THE NEW ORB-WEAVER GENUS *LEWISEPEIRA* (ARANEAE: ARANEIDAE)

BY HERBERT W. LEVI

Museum of Comparative Zoology
Harvard University
Cambridge, Mass. 02138

INTRODUCTION

Most new American orb-weaver genera are South American. *Lewisepeira,* containing four species, is one of the few new genera found only in the mountains of Mexico, the Greater Antilles and Central America. Although one *Lewisepeira* species was originally placed in the genus *Bertrana* Keyserling, 1884, that genus is not closely related to *Lewisepeira. Bertrana* has a male palpus resembling that of *Alpaida* O. P.-Cambridge, 1889, with the tegulum of the left palpus visible on the right of the conductor, but the median apophysis in the middle of the tegulum (not on the edge) in mesal view, and situated close to the cymbium (Levi, 1989, figs. 17, 23). The epigynum of the female of *Bertrana* lacks the narrow annulate scape (Levi, 1989, figs. 11, 19) that is present in *Lewisepeira* (Figs. 1,7).

This is one of a series of revisions on American orb-weavers (listed in Levi 1993). These revisions make it possible to identify Neotropical orb weavers for ecological, behavior and venom studies, and eventually will elucidate the interrelationships of genera.

For this revision, specimens from the American Museum of Natural History (AMNH), N. I. Platnick, Curator, and the Museum of Comparative Zoology (MCZ) were used.

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Lewisepeira new genus

Type species is *Bertrana farri* Archer, 1958. This genus is named after C. Bernard Lewis, former director of the Science Museum of the Institute of Jamaica, combined with Epeira, the suffix of many araneid generic names. The generic name is feminine.

Diagnosis. Lewisepeira males are distinguished by the large palpal sclerite, which faces medially and covers the embolus of the palpus (embolus lamella, A in Figs. 11,13). It is probably derived from the embolus lamella or terminal apophysis. This unusual structure is a synapomorphy for the four species belonging to this genus. In species of *Lewisepeira,* unlike most (but not all) *Araneus* species (Levi 1991), the palpal patella has only one, but a very strong, patellar seta (Fig. 15).

The female resembles species of *Araneus* Clerck, 1758 and *Aculepeira* Chamberlin and Ivie, 1942 having a setose carapace and abdomen, a subspherical abdomen and sometimes an anterior dorsal pair of humps (Figs. 3, 9, 18); the epigynum has an annulate scape (Figs. 1, 7). Females differ from *Araneus* by having a scape with a pointed tip (Figs. 1, 7), and from *Aculepeira* (Levi 1991) by having the epigynum less sclerotized (Figs. 1, 7). While the generic placement of males is easy, this is not so with females.

Description. Width of the cephalic region of the carapace measured behind the posterior median eyes is about half the maximum width of the thoracic region (Figs. 3, 9). The posterior median eyes are as large or larger than the anterior medians in profile. The height of the clypeus is less than the diameter of the anterior median eyes. The abdomen is subspherical and about as wide as long. It has distinct anterior lateral humps in females of *L. farri* and *L. chichinautzin* (Figs. 9, 18), indistinct humps in male *L. farri* and no humps in either female or male of *L. boquete* (Fig. 3) and *L. maricao.*

The male palpal patella of all four species has a very strong, single macroseta (Fig. 15). The male may have a tooth on the endite (*L. farri, L. maricao, L. chichinautzin*) or it may be absent (*L. boquete*).

In many araneid species with relatively large males (carapace width of male equal to that of the female), the males have a hook on the first coxa with a corresponding groove on the second femur. In araneid species with small males, such leg modifications are

often lost. In *L. farri* the hook on the first coxa is reduced to a minute, barely visible projection. The groove is also minute. In *L. boquete* and *L. maricao* the hook and groove appear to be absent, though none was examined by electron microscope. *Lewisepeira chichinautzin* male has this hook. The second tibia in all species is thicker than the first, but not otherwise modified. In *L. boquete* the maximum diameter of the female carapace is 1.6 times the width of the male carapace (Figs. 3, 6, 18); in *L. farri* and *L. chichinautzin* they are about equal in width. As in other araneids, the male, when much smaller than the female (as in *L. boquete*), loses the usual adaptations of araneid males (Levi 1983: 253; Levi, in press). From their absence we can expect the carapace of the female *L. maricao* to be larger than that of the male. All four species come mainly from mountainous areas, but nothing is known of their habits.

Distribution. Of the four known species of the genus, one is found in Mexico, another in Central America and two in the Greater Antilles.

Key to the species of *Lewisepeira*

The female of *L. maricao* is not known.

1 Females 2
– Males 5
2(1) Puerto Rico ..... *maricao*
– Mexico, Jamaica, Central America 3
3(2) Abdomen with humps (Fig. 9, 18); Mexico, Jamaica 4
– Abdomen without humps (Fig. 3); epigynum as in Figures 1, 2; Central America ..... *boquete*
4(3) Mexico ..... *chichinautzin*
– Jamaica ..... *farri*
5(1) Terminal edge of embolus lamella with distal bulge as at 2 hr of A in Figure 11, sclerotization as 9–10 hr in Figure 12; Jamaica ..... *farri*
– Terminal edge of embolus lamella covering sclerite otherwise (Figs. 4, 5, 14, 15, 16, 17) 6
6(5) Terminal edge of embolus lamella dissected as in Figures 16, 17; Mexico ..... *chichinautzin*

– Terminal edge of embolus lamella otherwise; West Indies, Central America 7

7(6) Terminal edge of embolus lamella not sclerotized as at 2–3 hr in Figure 4, at 9–10 hr in Figure 5; Central America ...*boquete*

– Terminal edge of embolus lamella as at 2–3 hr in Figure 14, at 9–10 hr in Figure 15; Puerto Rico .....*maricao*

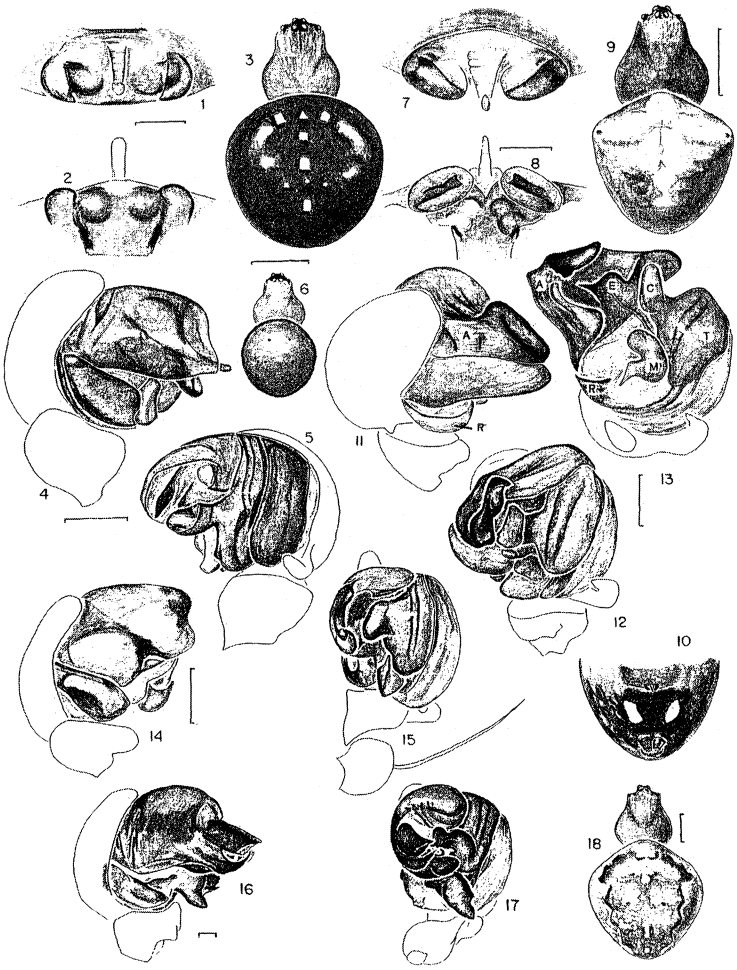
Lewisepeira boquete new species

Figures 1–6; Map 1

Holotype. Female holotype from Boquete, Chiriquí Prov., Panama, July 1939 (A. M. Chickering) in MCZ. The specific name is a noun in apposition after the type locality.

Description. Female from Boquete, Panama. Carapace dusky orange, median eye area black. Chelicerae brown, proximal area with reticulate, dusky pattern. Labium, endites brown. Sternum brown. Legs black, with last two pairs lighter above. Dorsum of abdomen black, with white spots along midline and across anterior (Fig. 3); venter black, anterior of spinnerets white, sides with a large white patch. Posterior median eyes 1.5 diameters of anterior medians, laterals 1 diameter. Anterior median eyes 1.5 diameters apart, 3 diameters from laterals. Posterior median eyes their diameter apart, 2 diameters from laterals. Ocular quadrangle wider behind than in front. Abdomen subspherical (Fig. 3). Total length 4.2 mm. Carapace 1.8 mm long, 1.5 wide, 0.8 behind lateral eyes. First femur 1.8 mm, patella and tibia 1.8, metatarsus 0.9, tarsus 0.5. Second patella and tibia 1.5 mm, third 0.9, fourth 1.3.

Male from Volcán, Panama. Color lighter than female. Carapace orange, sternum dusky orange. Legs orange, distal articles darker. Abdomen dusky brown without any white areas or spots (Fig. 6). Posterior median eyes 1.8 diameters of anterior medians, laterals 1 diameter. Anterior median eyes their diameter apart, 1.5 diameters from laterals. Posterior median eyes their diameter apart, 1 diameter from laterals. Ocular quadrangle wider behind than in front. Height of clypeus equals 0.8 diameter of anterior median eye. Endite without tooth. First coxa without hook. Abdomen round, widest in middle with dorsal area sclerotized (Fig. 6). Total length 2.0 mm. Carapace 1.1 mm long, 0.9 wide, 0.5 behind lateral eyes. First femur 1.1 mm, patella and tibia 1.1, metatarsus 0.6, tarsus 0.4. Second patella and tibia 1.0 mm, third 0.5, fourth 0.7.



Figures 1–6. *Lewisepeira boquete* n. sp. 1–3, female. 1, epigynum, ventral. 2, epigynum, posterior. 3, dorsal. 4–6, male. 4, 5, left palpus. 4, mesal. 5, ventral. 6, dorsal.

Figures 7–13. *L. farri* (Archer). 7–10, female. 7, epigynum, ventral. 8, epigynum, posterior. 9, dorsal. 10, abdomen, ventral. 11–13, male. 11, mesal. 12, ventral. 13, ventral, pulled apart.

Figures 14, 15. *L. maricao* n. sp. male palpus. 14, mesal. 15, ventral.

Figures 16–18. *L. chichinautzin* n. sp. 16, 17, male palpus. 16, mesal. 17, ventral. 18, female, dorsal.

Scale lines: 1.0 mm; genitalia 0.1 mm. *Abbreviations:* A, embolus lamella. C, conductor. E, embolus. M, median apophysis. R, radix. T, tegulum.

Note. Males and females were collected together.

Variation. Total length of females 3.7 to 4.2 mm.

Diagnosis. Lewisepeira boquete is larger than the other species, with a black abdomen (Figs. 3, 6). The lateral plates of the epigynum (Fig. 2) and the sclerotized edge of the embolus lamella (at 2–3 hr in Fig. 4) differ in shape from those of *L. farri* (at 9–10 hr in Fig. 5). It is known only from the eastern mountains of Panama.

Paratypes. PANAMA *Chiriquí:* Volcán, 20 Feb. 1936, ♀, ♂ (W. J. Gertsch, AMNH).

Lewisepeira farri (Archer), new combination

Figures 7–13; Map 1

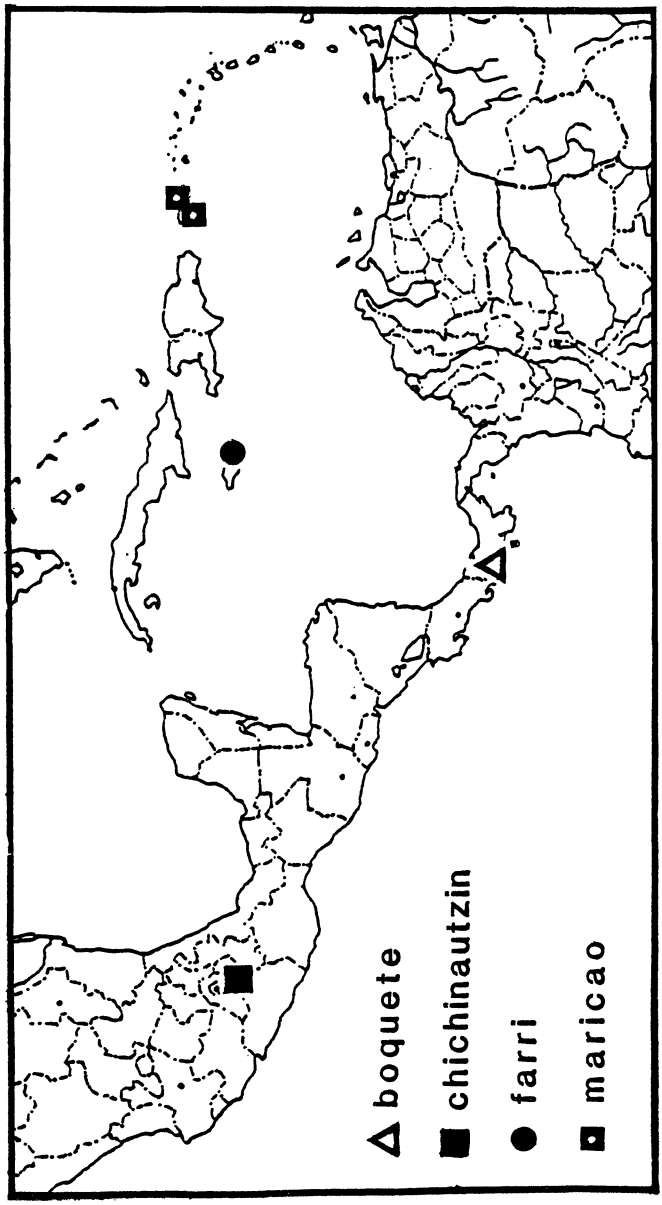
Bertrana farri Archer, 1958: 11, figs. 20, 21, ♂. Male holotype from Hardwar Gap, 4800 ft. [1460 m], Jamaica, [not figs. 18, 19, ♀ allotype], in AMNH, examined. Brignoli, 1983:264.

Atea lewisi Archer, 1958: 17, figs. 39, 40, ♀. Female holotype from Hardwar Gap, 4600 ft. [1400 m], Jamaica, lost. NEW SYNONYMY.

Araneus lewisi: – Brignoli, 1983: 263.

Note. The female allotype of *Bertrana farri* and the immature paratypes belong to the genus *Chrysometa* Simon, 1895, but has not been named. Archer illustrated the median apophysis of *Bertrana farri* (1958, fig. 24). But this is apparently an embolus part coming from a female epigynum. Only a first femur of the holotype of *A. lewisi* survives.

Description. Female from Hardwar Gap. Carapace orange with white setae laterally on the cephalic region. Chelicerae orange. Labium, endites brown. Sternum orange, margins darker. Coxae yellow-white; legs yellow-white with indistinct dusky rings. Dorsum of abdomen with an indistinct dusky folium, a white band from hump to hump, and a dark spot on the tip of each hump (Fig. 9), sides light with four dusky patches; venter black, with a pair of white patches (Fig. 10). Posterior median eyes same diameter as anterior medians, laterals 0.6 diameter. Anterior median eyes 0.8 diameter apart, 1.1 diameters from laterals. Posterior median eyes 0.7 diameter apart, 2.5 diameters from laterals. Ocular quadrangle narrower behind than in front. Total length 3.5 mm. Carapace 1.6 mm long, 1.3 wide, 0.7 behind lateral eyes. First femur



Map 1. Distribution of *Lewisepeira* species.

1.4 mm, patella and tibia 1.7, metatarsus 0.9, tarsus 0.5. Second patella and tibia 1.5 mm, third 0.9, fourth 1.2.

Male holotype. Lighter than female. Posterior median eyes 0.8 diameter of anterior medians, laterals 0.8 diameter. Anterior median eyes 0.8 diameter apart, 0.8 diameter from laterals. Posterior median eyes 0.8 diameter apart, 2.5 diameters from laterals. Ocular quadrangle narrower behind than in front. Endite with tooth facing a large tubercle on palpal femur. First coxa with a very small hook, second femur with a small proximal notch. Abdominal humps indistinct. Total length 2.2 mm. Carapace 1.4 mm long, 1.2 wide, 0.6 behind lateral eyes. First femur 1.6 mm, patella and tibia 1.7, metatarsus 1.0, tarsus 0.5. Second patella and tibia 1.6 mm, third 0.9, fourth 1.2.

Note. the dorsal pattern of the abdomen is quite variable, occasionally with a distinct folium on the abdomen. Males and females were collected at the same locality.

Variation. Total length of females 3.2 to 3.6 mm, males 2.3 to 2.7.

Diagnosis. This species is smaller than *L. maricao.* The lateral plates of the epigynum (Fig. 8) and sclerotized edge of the embolus lamella of the palp (A in Figs. 11, 13) differ from those of other species. *Lewisepeira farri* is found only in Jamaica.

Specimens Examined. JAMAICA *Portland Par.:* Main Range, Blue Mountains, 1500–2100 m, 17–19 Aug. 1934, ♂ (P. J. Darlington, MCZ); Newcastle, Nov. 1950, 2♀ (N. L. H. Krauss, MCZ); Hardwar Gap, 6 Dec. 1954, ♂; 17 March 1955 (both A. M. Nadler, AMNH); 2 Oct. 1957, ♂; 20 Nov. 1957, 2 ♀; 24 June 1958, 3♂, 2 imm.; 27 June 1958, ♀, ♂ (all A. M. Chickering, MCZ); Kingston, Palisadoes, Nov. 1957 (A. M. Chickering, MCZ). *St. Thomas Par.:* 10–11 km NE Bath, 10 Sept. 1957, ♀ (A. M. Chickering, MCZ).

Lewisepeira maricao new species

Figures 14, 15; Map 1

Holotype. Male holotype from National Forest near Maricao, Puerto Rico, 10, 11 Sept. 1959, male paratype from same locality, 12 March 1959, (A. M. Nadler) in AMNH. The specific name is a noun in apposition after the type locality.

Description. Male holotype. Carapace yellowish white, cephalic region gray, eye area and clypeus darkest. Chelicerae proximally dark, distally light. Labium, endites yellow-white. Sternum dusky yellow-white, darkest on sides and posterior. Coxae yellowish white, legs with dark rings. Dorsum of abdomen with a wider folium than in *L. farri;* venter gray with a pair of white patches. Posterior median eyes 1.1 diameters of anterior medians, laterals 0.7 diameter. Anterior median eyes their diameter apart, 0.6 from laterals. Posterior median eyes 0.6 diameter apart, 1.3 diameters from laterals. Ocular quadrangle slightly narrower behind than in front. Height of clypeus equals 0.8 diameter of anterior median eye. Endite with small tooth, palpal femur with facing small tubercle. Abdomen as wide as long, widest anteriorly and without humps. Total length 2.2 mm. Carapace 1.07 mm long, 0.89 wide, 0.49 wide behind lateral eyes. First femur 1.10 mm, patella and tibia 1.33, metatarsus 0.70, tarsus 0.39. Second patella and tibia 1.11 mm, third 0.61, fourth 0.87.

Variation. Total length of two males 1.4 and 2.2 mm. Illustrations were made from the holotype.

Diagnosis. This species is smaller than *L. farri* and the edge of the embolus lamella differs (at 2–3 hr in Fig. 14, at 9–10 hr in Fig. 15). The species is known only from Puerto Rico.

Specimens Examined. PUERTO RICO El Yunque, 27–28 Feb. 1955, ♂ (A. M. Nadler, AMNH).

Lewisepeira chichinautzin new species

Figures 16–18; Map 1

Holotype. Male holotype and female paratype (without epigynum) from Derrame del La'vico [derrame de lava, lava discharge] of Chichinautzin, 1800 m, Morelos, Mexico, 8 Aug. 1990, (M. A. Torres) in MCZ. The specific name is a noun in apposition after the locality.

Description. Female paratype. Carapace orange with white setae. Chelicerae, labium, endites orange. Legs with brown rings and speckles. Dorsum of abdomen with a brown folium (Fig. 18); venter with two white brackets. Posterior median eyes 1.2 diameters of anterior medians, laterals 0.8 diameter. Anterior median eyes 1.5 diameters apart, 2.8 diameters from laterals. Posterior

median eyes 1 diameter apart, 4 diameters from laterals. Ocular quadrangle square. Height of clypeus equals 1.2 diameters of anterior median eye. Abdomen oval (Fig. 18). Total length 6.5 mm. Carapace 2.7 mm long, 2.1 wide, 1.1 wide behind lateral eyes. First femur 2.9 mm, patella and tibia 3.4, metatarsus 2.0, tarsus 0.9. Second patella and tibia 2.9 mm, third 1.6, fourth 2.5.

Male holotype. Coloration as in female, but folium more distinct. Posterior median eyes 1.2 diameters of anterior medians, laterals 0.8 diameter. Anterior median eyes 1.2 diameters apart, 2.1 diameters from laterals. Posterior median eyes 1.2 diameters apart, 2.2 diameters from laterals. Ocular quadrangle square. Height of clypeus equals 1 diameter of anterior median eye. Endite with tooth, palpal femur with tubercle. Coxal hook present. Abdomen oval. Total length 5.0 mm. Carapace 2.7 mm long, 2.1 wide, 1.1 wide behind lateral eyes. First legs lost. Second patella and tibia 3.4 mm, third 1.6, fourth 3.1.

Diagnosis. It is not possible to separate the female from others without knowing the structure of the epigynum. The male differs from others by having the edge of the large embolus lamella dissected (at 2–3 hr in Fig. 16, at 8–9 hr in Fig. 17) and a more sclerotized conductor with the tip hidden by the sclerotized lamella (center of Fig. 17).

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