

**MALE OF THE BLIND CAVE GNAPHOSOID *LYGROMMA ANOPS*
(ARANEAE, GNAPHOSOIDEA, PRODIDOMIDAE)
FROM GALAPAGOS ISLANDS, ECUADOR**

Peck and Shear (1987) described the prodidomid spider *Lygromma anops* from female specimens collected in lava caves on Isla Santa Cruz, Galápagos, Ecuador. This species is one of three known eyeless gnaphosoid spiders, and one of only two known gnaphosoid troglobites. The lack of males left us unable to assess the relationships of *L. anops*.

Further field work by S. B. Peck in 1989 resulted in the collection of a total of three males from two localities. Below we describe and illustrate the male, and provide some new thoughts on the species' relationships and biogeography.

Lygromma anops Peck and Shear
Figs. 1, 2

Lygromma anops Peck and Shear, 1987:106.

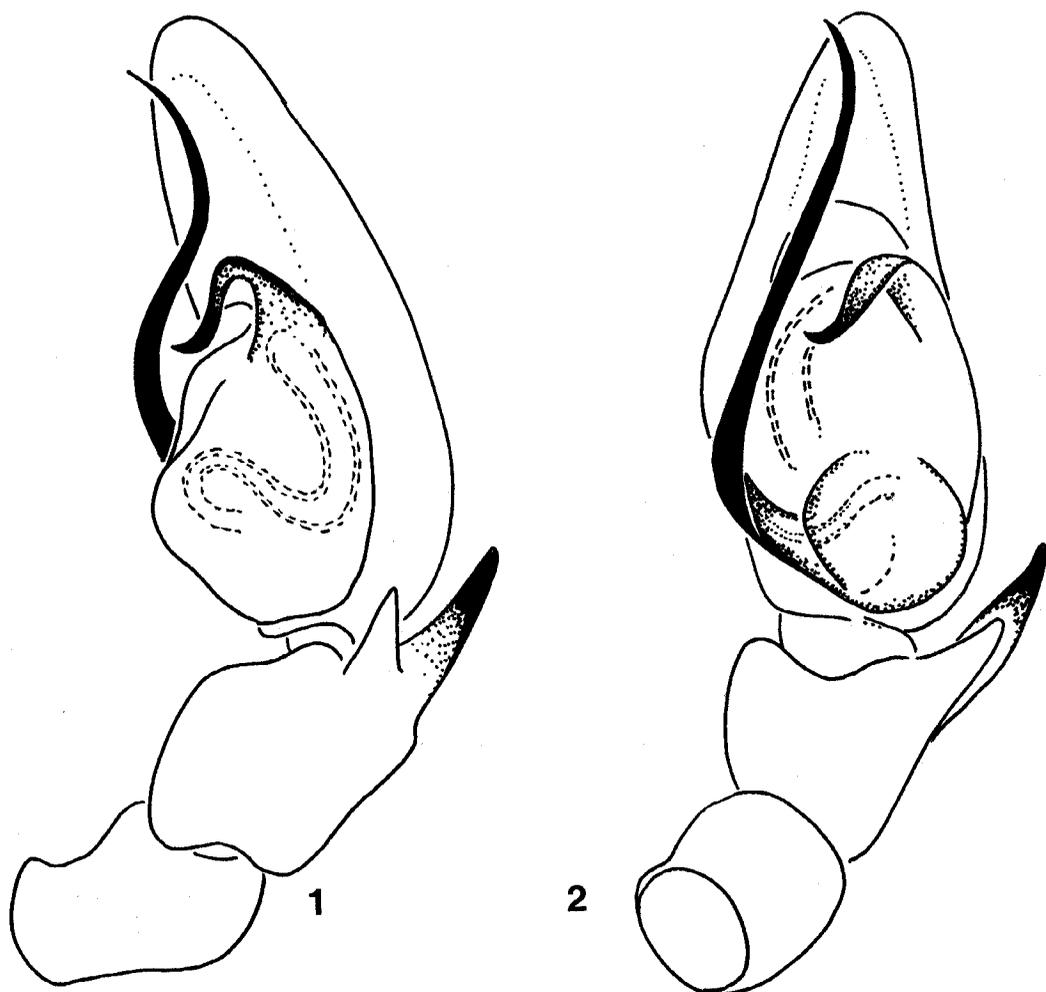
Male.—From Cueva Enrique Sevilla. Total length, about 3.4 mm. Carapace 1.28 mm long, 1.12 mm wide. Eyes absent, carapace smooth, without any indication of lenses. Chelicerae with four denticles in promarginal row, single small retromarginal denticle. Other characters closely resembling those of female. Leg spination (method of Platnick & Shadab 1975): femora I, II: d2-2-0, p0-0-2; III, IV: d1-1-1, p0-0-1, r0-0-1; tibiae I, II: v2-2-2, p0-0-1; III, IV: v2-2-2, p1-1-1, r1-1-1, d0-1-0. Palpus (Figs. 1, 2) with bases of retrolateral tibial apophyses fused. Embolus long, robust; base of embolus broad, free from bulb, shallowly, sinuously curved. Median apophysis robust, sigmoid.

Material examined.—One male from Cueva Enrique Sevilla, 250 m elevation, 5 February 1989 (S. Peck); 2 males from 200 m elevation, Cuevas de Bellavista no. 2, March-April 1989 (S. Peck); all from Isla Santa Cruz, Galápagos.

Habitat notes.—The first locality represents a new record for *Lygromma anops*. Previously (Peck & Shear 1987) females and juveniles had been taken in Cueva Bellavista No. 2 (Bellavista) and Cuevas de Vargas (5 km NE of Santa Rosa). Cueva Enrique Sevilla, like the others, is in the moist transition (*Scalesia*) zone and is moder-

ately moist at all times, probably never drying out and never flooding. Roth and Craig (1970) noted what is probably *Lygromma anops* from three juveniles in the Institut Royal des Sciences Naturelles de Belgique, Brussels. These specimens were taken from moist litter at the bottom of a crevasse 10 m deep and about 800 m from the dock of the Darwin Station. This is also known as "Grieta Iguana," and is the water source for the Darwin Station. It is possible that *Lygromma anops*, like many inhabitants of lava caves, colonizes new caves through interconnecting cracks and crevices, and that these small spaces, inaccessible to man, are in reality its main habitat. Thus it is not surprising that examples may be found in any suitably cool and damp habitat that the spiders can reach through this maze of tiny "cavelets" (Peck 1990).

Evolutionary considerations.—In the context of a detailed study of the spinneret morphology of gnaphosoid spiders, Platnick (1990) has assigned *Lygromma*, formerly in the Gnaphosidae, to a revalidated Family Prodidomidae. Platnick and Shadab (1976b) give a discussion of the relationships of the genus *Lygromma*. While they were unable to analyze the evolution of the species of the genus in a comprehensive fashion due to missing data (many species are known only from one sex), they did note that three species from Venezuela (*senoculatum*, *valencianum* and *huberti*) seemed to be closely related to each other but not to other species of *Lygromma*. The discovery of the male of *L. anops* now allows the inclusion of the Galápagos species in this group. While Platnick and Shadab (1976b) did not suggest any candidate synapomorphies, the males of the four species differ from other *Lygromma* in having the retrolateral apophyses of the male palpal tibia with their bases close together (practically fused in *anops*), in having the embolus long and originating as a separate sclerite on the proximal surface of the bulb, and in the sigmoid median apophysis. The epigynum of *L. anops* is characterized by elaborate convoluted ducts. These are known to occur in one of the Venezuelan species, *senoculatum* (females of *huberti*



Figures 1, 2.—*Lygromma anops* Peck & Shear: 1. Right palpus of male, retrolateral view; 2. Same, ventral view.

and *valencianum* are unknown; in our original description of *L. anops* we mistook Platnick and Shadab's illustrations of the epigynum of *L. peruviana* for those of *huberti*). Outside this group, both convoluted ducts and a sigmoid median apophysis are found in *L. gertschi*, a blind, cave-inhabiting species from Jamaica which we originally suggested as a relative of *L. anops*, but this species has a very short, distally arising embolus. We doubt that eyelessness is a reasonable basis for supposing close relationship; *Lygromma* contains species with eight eyes, six, and none. *Lygromma simoni* (Ecuador) and *L. peruviana* have convoluted epigynal ducts, but males are not known.

Are the characters we have mentioned synapomorphies? Platnick and Shadab (1976a) have suggested the Mexican genus *Tivodrassus* as the

sister group of *Lygromma*. The two *Tivodrassus* species known from males have rather short emboli but have a sigmoid median apophysis. The tibial apophyses are widely separated and have a small, dark tooth between their bases. The epigynal ducts are long and convoluted in all three known species. Outgroup comparison thus suggests that the long emboli and the approximated bases of the tibial apophyses may be synapomorphies but that the sigmoid median apophysis and convoluted epigynal ducts are plesiomorphic within *Lygromma*. A second possible outgroup genus is *Tricongius* (Platnick & Höfer 1990). *Tricongius amazonicus* has convoluted epigynal ducts and a rather long, basally arising embolus, but the median apophysis is membranous, not sigmoid, and there is a single, strong tibial apophysis. *Tricongius* has a number of apomor-

phies of its own, including a bizarre modification of the cheliceral promargin. These questions of relationships can be resolved only by analyzing the full spectrum of characters in all prodidomid genera.

Unfortunately each of the Venezuelan species possibly related to *L. anops* is known only from its type locality. However, numerous northern South American soil arthropods have extended their distribution into the Isthmus of Panamá, a known source area for Galápagos biota, and this species group of *Lygromma* may eventually be found there. Again, lack of data about the species composition and the distribution of mainland forms hampers study of the historical biogeography of the Galápagos soil and litter fauna.

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