recurved by one-half diameter of PME. Borders of eyes, particularly AMEs, with heavy black pigmentation. AMEs, PMEs and PLEs equal in diameter, ALEs slightly larger. ALEs separated by 0.24–0.30, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.67–1.00 ×, AME-ALE 0.67–1.00 ×, AME-PME 1.00–1.33 ×, ALE-PLE 0.67 ×. PLEs separated by 0.32–0.34, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.00–2.00 ×, PME-PLE 1.00–1.67 ×.

CLYP 0.67–1.33 × one AME diameter. CHEL variable, 4.75–10.00 × CLYP, 2.00 × width. Chelicerae with 2 small retromarginal teeth. Chelicerae have a wide dark median transverse band on their anterior surfaces (Fig. 31). Labium, endites and sternum pale yellow. LABL 0.75–1.00 × width. ENDL 1.85–2.00 × width. STRL 0.56–0.68, 1.18–1.26 × width. Anterior margin of sternum straight. Legs light yellow with light, non-distinct, dusky grey bands on tibia and femur. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of Leg I and Leg IV articles: FEM1 1.30, PAT1 0.32, TIB1 1.11, MET1 0.84, TAR1 0.50, FEM4 1.11, PAT4 0.30, TIB4 0.95, MET4 0.82, TAR4 0.45. CALM 0.63–0.71 × MET4.

ABDL 1.29–1.68 × width. Dorsum of most individuals with alternating, dark green and yellow chevrons. Lateral surfaces abdomen with dark stripe anterior two thirds. Venter, uniformly light yellow, lacking median line typical of most *Mallos* species. Cribellum undivided. Bursae situated anteriorly, their sclerotized rims widely separated, convex relative to centre of epigynum. Pair of simple contiguous, heavily sclerotized spermethecae at centre of epigynum; visible externally as dark trapezoid (Figs 33, 34).

Male (1). TL 2.08, CL 0.94, CL 1.20 × CW. CPW 0.59 × that of CW. Weakly developed thoracic groove, when evident, located just posterior to cephalic region, 0.70 CL from anterior carapace margin. Carapace colour and setal pattern like female.

PER slightly recurved by one-half PME diameter. Borders of eyes, particularly AMEs, have heavy, black pigmentation. ALEs, PMEs, PLEs equal in diameter, AMEs slightly smaller. ALEs separated by 0.22, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.67 ×, AME-ALE 0.67 ×, AME-PME 1.00 ×, ALE-PLE 0.67 ×. PLEs separated by 0.30, remaining posterior eye inter-distances, expressed as PME diameters: PME-PME 0.75 ×, PME-PLE 0.75 ×.

CLYP 1.33 × one AME diameter. CHEL 5.25 × CLYP, 2.10 × width. Chelicerae slightly emarginated; anterior dorsal surface not extending anterior to clypeus. Chelicerae with 2 small retromarginal teeth. Labium, endites and sternum pale yellow. LABL 0.90 × width. ENDL 1.86 × width. STRL 0.60 long, 1.30 × width. Anterior margin of sternum concave. Leg colour and formula as in female. Lengths
of LegI and LegIV articles: FEM1 1.20, PAT1 0.30, TIB1 1.08, MET1 0.82, TAR1 0.48, FEM4 0.98, PAT4 0.26, TIB4 0.80, MET4 0.76, TAR4 0.40.

ΔBDL 1.67 × width. Dorsum solid greyish green without distinct markings (Fig. 32). Embolus originates at 11:00 from an oval base. CYMB 1.89 × width.

Distribution. From Southern Mexico through Central America and into Peru and Paraguay.


Mallos gregalis (Simon, 1909)

(Figs 28–33)

Coenothel e gregalis Simon 1909, p. 736 (male and female holotypes from Sierra de Hapuguala, Mexico, in MNDM, examined).

Coenothel e gregalis Berland, 1913, p. 27, Figs 27–30.

Mallos gregalis Chamberlin and Gertsch, 1958, p. 37, Figs 9, 14, 15.

Diagnosis. The females of this species closely resemble M. hesperius and M. margaretae in size, abdominal colour pattern, and cheliceral markings. However, the posterior eye row is not recurved and the epigynum has a pair of heavily sclerotized, bifurcate, spermethcae (Fig. 37). The males of this species are small, less than 3.20 in length. C-shaped Dita-T, like that of M. bryanti, however, in M. gregalis the cymbium length is only 1.5 times its width, whereas, in M. bryanti it is twice the cymbium width.

Female (♀). TL 3.16–3.88, CL 1.28–1.60, CL 1.12–1.28 × CW, CPW 0.63–0.66 × CW. Weakly developed thoracic groove, when evident, located just posterior to cephalic region, 0.98–1.30 from anterior carapace margin. Carapace dark brown, covered in thick white setae.

PER straight. Borders of eyes only lightly pigmented. Eye diameters 0.08, ALEs slightly larger 0.10. ALEs separated by 0.34–0.38. Remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00 × , AME-ALE 1.00 × , AME-PME 1.00 × , ALE-PLE 0.50 × . PMEs separated by 0.32–0.34. Remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.25–1.50 × , PME-PLE 1.25–1.50 ×.

CLYP 1.00–1.25 × one AME diameter. CHEL 6.20–7.00 × CLYP. CHEL 1.87–2.07 × width. Chelicerae with 3 small retromarginal teeth. Chelicerae with wide dark median transverse band on anterior surfaces. Labium, endites, sternum dark brown like carapace. LABLE 0.71–1.00 × width. ENDL 1.82–2.27 × width. STRL 0.70–0.92, 1.14–1.17 × width. Anterior margin of sternum slightly concave. Legs light brown. Tibia and distal 2/3 of femur LI and LII have dark bands. Leg formula I-IV-II-III, with leg IV only slightly longer than leg II. Mean lengths of LegI
and LegIV articles: FEM1 1.29, PAT1 0.40, TIB1 1.07, MET1 0.87, TAR1 0.56, FEM4 1.15, PAT4 0.43, TIB4 0.87, MET4 0.85, TAR4 0.39. CALM 0.57±0.81 × MET4.

ABDL 1.36–1.42 × width. Dorsum of most individuals with alternating, dark green and yellow chevrons (Fig. 35). Lateral surfaces of abdomen lacking distinct markings. Venter with median line. Cribellum undivided. Bursae situated anteriorly, their sclerotized rims concave relative to centre of epigynum. Single pair of bifurcate, heavily sclerotized spermethecae positioned directly above epigastric furrow, visible externally as small dark circles.

**Male (3).** TL 3.00–3.20, CL 1.24–1.32, CL 1.10–1.13 × CW, CPW 0.65–0.67 × CW. Weakly developed thoracic groove, when evident, located just posterior to cephalic region. Carapace colour and setal pattern like female (Fig. 36).

PER straight. Borders of eyes lack heavy, black pigmentation. Eye diameters same as in female. ALEs separated by 0.36–0.52, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.75–1.75 ×, AME-ALE 1.00–1.50 ×, AME-PME 1.00–1.25 ×, ALE-PLE 0.50–0.68, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.50–2.50 ×, PME-PLE 1.25–2.00 ×.

CLYP 1.25–2.00 × one AME diameter. CHEL 4.00–7.00 × CLYP, CHEL 1.78–2.46 × width. Chelicerae slightly emarginated, anterior dorsal surface not extending anterior to clypeus. Chelicerae with 3 small retromarginal teeth. Labium and sternum darker brown in colour than endites. LABL 0.94–1.00 × width, ENDL 0.72–0.82, 1.13–1.17 × width. Anterior margin of sternum concave. Leg colour and leg formula like female. Mean lengths of LegI and LegIV articles: FEM1 1.37, PAT1 0.45, TIB1 1.18, MET1 0.91, TAR1 0.58, FEM4 1.11, PAT4 0.41, TIB4 0.89, MET4 0.91, TAR4 0.40.

ABDL 1.49–1.57 × width. Dorsal colouration like female, however, markings much lighter in colour (Fig. 36). Light stripes down sides of abdomen. Venter with grey median line.

The DiTA-T C-shaped with its tip directed outward and away from embolus base (Figs 39, 40). Embolus base is oval, angled away from embolus-embolus base junction. Embolus originates at 11:00. CYMB 1.50–1.57 × width.

**Distribution.** Southern Mexico (Fig. 21).

**Material examined.** MEXICO: Jalisco, Guadalajara: 1 ♀ (Jul. 1974, from colony in Raleigh, NC, R. Jackson, AMNH); 1 ♀ (Jul. 1974, W. Buress, AMNH); Dignet: Cerro de Huejotitlan, ♀ ♂ AMNH.

*Mallos bryanti* Gertsch, 1946 *(Figs 41–46)*

*Mallos bryanti* Gertsch, 1946, p. 6, Figs 2, 3 (male holotype and female paratype from Arizona, Santa Rita Mtns., in AMNH, examined).

**Diagnosis.** The male and female genitalia of this species closely resemble those of *M. gregalis*. Females of both species have a heavily sclerotized, bifurcate spermathecae and the anteriorly situated bursae are concave relative to the centre of the epigynum, males have a C-shaped DiTA terminus oriented away from the embolus base.
However, the total length of *M. bryanti* females is greater than 4.32, whereas *M. gregalis* individuals are less than 4.00 long. Both female and male *M. bryanti* have a distinct anchor-shaped marking on the dorsal surface of the carapace as well as a distinct dark yellow band down the centre of the carapace. This contrasts with the uniform carapace colouration and chevron abdominal pattern of *M. gregalis*.

**Female** (5). TL 4.32–5.73, CL 1.52–1.96, CL 1.00–1.23 × CW, CPW 0.55–0.61 × CW. Prominent thoracic groove, located just posterior to cephalic region, 1.08–1.42 from anterior carapace margin. Carapace, dark brown with yellow median line, with 5 narrow rows of thick white setae; three rows extending length of cephalic region, two additional rows located anterior laterally.

PER straight. Borders of eyes without heavy pigmentation. Eye diameters 0.08, ALEs slightly larger 0.09–0.10. ALEs separated by 0.34–0.38. Remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.75–1.25 ×, AME-ALE 0.75–1.25 ×, AME-PME 1.00–1.25 ×, ALE-PLE 0.25 ×. PLEs separated by 0.46–0.60. Remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.25–2.00 ×, PME-PLE 1.25–1.75 ×.

CLYP 1.00–1.50 × one AME diameter. CHEL 6.40–7.75 × CLYP. CHEL 2.10–2.67 × width. Chelicerae with 2 small retromarginal teeth. Chelicerae have wide dark median transverse band on their anterior surfaces. Labium, endites and sternum dark brown, labium slightly darker in colour. LABL 0.81–1.00 × width. ENDL 1.83–2.18 × width. STRL 0.94–1.20, 1.27–1.33 × width. Anterior margin
of sternum concave. Legs light brown with light, non-distinct, dusky grey bands on distal patella and tibia. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of LegI and LegIV articles: FEM1 2.03, PAT1 0.62, TIB1 1.83, MET1 1.48, TAR1 0.79, FEM4 1.45, PAT4 0.54, TIB4 1.20, MET4 1.15, TAR4 0.49. CALM 0.46±0.71 × MET4.

ABDL 1.15–1.43 × width. Dorsum of most individuals with distinct anchor-shaped mark, two additional posterior stripes (Fig. 41). Lateral surfaces of abdomen have no distinct markings. Venter with dark median line. Tips of spinnerets black. Cribellum undivided. Bursae located anteriorly, their sclerotized rims concave relative to centre of epigynum. Epigynal ducts with a simple pair of heavily sclerotized, bifurcate, spermtheca (Fig. 44) that are visible externally as hazy black patches posterior to bursal openings (Fig. 43).

**Male** (6) TL 3.72–4.98, CL 1.68–2.36, CL 1.23–1.39 × CW. CPW 0.60–0.65 × CW. Prominent thoracic groove located just posterior to the cephalic region, 0.57–0.78 × CL from anterior carapace margin. Carapace colour and setal pattern like female except much darker in colour (Fig. 42).

PER straight. Borders of eyes without heavy, black pigmentation. Eye diameters 0.08, ALEs slightly larger 0.10. ALEs separated by 0.42–0.52, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00–1.50 ×, AME-ALE 0.75–1.25 ×, AME-PME 1.75 ×, ALE-PME 0.25 ×. PMEs separated by 0.54–0.74, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.50–2.25 ×, PME-PLE 1.50–2.25 ×.

CLYP 1.50–2.75 × one AME diameter. CHEL 5.45–8.00 × CLYP, 2.29–2.46 × width. Chelicerae emargination variable, anterior dorsal surface not extending anterior to clypeus. Chelicerae with 2 small retromarginal teeth. Labium, endites, sternum dark brown. Labium longer than wide: LABL 1.05–1.25 × width. ENDL 1.89–2.27 × width. STRL 0.90–1.30, 0.69–1.53 × width. Anterior margin of sternum straight. Legs dark brown, distal 2/3 of femurs I and II with dark band (Fig. 42). Leg formula I-II-IV-III, with leg II exceptionally longer than leg IV. Mean lengths of LegI and LegIV articles: FEM1 2.57, PAT1 0.70, TIB1 2.42, MET1 1.83, TAR1 0.84, FEM4 1.54, PAT4 0.53, TIB4 1.29, MET4 1.29, TAR4 0.54.

ABDL 1.35–1.75 × width. Dorsum female (Fig. 42). No distinct lateral markings. Ventral abdomen with dark median line, black patch in centre and red anterior spot.

DiTA-T open C-shape tip directed outward and away from embolus base (Figs 45, 46). Embolus originates from round base at 11:00. CYMBL 1.82–2.05 × width.

**Distribution.** Southwestern New Mexico, southern Arizona, and northern Mexico (Fig. 21).


*Mallos dugesi* (Becker, 1886)

(Figs 47–53)

*Dictyna dugesi* Becker, 1886, p. xxiii

*Dictynoides arizonensis* Chamberlin, 1919b, p. 244, Fig. 1 (female holotype from Arizona, Huachuca Mts. in MCZ, examined).

*Mallos arizonensis* Gertsch and Davis, 1942, p. 17.  

Diagnosis. This species closely resembles its sister species *M. kraussi*. The epigyna of both have two posteriorly positioned small bifurcate spermethcae. In females of
both species the dorsum of the abdomen bears an anchor-shaped mark. Externally the epigynum of *M. dugesi* appears as two black spots with no visible openings (Fig. 50), whereas females of *M. kraussi* each have distinct bursal openings (Fig. 54). The palps of male *M. dugesi* and *M. kraussi* each have a thin, elongate DiTA-T with a small triangular extension and an embolus that originates from the base at 8:00 position. However, *M. dugesi* males have a distinct anchor-shaped mark on their dorsum, while the male *M. kraussi* specimen does not.

**Female** (10). TL 3.56–5.64, CL 1.60–2.16, CW 1.11–1.35 × CW, CPW 0.54–0.63 × CW. Prominent, but shallow, thoracic groove, located just posterior to cephalic region, 1.14–1.66 from anterior carapace margin. Carapace margins light brown, cephalic region slightly lighter in colour. Five narrow rows of thick white setae intermingled with thin black setae: three rows extending the length of cephalic region, and two additional rows located anterior laterally. One row of single black setae down centre of carapace.

PER straight. Borders of eyes without heavy black pigmentation. Eye diameters variable: AME 0.06–0.08, ALE 0.08–0.12, PME 0.06–0.10, PLE 0.08–0.10. ALEs separated by 0.36–0.50, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00–2.33 ×, AME-ALE 1.00–1.67 ×, AME-PME 0.75–2.33 ×, ALE-PLE 0.25–0.33 ×. PLEs separated by 0.48–0.68 diameter. Remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.25–2.67 ×, PME-PLE 1.50–2.30 ×.

CLYP 1.50–2.33 × one AME diameter. CHEL 5.71–7.20 × CLYP and 2.10–2.67 × width. Chelicerae with 3 small retromarginal teeth. Labium, endites and sternum yellow, labium with a grey hue. LABEL 0.65–1.11 × width. ENDL 1.73–2.63 × width. STRL 1.00–1.38, 1.20–1.41 × width. Anterior margin of sternum concave. Legs light yellow without distinct markings. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of Leg I and Leg IV articles: FEM1 2.18, PAT1 0.62, TIB1 1.97, MET1 1.58, TAR1 0.82, FEM4 1.67, PAT4 0.58, TIB4 1.33, MET4 1.20, TAR4 0.54. CALM 0.59–0.97 × MET4.

ABDL 1.21–1.57 × width. Dorsum of most individuals with simple anchor-shaped marking and 3 pairs of posterior spots connected by light red streaks (Fig. 47). Lateral surface of abdomen has no distinct markings. Venter with light median line. Cribellum undivided.

Bursae open anteriorly as small pits surrounded by area of heavy sclerotization. Epigynum with pair of small bifurcate spermatoceae located posteriorly to bursal openings (Figs 50, 51).

**Male** (8). TL 3.12–4.73, CL 1.36–2.12, CW 1.20–1.77 × CW, CPW 0.63–0.87 × CW. Prominent thoracic groove located just posterior to cephalic region, 1.04–1.68 from anterior carapace margin. Carapace uniform light brown (Fig. 43). Carapace setal pattern like female.

PER straight. Borders of eyes without black pigmentation. Eye diameters variable: AME 0.06–0.08, ALE 0.06–0.12, PME 0.06–0.10, PLE 0.06–0.10. ALEs separated by 0.32–0.48, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00–1.67 ×, AME-ALE 1.00–1.75 ×, AME-PME 1.25–1.50 ×, ALE-PLE 0.25–0.33 ×. PLEs separated by 0.40–0.60, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.25–1.75 ×, PME-PLE 1.00–2.00 ×.

CLYP 1.50–2.67 × one AME diameter. CHEL 7.50–11.50 × CLYP, CHEL
2.14–3.00 × width. Chelicerae emargination very variable, some individuals greatly emarginated. Anterior dorsal surface of chelicerae extending anterior to clypeus (Fig. 49). Chelicerae with 3 small retromarginal teeth. Endites and sternum dark brown, labium very dark brown. LABL 0.88–1.46 × width. ENDL 1.35–3.00 × width. STRL 0.84–1.26, length 1.23–1.41 × width. Anterior margin of sternum concave. Legs light yellow with dusky grey bands on distal segments of femur and tibia. Leg formula I-II-IV-III, with leg II considerably longer than leg IV. Mean lengths of Leg I and Leg IV articles: FEM1 2.35, PAT1 0.57, TIB1 2.25, MET1 1.70, TAR1 0.78, FEM4 1.56, PAT4 0.48, TIB4 1.25, MET4 1.29, TAR4 0.50.

ABDL 1.72–2.19 × width. Dorsum coloration like female. No distinct lateral or ventral markings (Fig. 48). Venter has dusky median line. Red spot just below pedicel.

DiTa-T thin projection with a small distal triangular tab (Figs 52, 53), orientated away from embolus base. Embolus originates at 9:00 from round base. CYMB 1.74–2.11 × width.

Distribution. Southwestern Arizona, Southeastern New Mexico and Mexico (Fig. 22).


Mallos kraussi Gertsch, 1946

(Figs 54–57)

Mallos kraussi Gertsch, 1946, p. 6, Fig. 1 (female holotype from Mexico: Cuernavaca, Morelos, in AMNH, examined).

Diagnosis. Mallos kraussi females are distinguished from those of its sister species M. dugesi by having a body length greater than 5.30. M. dugesi females are typically less than 5.00 long. The bursal openings of M. kraussi females are large and have convex (relative to the centre of the epigynum) bursal rims (Fig. 54), whereas those of M. dugesi are very small and lack developed bursal rims (Fig. 50). Mallos kraussi males lack distinct abdominal markings (Fig. 57), whereas M. dugesi males have a distinctive anchor-shaped mark on the dorsum of the abdomen (Fig. 48).

Female (2). TL 5.31–5.82, CL 1.73–2.16, CL 1.15–1.23 × CW, CPW 0.59–0.60 × CW. Prominent thoracic groove located just posterior to cephalic region, 1.30–1.50 from anterior carapace margin. Carapace dark orange with 5 rows of thick white setae: three rows extending length of cephalic region, two additional rows located anterior laterally.
PER straight. Borders of eyes without heavy pigmentation. Eye diameters 0.10, with ALEs slightly larger 0.13. ALEs separated by 0.42–0.50, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00–1.25 ×, AME-ALE 0.80–1.00 ×, AME-PME 1.00–1.50 ×, ALE-PLE 0.20–0.25 ×. PLEs separated by 0.54–0.64, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.20–1.60 ×, PME-PLE 1.20–1.60 ×.

CLYP 1.00–1.50 × AME diameter. CHEL 6.50–9.20 × CLYP and 2.35–2.79 × width. Chelicerae with 3 small retromarginal teeth. Chelicerae with no distinct markings. Endites and sternum light orange, labium very dark brown. LABL 0.91–1.06 × width. ENDL 1.79–2.31 × width. STRL 1.12–1.30 and 1.24–1.33 × width. Anterior margin of sternum concave. Legs orangish-brown, I and II darker in colour than III and IV. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of LegI and LegIV articles: FEMI 2.13, PAT1 0.67, TIBI 2.03, METI 1.61, TAR1 1.13, FEM4 1.77, PAT4 0.60, TIB4 1.45, MET4 1.37, TAR4 0.57. CALM 0.54–0.60 × that of MET4.

ABDL 1.21–1.40 × width. Dorsum of most individuals with anchor-shaped mark. Lateral surfaces without distinct markings. Venter with brown median line typical of most Mallos species. Cribellum undivided. Bursae situated anteriorly, their sclerotized rims convex relative to centre of epigynum. Dark, heavily sclerotized spot at upper margin of each bursal opening. Epigynum with pair of unbranched ducts that terminate in two small, posterior spermastial lobes (Figs 54, 55).

Male (1). TL 4.89, CL 2.16, CL 1.31 × CW, CPW 0.65 × CW. Prominent thoracic groove, located just posterior to cephalic region, 1.50 from anterior carapace margin. Carapace colour and setal pattern like female (Fig. 50).

PER straight. Borders of eyes without heavy pigmentation. Eye diameters: AME 0.08, ALE 0.12, PME 0.10, PLE 0.10. ALEs separated by 0.52, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.50 ×, AME-ALE 1.50 ×, AME-PME 1.50 ×, ALE-PLE 0.25 ×. PLEs separated by 0.66, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.60 ×, PME-PLE 1.80 ×.

CLYP 1.25 × one AME diameter. CHEL 13.80 × CLYP and 2.56 × width. Chelicerae emarginated (bowed) with anterior dorsal surface extending anterior to clypeus. Chelicerae with 3 small retromarginal teeth. Endites and sternum orange, labium slightly darker in colour. LABL 1.40 × width. ENDL 2.18 × width. STRL 1.30 and 1.33 × width. Anterior margin of sternum straight. Legs dark orange, without distinct markings. Leg formula same as female. Lengths of LegI and LegIV articles: FEMI 2.92, PAT1 0.76, TIBI 2.76, METI 1.94, TAR1 0.94, FEM4 1.78, PAT4 0.52, TIB4 1.48, MET4 1.42, TAR4 0.56.

ABDL 1.68 × width. Dorsum solid greyish green without distinct markings (Fig. 57). No distinct lateral markings. Venter with brown median line. DiTA-T thin projection with small distal triangular tab (Fig. 56). Embolus originates at 8:00 from round base. CYMB 1.84 × width.

Distribution. Southern Mexico (Fig. 22).

Material examined. MEXICO: Morelos: Cuernavaca, 1 ♀ (Nov. 1945, Krauss, AMNH); Cuernavaca, 3 ♀ paratypes (Nov. 1945, Krauss, AMNH); Guerrero: Taxco, 1 ♀; (Jan. 1946, Isaacs, AMNH); Taxco, W99.36: N18.32 1 ♂ (Sept. 1966, J. & W Ivie, AMNH).
Mallos blandus Chamberlin and Gertsch, 1958

(Figs 58–63)

Mallos blandus Chamberlin and Gertsch 1958, p. 40, Fig. 7 (female holotype from New Mexico: Whites City, in AMNH, examined).
Diagnosis. The abdominal colour pattern of Mallos blandus females resembles that of M. bryanti and M. niveus. However, externally the epigynum closely resembles that of M. chamberlini. Each epigynal bursae has a convex sclerotized rim that continues as a straight ridge that runs parallel to the epigastric furrow (Fig. 60). Both species have a tri-lobed spermetheca. The anterior spermethecal lobe of M. blandus is short, whereas in all other Mallos species having a tri-lobed spermetheca, it is elongate and/or elongate and coiled. The male palp of this species is similar to that of M. gertschi, DiTA-T is thicker and terminates in a blunt, rather than a sharp point. Mallos blandus is also distinguished by a large, rounded sclerite, visible under the proximal outer edge of the embolus base, whereas in M. gertschi this sclerite is small and not easily seen.

Female (4). TL 2.08–5.31, CL 1.52–2.00, CL 1.15–1.24 × CW, CPW 0.57–0.59 × CW. Prominent thoracic groove located just posterior to cephalic region, 1.24–1.44 from anterior carapace margin. Carapace brownish orange with 5 rows of thick white setae: three rows extending length of cephalic region, and two additional rows located anterior laterally.

PER straight. Borders of eyes without heavy pigmentation. Eye diameters variable: AME 0.08, ALE 0.08–0.10, PME 0.06–0.08, PLE 0.06–0.08. ALEs separated by 0.38–0.46, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00–1.25 ×, AME-ALE 0.75–1.00 ×, AME-PME 1.25–1.50 ×, ALE-PLE 0.25 ×. PLEs separated by 0.50–0.60, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.00–2.67 ×, PME-PLE 1.00–2.67 ×.

CLYP 1.50–2.25 × one AME diameter. CHEL 4.67–6.17 × CLYP and 2.10–2.47 × width. Chelicerae with 2 small retromarginal teeth. Chelicerae without distinct markings. Labium, endites, and sternum light orange. LABL 0.94–1.06 × width. ENDL 1.14–2.54 × width. STRL 0.98–1.20 and 1.14–1.35 × width. Anterior margin of sternum concave. Legs I and II dusky orange, no prominent markings. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of LegI and LegIV articles: FEM1 1.95, PAT1 0.62, TIB1 1.74, MET1 1.15, TAR1 0.78, FEM4 1.47, PAT4 0.53, TIB4 1.14, MET4 1.15, TAR4 0.47, CALM 0.60–0.75 × MET4.

ABDL 1.15–1.39 × width. Dorsum of most individuals with brown anchor-shaped mark (Fig. 58). Lateral surfaces without distinct markings. Venter with brown median line typical of most Mallos species. Cribellum undivided. Bursae situated anteriorly, their sclerotized rims convex relative to centre of epigynum, each with short sclerotized ridge that runs parallel to epigastric furrow. Externally, epigynal ducts small dark patch below lateral margin of bursal rim. From each epigynal opening short duct connects to tri-lobed spermetheca, arranged as single short anterior lobe, bifurcate posterior lobe (Figs 60, 61).

Male (2): TL 3.44, 3.72, CL 1.64, 1.68, CL 1.21, 1.24 × CW, CPW 0.60 × CW. Prominent thoracic groove, located just posterior of cephalic region, 0.60, 1.24 from anterior carapace margin. Carapace colour and setal pattern like female (Fig. 55).

PER straight. Borders of eyes without heavy pigmentation. Eye diameters equal, 0.80, with ALEs slightly larger, 0.10. ALEs separated by 0.38, 0.40, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00 ×, AME-ALE 0.75 ×, AME-PME 1.00, 1.25 ×, ALE-PLE 0.25 ×. PLEs separated by 0.52. Remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.50 ×, PME-PLE 1.50 ×.
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CLYP 1.75 × AME diameter. CHEL 6.71 × CLYP and 2.61, 2.76 × width. Chelicerae slightly emarginated (bowed), with anterior dorsal surface not extending anterior to clypeus. Chelicerae with 2 small retromarginal teeth. Endites and sternum orange, labium slightly darker in colour. LABL 1.18 × width. ENDL 1.77, 1.85 × width. STRL 0.90 and 2.61, 2.76 × width. Anterior margin of sternum concave. Leg colour tan without distinct markings. Leg formula same as female. Mean lengths of Leg I and Leg IV articles: FEM1 2.03, PAT1 0.59, TIB1 1.88, MET1 1.42, TAR1 0.78, FEM4 1.27, PAT4 0.46, TIB4 1.04, MET4 1.05, TAR4 0.44.

ABDL 1.55 × width. Dorsum with brown anchor-shaped mark (Fig. 59). No distinct lateral markings. Venter with median line.

DiTA-T broad, corkscrew shaped (Figs 62, 63), directed towards embolus-embolus base junction. Embolus originates at 12:00 from an oval base, terminates in hook. This species also has a large unnamed sclerite that terminates under lateral proximal margin of embolus base in a blunt point. CYMB 1.45, 1.52 × width.

Distribution. Southern New Mexico and Northwestern Texas (Fig. 23).


Mallos macrolirus sp. nov.

(Figs 64–66)

Holotype. Female holotype from Mexico: Guerrero, Taxco (1948, L. Isaacs), deposited in AMNH.

Etymology. This species’ name refers to its large size and distinctive white abdominal colouration.

Diagnosis. This large species is known only from the female holotype. It is best distinguished by the solid white colouration of its abdomen (Fig. 64). The bursae of the epigynum are very small, widely separated, and located near the epigastric furrow. This is the only species with a long, uncoiled anterior spermatic lobe (Fig. 66).

Female. TL 4.98, CL 1.78, CL 1.14 × CW, CPW 0.58 × CW. Prominent thoracic groove located just posterior to cephalic region, 1.34 from anterior carapace margin. Carapace dark orange with 5 rows of thick white setae: three rows extending the length of cephalic region, and two additional rows located anterior laterally.

PER straight. Borders of eyes without heavy pigmentation. Eye diameters: AME 0.09, ALE 0.11, PME 0.09, PLE 0.10. ALEs separated by 0.40 diameter, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.89, AME-ALE 0.89, AME-PME 1.33, ALE-PLE 0.22. PLEs separated by 0.40 diameter, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.33, PME-PLE 1.33.

CLYP 1.33 × AME diameter. CHEL 6.67 × clypeus height, 2.50 × width. Chelicerae with 3 small retromarginal teeth. Chelicerae with no distinct markings. Endites
and sternum light orange, labium darker orange. Labial 1.00 × width. Endl 1.47 × width. Stirr 1.08 and 1.17 × width. Anterior margin of sternum concave.

Legs brownish orange with no distinct markings, I and II darker in colour than III and IV. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of Leg I and Leg IV articles: Fem 1 2.10, Pat 1 0.64, Tib 1 1.88, Met 1 1.48, Fem 4 1.56, Pat 4 0.52, Tib 4 1.16, Met 4 1.14, Tar 4 0.44. Calm 0.79 × Met 4.

ABDL 1.32 × width. Abdomen solid white with small horizontal I-shaped mark on cardiac region of dorsum (Fig. 65). Venter with brown median line typical of most Mallos species. Cribellum undivided. Bursae situated posteriorly, their widely separated sclerotized rims convex relative to centre of epigynum. Anterior spermathecal lobe visible externally as a dark patch above bursal openings. A single duct leads from each opening to a trilobed spermatheca, formed of an elongate anterior lobe and a short, bifurcate posterior lobe (Figs 65, 66).

Distribution. Southern Mexico.


Mallos chamberlini sp. nov.

(Figs 67, 68)

Holotype. Female holotype and female paratype from Mexico: Morelos, Cuernavaca (27 July 1956, V. Roth & W. Gertsch), deposited in AMNH.

Etymology. This species is named after Ralph V. Chamberlin.

Diagnosis. This species is known only from two female specimens. Like its sister species Mallos gertschi, this species has a total length greater than 5.00, a divided cribellum and a trilobed spermatheca. The epigynal bursae are more like that of M. blandus. The anterior spermatheca is elongate, loosely coiled, and visible externally as a thick anterior line circumventing the bursal openings (Figs 67, 68). In M. blandus the anterior spermathecal lobe is short, uncoiled, and not visible from the exterior (Figs 60, 61).

Female (2). TL 5.26, 6.64, CL 2.12, 2.16, CL 1.16, 1.15 × CW, CPW 0.55, 0.56 × CW. Prominent thoracic groove located just posterior to cephalic region. Carapace dark margins orangish/brown, cephalic region light tan with 5 rows of thick white setae: three rows extending length of cephalic region, two additional rows located anterior laterally.

PER straight. Borders of eyes without heavy pigmentation. Eye diameters equal 0.10 with ALEs slightly larger 0.11, 0.12. ALEs separated by 0.52, 0.56, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00 ×, AME-ALE 1.20 ×, AME-PME 0.60, 1.20 ×, ALE-PLE 0.20 ×. PLEs separated by 0.54, 0.70, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.40, 1.80 ×, PME-PLE 1.40, 1.60 ×.

CLYP 1.40, 1.60 × one AME diameter. CHEL 6.12, 6.86 × CLYP. CHEL 2.27, 2.40 × width. Chelicerae with 2 small retromarginal teeth. Chelicerae black. Labium, endites, and sternum brownish/orange. Labial 1.00 × width. Endl 2.00 × width. TRL 1.36, 1.38, and 1.26, 1.33 × width. Anterior margin of sternum concave. Legs dark brown. Femur of legs I and II with dark band on distal 2/3. Legs III and IV
Figures 67–74. Figs 67, 68. *Mallos chamberlini* sp. nov. 67, external view of epigynum; 68, internal ducts of epigynum. Figs 69–74. *Mallos gertschi* sp. nov. 69, dorsal view of female; 70, anterior view of male; 71, external view of epigynum; 72, internal ducts of epigynum; 73, ventral view, male pedipalp; 74, retrolateral view, male pedipalp.

with 2 distinct bands on femur. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of LegI and LegIV articles: FEMI 2.50, PAT1 0.84, TIBI 2.25, METI 1.78, TAR1 1.00, FEM4 1.86, PAT4 0.68, TIB4 1.49, MET4 1.48, TAR4 0.63. CALM 0.62, 0.72 × that of MET4.

ABDL 1.36, 1.57 × width. Dorsum has typical brown anchor-shaped mark. Lateral surfaces without distinct markings. Venter with brown median line typical of most *Mallos* species. Cribellum divided. Bursae situated anteriorly, their sclerotized rims
convex relative to centre of epigynum, each with short sclerotized ridge that runs parallel to epigastric furrow. Epigynum with pair of tri-lobed spermathecae: anterior lobe elongate, loosely coiled, horizontally orientated; posterior lobe bifurcate. Anterior most lobe visible externally as a dark eyebrow above bursal opening (Figs 67, 68).

**Distribution.** Southern Mexico.

**Material examined.** MEXICO, Morelos: Cuernavaca 2 ♀ (Jul. 1956, Roth & Gertsch, AMNH).

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**Mallos gertschi** sp. nov.

(Figs 69–74)

**Holotype.** Male holotype and female paratype from Mexico: Guerrero, Teloloapan, 1200 m (3 November 1947, H. Wagner), deposited in AMNH.

**Etymology.** This species is named in honour of Willis J. Gertsch.

**Diagnosis.** Females of this species are distinguished from those of its sister species, *Mallos macrolirus*, by having epigynal bursae that are U-shaped, relative to the
epigastric furrow (Fig. 71). Like *M. blandus* this species has a corkscrew shaped DiTA-T. However, the tip of the DiTA-T of this species is a sharp point (Fig. 73), whereas that of *M. blandus* is blunt (Fig. 62).

**Female** (2). TL 5.48, 6.14, CL 1.76, 2.57, CL 1.00, 1.24 × CW, CPW 0.59, 0.64 × CW. Prominent thoracic groove located just posterior to cephalic region, 1.60, 1.98 from anterior carapace margin. Carapace margins dark brown, cephalic region dark tan, with 5 rows of thick white setae: three rows extending length of cephalic region, and two additional rows located anterior laterally.

PER straight. Borders of eyes without heavy pigmentation. Eye diameters: AME 0.08, 0.10, ALE 0.10, 0.12, PME 0.08, 0.10, PLE 0.08, 0.12. ALEs separated by 0.60, 0.62, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.40, 1.50 ×, AME-ALE 1.60, 2.25 ×, AME-PME 1.00 ×, ALE-PLE 0.20, 0.25 ×,PLEs separated by 0.20, 0.25 ×, remaining posterior eye interdistances, expressed as PME diameters; PME-PME 1.80, 2.25 ×, PME-PLE 2.00, 3.50 ×.

CLYP 1.60, 2.25 × one AME diameter. CHEL 6.00, 6.12 × CLYP and 2.16, 2.23 × width. Chelicerae with 3 small retromarginal teeth. Chelicerae black. Labium, sternum, and endites very dark brown. LABL 1.00, 1.09 × width. ENDL 1.94, 2.12 × width. STRL 1.40, 1.64 ×, and 1.40, 1.49 × width. Anterior margin of sternum concave. Legs dark brown. Femur of Legs I and II with dark band on distal 2/3. Leg formula I-II-IV-III. Mean lengths of LegI and LegIV articles: FEM1 2.52, PAT1 0.85, TIB1 2.18, MET1 1.78, TAR1 0.98, FEM4 1.82, PAT4 0.79, TIB4 1.46, MET4 1.45, TAR4 0.58. CALM 0.67, 0.70 × MET4.

ABDL 1.53, 1.64 × width. Dorsal colour pattern indistinguishable due to poor preservation, appears faintly to be anchor shaped colour pattern, however, the specimen is illustrated as it appears (Fig. 69). Lateral surfaces with brown anterior stripes. Venter with brown median line typical of most *Mallos* species. Spinnerets black. Cribellum divided. Bursae situated posteriorly, their sclerotized rims U-shaped relative to epigastric furrow. Epigynum with pair of tri-lobed spermethecae: elongate anterior lobe is loosely coiled, horizontally orientated; posterior lobe is bifurcate. Anterior most spermethecal lobes are visible externally as dark bursens above bursal openings (Figs 71, 72).

**Male** (2). Males exceptionally large, TL 6.67, 6.72, CL 2.91, 3.15, CL 1.19, 1.40 × CW, CPW 1.51, 1.58 × CW. Prominent thoracic groove, located just posterior to cephalic region, 2.08 from anterior carapace margin. Carapace uniform dark brown. Setal pattern like female.

PER straight. Border of eyes without heavy pigmentation. Eye diameters: AME 0.12, ALE 0.14, PME 0.12, PLE 0.12. ALEs separated by 0.68, 0.72, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.83 ×, AME-ALE 1.50 ×, AME-PME 1.17, 1.33 ×, ALE-PLE 0.17 ×. PLEs separated by 0.84, 1.00, remaining posterior eye interdistances, expressed as PME diameters; PME-PME 1.33, 1.67 ×, PME-PLE 2.33, 2.67 ×.

CLYP 1.83, 2.33 × AME diameter. CHEL 6.36, 7.63 × clypeus height, 2.02, 2.21 ×, width. Chelicerae widely emarginated (bowed) (Fig. 70) with anterior dorsal surface extending anterior clypeus. Chelicerae with 3–4 small retromarginal teeth. Endites, sternum dark brown, labium slightly darker. LABL 1.96, 2.14 × width. ENDL 1.96, 2.14 × width. STRL 1.82, 1.37; 1.52 × width. Anterior margin of sternum straight. Legs dark brown, legs I and II darker than legs III and IV. Distal 2/3 of femurs I and II with dark band. Legs III and IV with light bands. Leg
formula I-II-IV-III, with leg II considerably longer than leg IV. Mean lengths of LegI and LegIV articles: FEM1 3.62, PAT1 1.11, TIB1 3.48, MET1 1.34, TAR1 1.18, FEM4 2.13, PAT4 0.81, TIB4 1.74, MET4 1.81, TAR4 0.66.

ABDL 1.72, 1.74 × , width. Abdominal colouration, markings like female. DiTA-T forms a corkscrew with its tip directed inward towards embolus base (Figs 73, 74). Embolus originates at 11:00 from round base. CYMB 1.88, 2.04 × , width.

Distribution. Southern Mexico (Fig. 23).

Material examined. MEXICO: Oaxaca: Monte Albán 1 ♀ (Sept. 1947, Mallein, AMNH); Guerrero: Teloloapan, 1200 m 2 ♂ ♀ (Nov. 1947, Wagner, AMNH).

_Mallos niveus_ O. Pickard-Cambridge, 1902

(_Figs 75–80_)

_Mallos niveus_ O. Pickard-Cambridge, 1902, p. 308, Fig. 1 (female holotype from Mexico: Cuernavaca, Morelos, in AMNH, examined).


_{Emblyna urica_ Chamberlin, 1948, p. 13, Fig. 63 (female holotype from Utah: Hurricane, in AMNH, examined).

_Mallos alpheus_ Chamberlin, 1948, p. 14, Figs 31, 32 (female holotype and male paratype from Utah: Timpanogos Park, American Fork Canyon, in AMNH, examined).

_Mallos niveus_ Chamberlin and Gertsch, 1958, p. 41, Figs 5–8.

Diagnosis. Like _Mallos pallidus_, females of this species have a divided cribellum and a bi-lobed spermetal duct. However, the epigynal bursae of _M. pallidus_ are large and positioned very close together (Fig. 81), whereas, those of _M. niveus_ are small and more widely separated (Fig. 77). The coiled anterior spermetalae of _M. pallidus_ are visible externally and are vertically positioned. Those of _M. niveus_ are not visible externally and are horizontally positioned. _Mallos niveus_ males have a palp similar to _M. pallidus_, _M. mians_ and _M. pearcei_. However, the DiTA terminus is elbow shaped and folds back over on itself forming a distinct curl (Fig. 79). In _M. pallidus_, _M. mians_, and _M. pearcei_, the DiTA terminus is oval shaped.

Female (10). TL 2.72–4.00, CL 0.86–1.40, CL 0.90–1.27 × CW, CPW 1.78–2.00 × CW. Prominent thoracic groove located just posterior to cephalic region, 0.82–1.00 from anterior carapace margin. Carapace margins dark brown cephalic region tan. Dorsal surface of carapace clothed in thick white setae.

PER straight. Borders of eyes without heavy pigmentation. Eye diameters: AME 0.06–0.08, ALE 0.06–0.10, PME 0.06–0.08, PLE 0.06–0.08. ALEs separated by 0.26–0.34, remaining anterior eye interdistances, expressed as AME diameters: AME-AME, 0.75–1.25 × , AME-ALE 0.50–0.74 × , AME-PME 0.75–1.33 × , ALE-PLE 0.25–0.33 × . PLEs separated by 0.36–0.48, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.00–1.67 × , PME-PLE 1.00–1.33 ×.

CLYP 0.75–1.33 × one AME diameter. CHEL 5.20–7.67 × CLYP. CHEL 1.77–2.25 × width. Chelicerae with 2 small retromarginal teeth. Chelicerae with no distinct markings. Endites, sternum brown, labium dark brown. LABEL 0.86–1.00 × width. ENDL 1.50–2.00 × width. STRL 0.64–0.84, 1.07–1.27 × width.
Anterior margin of sternum concave. Legs dark brown. Distal 2/3 of femurs darkly banded. Tibia of legI-legIV with 2 distinct bands, 1 proximal, 1 distal. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of LegI and LegIV articles: FEM1 1.36, PAT1 0.40, TIB1 1.21, MET1 0.95, TAR1 0.53, FEM4 1.04, PAT4 0.36, TIB4 0.82, MET4 0.80, TAR4 0.34. CALM 0.59–0.77 × MET4.

ABDL 1.10–1.48 × width. Dorsum with brown anchor-shaped mark (Fig. 75). Lateral surfaces with distinct stripe. Venter with brown median line typical of most Mallos species. Cribellum divided. Bursae situated anteriorly, their sclerotized rims concave relative to centre of epigynum, separated by approximately one and a half times diameter of their openings. Epigynal ducts visible externally only as dark blotch adjacent to bursal openings. Epigynum has pair of bilobed spermethcae: anterior lobe is elongate, coiled, horizontally orientated; posterior lobe is unbranched (Figs 77, 78).

**Male** (10). TL 1.30–2.80, CL 0.90–1.20, CL 1.08–1.22 × CW, CPW 0.56–0.63 × CW. Prominent thoracic groove, located just posterior to cephalic region, 0.70–0.90 from anterior carapace margin. Carapace uniformly dark brown. Setal pattern like female. PER straight. Borders of eyes without heavy pigmentation. Eye diameters: AME 0.06–0.08, ALE 0.06–0.08, PME 0.06–0.08, PLE 0.06–0.08. ALEs separated by 0.22–0.34, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.67–1.33 ×, AME-ALE 0.50–0.86 ×, AME-PME 0.75–1.33 ×, ALE-PLE 0.25–0.33 ×. PLEs separated by 0.37–0.48, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.00–1.67 ×, PME-PLE 1.00–1.67 ×.

CLYP 1.00–1.33 × one AME diameter. CHEL 5.50–8.33 × CLYP, 2.14–2.50 × width. Chelicerae slightly emarginated, anterior dorsal surface does not extend anterior to clypeus. Chelicerae with 2 small retromarginal teeth. Endites and sternum brown, labium slightly darker in colour. LABL 0.81–1.20 × width. ENDL 1.50–2.50 × width. STRL 0.56–0.76, 1.06–1.38 × width. Anterior margin of sternum concave. Leg colouration as in females, bands on legII and legIV not as distinct. Leg formula same as for female. Mean lengths of LegI and LegIV articles: FEM1 1.31, PAT1 0.36, TIB1 1.25, MET1 0.99, TAR1 0.49, FEM4 0.90, PAT 0.29, TIB4 0.70, MET4 0.70, TAR4 0.31.

ABDL 1.38–1.66 × width. Colour pattern like female, but less distinct (Fig. 76). DiTA-T short projection with distal end looped back on itself in direction of embolus base, forming a small curl (Figs 79, 80). Embolus originates at 9:30 from a small round base. CYMB 1.40–1.60 × width.

**Distribution.** Western United States and Mexico (Fig. 24).

Mallos pallidus (Banks, 1904)  
(Figs 81–84)

Dictynina pallida Banks, 1904, p. 342, Fig. 22 (female holotype from California: Mt. Shasta, in MCZ, examined).

Heterodictyna pallidus Dahl, 1904, p. 118.

Dictyna eutyba Chamberlin and Gertsch, 1928, p. 175 (female holotype from Utah: Bluff, in AMNH, examined).

Mallos halli Chamberlin and Ivie, 1941, p. 4, Fig. 1, (female holotype, lacked an epigynum, from California: Ben Lomond, in AMNH, examined).


Diagnosis. Females of this species closely resemble those of *M. niveus* in colour pattern, although the carapace and abdominal colouration of *M. pallidus* is somewhat mottled and highly variable. The palp closely resembles that of *M. mians* and *M. pearcei*. The oval shaped DiTA-T of *M. pallidus* has a flattened distal margin that is perpendicular to the vertical axis of the cymbium (Fig. 83), whereas the DiTA terminus of *M. mians* and *M. pearcei* is more rounded.

Female (10). TL 2.64–4.40, CL 1.00–1.60, CL 1.00–1.30 × CW, CPW 0.52–0.63 × CW. Prominent thoracic groove located just posterior to cephalic region, 0.82–0.98 from anterior carapace margin. Carapace, like that of *M. niveus*, margins dark brown, cephalic region tan. Dorsal surface of carapace clothed in thick white setae.

PER straight. Borders of eyes without heavy pigmentation. Eye diameters: AME 0.06, ALE 0.06–0.08, PME 0.06, PLE 0.06. ALEs separated by 0.26–0.36, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00–1.67, ALE-ALE 0.67–1.30, AME-PME 1.00–1.67, ALE-PLE 0.33. PMEs separated by 0.38–0.54, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.33–2.33, PME-PLE 1.33–2.00.

CLYP 1.00–2.00 × one AME diameter. CHEI. 5.00–8.33 × CLYP. CHEL 1.57–2.46 × width. Chelicerae with 2 small retromarginal teeth. Chelicerae without distinct markings. Labium, endites, sternum rust coloured. LABL 0.81–1.00 × width. ENDL 1.54–2.00 × width. STRL 0.62–0.88, 1.03–1.28 × width. Anterior margin of sternum concave. Legs dark brown, distal 2/3 of femurs darkly banded, tibia of...
legI-legV with 2 distinct bands, 1 proximal and 1 distal. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of LegI and LegIV articles: FEM1 1.39, PAT1 0.41, TIB1 1.21, MET1 0.93, TAR1 0.56, FEM4 1.08, PAT4 0.36, TIB4 0.85, MET4 0.82, TAR4 0.34. CALM 0.57–0.72 × MET4.

ABDL 1.12–1.40 × width. Dorsum of most individuals with brown anchor-shaped mark, most individuals abdomen is overlaid by mottled colour pattern. Lateral surfaces with dusky bands. Venter with brown median line typical of most Mallos species. Cribellum divided. Large, closely spaced bursal openings are situated anteriorly, their sclerotized rims convex relative to centre of epigynum. Epigynum with bifurcate spermtheical: anterior lobe coiled, vertically orientated; elongate posterior lobe unbranched. Anterior spermtheical lobe visible externally between epigynal bursae (Figs 81, 82).

Male (10). TL 1.98–2.96, CL 0.88–1.20, CL 1.11–1.22 × CW, CPW 0.40–0.62 × CW. Prominent thoracic groove, located just posterior to cephalic region 0.76–0.96 from anterior carapace margin. Carapace colour and setal pattern like female. PER straight. Borders of eyes without heavy pigmentation. Eye diameters: AME 0.04–0.08, ALE 0.04–0.10, PME 0.04–0.08, PLE 0.04–0.08. ALEs separated by 0.20–0.36, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.50–1.33 ×, AME-ALE 0.50–1.00 ×, AME-PME 1.00–2.00 ×, ALE-PLE 0.25–0.50 ×. PLEs separated by 0.26–0.44, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 0.67–1.67 ×, PME-PLE 1.25–2.00 ×.

CLYP 1.00–1.67 × one AME diameter. CHEL 6.20–9.20 × CLYP, 2.20–2.58 × width. Chelicerae slightly emarginated and keeled. Anterior dorsal surface does not extend anterior to clypeus. Chelicerae with 2 small retromarginal teeth. Endites and sternum tan, labium slightly darker in colour. LABL 0.92–1.20 × width. ENDL 1.60–2.17 × width. STRL 0.56–0.74, 0.07 × width. Anterior margin of sternum concave. Legs tan, I and II darker in colour. Femurs of all legs darker in distal 3/4 of length. Leg formula I-II-IV-III. Mean lengths of LegI and LegIV articles: FEM1 1.43, PAT1 0.40, TIB1 1.33, MET1 0.95, TAR1 0.53, FEM4 0.95, PAT4 0.30, TIB4 0.74, MET4 0.72, TAR4 0.30.

ABDL 1.31±1.61 × width. Colour pattern like female. DiITA-T oval and has a flattened distal margin that is perpendicular to the vertical axis of the cymbium (Figs. 83, 84). CYMB 1.64–2.30 × width.

Distribution. Widespread; western United States and Mexico (Fig. 25).

Select material examined. MEXICO: Sonora: W110.05: N27.35, 1 ♀ (May 1963 Gertsch & Ivie, AMNH); Morelos: Cuernavaca 1 ♀ (Mar. 1937, Diamond, AMNH); Baja California: 45 mi. S. Santa Rita 1 ♀ (Jun. 1977, Griswold, CAS); El Mayor, 6 ♀ & 3 ♂ (Jun. 1952, Gertsch, AMNH); UNITED STATES: Arizona: Cochise Co.: Chiricahua Natl. Monument 1 ♂ (May 1956, Statham, AMNH); Coconino Co.: Grand Canyon 1 ♂ (Oct. 1982, Roth, AMNH); Maricopa Co.: Scottsdale 3 ♀ & ♂ (1903, Britcher) AMNH; Pima Co.: Quitobaquito Organ Pipe Natl. Monument 1 ♂ (Jun. 1952, AMNH); San Luis 2 ♀ (Jan. 1941, Mulaik, AMNH); Summerhaven 1 ♀ (Jun. 1939, Davis, AMNH); Baboquivari Mts. 1 ♀ & 1 ♂ Dictyna sp. (Jul. 1959, Roth, AMNH); Yuma Co.: Horse Tanks, 2 ♂ (May 1960, Roth & Gertsch, AMNH); California: Fresno Co., Marshall Station 1 ♀ (Aug. 1983, Burdick, CAS); Ventura Co., Santa Paula, 2 ♀ (Jun. 1950, Gertsch, AMNH); Inyo Co., nr. Bishop 1 ♀.

**Mallos mians** (Chamberlin, 1919a)

(Figs 85–90)

*Dictyna mians* Chamberlin, 1919a, p. 4, Fig. 8 (female holotype from Los Angeles Co., California, in MCZ, examined).


*Diagnosis.* Females of this species like those of its sister species *Mallos pearcei*, have an undivided cribellum, a mottled abdominal colour pattern, and anteriorly positioned epigynal bursae (Fig. 87). The bursae of *M. mians* are very small in diameter (1/14 the width of the epigynum), whereas those of *M. pearcei* are wider (1/4 the width of the epigynum). The males of both species have palps with an oval DiTA-T. However, in *M. mians* the distal end of the rounded terminus does not overlap its proximal end (Fig. 89) as it does in *M. pearcei* (Fig. 94).

*Female* (10). TL 3.64–4.32, CL 1.06–1.58, CW 1.05–1.56 × CW. CPW 0.52–0.67 × CW. Prominent thoracic groove located just posterior to cephalic region, 0.90–1.20 from anterior carapace margin. Carapace, like that of *M. pearcei*, margins dark orange-brown, cephalic region tan. Dorsal surface of carapace clothed in thick white setae.

PER straight. Border of eyes without heavy pigmentation. Eye diameters: AME 0.06–0.08, ALE 0.08–0.10, PME 0.06–0.08, PLE 0.06–0.08. ALEs separated by 0.26–0.50, remaining anterior eye interdistances, expressed as AME diameters:
Figures 85–95. *Mallos mians* (Chamberlin). 85, dorsal view of female; 86, dorsal view of male; 87, external view of epigynum; 88, internal ducts of epigynum; 89, ventral view, male pedipalp; 90, retrolateral view, male pedipalp. Figs 91–95, *Mallos pearcei* Chamberlin and Gertsch. 91, dorsal view of female; 92, external view of epigynum; 93, internal ducts of epigynum; 94, ventral view, male pedipalp; 95, retrolateral view, male pedipalp.

AME-AME 0.75–1.33 ×, AME-ALE 0.67–1.00 ×, AME-PME 1.00–1.33 ×, ALE-PLE 0.25–0.33 ×. PLEs separated by 0.38–0.58, remaining posterior eye inter-distances, expressed as PME diameters: PME-PME 1.25–2.00 ×, PME-PLE 0.38–0.58 ×.

CLYP 1.00–2.00 × one AME diameter. CHEL 3.33–6.75 × CLYP.
Chelicerae with 2 small retromarginal teeth. Chelicerae without distinct markings. Labium, endites, sternum yellow orange. LABL 0.92±1.03 × width. ENDL 1.60±2.00 × width. STRL 0.66–1.08, 1.10–1.35 × width. Anterior margin of sternum concave. Legs with light dusky grey bands. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of LegI and LegIV articles: FEM1 1.57, PAT1 0.46, TIB1 1.38, MET1 1.06, TAR1 0.62, FEM4 1.26, PAT4 0.47, TIB4 1.02, MET4 0.92, TAR4 0.43. CALM 0.52–0.74 × MET4.

ABDL 0.91–1.46 × width. Dorsum of most individuals with brown anchor-shaped mark, usually mottled (Fig. 85). Lateral surfaces with dusky mottled bands. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of LegI and LegIV articles: FEM1 1.57, PAT1 0.46, TIB1 1.38, MET1 1.06, TAR1 0.62, FEM4 1.26, PAT4 0.47, TIB4 1.02, MET4 0.92, TAR4 0.43. CALM 0.52–0.74 × MET4.

DiTA-T oval, its most distal aspect rounded (Figs. 89, 90). The embolus originates at 11:00 from an oval base. CYMB 1.47–1.87 × width.

Distribution. California and Baja California, Mexico (Fig. 26).

Mallos pearcei Chamberlin and Gertsch, 1958
(Figs 91–95)

Mallos pearcei Chamberlin and Gertsch, 1958, p. 45, Figs. 1, 2, pl. 19 (male holotype from Viejas Valley, San Diego Co., California, in AMNH, examined).

Diagnosis. Females and males of this species closely resemble those of its sister species Mallos mians and are diagnosed in the description of that species.

Female (4). TL 3.40–4.20, CL 1.16–1.44, CL 1.15–1.23 × CW, CPW 0.55–0.57 × CW. Prominent thoracic groove located just posterior to cephalic region. Carapace margins dark orange-brown, cephalic region tan. Dorsal surface of carapace clothed in thick white setae.

PER straight. Border of eyes without heavy pigmentation. Eye diameters: AME 0.06–0.08, ALE 0.08–0.10, PME 0.08, PLE 0.08. ALEs separated by 0.26–0.38, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00–1.33 ×, AME-ALE 0.75–1.00 ×, AME-PME 1.25–1.67 ×, ALE-PLE 0.14–0.20 ×. PLEs separated by 0.40–0.52, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.25–1.50 ×, PME-PLE 1.00–1.75 ×.

CLYP 1.33–2.00 × one AME diameter. CHEL 4.50–6.50 × CLYP, 2.00–2.25 × width. Chelicerae with 2 small retromarginal teeth. Chelicerae without distinct markings. Endites, sternum brownish orange, labium slightly darker in colour. LABL 0.86–0.93 × width. ENDL 1.45–1.78 × width. STRL 0.76–0.94, 1.12–1.27 × width. Anterior margin of sternum concave. Legs with light dusky grey bands. Leg formula I-II-IV-III, with leg II only slightly longer than leg IV. Mean lengths of LegI and LegIV articles: FEM1 1.51, PAT1 0.45, TIB1 1.36, MET1 1.03, TAR1 0.62, FEM4 1.22, PAT4 0.38, TIB4 0.98, MET4 0.90, TAR4 0.40. CALM 0.61–0.70 × MET4.

ABDL 1.32–1.55 × width. Dorsum of most individuals with brown anchor-shaped marks. Most individuals’ coloration mottled (Fig. 91), lateral surfaces with dusky mottled bands. Venter with median brown line typical of most Mallos species. Cribellum undivided. Large bursal openings situated anteriorly, separated by distance approximately twice their diameter, their sclerotized rims concave relative to centre of epigynum. Epigynum has bifurcate spermethecae: elongate coiled anterior lobe vertically oriented, elongate posterior lobe unbranched. Anterior spermethecal lobe visible externally between epigynal bursae (Figs 92, 93).

Male (1). TL 3.08, CL 1.34, CL 1.26 × CW, CPW 0.60 × CW. Prominent thoracic groove, located just posterior to cephalic region, 1.06 from anterior carapace margin. Carapace colour and setal pattern like female.

PER straight. Border of eyes without heavy pigmentation. Eye diameters: AME 0.08, ALE 0.08, PME 0.10, PLE 0.09. ALEs separated by 0.32, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.75 ×, AME-ALE 0.75 ×, AME-PME 1.00 ×, ALE-PLE 0.25 ×. PLEs separated by 0.44, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.00 ×, PME-PLE 1.00 ×.

CLYP 1.25 × one AME diameter. CHEL 7.00 × CLYP, 2.33 × width. Chelicerae slightly emarginated and keeled. Anterior dorsal surface does not extend anterior to clypeus. Chelicerae with 2 small retromarginal teeth. Labium, endites, and sternum tan. LABL 1.08 × width. ENDL 1.82 × width. STRL 0.80, 1.14 × width.
Anterior margin of sternum concave. Leg colouration like that of female. Leg formula I-II-IV-III. Mean lengths of LegI and LegIV articles: FEM1 1.80, PAT1 0.48, TIB1 1.72, MET1 1.24, TAR1 0.64, FEM4 1.16, PAT4 0.34, TIB4 1.02, MET4 missing, TAR4 missing.

ABDL $1.51 \times$ width. Abdominal colour pattern like female.

DiTA-T oval shaped, its most distal aspect is rounded, overlaps upper proximal margin of terminus (Figs. 94, 95). Embolus originates at 12:00 from an oval base. CYMB $1.50 \times$ width.

**Distribution.** San Diego Co., California (Fig. 26).

*Select material examined.** UNITED STATES: California: San Diego Co.: Bee Canyon 1 ♂ (Jul. 1947, Pearce, AMNH); Jamul, 2 ♂ (Jun. 1947, Pearce, AMNH); Viejas Valley, 1 ♂ (May 1947, Pearce, AMNH); Potrero, 1 ♂ (Jun. 1947, Pearce, AMNH); Lakeview District 1 ♂ (May 1947, Pearce, AMNH); Barrett, 1 ♂ (July 1947, Pearce, AMNH).

*Mexitlia* Lehtinen, 1967
(Figs. 96–109)


*Type species.* *Mexitlia trivittata* (Banks), by original description of genus Lehtinen (1967: 248, 359).
Diagnosis. Like its sister genus *Mallos*, *Mexitlia* females have an epigynum that lacks lateral foveae and a male palp that lacks an RTA. Males and females lack a distinctive white band circumventing the lateral margins of the carapace, whereas *Mallos* males and females have such coloration. The male palp has a thick embolus with a bifurcate tip (Fig. 11), whereas that of *Mallos* is thin and unbranched (Fig. 12). The terminus of the DiTA is hatchet shaped in lateral view (e.g. Fig. 104).

Female. TL 3.44–6.97, CW typically 3/5 CL. Thoracic groove, when evident, consists of shallow, circular depression located just posterior to cephalic region. Carapace reddish brown, uniform in colour, in most species clothed with five rows of thick white setae: three rows extending length of cephalic region, two additional rows located anterior laterally.

PER straight. Eyes with thin black borders. AME, ALE and PME round and equal in size, ALE usually oval and slightly larger than other eyes. AME-AME, AME-ALE, AME-PME, separated by one AME diameter. ALE-PLE separated by 1/5 AME diameter. PME-PME, PME-PLE separated one PME diameter.

CLYP 1–2 × one AME diameter, covered in thick white setae. Chelicerae width 1/2–1/3 × length. Chelicerae with 3 promarginal teeth, median tooth approximately 2 times larger than the others, 2 small retromarginal teeth. Chelicerae usually unmarked, similar in colour to carapace. Endites, sternum and labium reddish brown. Labium width equal or slightly greater than length. Endite width 1/2 length. Sternum oval with concave anterior margin. Sternum width 0.24–1.00 × length. Legs reddish brown, unbanded. Leg formula I-II-IV-III with legs II, IV similar in length, Calamistrum length 2/3 metatarsus IV length.

Dorsum of most individuals with dark brown anterior, posterior patches, 3 pairs of smaller lateral spots (Fig. 95). Venter with light brown median line. Cribellum undivided. Epigynum lacks lateral foveae. Sclerotized rims of epigynal bursae convex relative to centre of epigynum. Epigynum with pair of simple, heavily sclerotized, unbranched ducts (Fig. 13). In most cases epigynal ducts visible externally as dark posterior patch.


PER straight. Eye border pigmentation like female. Eyes equal in diameter, ALEs in some individuals slightly larger. AME-AME, AME-ALE, AME-PME, separated by distance approximately equal to AME diameter. ALE-PLE separated by 1/5 AME diameter. PME-PME, PME-PLE separated by approximately one PME diameter.

CLYP 1–2 × one AME diameter. Distal anterior margin of chelicerae without keel, only slightly emarginated. Anterior dorsal surface does not extend anterior to clypeus. Cheliceral dentition; endites, sternum, and labium coloration like female. LABL in most individuals slightly greater than width. ENDL approximately 2 × width. Sternum oval, anterior margin concave. Leg coloration like female. Leg formula I-II-IV-III. Abdomen oval, colouration like female.

In most species of *Mexitlia* features of male palp are similar. CYMB 1.5–2.00 width. All species have lost RTA. Thick, bifurcate embolus originates from round or triangular base between 8:00 and 12:00 position. The DiTA consists of conductor with hatchet shaped terminus in lateral view (Figs 103, 104).

Distribution. Southwestern United States and Mexico (Fig. 96).
Mexitlia altima sp. nov.  
(Figs 97–99)

Holotype. Female holotype from Mexico: Hidalgo, 10–20 miles south of Jacala (20 July 1956 V. Roth & W. Gertsch), deposited in AMNH.

Etymology. The name of this species is in reference to the high altitude at which some of the specimens were collected.

Diagnosis. Both M. grandis and M. altima have epigynal bursae that are vertically orientated and are convex relative to the centre of the epigynum. Each bursa of M. altima has a diameter that is 1/2 the epigynal width (Fig. 98), whereas each bursae of M. grandis is 3/4 the epigynal width (Fig. 105).

Female (5). TL 3.80–5.31, CL 1.40–1.88, CL 1.06–1.32 × CW, CPW 0.63–0.67 × CW. Prominent thoracic groove located just posterior to cephalic region. Carapace dark reddish brown with 5 rows of thick white setae: three rows extending length of cephalic region, and two additional rows located anterior laterally.

PER straight. Border of eyes without heavy pigmentation. Eye diameters: AME 0.08–0.10, ALE 0.10–0.12, PME 0.10, PLE 0.10. ALE’s separated by 0.38–0.52, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.80–1.25 ×, AME-ALE 0.60–1.25 ×, AME-PME 0.80–1.50 ×, ALE-PLE 0.20–0.25 ×. PLEs separated by 0.52–0.70, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.20–1.60 ×, PME-PLE 1.20–2.00 ×.

CLYP 0.60–1.20 × AME diameter. CHEL 7.00–11.33 × CLYP, 1.90–2.31 × width. Chelicerae with no distinct markings. Labium, endites, sternum reddish brown. LABL 0.88–1.05 × width. ENDL 1.53–1.77 × width. STRL 0.94–1.18, 1.22–1.32 × width. Anterior margin of sternum concave. Legs reddish brown, I and II darker in colour than III and IV, femur and tibia with light bands. Leg formula I-IV-II-III, with leg IV only slightly longer than leg II. Mean lengths of LegI and LegIV articles: FEM1 1.55, PAT1 0.56, TIBI 1.32, MET1 0.99, TAR1 0.64, FEM4 1.19, PAT4 0.44, TIB4 0.90, MET4 1.90, TAR4 0.41. CALM 0.60–0.74 × MET4.

ABDL 1.19–2.17 × width. Dorsum with large anterior and posterior spots, with 2–3 pairs of small lateral spots (Fig. 97). Some individuals have a large, elaborate medial patch with a dark posterior spot. Lateral surfaces without distinct markings. Venter with brown median line. Epigynal bursae elongate, situated anteriorly, their closely positioned sclerotized rims convex relative to centre of epigynum. Epigynum with pair heavily sclerotized unbranched oval spermathecae. Epigynal ducts visible externally as dark spots below bursal openings (Figs. 98, 99).

Distribution. Southern Mexico (Fig. 96).

Material examined. MEXICO: Hidalgo, 10–20 miles south of Jacala 1 F (Jul. 1956, Roth & Gertsch, AMNH); Desierto de Leones, D.F, 1 ♀ (Aug. 1946, Goodnight, AMNH); Desierto de Los Leones, D.F., 9000’–10000’, 2 ♀ (Apr. 1946, Pallister, AMNH); District Federal, 2 miles West of Rio Frio, 3200 m, 7 ♀ (Jul. 1950, Gertsch & Roth, AMNH).
Figures 97–103. Figs 97–99. *Mexitlia altima* sp. nov. 97, dorsal view of female; 98, external view of epigynum; 99, internal ducts of epigynum. Figs 100–103. *Mexitlia trivittata* (Banks). 100, external view of epigynum; 101, internal ducts of epigynum; 102, ventral view, male pedipalp; 103, retrolateral view, male pedipalp.

_Mexitlia trivittata_ (Banks, 1901)

_(Figs 100–103)_

*Lethia trivittata* Banks, 1901, p. 577, Figs. 9–10 (males and female holotype from New Mexico: Albuquerque, in MCZ, examined).

*Lathys trivittata* Petrunkevitch, 1911, p. 112.

*Dictynoides trivittatus* Chamberlin, 1919b, p. 244.

*Dictyna trivittata* Gertsch, 1935, p. 15.


*Mallos zionis* Chamberlin, 1948, p. 15. (female holotype from Utah: Zion’s National Park, in AMNH, examined).


*Mallos triviatta* Roth, 1993, p. 89 (*lapsus calamorum*).

**Diagnosis.** The epigynal bursae of this species are wider than long (Fig. 100), whereas in *M. grandis* and *M. altima* the epigynal bursae are longer than wide (Fig. 105). The male palp is similar to that of *M. grandis*. The DiTA-T of *M. trivittata* has a vertical
orientation (Fig. 102), whereas the DiTA-T of *M. grandis* is horizontally oriented (Fig. 108).

**Female** (10). TL 5.48–6.97, CL 1.80–2.57, CL 1.06–1.73 × CW, CPW 0.55–0.81 × CW. Prominent thoracic groove located just posterior to cephalic region, 1.30–1.90 anterior carapace margin. Carapace dark reddish brown with 5 rows of thick white setae: three rows extending length of cephalic region, and two additional rows located anterior laterally.

PER straight. Border of eyes without heavy pigmentation. Eye diameters: AME 0.10–0.14, ALE 0.12–0.16, PME 0.10–0.14, PLE 0.10–0.14. ALEs separated by 0.44–0.58, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.83–1.40 × , ALE-AME 0.57–1.20 × , AME-PME 0.86–1.40 × , ALE-PLE 0.14–0.20 × PLEs separated by 0.64–0.80, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.29–1.50 × , PME-PLE 1.14–1.83 ×.

CLYP 1.00–1.43 × one AME diameter. CHEL 5.80–8.67 × CLYP, 2.17–2.41 × width. Chelicerae with no distinct markings. Endites, sternum reddish brown, labium darker in colour. LABL 1.05–1.50 × width. ENDL 1.50–1.94 × width. STRL 1.18–1.66, 1.13–1.33 × width. Anterior margin of sternum concave. Legs reddish brown, I and II darker in colour than III and IV, femur and tibia with light bands. Leg formula I-II-IV-III. Mean lengths of LegI and LegIV articles: FEMI 2.42, PATI 0.86, TIBI 2.05, METI 1.55, TAR1 0.87, FEM4 1.77, PAT4 0.67, TIB4 1.38, MET4 1.32, TAR4 0.59. CALM 0.44–0.78 × MET4.

ABDL 1.21–1.93 × width. Dorsum with large anterior and posterior spots, with 2–3 pairs of small lateral spots. Lateral surfaces without distinct markings. Venter with faint grey median line. Epigynal bursae anteriorly situated, their sclerotized rims oval shaped, wider than long. Some individuals have a short, sclerotized scape between the bursae. Epigynum with pair of heavily sclerotized unbranched oval spermthecae (Figs 100, 101). Epigynal ducts visible externally as pair of very large black spots below bursal openings.

**Male** (10). TL 4.15–5.98, CL 2.04–2.56, CL 1.13–1.27 × CW, CPW 0.57–0.61 × CW. Prominent thoracic groove, located just posterior to cephalic region, 1.38–1.80 from anterior carapace margin. Carapace colour and setal pattern like female (Fig. 95).

PER straight. Border of eyes without heavy pigmentation. Eye diameters: AME 0.10–0.14, ALE 0.12–0.16, PME 0.08–0.12, PLE 0.10–0.12. ALEs separated by 0.44–0.56, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.80–1.33 × , ALE-AME 0.50–1.33 × , AME-PME 0.92–1.17 × , ALE-PLE 0.14–0.20 × PLEs separated by 0.64–0.80, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.20–2.00 × , PME-PLE 1.50–2.50 ×.

CLYP 1.14–1.50 × one AME diameter. CHEL 6.11–7.71 × CLYP, 2.19–2.70 × width. Chelicerae with very slight emargination. Endites and sternum reddish brown, labium slightly darker in colour. LABL 1.30–1.50 × width. ENDL 1.65–1.84 × width. STRL 1.18–1.60, 1.23–1.47 × width. Anterior margin of sternum straight. Legs reddish brown, lighter in colour than carapace. Distal 2/3 of femur I and II with dark band. Leg formula I-IV-II-III, with leg IV slightly longer than leg II. Mean lengths of LegI and LegIV articles: FEMI 2.55, PATI 0.86, TIBI 2.22, METI 1.66, TAR1 0.88, FEM4 1.74, PAT4 0.64, TIB4 1.44, MET4 1.42, TAR4 0.60.
ABDL 1.32–1.60 × width. Abdominal colouration similar to female. DiTA-T hatchet shaped with its flat edge orientated vertically (Figs 102, 103). Embolus originates at 9:00 from a small triangular base. CYMB 1.41–1.68 × width.

Distribution. Western United States and Mexico (Fig. 96).


Dictyna grandis (O. Pickard-Cambridge, 1896) comb. nov. (Figs 104–109)

Dictyna grandis O. Pickard-Cambridge, 1896, p. 172, Fig. 4–4d (see note).

Dictyna avara Banks, 1898, p. 232, Fig. 19 (female holotype presumably deposited in the CAS, reported lost).

Dictyna grandis F.O. Pickard-Cambridge, 1902, p. 359, Fig. 22.

Mallos ghiggi Caporiacco, 1938, p. 257, Fig. 1. syn. nov.


Note. Types of Dictyna avara (Banks, 1898) appear to have been destroyed in the San Francisco earthquake of 1906. Types of Dictyna grandis (O. Pickard Cambridge, 1896) could not be found in either the British Natural History Museum (Paul Hillyard, pers. comm.) or the Hope Entomological Collections of the University of Oxford. Although the epigynum illustrated by O. Pickard Cambridge (1896) lacks the detail to clearly identify it, his dorsal view of the spider shows it to be a member of the genus Mexitlia. In the redescription of this species, F. O. Pickard Cambridge (1902) illustrates an epigynum that is clearly that of the species here defined as M. grandis.

Diagnosis. Females of this species closely resembles Mexitlia alta in colouration and epigynal morphology and are distinguished from it in that species’ diagnosis. The
male palp is similar to that of M. trivittata and is distinguished from it in that species’
diagnosis.

**Female** (7). TL 3.44–4.52, CL 1.36–1.92, CL 0.99–1.20 × CW, CPW 0.59–0.63 × CW. Prominent thoracic groove located posterior to cephalic region. Carapace dark reddish brown with 5 rows of thick white setae: three rows extending length of cephalic region, and two additional rows located anterior laterally.

PER straight. Border of eyes without heavy pigmentation. Eye diameters: AME 0.08–0.10, ALE 0.10–0.12, PME 0.08–0.10, PLE 0.08–0.10. ALEs separated by 0.40–0.50, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 1.00–1.50 ×, AME-ALE 0.60–1.11 ×, AME-PME 1.00–1.50 ×, ALE-PLE 0.20–0.25 ×. PLEs separated by 0.50–0.68, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.40–1.78 ×, PME-PLE 1.20–2.00 ×.

CLYP 0.80–1.25 × one AME diameter. CHEL 7.20–9.25 × CLYP. CHEL 1.94–2.65 × width. Chelicerae with no distinct markings. Endites and sternum reddish brown, labium slightly darker in colour. LABL 0.95–1.20 × width. ENDL 1.62–1.83 × width. STRL 1.18–1.31, 0.92–1.10 × width. Anterior margin of sternum concave.

Legs lighter reddish-brown than carapace, femur and tibia with light bands. Leg formula I-II-IV-III. Mean lengths of LegI and LegIV articles: FEM1 1.62, PAT1 0.57, TIBI 1.44, MET1 1.11, TAR1 0.65, FEM4 1.23, PAT4 0.44, TIB4 0.98, MET4 0.93, TAR4 0.44. CALM 0.68–0.88 × MET4.
ABDL 1.30–1.37 × width. Dorsum with large anterior and posterior spots, with 2–3 pairs of small lateral spots (Fig. 104). Lateral surfaces without distinct markings. Venter with faint grey median line. Bursae elongate, situated anteriorly, extending 3/4 length of epigynum. Epigynum with pair of heavily sclerotized, almost contiguous, unbranched oval spermathecae (Figs 105, 106). Epigynal ducts visible externally as dark patches below bursal openings.

**Male** (3). TL 3.40–4.00, CL 1.48–1.88, CW 1.08–1.25 × CW, CPW 0.60–0.63 × CW. Prominent thoracic groove, located just posterior to the cephalic region. Carapace colour and setal pattern like female.

PER straight. Border of eyes without heavy pigmentation. Eye diameters: AME 0.10, ALE 0.10–0.12, PME 0.08–0.10, PLE 0.10. ALEs separated by 0.43, remaining anterior eye interdistances, expressed as AME diameters: AME-AME 0.80–1.00 ×, AME-ALE 0.60–0.80 ×, AME-PME 0.80–1.40 ×, ALE-PLE 0.20 ×. PLEs separated by 0.58–0.62, remaining posterior eye interdistances, expressed as PME diameters: PME-PME 1.60–1.75 ×, PME-PLE 1.60–1.80 ×.

CLYP 1.00–1.20 × one AME diameter. CHEL 7.00–7.67 × CLYP, 2.30–2.32 × width. Chelicerae with very slight emargination (Fig. 107). Labium, endites, and sternum reddish brown. LABL 1.00–1.10 × width. ENDL 1.62–2.00 × width. STRL 0.96–1.16, 1.19–1.32 × width. Anterior margin of sternum concave. Leg colours reddish brown. Distal 2/3 of femur I and II with dark band. Leg formula I-IV-II-III, with leg IV slightly longer than leg II. Mean lengths of LegI and LegIV articles: FEM1 1.97, PAT1 0.62, TIB1 1.84, MET1 1.30, TAR1 0.70, FEM4 1.38, PAT4 0.45, TIB4 1.01, MET4 1.03, TAR4 0.43.

ABDL 1.33–1.38 × width. Abdominal coloration like female.

DiTa-T hatchet shaped with leading edge oriented almost horizontally (Figs. 108, 109). Embolus originates at 10:00 from rounded base. CYMB 1.46–1.60 × width.

**Distribution.** Southern Mexico.

**Material examined.** MEXICO: Hidalgo: Ixmiquilpan, (Rio Tula), 27 ♀, 10 ♂ (Apr. 1963, Gertsch & Ivie, AMNH); Tlaxcala: Tlaxcala, 11 ♀ (Jul. 1956, Gertsch & Roth, AMNH); Veracruz: Orizaba, 2 ♀, 1 ♂ (Jun. 1944, Davis, AMNH); Michoacan: Morelia, 3 ♀ (May 1963, Gertsch & Ivie, AMNH).

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