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The Andean tarantulas *Euathlus* Ausserer, 1875, *Paraphysa* Simon, 1892 and *Phrixotrichus* Simon, 1889 (Araneae: Theraphosidae): phylogenetic analysis, genera redefinition and new species descriptions

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The Andean tarantulas *Euathlus* Ausserer, 1875, *Paraphysa* Simon, 1892 and *Phrixotrichus* Simon, 1889 (Araneae: Theraphosidae): phylogenetic analysis, genera redefinition and new species descriptions

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Based on a phylogenetic analysis we revised the Chilean tarantula genera *Euathlus* and *Paraphysa*. As results of our analyses, within a wider context of South American lineages, *Paraphysa* is synonymous of *Euathlus*, and *Phrixotrichus* is resurrected. *Euathlus* and *Phrixotrichus* are sister genera, supported by their shared palpal organ morphology, especially at the ventral position of the distal prolateral inferior keel, also by spermathecal receptacles with a lateral chamber, and tarsal claws without teeth. Both genera are redefined based on cladistic results, and some of their constituent species are transferred. We describe four new species, and for the first time present the spermathecae of *Euathlus parvulus* comb. nov. All species described for both genera are diagnosed and keyed. *Euathlus* now includes: *Euathlus antai* Perafán and Pérez-Miles sp. nov., *Euathlus atacama* Perafán and Pérez-Miles sp. nov., *Euathlus condorito* Perafán and Pérez-Miles sp. nov., *Euathlus manicata* (Simon 1892) comb. nov., *Euathlus parvulus* (Pocock, 1903) comb. nov. and *Euathlus truculentus* L. Koch, 1875. *Phrixotrichus* now comprises: *Phrixotrichus jara* Perafán and Pérez-Miles sp. nov., *Phrixotrichus scrofa* (Molina, 1788) comb. nov. and *Phrixotrichus vulpinus* (Karsch, 1880) comb. nov. Furthermore, *Paraphysa riparia* Schmidt and Bolle, 2008 is synonymized with *Eupalaestrus weijenberghi* (Thorell, 1894), *Paraphysa pulcherrimaklaasi* Schmidt, 1991 is transferred to *Maraca* Pérez-Miles, 2006 and *Paraphysa peruviana* Schmidt, 2007 is considered a *nomen dubium*.

<http://zoobank.org/urn:lsid:zoobank.org:pub:62B49343-DCF0-4AFE-8154-19F9D50E9AA0>

Keywords: Chile; cladistics; morphology; tarantula; taxonomy

Introduction

Theraphosidae Thorell, 1869 is the most speciose family of mygalomorph spiders, and is predominantly found in the tropical and subtropical regions. Within this family, Aviculariinae and Theraphosinae are distributed exclusively in the New World. Given their great morphological homogeneity these spiders have presented considerable taxonomic difficulties and confusion (Gerschman de P. and Schiapelli 1969; Schiapelli and Gerschman de P. 1979; Valerio 1980; Raven 1985, 1990; Goloboff 1993a; Pérez-Miles et al. 1996; Bertani 2000; Fukushima et al. 2008), and several genera and species described mainly in the nineteenth century are poorly diagnosed, and their holotypes have been lost or damaged. In addition, much later

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poor taxonomic revisions were made in small non-peer-reviewed magazine articles, often without examining type specimens or original descriptions, and even new descriptions based on imported pet trade material of unknown provenance, with little useful diagnostic value.

Euathlus Ausserer, 1875, *Paraphysa* Simon, 1892 and *Phrixotrichus* Simon, 1889 are genera with a long and controversial taxonomic history, evidenced by the difficulties met when trying to diagnose and differentiate them. Many species of these genera have experienced repeated nomenclatural changes and some species have been transferred between these genera.

The genus *Euathlus* was originally described on the basis of its type species *Euathlus truculentus* L. Koch, 1875 (in Ausserer 1875), originally from Argentina and Chile. The taxonomy of this genus has long been controversial. It was first considered as a senior synonym of *Brachypelma* Simon, 1891 by Raven (1985). Afterwards, Schmidt (1991b) removed it from this synonymy, but the resurrection of *Brachypelma* was rejected by Smith (1991, 1992), and established again by Schmidt (1992a) and subsequently endorsed by Smith (1994); Gallon (2005) also placed *Ashantia* Strand, 1908 in the synonymy of *Euathlus*. The genus *Phrixotrichus* has long and complicated synonymies (Bonnet 1958; Pérez-Miles et al. 1996). Schmidt (1996b) removed *Phrixotrichus* from the synonymy of *Grammostola* Simon, 1892, which had been established by Pérez-Miles et al. (1996), and considered *Phrixotrichus* as a synonym of *Euathlus* (Schmidt 1996a). *Paraphysa* was described on the basis of *Paraphysa manicata* Simon, 1892, from Chile. It was considered a senior synonym of *Pseudhupalopus* Strand, 1907 by Raven (1985), but that synonymy was rejected by Schmidt and Weinmann (1997).

The frequent transfers of species between *Euathlus*, *Paraphysa* and *Phrixotrichus* reflect the difficulties in differentiating the species of these genera. Based on a phylogenetic analysis performed using morphological characters of type specimens and additional new material from Chile, we revised the species composition for these genera. As a consequence of our study, we propose the synonymy of *Paraphysa* with *Euathlus*, revalidate the genus *Phrixotrichus*, as well as new composition of species for *Euathlus* and *Phrixotrichus*. We describe four new species and present a key for species of both genera. Additionally, *Euathlus pulcherrimaklaasi* (Schmidt 1991a) and *Paraphysa riparia* Schmidt and Bolle, 2008 are transferred to other Theraphosinae genera. Male and female *E. pulcherrimaklaasi* are not congeneric. *Paraphysa peruviana* Schmidt, 2007 is considered a *nomen dubium*.

Material and methods

Measurements were taken with an ocular micrometer and are given in millimetres. We took the photographs with a digital camera (Nikon Coolpix P5100, AC ADAPTER EH – 62A) and Infinity Lite adapted to the stereoscope lens (Nikon SMZ-10). Leg and palp measurements were taken in dorsal view of left-side limbs, unless appendages were lost. Urticating setae terminology follows Cooke et al. (1972) and Bertani (2002). Male palpal organ keel terminology follows Bertani (2000) and Fukushima et al. (2008).

Abbreviations: AK, accessory keels; ALE, anterior lateral eyes; AME, anterior median eyes; *d*, dorsal; OQ, ocular quadrangle (including lateral eyes); *p*, prolateral; PB, prolateral branch of tibial apophysis; PI, prolateral inferior keel; PME, posterior

median eyes; PMS, posteromedial spinnerets; PLE, posterior lateral eyes; PLS, posterolateral spinnerets; PS, prolateral superior keel; *r*, retrolateral; RB, retrolateral branch of tibial apophysis; *v*, ventral.

We examined specimens from the following collections: British Museum of Natural History, London, UK (BMNH); Entomology, Science Faculty, Montevideo, Uruguay (FCE-MY); Butantan Institute, São Paulo, Brazil (IBSP); Muséum National D'Histoire Naturelle, Paris, France (MNHN); Zoology Museum, São Paulo University, Brazil (MZUSP); Zoological Museum, Concepción University, Chile (MZUC-UCCC); and Senckenbergmuseum, Frankfurt, Germany (SMF).

Cladistic analysis

As out-group, we used five species selected based on the cladograms of Pérez-Miles et al. (1996), Fukushima et al. (2008) and Perafán (2010). *Euathlus* and *Phrixotrichus* are related to a basal Theraphosinae group. Hence, the out-group included species representatives of the genera *Cyriocosmus* Simon, 1903; *Grammostola*; *Homoeomma* Ausserer, 1871; *Maraca* Pérez-Miles, 2006 and *Plesiopelma* Pocock, 1901. All data for the out-groups were obtained from material that we examined, as well as those in the following list.

Cyriocosmus fernandoi Fukushima et al., 2005: holotype♂, Brasil, Mato Grosso, Pontes and Lacerda, U.H.E. Guaporé, Area 2 (IBSP 10966); Brasil, Mato Grosso, Entre vale de S. Lourenzo e Pontes and Lacerda, U.H.E. Guaporé (Op. Coatá) 1♀ (IBSP 10976); *Grammostola anthracina* (C.L. Koch 1842): Uruguay, Maldonado, Sierra de las Animas, 1♀ (FCE-MY 0180); Uruguay, Maldonado, Sierra de los Caracoles, 1♂ (FCE-MY 0241); *Homoeomma uruguayense* (Mello-Leitão 1946): Uruguay, Montevideo, Cerro, 3♀ (FCE-MY 0300); Uruguay, Montevideo, Sayago, Facultad de Agronomía, 2♂ (FCE-MY 0320); *Maraca horrida* (Schmidt 1994): Brasil, Fazenda UFAM, AM. 54 km. al N. de Manaus, 2♂ (FCE-MY); and *Plesiopelma longisternale* (Schiapelli and Gerschman 1942): Uruguay, Maldonado, Sierra de las Animas, 1♀ (FCE-MY 0519); Uruguay, Maldonado, Sierra de Las Animas, 2♂ (FCE-MY 0454).

We analysed a data matrix with 46 morphological characters and 14 taxa (Table 1) edited using NDE 0.5.0 (Page 2001). The characters were polarized according to the out-group criterion (Watrous and Wheeler 1981), and all characters treated unordered. The cladistics analysis was carried out in TNT version 1.1 (Goloboff et al. 2003a), under maximum parsimony and the implicit enumeration algorithm. The unsupported nodes on the trees found were collapsed. We also carried out implied weighting (Goloboff 1993b) under different concavity values ($k = 1-12$) with the same search strategy. *Homoeomma uruguayense*, *E. truculentus* and *Phrixotrichus scrofa* were used to root the cladogram on different analyses as a strategy to evaluate the stability of each genus. The Bremer support (Bremer 1994) was calculated by searching the suboptimal trees one step longer, until the value was obtained for each node. Jackknife (Goloboff et al. 2003b) values were calculated for each node using resampled matrices, with 1000 pseudoreplicates of 10 random addition sequences, and with 36% of the probability of alteration; the frequency differences (GC) are reported over the optimal preferred tree, so the values < 50% are reported.

Table 1. Characters matrix used in cladistic analysis of *Euathlus* and *Phrixotrichus*. (–) inapplicable (?), unknown; treated as missing data in the analysis.

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
<i>H. uruguayense</i>	0	0	0	0	0	0	?	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0
<i>P. longisternale</i>	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	1	0
<i>C. fernandoi</i>	1	1	0	1	–	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	0	1	0
<i>G. anthracina</i>	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	2	1	0	1	0
<i>M. horrida</i>	1	0	1	1	–	1	1	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0
<i>E. truculentus</i>	1	1	0	0	1	0	0	1	0	0	0	1	0	1	0	0	1	2	1	0	1	0	1
<i>E. parvulus</i>	1	1	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	1	1
<i>E. condorito</i>	1	1	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	1	1	0	0	1	1
<i>E. manicata</i>	1	1	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	?	?
<i>E. atacama</i>	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	1	2	0	0	1	1
<i>E. antai</i>	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
<i>P. vulpinus</i>	1	1	0	0	1	0	0	0	0	0	0	1	1	2	1	1	1	0	2	1	0	1	1
<i>P. scrofa</i>	1	1	0	0	1	0	0	0	0	0	0	1	1	2	1	1	1	0	2	1	0	1	1
<i>P. jara</i>	1	1	0	0	1	0	0	1	0	0	0	1	1	2	1	1	1	0	2	1	0	?	?
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
<i>H. uruguayense</i>	0	0	0	0	0	0	0	0	2	2	4	5	2	2	2	2	0	1	0	0	0	1	0
<i>P. longisternale</i>	0	1	0	1	0	0	0	1	1	1	2	3	0	1	2	2	0	1	0	1	0	0	0
<i>C. fernandoi</i>	0	1	0	0	0	0	0	1	1	1	2	3	0	1	2	2	1	1	0	1	1	–	0
<i>G. anthracina</i>	0	0	0	0	1	0	0	1	0	1	2	3	0	0	0	0	0	1	1	0	0	0	1
<i>M. horrida</i>	0	0	0	0	?	1	1	0	2	3	4	4	0	0	0	1	0	1	1	0	0	0	0
<i>E. truculentus</i>	0	0	0	0	1	1	1	0	?	?	3	4	0	0	0	0	1	1	?	0	0	0	?
<i>E. parvulus</i>	0	0	0	0	1	1	1	0	1	2	3	4	0	0	0	1	1	1	1	0	0	0	0
<i>E. condorito</i>	0	0	0	0	1	0	1	0	1	2	3	4	0	0	0	1	1	1	2	0	0	0	0
<i>E. manicata</i>	?	?	?	?	?	0	1	0	1	2	3	4	0	0	0	1	1	1	2	0	0	0	0
<i>E. atacama</i>	0	0	0	0	1	0	1	0	1	2	3	4	0	0	0	1	1	1	2	0	0	0	0
<i>E. antai</i>	1	0	0	0	1	0	1	0	1	2	3	4	0	0	0	1	1	1	2	0	0	0	0
<i>P. vulpinus</i>	0	0	1	1	0	1	0	0	1	2	3	4	0	0	0	1	1	1	1	0	0	0	2
<i>P. scrofa</i>	0	0	0	0	1	0	0	1	1	2	3	4	0	0	0	1	1	1	1	0	0	0	2
<i>P. jara</i>	?	?	?	?	?	1	0	0	1	2	3	4	0	0	0	1	1	1	1	0	0	0	2

Data set

Characters used in the cladistic analysis. Multistate characters were coded as non-additive. The data matrix is listed in Table 1. (0) Embolus direction: directed ventrolaterally = 0; directed retrolaterally = 1. (1) Relative width of bulb sclerites II + III: wide = 0; narrow (less than 10% of length) = 1. (2) PS: extended along the embolus = 0; only apically = 1. (3) PI: present = 0; absent = 1. (4) Position of distal PI: prolateral = 0; prolateroventral = 1. (5) Retrolateral keel: absent = 0; present = 1. (6) Apical keel: absent = 0; present = 1. (7) Ventral crest on PI: absent = 0; present = 1. (8) Subapical tooth on PI: absent = 0; present = 1. (9) Tegular apophysis on bulb: absent = 0; present = 1. (10) Male palpal tibia: without retrolateral nodule = 0; with retrolateral nodule = 1. (11) Male palpal tibia: without prolateral nodule = 0; with prolateral nodule = 1. (12) Position of male tibial apophysis: ventral = 0; prolateroventral = 1. (13) Male tibial apophysis: branches with fused bases = 0; branches with non-fused bases = 1. (14) Male tibial apophysis: with one retrolateral spine = 0; with two retrolateral spines = 1; without retrolateral spines = 2. (15) PB: with basal spine = 0; without basal spine = 1. (16) Position of distal spine on RB: subapical = 0; apical = 1. (17) Ventral spine on RB: absent = 0; present = 1. (18) Flexion of male metatarsus I: between the branches of tibial apophysis = 0; on the apex to the retrolateral branch = 1; retrolateral to the tibial apophysis = 2. (19) Male metatarsus I: strongly curved = 0; straight = 1. (20) Basal process on male metatarsus I: absent = 0; present = 1. (21) Spermathecal morphology: spheroid shape = 0; not spheroid shape = 1. (22) Spermathecae with a lateral spheroid chamber: absent = 0; present = 1. (23) Spermathecal receptacles: single = 0; bifurcated = 1. (24) Spermathecal neck: straight = 0; spiralled = 1. (25) Digitiform projections on spermathecae: absent = 0; present = 1. (26) Lobes on spermathecae: absent = 0; present = 1. (27) Female palpal tibia spination: with apical spines only = 0; with apical and others ventral spines = 1. (28) Labial cuspules: numerous (> 20) = 0; few or none = 1. (29) Sternum: as long as wide = 0; longer than wide = 1. (30) Coxal stridulatory setae: absent = 0; present = 1. (31) Extension of scopula on metatarsus I: complete = 0; more than a half (distal 2/3) = 1; distal half = 2; less than half (1/3) = 3; only apical (1/4, 1/5) = 4; absent = 5. (32) Extension of scopula on metatarsus II: complete = 0; more than half (distal 2/3) = 1; distal half = 2; less than half (1/3) = 3; only apical (1/4, 1/5) = 4; absent = 5. (33) Extension of scopula on metatarsus III: complete = 0; more than distal half (2/3) = 1; distal half = 2; less than half (1/3) = 3; only apical (1/4, 1/5) = 4; absent = 5. (34) Extension of scopula on metatarsus IV: complete = 0; more than distal half (2/3) = 1; distal half = 2; less than half (1/3) = 3; only apical (1/4, 1/5) = 4; absent = 5. (35) Scopulae on tarsi I: entire = 0; narrowly divided = 1; widely divided = 2. (36) Scopulae on tarsi II: entire = 0; narrowly divided = 1; widely divided = 2. (37) Scopulae on tarsi III: entire = 0; narrowly divided = 1; widely divided = 2. (38) Scopulae on tarsi IV: entire = 0; narrowly divided = 1; widely divided = 2. (39) Tarsal claws: with teeth = 0; without teeth = 1. (40) Urticating setae type III: absent = 0; present = 1. (41) Length of urticating setae type III: short (less than 0.75 of the optical field diameter of microscope; 40 \times) = 0; medium-sized (more than 0.75 and less than 1.5 of the optical field diameter, 40 \times) = 1; long (more than 1.5 of the optical field diameter, 40 \times) = 2. (42) Barbs on urticating setae type III: long = 0; short = 1. (43) Urticating setae type IV: present = 0; absent = 1. (44) Setules on urticating setae

type IV: absent = 0; present = 1. (45) Extension of the area with urticating setae: restricted to the middle section of the dorsal abdomen = 0; covering almost all the dorsal abdomen = 1; two lateral patches = 2.

Results and discussion

Phylogenetics

Searches using *H. uruguayense* to root the cladogram and implicit enumeration, found only one shortest tree (Figure 1) with maximum parsimony ($L = 81$; $Ci = 68$; $Ri = 70$). Additional search using implied weighting with different concavity indices ($k = 2-12$) and implicit enumeration found the same resolution.

The in-group recovers as monophyletic in this topology, and it resolves into two main groups. In one of these groups it recovers the type species of *Euathlus* (*E. truculentus*), whereas in the other group it recovers the type species of

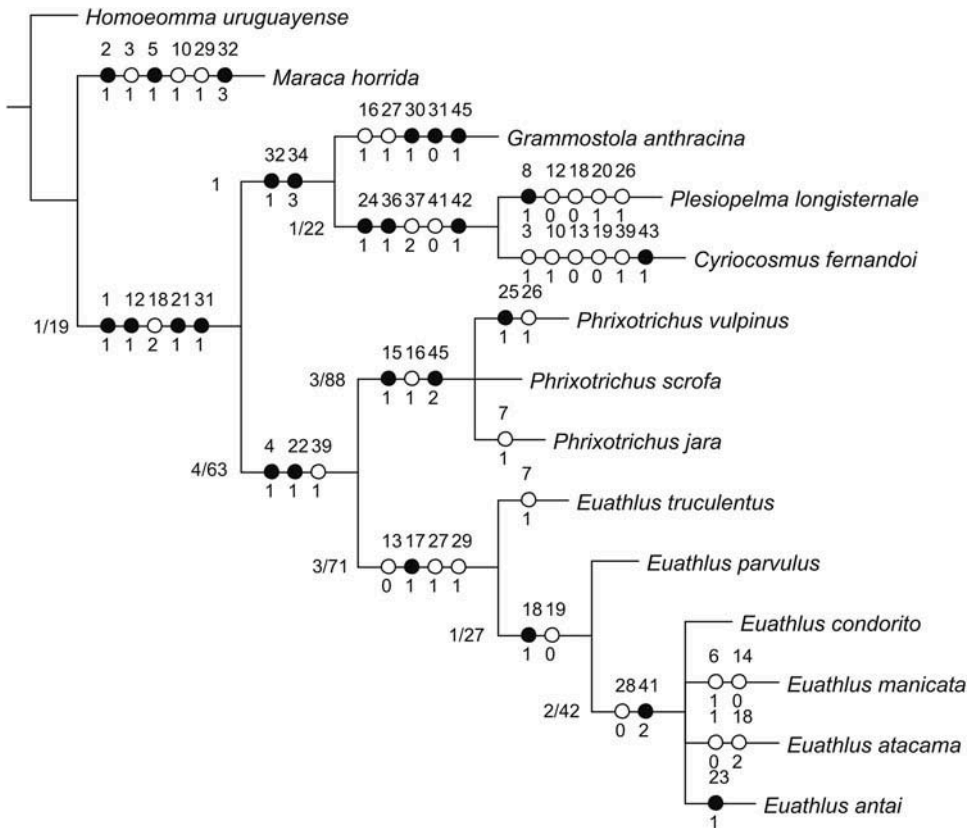


Figure 1. Hypothesis of phylogenetic relationship of *Euathlus* and *Phrixotrichus*. Only one maximum parsimony tree, using implicit enumeration ($L = 81$; $Ci = 67$; $Ri = 70$). Optimization: unambig changes only. White and black circles imply homoplastic and non-homoplastic characters that define each node, respectively. The numbers at each node are the bootstrap/frequency differences (GC) jackknife values.

Phrixotrichus (*P. scrofa*). The type species of *Paraphysa* (*Pa. manicata*) is removed from the synonymy with *P. scrofa* (see below). *Paraphysa manicata* occur within the clade *E. truculentus*.

The evidence of this analysis suggests that species of the genera under discussion may be treated as a single genus (with *E. truculentus* as type species, and possibly two subgenera), or that each one of the groups corresponds to a genus. If we change the root in the analyses by each one of the type species of the genera under discussion (*E. truculentus* and *P. scrofa*) the genera maintain their monophyly (Figure 2). Similarly, if we change the root by any of the out-group species it recovers the same topology into the in-group. We prefer to maintain each group as a different genus, based on the synapomorphies of each group and their morphological divergence.

Therefore we propose the synonymy of *Paraphysa* with *Euathlus*, and the revalidation of *Phrixotrichus*.

In the selected hypothesis *Euathlus* and *Phrixotrichus* were both recovered as monophyletic, and resolved here as sister genera, which is supported by shared ventral position of distal PI, spermathecal receptacles with a lateral spheroid chamber and tarsal claws without teeth. The sister-group of *Euathlus*–*Phrixotrichus* clade is (*Grammostola* (*Plesiopelma*–*Cyriocosmus*)) and *Maraca horrida* was recovered as sister-group of all the other species.

The monophyly of *Euathlus* is supported by the male tibial apophyses with bases fused, presence of ventral spine on RB, female palpal tibia spination (apical + ventral spines) and sternum longer than wide. *Euathlus truculentus* is sister-group to the remaining *Euathlus* species. *Euathlus parvulus* is the sister-group of *E. antai*, *E. manicata*, *E. atacama* and *E. condorito*, which are altogether supported by the flexion of male metatarsus I on the apex to the RB (with a reversion in *E. atacama*) and strongly curved male metatarsus. We did not find synapomorphies to resolve the internal relationships within this last group, but their monophyly was supported by numerous labial cuspules and long urticating setae type III. *Phrixotrichus* was recovered as monophyletic based on support from the PB without basal spine, presence of an apical distal spine on RB, and two lateral urticating setal patches. The relationship among *Paraphysa* species was not solved.

Euathlus differs from *Phrixotrichus* in the presence of basal spines on the retrolateral face of the male tibial apophysis, the presence of a subapical spine in the RB (apical in *Phrixotrichus*) and the presence of a basal spine in the PB. Furthermore, *Euathlus* differs in the presence of prolateral spines on the palpal tibia and femora of palp and legs (absent in *Phrixotrichus*), and the presence of a single patch of urticating setae (two lateral patches in *Phrixotrichus*). These genera are putative sister-groups, which seem close allies to other basal genera of Theraphosinae. They share with *Maraca* the palpal organ morphology, which is piriform and the tip is directed retrolaterally, different to *Grammostola*, *Homoeomma* and *Plesiopelma* where the tip is directed prolaterally. *Maraca* differs from *Euathlus* and *Phrixotrichus* by the presence of an apical keel in the palpal organ and a retrolateral process in the palpal tibia. *Cyriocosmus*, *Homoeomma*, *Grammostola* and *Plesiopelma* differ from these other considered genera in the spermathecal morphology and the palpal organ. Females of another seemingly closely related genus *Kochiana* Fukushima et al. 2008 exhibit two divergent spermathecal receptacles, nevertheless *Kochiana* presents horn-shaped spermathecal receptacles with large granules, and divided tarsal scopulae III and IV (Fukushima et al. 2008).

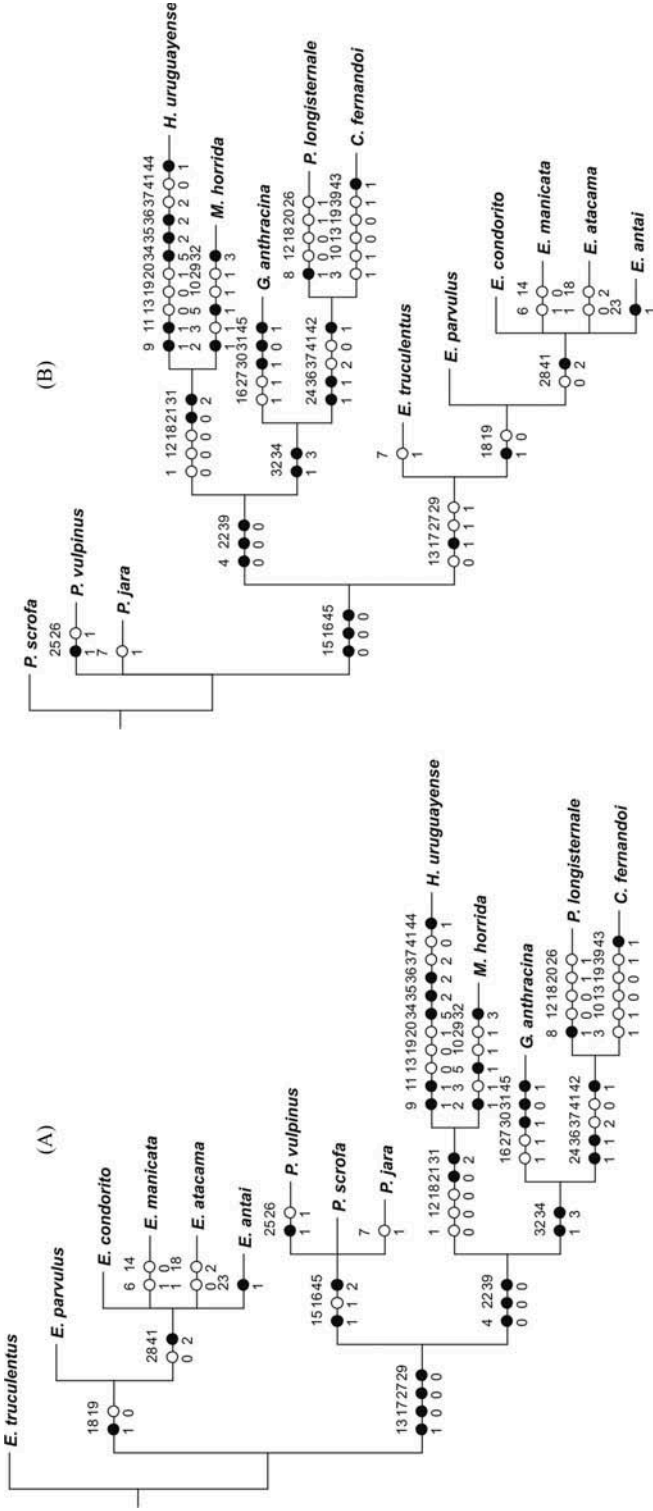


Figure 2. Hypothesis of phylogenetic relationship of *Euathlus* and *Phrixotrichus*. (A) Hypothesis using *E. truculentus* to root the cladogram; only one maximum parsimony tree, using implicit enumeration ($L = 81$; $Ci = 68$; $Ri = 70$). (B) hypothesis using *Phrixotrichus scrofa* to root the cladogram; only one maximum parsimony tree, using implicit enumeration ($L = 81$; $Ci = 68$; $Ri = 70$). Optimization: unambig changes only. White and black circles imply homoplastic and non-homoplastic characters that define each node, respectively.

TaxonomyGenus *Euathlus*
(Figures 3–8)

Paraphysa Simon, 1892, p. 166 [in part, *nec P. peruviana* Schmidt, 2007, *nec P. riparia* Schmidt and Bolle, 2008] Syn. nov.

Type species: *Euathlus truculentus* L. Koch, 1875

Diagnosis

Differs from most Theraphosinae by the presence of type IV urticating setae. Male differs by the palpal organ morphology with two prolateral keels (PI and PS) and the tip directed retrolaterally (Figures 4A,B, 5A,B, 6C–E, 7A,B, 8B,C), tibial apophysis with retrolateral spines, subapical spine on RB and a basal spine on PB (Figures 4D, 5D, 8A). Female differs by the presence of two spermathecal receptacles with a lateral spheroid chamber (Figures 3A, 4C, 5C, 7D) and only one patch of the urticating setae (Figures 3C, 4F, 5F).

Generic redescription

Carapace: oval, hirsute, red-brown to black-brown. Caput strongly arched. Fovea: short, transverse to slightly recurved. Well-defined ocular tubercle, wider than long. Clypeus: narrow. Anterior eye row procurved, posterior eye row slightly recurved. Chelicerae: normal, with 6–9 well-developed teeth on promargin of furrow and 6–12 small teeth on the proximal area of furrow. Labium wider than long, with 7–117 cuspules on the subapical margin, broad suture. Maxillae longer than wide, prolateral distal angle slightly produced, with numerous cuspules. Sternum longer than wide, posterior sigilla oval, submarginal. Stridulatory setae absent. Legs black-brown, hirsute, spines present even on femora. Paired claws without teeth on legs and well-developed claw tufts. Retrolateral scopulae on femur IV absent. All tarsi with dense scopulae. Metatarsi I at

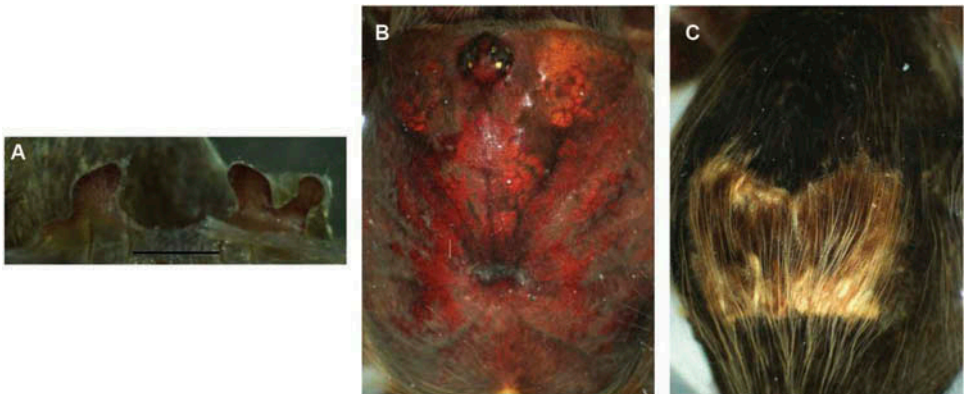


Figure 3. *Euathlus antai* sp. nov. (A) Spermathecae, dorsal view; (B) cephalotorax; (C) abdomen. Scale bar = 1mm.



Figure 4. *Euathlus atacama* sp. nov. (A) Palpal organ, prolateral view; (B) palpal organ, retrolateral view; (C) spermathecae, dorsal view; (D) tibial apophysis, ventral view; (E) cephalotorax; (F) abdomen. PB: prolateral branch, PI: prolateral inferior keel, PS: prolateral superior keel, RB: retrolateral branch. Scale bar = 1mm.

least scopulated on distal two-thirds. Metatarsi II scopulated on the distal half. Metatarsi III scopulated on the distal one-third. Metatarsi IV scopulated on distal portion. Trichobothria of three types on tarsi; clavate (short), filiform (long) and fusiform (medium-sized) randomly dispersed in a dorsal longitudinal arrangement. Metatarsi and tibiae with only filiform trichobothria arranged in a median, longitudinal and dorsal strip. Abdomen hirsute, with one large patch of urticating setae clearly defined in the central dorsum. Type III and IV urticating setae present. PMS well-developed, PLS normal, apical segment digitiform. Tibia I of males with paired distal prolateroventral strong apophysis, with fused bases and retrolateral spines. RB with an internal subapical spine and 1–3 external spines, PB with an internal spine at basal or medial position. Curved male metatarsi I, except in *E. truculentus*. Palpal tibiae without spines on retrolateral face and with spines on prolateral face. Femora and tibiae with a prolateral curved spine. Palpal organ piriform with extended subtegulum and curved embolus with two prolateral keels (PI and PS); very flat and serrated PI in *E. truculentus*. Female palpal

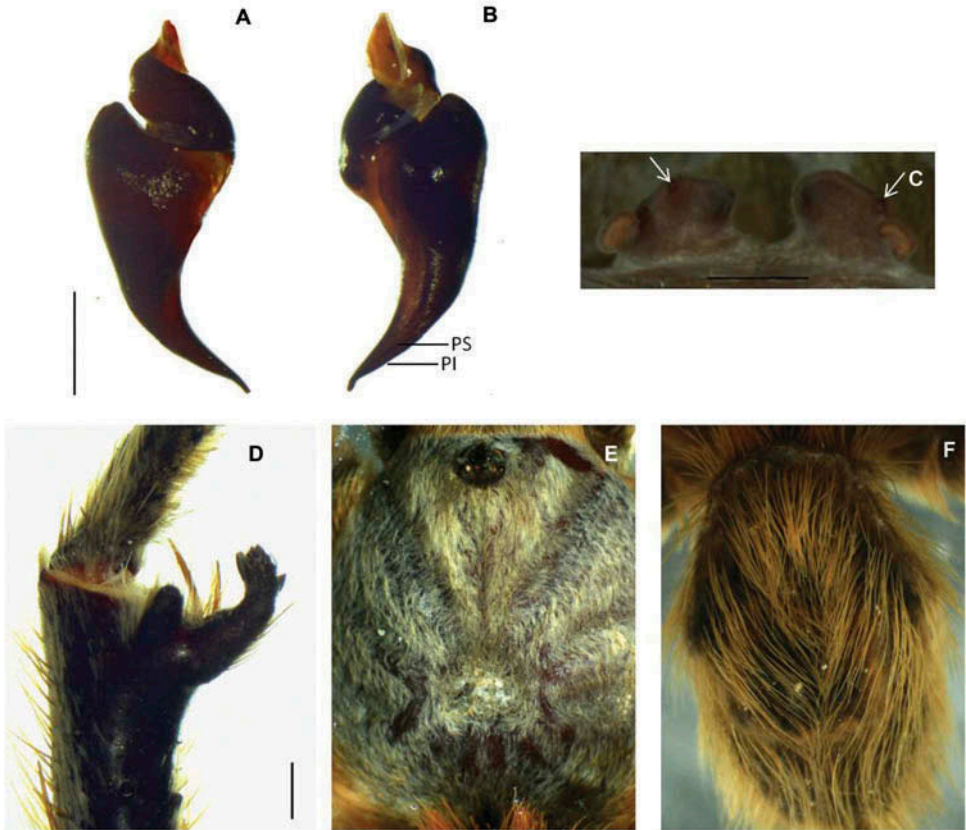


Figure 5. *Euathlus condorito* sp. nov. (A) Palpal organ, retrolateral view; (B) palpal organ, prolateral view; (C) spermathecae, dorsal view; (D) tibial apophysis, prolateral view; (E) cephalotorax; (F) abdomen. PB: prolateral branch, PI: prolateral inferior keel, PS: prolateral superior keel, RB: retrolateral branch. The arrow shows the small sclerotized nodule on the seminal receptacles. Scale bar = 1mm.

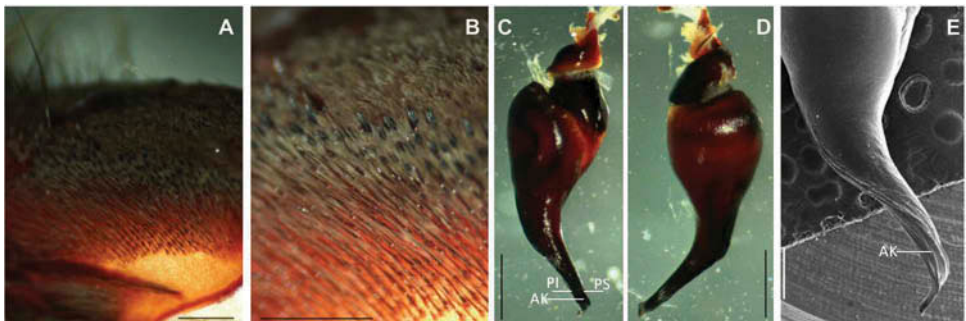


Figure 6. *Euathlus manicata* comb. nov. (A) Maxilla, retrolateral view; (B) maxilla, detail showing black spiniform setae; (C) palpal organ, prolateral view; (D) palpal organ, retrolateral view; (E) detail of embolus showing prolateral and accessory keels (scale bar = 0.5 mm). AK: accessory keels, PI: prolateral inferior keel, PS: prolateral superior keel. Scale bar = 1 mm.

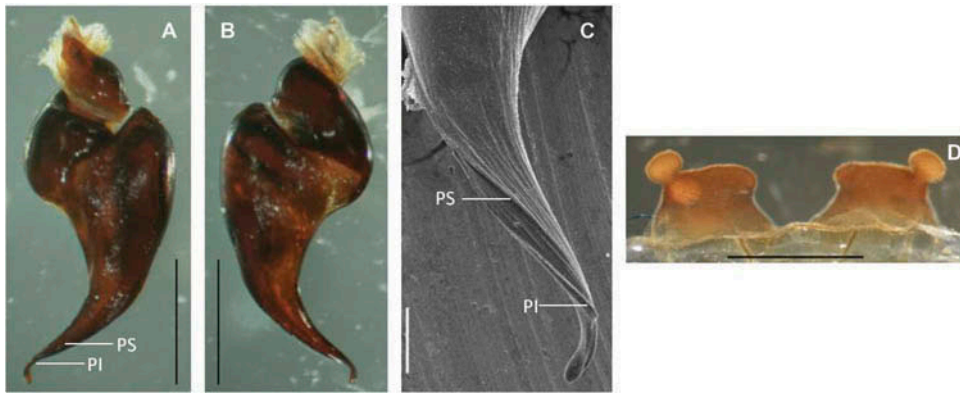


Figure 7. *Euathlus parvulus* comb. nov. (A) palpal organ, prolateral view; (B) palpal organ, retrolateral view; (C) palpal organ, detail of apex showing PI truncated in the middle of the embolus (scale bar = 0.2 mm); (D) spermathecae, dorsal view. PI: pro-lateral inferior keel, PS: pro-lateral superior keel. Scale bar = 1mm.

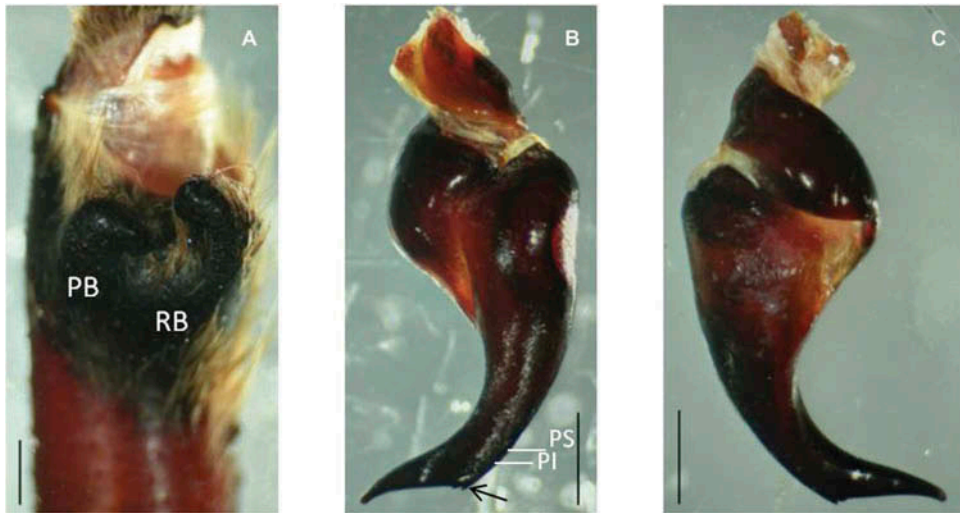


Figure 8. *Euathlus truculentus*. (A) tibial apophysis, prolateroventral view; (B) palpal organ, prolateral view; (C) palpal organ, retrolateral view. PB: pro-lateral branch, PI: pro-lateral inferior keel, PS: pro-lateral superior keel, RB: retrolateral branch. The arrow shows the PI serrated. Scale bar = 1mm.

tibiae with numerous spines. Spermathecae with two seminal receptacles, each one with a lateral spheroid chamber.

Remarks

Pérez-Miles et al. (1996) synonymized *Grammostola* with *Phrixotrichus* and transferred *Phrixotrichus scrofa* to *Paraphysa*. Schmidt (1996a) included in the synonymy *Paraphysa manicata* with *Paraphysa scrofa*. We examined the holotypes of *Paraphysa*

manicata and they clearly differ from *Phrixotrichus auratus* Pocock 1903 (in the synonymy with *Paraphysa scrofa*). *Paraphysa manicata* differs from *Phrixotrichus auratus* and *Paraphysa scrofa* in the morphology of the palpal organ, male tibial apophysis and pattern of distribution of the urticating setae. Based on the descriptions of Schiapelli and Gerschman de P. (1963) and Legendre and Calderon (1984) of the holotype of *P. scrofa* and our observations, we remove *Pa. manicata* from the synonymy with *Pa. scrofa*. On the phylogenetic analysis, *Pa. manicata* occurred in the clade of *Euathlus*, consequently we considered *Paraphysa* as junior synonym of *Euathlus*. Additionally, we revalidate the genus *Phrixotrichus*.

***Euathlus antai* sp. nov.**

(Figure 3)

Types

Holotype ♀, Chile, II Región Antofagasta, San Pedro de Atacama, Puritama, high area, around 3200 m asl, 8 February 1997. J.C. Ortiz leg. Type is deposited in the arachnological collection of the Museo de Zoología, Universidad de Concepción, Chile (MZUC-UCCC 35893).

Etymology

The specific epithet is a noun in apposition from an ancient indigenous group that inhabited the Atacama region, known as Likan-Antai or Atacameños. Likan-Antai in Kunza language means *likan* = people and *antai* = of this territory. Hence, the name means *Euathlus* of this territory.

Diagnosis

Females differs from the other *Euathlus* species by the shape of the spermathecae with two seminal receptacles bifurcated (Figure 3A).

Description

Female (holotype). Total length, not including chelicerae, nor spinnerets 32.5, carapace length 14.0, width 13.0. Anterior eye row procurved, posterior row recurved. Eye sizes and interdistances: AME 0.26, ALE 0.44, PME 0.28, PLE 0.41, AME–AME 0.55, AME–ALE 0.26, PME–PME 0.88, PME–PLE 0.15, ALE–PLE 0.30, OQ length 1.87, width 2.11, clypeus 0.26. Fovea slightly recurved width 2.3. Labium length 1.8, width 2.9, with 88 cuspules. Maxillae (right/left) with 101/120 cuspules. Sternum length 6.5, width 6.2. Chelicerae with 8 well-developed teeth on promargin of furrow and 9 small teeth on the proximal area of furrow. Tarsi densely scopulated, scopulae I–IV entire. Metatarsi I scopulated more than a distal half, II scopulated on distal half, III on distal third, IV apically scopulated. Legs and palpal segments lengths in Table 2. Spination: Femora I 1P; II 1P; III and IV 0; palp 1P. Patellae I–IV and palp 0. Tibiae I 3V; II 3V; III 2V; IV 1R, 2V; palp 6V. Metatarsi: I 2V; II 2V; III 2P, 2R, 5V; IV 2P, 5R, 5V. Tarsi I–IV and palp, 0. Colour (in alcohol): Cephalothorax and legs red-orange, abdomen brown

Table 2. Legs and palpal segments lengths of female *Euathlus antai*.

	I	II	III	IV	Palp
Fe	11.1	10.9	9.1	11.6	8.3
Pa	6.1	6.0	5.3	5.7	4.9
Ti	8.2	7.6	6.9	8.2	5.5
Mt	7.4	7.2	7.7	9.5	–
Ta	4.4	4.3	4.3	4.4	5.3
Total	37.2	36.0	33.3	39.4	24.0

(Figure 3B,C). Brown setae on body and legs mixed with longer golden setae. Cephalothorax and chelicerae with grey small setae. Type III and IV setae present; urticating setae gathered in a conspicuous golden patch. PMS well-developed, PLS normal, apical segment digitiform. Spermathecae with two wide bifurcated seminal receptacles with lateral spheroid chamber (Figure 3A).

Male. Unknown.

***Euathlus atacama* sp. nov.**
(Figure 4)

Types

Holotype ♂, Chile, II Región Antofagasta, San Pedro de Atacama, 2400 m asl, 10 February 1997, J.C. Ortíz leg. Paratype ♀, from the same locality of the holotype. Both types are deposited in the arachnological collection of the Museo de Zoología, Universidad de Concepción, Chile (MZUC-UCCC 35892).

Etymology

The specific epithet is a noun in apposition for one of Chile's regions with some of the most arid and beautiful landscapes on the planet, located in the north of this Andean country, and characterized by its vast deserts, salty flats and blue skies.

Diagnosis

Male differs from other *Euathlus* species except *E. truculentus* by the tibial apophysis with convergent branches (Figure 4D). Differs from *E. truculentus* by the palpal organ morphology with wide and not serrated PI (Figure 4A,B), and very curved metatarsi I. Female differs from other *Euathlus* species by the shape of the spermathecae (Figure 4C) with longer basis and the spheroid chamber directed to the epigastric furrow.

Description

Male (holotype). Total length, not including chelicerae, nor spinnerets 28.0, carapace length 13.5, width 13.5. Anterior eye row procurved, posterior slightly recurved. Eyes

sizes and interdistances: AME 0.30, ALE 0.44, PME 0.28, PLE 0.38, AME–AME 0.52, AME–ALE 0.18, PME–PME 0.98, PME–PLE 0.14, ALE–PLE 0.38, OQ length 1.70, width 2.30, clypeus 0.30. Fovea transverse, recurved, width 2.7. Labium length 2.10, width 2.7 with 114 cuspules. Maxillae (right/left) with 96/102 cuspules. Sternum length 6.80, width 6.0. Chelicerae with 6 well-developed teeth on promargin of furrow and 6 small teeth on the proximal area of furrow. Tarsi I–IV densely scopulated, scopula I–IV entire. Metatarsi I scopulated more than a distal half, II scopulated on distal half, III on distal third, IV apically scopulated. Tibia I with prolateroventral distal dual short-stout apophyses with near-equal length branches (Figure 4D); two retrolateral basal spines to the tibial apophysis, PB with a medial spine, RB with an internal subapical spine and other small spine over it. Flexion of metatarsus I on the RB. Metatarsus I strongly curved. Palpal organ with unequal prolateral keels, flat PS and wide PI on the curvature of the embolus (Figure 4A,B). Leg and palpal segments lengths in Table 3. Spination: Femora I 2P; II 3P, 1R; III 2P, 2R; IV 2P, 2R; palp 1R (curved). Patellae I 1P, 1R; II 1P; III 1P; IV 0 and palp 1P. Tibiae I 5P, 4R, 4V; II 3P, 4R, 6V; III 4P, 2R, 6V; IV 4P, 2R, 5V; palp 3P, 1R, 2V. Metatarsi I 3V; II, 1R, 3V; III 3P, 3R, 7V; IV 3P, 5R, 7V; Tarsi I–IV and palp 0. Colour (in alcohol): Cephalothorax and legs dark reddish brown, abdomen brown with longer brown setae; light grey small setae on cephalothorax (Figure 4E,F). Type III, IV and intermediate III–IV urticating setae present; urticating setae gathered in a conspicuous golden patch (Figure 4F). PMS well-developed, PLS normal, apical segment digitiform.

Female (paratype). Total length, not including chelicerae, nor spinnerets 34.0, carapace length 15.0, width 13.8. Anterior eye row slightly procurved, posterior row slightly recurved. Eye sizes and interdistances: AME 0.34, ALE 0.44, PME 0.26, PLE 0.30, AME–AME 0.52, AME–ALE 0.30, PME–PME 0.92, PME–PLE 0.16, ALE–PLE 0.38, OQ length 1.90, width 2.40, clypeus 0.10. Fovea slightly recurved width 3.00. Labium length 2.00, width 3.40, with 106 cuspules. Maxillae (right/left) with 151/145 cuspules. Sternum length 6.5, width 6.5. Chelicerae with 7 well-developed teeth on promargin of furrow and 8 small teeth on the proximal area of furrow. Tarsi densely scopulated, scopulae I–IV entire. Metatarsi scopulae as in male. Leg and palpal segments lengths in Table 4. Spination: Femora I 1P; II 1P; III and IV 0; palp 1P. Patellae I–IV and palp 0. Tibiae I 4V; II 4V; III 2P, 1R, 4V; IV 2R, 3V; palp 1P, 6V. Metatarsi: I 3V; II 4V; III 1P, 2D, 2R, 5V; IV 2P, 5R, 4V. Tarsi I–IV and palp, 0. Colour (in alcohol): As in male. Urticating setae and spinnerets as in male.

Table 3. Legs and palpal segments lengths of male *Euathlus atacama*.

	I	II	III	IV	Palp
Fe	11.5	11.0	10.0	11.5	7.5
Pa	5.5	5.4	4.8	5.2	4.5
Ti	8.3	8.4	7.4	8.7	5.3
Mt	8.3	8.5	8.4	10.4	–
Ta	5.2	5.2	4.8	5.2	2.2
Total	38.8	38.5	35.4	41.0	19.5

Table 4. Legs and palpal segments lengths of female *Euathlus atacama*.

	I	II	III	IV	Palp
Fe	10.4	10.0	9.4	10.6	8.0
Pa	6.4	5.7	5.1	5.6	4.7
Ti	7.7	7.1	6.4	7.6	5.4
Mt	6.7	6.8	7.2	9.1	–
Ta	4.0	4.0	4.0	4.1	4.7
Total	35.2	33.6	32.1	37.0	22.8

Spermathecae with two wide seminal receptacles each with a lateral spheroid chamber (Figure 4C). Other characters as in male.

Euathlus condorito sp. nov.
(Figure 5)

Types

Holotype ♂, Chile, Región Metropolitana Santiago, Farellones (33°22' S, 70°17' W), 2400 m above sea level, December 2005, Claudio Velosos leg. Paratype ♀, from the same locality of the holotype. Both types are deposited in the arachnological collection of the Museo de Zoología, Universidad de Concepción, Chile (MZUC-UCCC 35891).

Etymology

The specific epithet is a noun in apposition inspired by the main character of the most popular Chilean comic book of the same name, and one of the most acclaimed comics in Hispanoamerica. Condorito represents a man–condor, emblematic bird of the Andeans and Chile’s national symbol, created in 1949 by Chilean cartoonist “Pepo”.

Diagnosis

Male differs from *E. truculentus* and *E. atacama* sp. nov. by the not convergent tibial apophysis branches (Figure 5D), and also from *E. truculentus* by the non-serrated PI, from *E. manicata* by the absence of accessory keels and from *E. parvulus* by the presence of an entire PI (not truncated). Female differs from other species by the shape of the spermathecae with a small sclerotized nodule on each receptacle (Figure 5C).

Description

Male (holotype). Total length, not including chelicerae, nor spinnerets 27.0, carapace length 14.1, width 12.9. Anterior eye row procurved, posterior slightly recurved. Eyes sizes and interdistances: AME 0.34, ALE 0.50, PME 0.34, PLE 0.45, AME–AME 0.24, AME–ALE 0.11, PME–PME 0.70, PME–PLE 0.02, ALE–PLE 0.15, OQ length 1.46, width 1.71, clypeus 0.20. Fovea transverse, recurved, width 1.1. Labium length 1.32,

width 2.0 with 72 cuspules. Maxillae (right/left) with 126/145 cuspules. Sternum length 5.3, width 4.0. Chelicerae with 7/6 well-developed teeth on promargin of furrow and 6 small teeth on the proximal area of furrow. Tarsi I–IV densely scopulated, scopula I–IV entire. Metatarsi I scopulate more than a distal half, II scopulate on distal half, III on distal third, IV apically scopulate. Tibia I with prolateroventral distal double apophysis (Figure 5D); two retrolateral basal spines to the tibial apophysis, PB with only a basal spine, RB with an internal subapical spine and three spines on the branch. Flexion of metatarsus I on the RB. Metatarsi I strongly curved. Palpal organ with subequal flat prolateral keels (flat prolateral keels (Figure 5A,B)). Leg and palpal segments lengths in Figure 5A,B). Leg and palpal segments lengths in Table 5. Spination: Femora I 2P; II 2P; III 1P, 1R; IV 1P, 2R; palp 1P (curved). Patellae I–IV 0 and palp 1P. Tibiae I 1P, 5R, 5V; II 5P, 4R, 9V; III 6P, 2R, 6V; IV 5P, 3R, 7V; palp 5P, 1R, 3V. Metatarsi I 1V; II 5P, 5R, 4V; III 6P, 5R, 4V; IV 5P, 5R, 3V; Tarsi I–IV and palp 0. Colour (in alcohol): Cephalothorax, legs and abdomen dark brown with longer lighter brown setae; light grey small setae on cephalothorax (Figure 5E,F). Type III, IV and intermediate III–IV urticating setae present. PMS well developed, PLS normal, apical segment digitiform.

Female (paratype). Total length, not including chelicerae, nor spinnerets 44.7, carapace length 19.1, width 17.2. Anterior eye row procurved, posterior row slightly recurved. Eye sizes and interdistances: AME 0.56, ALE 0.58, PME 0.40, PLE 0.36, AME–AME 1.40, AME–ALE 0.22, PME–PME 1.30, PME–PLE 0.14, ALE–PLE 0.32, OQ length 1.90, width 2.50, clypeus 0.40. Fovea slightly recurved width 3.00. Labium length 2.80, width 3.40, with 117 cuspules. Maxillae (right/left) with 176/187 cuspules. Sternum length 7.6, width 6.1. Chelicerae with 7 well-developed teeth on promargin of furrow and 7/9 small teeth on the proximal area of furrow. Tarsi densely scopulated, scopulae I–IV entire. Metatarsi I almost completely scopulated,

Table 5. Legs and palpal segments lengths of male *Euathlus condorito*.

	I	II	III	IV	Palp
Fe	11.4	11.3	10.0	12.1	7.1
Pa	6.2	5.8	5.0	5.4	4.3
Ti	8.2	8.1	7.5	9.3	5.5
Mt	9.4	9.5	9.3	12.0	–
Ta	5.4	5.0	4.8	5.4	2.3
Total	40.6	39.7	36.6	44.2	19.2

Table 6. Legs and palpal segments lengths of female *Euathlus condorito*.

	I	II	III	IV	Palp
Fe	12.4	11.7	10.7	13.0	9.1
Pa	7.8	7.0	5.9	6.6	5.8
Ti	9.5	8.7	7.6	9.9	6.5
Mt	7.8	7.6	8.4	11.4	–
Ta	4.9	4.7	4.7	5.3	5.5
Total	42.4	39.7	37.3	46.2	26.9

II, III and IV as in male. Leg and palpal segments lengths in Table 6. Spination: Femora I 1P; II 1P; III 1P, 1R; IV 1R; palp 1P. Patellae I–IV and palp 0. Tibiae I 4V; II 1P, 4V; III 2P, 2R, 4V; IV 2P, 2R, 4V; palp 8V. Metatarsi: I 2V; II 5V; III 3P, 2R, 6V; IV 3P, 4R, 7V. Tarsi I–IV and palp, 0. Colour (in alcohol): As in male. Urticating setae and spinnerets as in male. Spermathecae with two wide seminal receptacles each with sclerotized nodules, and with a lateral spheroid chamber (Figure 5C). Other characters as in male.

Euathlus manicata (Simon 1892), comb. nov.
(Figure 6)

Paraphysa manicata Simon 1892, p. 166

Paraphysa scrofa: Schmidt and Antonelli 1999, p. 21, figs. 1–7 (4–7 misidentified); Peters 2000, p. 74, fig. 207–209 (misidentified); Schmidt 2003, p. 126, figs. 105–107 (misidentified)

Types

Holotype ♂, Chile (MNHN 17.714), examined.

Additional material examined

Chile, VIII Región del Biobío, Concepción, Barrio Universitario, 150 m asl, November 2004, 1 ♂ (MZUC-UCCC 35890).

Diagnosis

Differs from other *Euathlus* species by the presence of black spiniform setae on the prolateroventral coxae and retrolateroventral maxillae (Figure 6A,B). Male differs from other species by the palpal organ morphology (Figure 6C,D) with wide embolus, and apical and accessory keels (Figure 6E).

Remarks

We removed *Pa. manicata* from the synonymy of *Pa. scrofa* and transferred it to *Euathlus* for the reasons given above, in the remarks of the genus.

The spiniform setae found in this species are similar in morphology to those described for some species of *Grammostola* (Ferretti et al. 2011). We did not locate a female allotype of this species, but it is our opinion that fig. 15 on pl. 1 of Legendre and Calderón (1984) does not match with *Euathlus* nor *Phrixotrichus*, given the differences in spermathecae morphology.

Euathlus parvulus (Pocock 1903), comb. nov.
(Figure 7)

Phrixotrichus parvulus Pocock 1903, p. 107

Paraphysa parvula: Schmidt 1996a, 2003, p. 182, fig. 461–463.

Types

Holotype ♂, Chile, V Región Valparaíso, Valparaíso, 160 m asl, (33°05' S, 71°40' W), Coronel Hayes Sadler leg. (BMNH 1987.7.18.16), examined.

Additional material examined

Chile, July 1925, A. Faz leg., 1 ♂ and 1 ♀ (MZUSP 10.892); Chile, A. Faz leg, 1 ♂ and 1 ♀ (MZUSP 10.889).

Diagnosis

Differs from other *Euathlus* species by the presence of median sized urticating seta type III, shorter than in other species (see character 41 in the cladistic matrix character set). Male differs from other species by the palpal organ morphology with flat and subequal prolateral keels (Figure 7A,B); PI evidently truncated in the middle of the embolus and shorter than PS (Figure 7C). Female differs from other species by the shape of the spermathecae (Figure 7D) with shorter basis, and both the basal segment and spheroid chamber form an angle equal or greater than 90° (spheroid chamber apicolateral in opposition of the epigastric furrow).

Remarks

We present for the first time the spermathecae of female of *E. parvulus* (Figure 7D).

***Euathlus truculentus* L. Koch, 1875**
(Figure 8)

Paraphysa phryxotrichoides Strand 1907: fig. 225

Paraphysa manicata: Schiapelli and Gerschman de P. 1963, p. 106, fig. 8 (♀ misidentified); Vol 1999, p. 12, fig. S (♀ misidentified).

Phryxotrichus phryxotrichoides: Schmidt 1994, p. 5.

Type

Holotype ♂, Chile?, with not further information (BMNH), examined.

Diagnosis

Differs from other *Euathlus* species by the presence of few labial cuspules (< 20). Male differs from other species except *E. atacama*, sp. nov. by the tibial apophysis with convergent branches (Figure 8A). Differs from *E. atacama* by the non-curved metatarsus I, and palpal organ morphology with very flat prolateral keels and serrated PI (Figure 8B,C). Female differs from other species by the shape of the spermathecae (see Legendre and Calderón 1984, pl. 11–fig. 13) with shorter basis and the spheroid chamber directed to the epigastric furrow.

Remarks

The holotype male of *Pa. pulcherrimaklaasi* is not congeneric with the paratype female and is transferred to another genus (see misplaced species). The paratype female of *Pa. pulcherrimaklaasi* fits with the generic characters of *Euathlus*, with the same spermathecal morphology as *E. truculentus*. No other differences between both were provided in the original description and its location is unknown. The paratype female of *Pa. pulcherrimaklaasi* was misidentified and is here identified as *E. truculentus*.

Genus *Phrixotrichus*
(Figures 9, 10)

Orthotrichus Karsch 1880, p. 390. (preoccupied).

Ashantia Strand 1908, p. 770. Syn. nov.

Type species

Phrixotrichus scrofa (Molina 1788)

Diagnosis

Differs from other Theraphosinae genera by the presence of urticating setae type IV gathered on two lateral patches (Figure 10C). Male differs by the palpal organ morphology with two sub equal prolateral keels (PI and PS) and the tip directed retrolaterally (Figures 9A,B, 10A,B), tibial apophysis with only one apical spine on RB and absence of basal spine on PB (Figure 9D). Female differs by the presence of two spermathecal receptacles with a lateral spheroid chamber (Figure 10D,E) and two lateral patches of urticating setae.

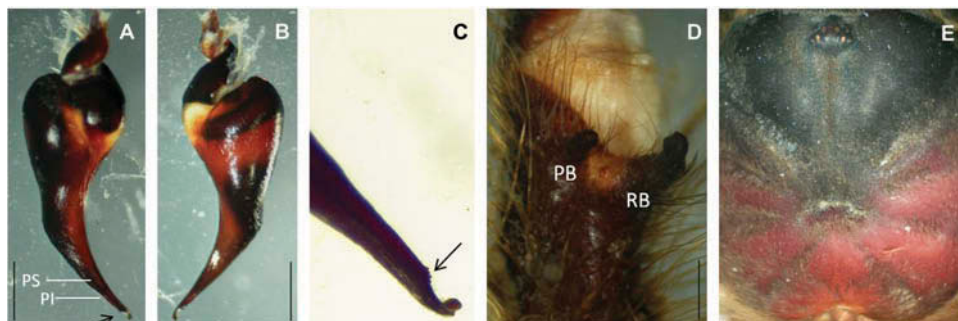


Figure 9. *Phrixotrichus jara* sp. nov. (A) palpal organ, prolateral view; (B) palpal organ, retrolateral view; (C) palpal organ, detail of apex showing PI serrated; (D) tibial apophysis, prolateroventral view (apical spine on RB lost); (E) cephalotorax. PB: prolateral branch, PI: prolateral inferior keel, PS: prolateral superior keel, RB: retrolateral branch. The arrow shows the PI serrated. Scale bar = 1mm.

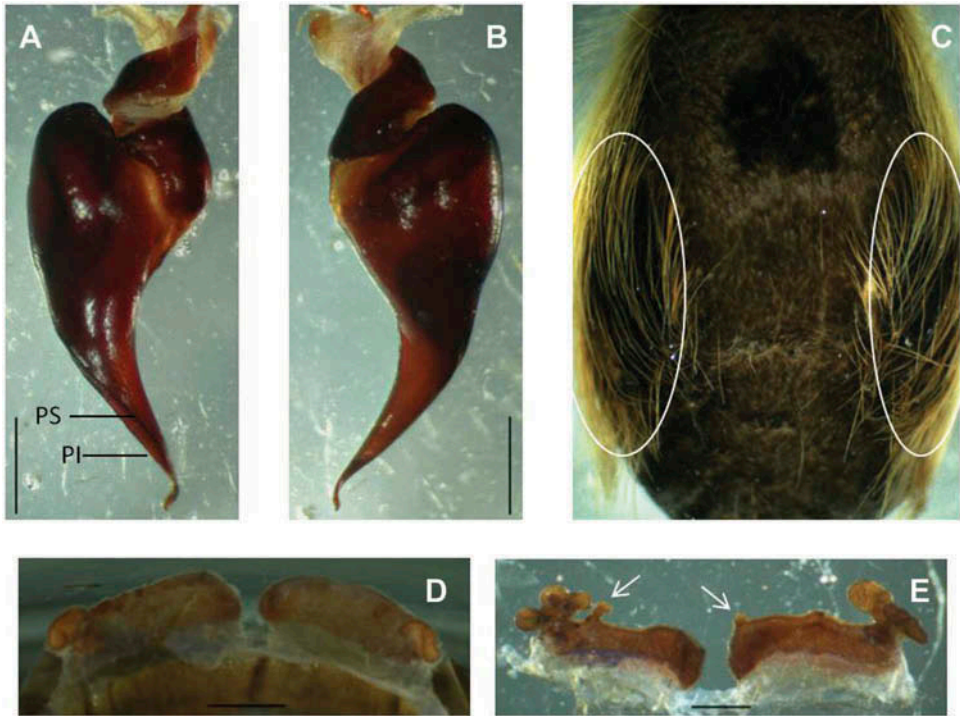


Figure 10. (A–D) *Phrixotrichus scrofa*. (A) palpal organ, prolateral view; (B) palpal organ, retrolateral view; (C) abdomen; (D) spermathecae, dorsal view. (E) *Phrixotrichus vulpinus* comb. nov. (E) spermathecae, dorsal view. PI: prolateral inferior keel, PS: prolateral superior keel. The arrow shows digitiform projection on seminal receptacles. Circles delimit the two urticating setae lateral patches. Scale bar = 1 mm.

Generic redescription

Carapace: subcircular, hirsute, black-purple to black. Strongly arched caput. Fovea: short transverse, straight to slightly recurved. Well-defined ocular tubercle, sub-quadrangular. Clypeus: narrow. Anterior eye row strongly procurved, posterior slightly recurved. Chelicerae: normal, with 7–8 well-developed teeth on promargin of furrow and 4–21 small teeth on the proximal area of furrow. Labium wider than long, with 0–16 cuspules on the subapical margin, suture broad. Maxillae longer than wide, prolateral distal angle slightly produced, with few cuspules. Sternum: subcircular, sigilla oval, elongated, sub-marginal. Stridulatory setae absent. Legs black-brown, hirsute, without spines on femora. Claws present on legs without teeth. Paired claws on legs and claw tufts well-developed. Retrolateral scopulae on femur IV absent. All tarsi with dense scopulae. Metatarsi I at least scopulated on two-thirds or distal half. Metatarsi II scopulated on the distal half. Metatarsi III scopulated on one-third. Metatarsi IV scopulated on distal portion. Trichobothria of three types on dorsal tarsi; clavate (short), filiform (long) and fusiform (medium-sized) randomly dispersed in a dorsal longitudinal arrangement. Metatarsi and tibiae with only filiform trichobothria arranged in a median, longitudinal and dorsal stripe. Abdomen hirsute, with two lateral patches of urticating setae. Type III and IV urticating setae present. PMS well-developed, PLS normal, apical segment digitiform.

Tibia I of males with paired distal prolateroventral apophysis, with bases not fused and without retrolateral spines. RB with an apical spine, PB without spines. Male metatarsi I straight. Palpal tibiae without spines or processes. Palpal organ piriform with extended subtegulum, PI and PS present, with a similar development along the embolus; the PI is serrated in *Phrixotrichus jara*. Female palpal tibiae with only apical spines. Spermathecae with two seminal receptacles each with a lateral spheroid chamber.

Remarks

Based on the descriptions of *P. scrofa* holotype of Schiapelli and Gerschman de P. (1963) and Legendre and Calderon (1984), and our examination of the holotype of *P. auratus* (in the synonymy with *P. scrofa*), *P. scrofa* clearly differ from *Paraphysa* (sub *Euathlus*), in the characters indicated in the diagnosis. The generic names *Aranea* and *Mygale* used in early times for *P. scrofa* are pre-occupied, so *Phrixotrichus* should be used, and is here restored. In our phylogenetic analysis three species of *Phrixotrichus* were resolved as a monophyletic clade, sister group of *Euathlus*.

Phrixotrichus jara sp. nov.

(Figure 9)

Types

Holotype ♂. Chile, VIII Región del Biobío, Concepción, Valle Nonguén, (37°00' S, 72°30' W), 150 m asl, 18 November 1995, C. Aracena leg., deposited in the arachnological collection of the Museo de Zoología, Universidad de Concepción, Chile (MZUC-UCCC 174).

Etymology

The specific epithet is a noun in apposition as a recognition to Victor Jara, famous Chilean singer who was killed in 1973, during the government of the dictator Augusto Pinochet.

Diagnosis

Male differs from other *Phrixotrichus* species by the palpal organ morphology with serrated PI (Figure 9A–C).

Description

Male (holotype). Total length, not including chelicerae, nor spinnerets 34.1, carapace length 17.1, width 18.5. Anterior eye row procurved, posterior slightly recurved. Eyes sizes and interdistances: AME 0.28, ALE 0.46, PME 0.28, PLE 0.36, AME–AME 0.52, AME–ALE 0.40, PME–PME 1.14, PME–PLE 0.10, ALE–PLE 0.42, OQ length 2.10, width 2.60, clypeus 0.30. Fovea transverse, slightly recurved, width 4.00. Labium length 2.10, width 3.40 with 3 cuspules. Maxillae (right/left) with 131/160 cuspules. Sternum length 7.00, width 7.40. Chelicerae with 8 well-developed teeth on promargin of furrow and 21 small teeth on the proximal area of furrow. Tarsi I–IV densely scopulated, scopula I–IV entire. Metatarsi I and II scopulated more than a distal half, III on distal third, IV apically

Table 7. Legs and palpal segments lengths of male *Phrixotrichus jara*.

	I	II	III	IV	Palp
Fe	18.0	15.5	13.4	14.6	10.3
Pa	8.2	7.8	6.8	7.2	6.0
Ti	17.5	13.8	11.2	12.6	8.2
Mt	14.0	12.1	11.4	14.1	–
Ta	7.4	6.5	6.4	6.7	3.2
Total	65.1	55.7	49.2	55.2	27.7

scopulated. Tibia I with prolateroventral distal double apophysis, RB has an apical spine and PB without spines (Figure 9D), branches are very different in size; prolateral very small. Flexion of metatarsus I on retrolateral side of the tibial apophysis. Palpal organ (Figure 9A,B) with two subequal prolateral keels (PI and PS); PI has a serrated edge with 4 teeth (Figure 9C). Leg and palpal segments lengths in Table 7. Spination: Femora I–IV and palp 0 (curved). Patellae I–IV and palp 0. Tibiae I 0; II 2V; III 1V; IV 1V; palp 0. Metatarsi I 2V; II 2V; III 1P, 1R, 5V; IV 1P, 11R, 4V; Tarsi I–IV and palp 0. Colour (in alcohol): Cephalothorax dark on the anterior region and dark-red backwards (Figure 9E), legs dark and abdomen dark brown with longer light brown setae (abdomen deteriorated). Type III, IV and intermediate III–IV urticating setae present; two lateral urticating setae patches. PMS well-developed, PLS normal, apical segment digitiform.

Female. Unknown.

Phrixotrichus scrofa (Molina 1788)
(Figure 10A–D)

Aranea scrofa Molina 1788, p. 236.

Mygale chilensis Molina 1810, p. 185.

Mygale rosea C.L. Koch 1842, p. 59, fig. 728.

Mygale chilensis Nicolet 1849, p. 332, pl. 1, fig. 2.

Phrixotrichus roseus Simon 1889, p. 222 (misidentified); Schmidt 1992b, p. 9, fig. 1 (misidentified).

Phrixotrichus chilensis Simon 1896, p. 63.

Phrixotrichus auratus Pocock 1903, p. 104. (holotype ♂. Chile, Santiago, G.A.J. Rothney leg. (BMNH), examined).

Paraphysa scrofa: Pérez-Miles et al. 1996; Schmidt 1996a, p. 17.

Types

Holotype ♂, not examined.

Additional material examined

Holotype ♂ of *Phrixotrichus auratus* (BMNH); Chile, VIII Región del Biobío, Colcura, 50 m asl, (37°07' S, 73°10' W), 18 October 1995, J. C. Ortiz leg, 2 ♀ (MZUC-UCCC 35894 and 35895); Chile, VIII Región del Biobío, Concepción,

Valle Nonguén, 150 m asl, (37°00' S, 72°30' W), 18 November 1995, C. Arocena leg, 1 ♀ and 1 ♂ (MZUC-UCCC 35897).

Diagnosis

Male differs from *P. jara*, sp. nov. by the palpal organ morphology with not serrated PI (Figure 10A,B). Female differs from *P. vulpinus* by the absence of a digitiform projection on the spermathecal receptacles, and absence of lobes on the lateral spheroid chambers of the seminal receptacles (Figure 10D).

Phrixotrichus vulpinus (Karsch 1880) comb. nov. (Figure 10E)

Orthotrichus vulpinus Karsch 1880, p. 390.

Ashantia latithorax Strand 1908, p. 770.

Euathlus vulpinus: Schmidt 1996a, 1996b, p. 67, unnumbered fig.; Schmidt 1998b, p. 10, fig. 1; Schmidt 2003, p. 163, figs. 355–358; Peters 2003, p. 175, fig. 696; Gallon 2005: 199, fig. 5; Perafán and Pérez-Miles 2010, p. 49, figs. 1–2. Syn. nov.

Euathlus latithorax: Gallon 2005, p. 199, figs. 1–4. Syn. nov.

Type

Holotype ♂, not examined, damaged (specimen preserved not in alcohol (dry) and very broken). Photographs of the holotype were studied.

Additional material examined

Chile, VIII Región del Biobío, Concepción, Prov. Concepción, 150 m asl, (36°50' S, 73°03' W), 21 December 1995, J.N. Artigas leg., 1 ♀ (MZUC-UCCC 35275); Chile, VIII Región del Biobío, Provincia de Ñuble, Río Infiernillo, 50 m asl, 1 ♀ (MZUCUCCC 35276).

Diagnosis

Female differs from other *Phrixotrichus* species by the presence of a digitiform projection on one or both seminal receptacles, and the lateral spheroid chamber of seminal receptacles with large lobes (Figure 10E).

Misplaced species

Eupalaestrus weijenberghi (Thorell 1894)

Lasiadora weijenberghii Thorell 1894, p. 31.

Pterinopelma saltator Pocock 1903, p. 108.

Eurypelma saltator Simon 1903, p. 937.

Weyemberghia weijenberghi Mello-Leitão 1941, p. 120, pl. II, fig. 3

Weyemberghiana weijenberghi Schiapelli and Gerschman de 1961, p. 203.

Pterinopelma weijenberghi Gerschman de and Schiapelli 1979, p. 86.

Paraphysa riparia Schmidt & Bolle 2008, p. 6, figs. 1–6. Syn. nov.

Material examined

Holotype ♂ of *Paraphysa riparia*, Argentina, Entre Ríos, San Cipriano (in the original description is erroneously indicated as a district Uruguay), deposited at Senckenberg Museum, Frankfurt.

Remarks

The male holotype of *Pa. riparia* is *Eupalaestrus weijenberghi* (Thorell 1894) because it clearly matches the palpal organ morphology and the presence of urticating setae type I, besides other specific characters. Female allotype of *Pa. riparia* has urticating setae type III and IV, so cannot be conspecific; urticating setae types I and IV do not co-occur in any known theraphosid species. Hence, *Pa. riparia* is a junior synonym of *E. weijenberghi* and female is identified as *Grammostola burzaquensis* (see below).

***Grammostola burzaquensis* Ibarra-Grasso 1946**

Grammostola burzaquensis Ibarra-Grasso 1946, p. 786, fig. 8.

Grammostola pulchripes burzaquensis Bücherl 1951, p. 118 (reduced to subspecies).

Material examined

Allotype ♂ of *Paraphysa riparia*, Argentina, Entre Ríos, San Cipriano (in the original description is erroneously indicated as a district of Uruguay), deposited at Senckenberg Museum, Frankfurt.

Remarks

The female allotype of *Pa. riparia* is *Grammostola burzaquensis* Ibarra-Grasso 1946 considering its collection locality, the spermathecal morphology, the presence of urticating setae type III and IV, and its size.

***Maraca pulcherrimaklaasi* (Schmidt 1991), comb. nov.**

Paraphysa pulcherrimaklaasi Schmidt 1991a, p. 8, figs.1–4.

Phrixotrichus pulcherrimaklaasi: Schmidt 1994, 1998a, p. 17, figs. 83, 85.

Euathlus pulcherrimaklaasi: Schmidt 2003, p. 163, figs. 353–354; 256, fig. 8. Peters 2003, p. 173, figs. 685–688.

Material examined

Holotype ♂ of *Pa. pulcherrimaklaasi*, Ecuador, A. Tinter leg. (SMF 37585), examined (except palpal organs)

Remarks

The male holotype lacks palpal organs and the original figures are not clear enough to identify it (Schmidt 1991). However, given the presence of a retrolateral node on the palpal tibiae, the presence of the urticating setae type III and IV, and besides other characters of generic significance, the male holotype seems to be *Maraca*, consequently is transferred to this genus. Hence *Maraca pucherrimaklaasi* comb. nov. is proposed. The female paratype (with no further information, deposited at SMF, not examined) is not congeneric with the male (based on the original description), and is identified as *E. truculentus* in this paper (see above).

Paraphysa peruviana Schmidt 2007 *nomen dubium**Material examined*

Holotype ♀ of *Paraphysa peruviana*, Peru, deposited at Senckenberg Museum, Frankfurt, examined (only spermathecae).

Remarks

This species was described based on exuviae of a female from Peru, the specimen was not located but the spermatheca (SMF) was examined and is not *Paraphysa* nor *Euathlus* (fig. 1 in Schmidt 2007). Although the spermathecal morphology is similar to *Thrixopelma*, it was impossible to examine other characters to guarantee the transference to this genus. For these reasons the name is of doubtful application and we considered as a *nomen dubium*.

Key for the species of *Euathlus* and *Phrixotrichus*

1. One single patch of urticating setae (types III and IV). Male tibial apophysis branches with fused bases, retrolateral spines present, a subapical spine present on the retrolateral branch and a basal spine on the prolateral branch. (*Euathlus*). 2
- Two lateral patches of urticating setae (types III and IV). Male tibial apophysis branches with non-fused bases, without retrolateral spines, presence of an apical spine present on the retrolateral branch and prolateral branch without spines. (*Phrixotrichus*).7
2. Spermathecae with two bifurcated receptacles (Figure 3A). *E. antai*
- Spermathecae with non-bifurcated receptacles. 3
3. Accessory keels present on male palpal organ (Figure 6C–E) . . *E. manicata*
- Accessory keels absent. 4
4. Male tibial apophysis with convergent branches. Spermathecae lateral spheroid chamber directed to the epigastric furrow. 5
- Male tibial apophysis with non-convergent branches 6

5. Few labial cuspules (less than 20). Male palpal organ with very flat and serrated PI (Figure 8B,C). Metatarsus I not very curved. Spermathecal receptacles with short base. *E. truculentus*
 - Numerous labial cuspules. Male palpal organ with wide and not serrated PI (Figure 4A,B). Very curved metatarsus I. Spermathecal receptacles with long base (Figure 4C). *E. atacama*
6. Male palpal organ with PI clearly truncated; shorter than PS (Figure 7A–C). Spermathecae without nodules (Figure 7D). *E. parvulus*
 - Male palpal organ with not truncated PI (Figure 5A,B). Spermathecal receptacles with a small sclerotized nodule each (Figure 5C). .. *E. condorito*
7. Male palpal organ with serrated PI (Figure 9A–C). *P. jara*
 - Male palpal organ with not serrated PI. 8
8. Spermathecae with a digitiform projection on one or both receptacles; the apex of receptacles with large lobes (Figure 10E). *P. vulpinus*
 - Spermathecae without digitiform projection and the apex of receptacles without large lobes (Figure 10D). Male palpal organ as in Figure, B. *P. scrofa*

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