

THE FIRST OLD WORLD SPECIES OF PHRYNIDAE (AMBLYPYGI): *PHRYNUS EXSUL* FROM INDONESIA

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ABSTRACT. A new species of *Phrynus*, *P. exsul*, from the Indonesian island of Flores, represents the first member of the family found outside of the New World.

Keywords: Whip-spiders, Phrynidae, Indonesia, Flores, new species

The whip-spiders (Amblypygi) of Asia and the Australasian region are currently represented by five genera in three families. The Charinidae includes species of *Charinus* Simon 1892 (a senior synonym of *Charinides* Gravely 1911, see Weygoldt (2000)), several species of *Sarax* Simon 1892 (a senior synonym of *Phrynichosarax* Gravely 1915, see Weygoldt (2000)), and a single species of *Catageus* Thorell 1889. The Charontidae are endemic to the Australasian region with two genera, *Charon* Karsch 1879 and *Stygophrynus* Kraepelin 1895. The Phrynichidae includes several species of *Phrynichus* Karsch 1879 that were recently revised by Weygoldt (1998). Therefore, it was surprising to find an adult male whip-spider collected from a cave situated on the Indonesian island of Flores that possesses all the major diagnostic features of the Phrynidae. Many different genera were attributed to the family (or its synonyms) during the 19th century, but the Phrynidae are presently regarded to be confined to an area ranging from southern U.S.A. to South America (Weygoldt 2000), where four Recent genera and a single genus from Tertiary amber deposits are represented in two subfamilies. The Heterophryninae consist of numerous species of *Heterophrynus* Pocock 1894, found only in northern South America. The Phryninae consist of a single species of *Acanthophrynus* Kraepelin 1899 from Mexico and south-western U.S.A., 17 species of *Paraphrynus* Moreno 1940, and 21 Recent species of *Phrynus* Lamarck 1801 (e.g., Mullinex 1975; Quintero 1981). The status and affinities of the Late Oligocene-Early Miocene *Electrophrynus mirus* Petrunkevitch 1971 from Chiapas amber are unknown.

The identity of the species was kindly confirmed by Dr. Peter Weygoldt who later pro-

vided a second male from the same cave. Although it is generally not desirable to name new taxa based upon so few specimens, it appears that further material from Flores will not be forthcoming in the near future, and a description of this remarkable species is presented here.

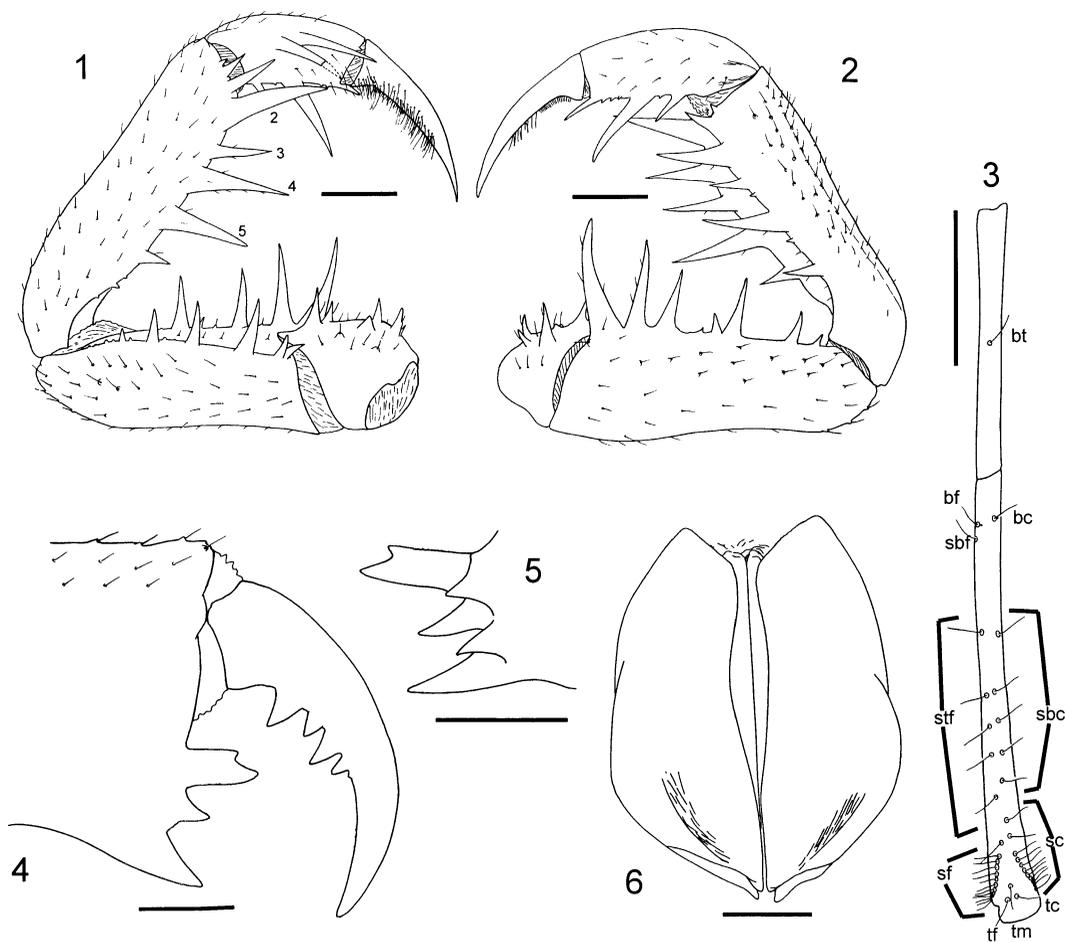
METHODS

The specimens are lodged in the Western Australian Museum, Perth (WAM) and the Muséum d'histoire Naturelle, Genève (MHNG). Terminology largely follows Weygoldt (1996, 2000), with the exception of the nomenclature of the pedipalp and leg segments, which follows Snodgrass (1948), Harvey & West (1998) and Shultz (1999). Therefore, the pedipalp consists of six segments: coxa, trochanter, femur, patella, tibia and tarsus, plus a terminal apotele (or claw). The legs consist of seven segments: coxa, trochanter, femur, patella, tibia, metatarsus and tarsus, plus the apotele (or claws). This terminology allows for the segments to be homologised with that used for other arachnids. The terminology used for the spination of the pedipalps follows Weygoldt (2000), rather than Quintero (1981). The distance of each pedal trichobothrium from the basal margin of the leg segment is expressed as a percentage of the total length of the segment and presented in parentheses.

SYSTEMATICS

Family Phrynidae Blanchard 1852
Subfamily Phryninae Blanchard 1852
Genus *Phrynus* Lamarck 1801

Tarantula Fabricius 1793: 432. Type species: *Phalangium reniforme* Linnaeus 1758, by subsequent designation of Karsch 1879.



Figures 1–6.—*Phrynus exsul* new species, male holotype 1. Left pedipalp, dorsal; 2. Left pedipalp, ventral; 3. Tibia IV segments 3 and 4, lateral; 4. Left chelicera, internal, most pilosity omitted; 5. Left chelicera, detail of teeth, external; 6. Genitalia, dorsal. Scale lines = 2 mm (Figs. 1–3), 1 mm (Figs. 4–6).

Phrynus Lamarck 1801: 175. Type species: *Phalangium palmatum* Herbst, in Lichtenstein & Herbst 1797, by subsequent designation of Karsch 1879.

Admetus C.L. Koch 1850: 81. Type species: *Phalangium palmatum* Herbst, in Lichtenstein & Herbst 1797, by subsequent designation of Simon 1892.

Neophrynus Kraepelin 1895: 23–24. Type species: *Phalangium palmatum* Herbst, in Lichtenstein & Herbst 1797, by original designation.

Diagnosis.—Species of *Phrynus* differ from those of *Paraphrynus* by the relative length of the dorsal spines on the pedipalpal patella (Mullinex 1975; Quintero 1981): in *Phrynus* dorsal spine 3 is shorter than spines 2 and 4, whereas in *Paraphrynus* dorsal spines 3 and 4 are shorter than spines 2 and 5.

Remarks.—An unresolved problem in the taxonomy of the Phrynidae is the status of the genera *Tarantula* Fabricius 1793 and *Phrynus*. Quintero (1981, 1982) discussed the problem in detail, and opted to retain the name *Phrynus* over *Tarantula*, despite the priority of the latter name. The International Commission on Zoological Nomenclature has yet to make a decision on the application, and I therefore maintain the prevailing usage of *Phrynus*.

Phrynus exsul new species
Figs. 1–6

Material examined.—Holotype male from Gua Cermin, near Labuan Bajo, Flores, Indonesia, 8°33'S, 119°55'E, 25 May 1990, R.E. Johnstone, R.A. How (WAM 98/1591). Para-

type: 1 male, same locality, 22 January 2001, C. Deeleman (MHNG).

Etymology.—The specific epithet refers to this species being the sole phrynid that is currently known from the Old World (*exsul*, Latin, a banished person, in exile).

Diagnosis.—*Phrynus exsul* differs from all other members of the family by the increased number of trichobothria on the distitibia, for example on distitibia IV, where rows sbc and stf are each composed of 5 trichobothria (Fig. 3).

Description.—Male: Carapace, pedipalps and legs reddish-brown; tergites slightly paler; femora of legs with barely discernible broad annulations. All setae acicular. Carapace: anterior margin slightly concave, with numerous setiferous tubercles; median and lateral eyes not reduced in size; carapace with numerous fine setiferous tubercles as well as many small non-setiferous tubercles; frontal process concealed. Sternum tripartite, each sternite not expanded; anterior sternite with two very stout distal setae and numerous smaller setae, mostly clustered in basal third; median sternite with 3–5 small setae; posterior sternite 3–7 small setae. Chelicera (Figs. 4, 5): hand with 3 teeth on external margin, the two dorsal teeth on a common base (Fig. 5); 3 teeth on internal margin, the most dorsal tooth bicusped with lower tooth the largest (Fig. 4); movable finger with 4 large teeth and 1 very small distal tooth along inner margin (Fig. 4). Pedipalps (Figs. 1, 2) stout; trochanter with several spines on antero-dorsal margin; femur with 6 major spines and several minor spines on antero-dorsal margin, spine 4 largest, antero-ventral margin with 6 major spines and several minor spines, spine 6 the longest; patella with 6 major spines on antero-dorsal margin, spine 3 smaller than spines 2 and 4, antero-ventral margin with 5 major spines, spines 2 and 4 the longest, all spines without basal sub-spine; tibia with 3 spines on antero-dorsal margin, spine 1 with 3 small denticles in basal half, dorsal margin with 4 small denticles; antero-ventral margin with 3 major spines, spine 2 largest, with 1 small denticle between spine 2 and 3, and 3 small denticles between spines 1 and 2; tarsus with single minute spine situated dorsal to cleaning organ; apotele completely fused to tarsus, without suture line or division; cleaning organ composed of a ventral row of large setae and a dorsal

row of small setae. Legs: leg I with 34 (holotype), 31 (paratype) tibial, 44 (holotype) 45 (paratype) metatarsal and 23 (holotype), 21 (paratype) tarsal segments; 12th last segment of tarsus I with plate organ; femur I 2.41 (3.54) times longer than carapace; tibiae II and III with 2 segments, tibia IV with 4 segments, third segment with 1 trichobothrium, bt (0.51), fourth segment (distitibia) with 36 trichobothria (Fig. 3): bf (0.12), bc (0.11), sbf (0.15), stf₁ (0.35), stf₂ (0.49), stf₃ (0.56), stf₄ (0.62), stf₅ (0.72), sbc₁ (0.36), sbc₂ (0.49), sbc₃ (0.55), sbc₄ (0.62), sbc₅ (0.68); distitibiae II and III with similar, increased, numbers of stf and sbc; tarsi II, III and IV each with 4 segments; last segment with oblique slit; pulvilli absent. Genitalia as in Fig. 6.

Dimensions (mm), holotype (paratype): Body length (without chelicerae) 27.5 (38.0). Carapace: median length 8.95 (13.35), width 13.77 (19.83). Pedipalps: trochanter length 4.10 (6.22), width 2.53 (4.03); femur length 7.52 (14.39), width 2.09 (3.17); patella length 9.30 (16.44), width 2.25 (2.82); tibia length 4.22 (7.10); tarsus length 4.00 (7.29). Leg I: femur 21.55 (47.25), patella 2.00 (2.91), tibia 39.70 (98.20), metatarsus 39.50 (89.50), tarsus 10.03 (14.51). Leg II: femur 15.60 (28.60), patella 2.06 (3.50), tibia 21.12 (33.60), metatarsus 1.47 (13.80), tarsus 2.21 (3.62). Leg III: femur 15.75 (29.40), patella 2.65 (4.45), tibia 23.48 (40.15), metatarsus 1.67 (2.53), tarsus 2.63 (3.64). Leg IV: femur 14.24 (23.50), patella 2.43 (3.83), tibia 23.30 (43.20), metatarsus 1.78 (2.65), tarsus 2.50 (3.87).

Remarks.—*Phrynus exsul* lacks the long apophysis on the pedipalpal trochanter which is a synapomorphy of *Heterophrynus*, the sole member of the Heterophryninae, and lacks the leaf-like setae on tarsus I characteristic of *Acanthophrynus*. It possesses more than three principal spines on the dorsal margin of the pedipalpal patella, which is a synapomorphy uniting *Phrynus* and *Paraphrynus* (Weygoldt 1996, 2000). These two genera are separated solely on the arrangement of the spines on the pedipalpal patella (Mullinex 1975; Quintero 1981): *Phrynus* species possess patella dorsal-3 being shorter than dorsal-2 and 4, whereas *Paraphrynus* species possess dorsal-3 and 4 being considerably shorter than dorsal-2 and 5. In this regard, *P. exsul* resembles other species of *Phrynus* but the polarity of these character states is ambiguous as the outgroup taxa

(*Acanthophrynus* and *Heterophrynus*) possess spine arrangements which do not allow for direct comparisons.

Phrynus exsul is extremely similar to other *Phrynus* species and, as noted above, the increased numbers of trichobothria on the distitibiae of legs II–IV distinguishes *Phrynus exsul* from all congeners.

Distribution.—The discovery of an Old World member of the Phrynidae poses the question of whether the species is endemic to the region or whether it may have been inadvertently introduced from somewhere in the Americas. As it represents a species that is clearly distinct from any other phrynid species (e.g., Armas 1994, 1995; Armas & Pérez 1994; Quintero 1981, 1983), it seems unlikely to represent an introduced species as any American source population would probably be already described and named. However, the disjunct distribution of the genus is highly surprising and suggests that further peculiar whip-spider species occur in Australasia.

Broadly speaking, the vast majority of the 17 currently recognized Recent whip-spider genera (Weygoldt 2000) are restricted to single biogeographic areas. *Trichodamon* Mello-Leitão 1935 (Phrynichidae), *Heterophrynus*, *Acanthophrynus* and *Paraphrynus* (Phrynidae) are restricted to the Americas. *Catageus*, *Sarax* (Charinidae), *Charon* and *Stygophrynus* (Charontidae) are restricted to Asia and Australasia. *Paracharon* Hansen 1921 (Paracharontidae), *Damon* C.L. Koch 1850, *Musico-damon* Fage 1939, *Phrynichodamon* Weygoldt 1996, *Euphrynichus* Weygoldt 1995 and *Xerophrynus* Weygoldt 1996 (Phrynichidae) are restricted to Africa. Of the remaining three genera, *Phrynichus* is found in both Asia and Africa, *Charinus*, as currently delimited, is largely circum-tropical, and *Phrynus* occurs in central America and Indonesia.

Biology.—One of the collectors of the holotype, Mr. R.E. Johnstone, informed me that several specimens of *P. exsul* were observed and all were situated on the walls in the dark zone of a cave located within limestone cliffs. Dr. Christa Deeleman-Reinhold (in litt. to Dr. Peter Weygoldt) noted that the whip-spiders were plentiful in the cave which are regarded as a tourist attraction by the local people who regard them as 'dangerous and poisonous', a popular misconception regarding these enigmatic arachnids. Photographs of a living spec-

imen and the entrance to the cave is provided by Weygoldt (2000, p. 131).

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