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# Revalidation of *Pterinopelma* Pocock 1901 with description of a new species and the female of *Pterinopelma vitiosum* (Keyserling 1891) (Araneae: Theraphosidae: Theraphosinae)

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## Abstract

We revalidate the theraphosid genus *Pterinopelma* Pocock 1901, describe the female of *P. vitiosum* for first time and *Pterinopelma sazimai* **sp. nov.** from Brazil. These two species were included in a matrix with 35 characters and 32 taxa and were analyzed both with all characters having same weight and with implied weights. Searches considering all characters non-additive or some additive were also carried out. The preferred tree, obtained with implied weights, concavity 6 and all characters non-additive shows that *Pterinopelma* is a monophyletic genus sister to the clade *Lasiodora* (*Vitalius* + *Nhandu*). The presence of denticles on the prolateral inferior male palpal bulb keel is a synapomorphy of the genus.

**Key words:** Brazil, Cladistic analysis, *Eurypelma*, *Eupalaestrus*, taxonomy, Tarantula

## Introduction

The genus *Pterinopelma* Pocock 1901 was described for *Eurypelma vitiosa* Keyserling 1891 (based on male holotype) from Taquara, Rio Grande do Sul, Brazil (Pocock 1901). Pocock (1901) diagnosed the genus and related it to *Brachypelma* Simon 1891 by the presence of "scopulae of fine or coarser delicately plumose hairs on the posterior side of the trochanter of the palp and the anterior side of that of the first leg"; absence of such scopula upon the anterior inner side of the femur I, and "inner side of the coxa of the leg I with simple hairs with slender not spiniform bases". Metatarsus I, when folded, closes outside the retrolateral branch of the tibial apophysis.

Two years later, Pocock (1903) included two more new species: *Pterinopelma saltator* Pocock 1903 and *Pterinopelma tigrinum* Pocock 1903, both from Uruguay.

In this same year, *Pterinopelma* was considered a synonym of *Eurypelma* Koch 1851 by Simon (1903). The synonymy was not followed by Mello-Leitão (1923) who considered the genus valid and included in it *Pterinopelma vitiosum* (Keyserling 1891) and three new species from Brazil: *Pterinopelma wacketi* Mello-Leitão 1923, *Pterinopelma dubium* Mello-Leitão 1923 and *Pterinopelma vellutinum* Mello-Leitão 1923. Mello-Leitão (1923) did not mention the status of *P. saltator* and *P. tigrinum*. Adding to this, Mello-Leitão transferred *Eurypelma rubropilosa* Ausserer 1871 to *Pterinopelma*. However, Mello-Leitão (1923:184) pointed out that the species *Eurypelma rubropilosa* which he was transferring to *Pterinopelma* was the species common on Northern Brazil and he did not know if it corresponded to *Eurypelma rubropilosa sensu* Ausserer (1871) or *sensu* Simon (1892). Even though this species was transferred to *Pterinopelma* by Mello-Leitão (1923), other authors considered it belonging to *Eurypelma* (Roewer 1942; Bonnet 1955). Despite its doubtful identity and the lost type (Raven 1985), this species was transferred to *Aphonopelma* by Schmidt (1993).

Gerschman & Schiapelli (1978) transferred *Lasiodora weijenberghi* Thorell 1894 (from Uruguay) to *Pterinopelma* making the new combination *Pterinopelma weijenberghi* (Thorell 1894) and considered it the senior-syn-

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onym of *Pterinopelma saltator* Pocock 1903. Later, Valerio (1980) described a new species, *Pterinopelma xanthochroma* Valerio 1980, from Costa Rica.

Bücherl, Timotheo da Costa & Lucas (1971) examined the types of the species described by Mello-Leitão (1923) and synonymized *P. dubium* and *P. vellutinum* with *P. wacketi*.

Raven (1985), in his review of mygalomorph genera, considered *Pterinopelma* a junior-synonym of *Rhechostica* Simon 1892 (=*Aphonopelma* Pocock 1901). Pérez-Miles (1992) did not agree with the synonymy, alleging morphological differences between the genera on male palpal bulb. Pérez-Miles transferred *P. weijenberghi* and *P. vitiosum* to *Eupalaestrus* Pocock 1901. As the type species of *Pterinopelma* was transferred to *Eupalaestrus*, the synonymy between both genera was established. However, the type species *P. vitiosum* was considered a *nomen dubium* (Pérez-Miles 1992). *Pterinopelma wacketi* remained in *Aphonopelma* as *Aphonopelma wacketi* (Mello-Leitão1923) (Platnick 1993) but the status of *P. xanthochroma* was not mentioned.

*Pterinopelma tigrinum* described by Pocock (1903) was transferred to *Eurypelma* by Simon (1903). It was cited in a catalog and bibliography as *E. tigrinum* (Roewer 1942) or *P. tigrinum* (Bonnet 1955, 1957). This species is now in *Avicularia* Lamarck 1818 since Raven (1985) synonymized the genus *Eurypelma* with *Avicularia*, resulting in the combination *Avicularia tigrinum* (Pocock 1903). Its identity will be discussed in a paper in preparation.

Schmidt (1997) transferred *P. xanthochroma* to *Aphonopelma*, making the new combination *Aphonopelma xanthochromum* (Valerio 1980).

Bertani (2001), on his study of some theraphosine genera, revalidated *P. dubium* and *P. vellutinum* and transferred them, as well as *P. wacketi*, to the genus *Vitalius* Lucas, Silva Junior & Bertani 1993.

After the examination of *P. vitiosum* holotype and additional specimens from Brazil, we revalidate the genus, redescribe the type species and describe the female for first time. The type species of *Pterinopelma* as well as a new species herein described from Brazil are included in a previously published matrix (Bertani 2001) and analyzed with two cladistic programs. The results are compared and discussed.

## Material and methods

The general description format follows Bertani (2001) and Raven (2005) with some modifications, e. g., hair types and trichobothrial conformation on legs were not as intensively described as in Raven's work. Terminology of male palpal bulb follows Bertani (2000), of urticating hairs follows Cooke *et al*. (1972) and of spination follows Petrunkevitch (1925) with modifications proposed by Bertani (2001).

All measurements are in millimeters and were obtained with a Mitutoyo® digital calliper with an error of 0.005 mm, rounded up to two significant decimals. Leg and palp measurements were taken from the dorsal aspect of the left side (unless appendages were lost or obviously regenerated). A Nikon® SMZ1500 dissecting microscope was used for illustrations (with a camera lucida attachment). Abbreviation: A = apical keel, ALE = anterior lateral eyes, AME = anterior median eyes, ap= apical, ITC = inferior tarsal claw, PI = prolateral inferior keel; PLE = posterior lateral eyes, PME = posterior median eyes, PMS = posterior median spinnerets, PS = prolateral superior keel; R = retrolateral keel; SA = subapical keel; STC = superior tarsal claws.

Specimens of the following institutions were examined: BMNH—The Natural History Museum, London; IBSP—Instituto Butantan, São Paulo; MCN—Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre; MCTP—Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre; ZUEC—Museu de Zoologia da Universidade Estadual de Campinas, Campinas.

Geographical coordinates: primary sources are between round brackets, secondary sources between square brackets.

Cladistic analyses were based on the matrix of Bertani (2001), with the inclusion of *Pterinopelma vitiosum* and *P. sazimai* **sp. nov.** List of characters: (1)—Embolus length: 0, long, embolus 2.5 times longer than its width. 1, short, embolus length less than 2.5 times its width. (2) —Apical keel (A): 0, small, restricted to the embolus apex. 1, intermediate, extending slightly backwards, reaching or not the subapical keel. 2, very long, extending backwards by almost all ventral embolus edge. (3)—Embolus apex diameter: 0, slender. 1, thick. (4)—Retrolateral keel: 0, absent. 1, present, not pronounced, slightly rounded. 2; present, pronounced, sharp. (5) —Subapical keel (SA): 0, absent. 1, present. (6)—Prolateral accessory keel, under prolateral inferior keel: 0, absent. 1, present. (7) —Denticulate row in the prolateral inferior keel: 0, absent. 1, present. (8)—Distal embolus shape: 0, embolus apex conical, retrolateral region slightly convex. 1, embolus apex slightly laterally flattened, retrolateral region slightly concave under and above retrolateral keel. 2, embolus apex very flattened laterally, giving it a concave/convex general appearance; retrolateral side very concave under and above retrolateral keel, or only one concave region when retrolateral keel absent. (9)—Prolateral inferior keel: 0, present. 1, absent. (10)—Male palpal bulb ventral median area: 0, normal, or with slight depression at ventral median area. 1, male palpal bulb with pronounced depression at ventral median area. (11)—Male palpal bulb with long subapical row of denticles (SA), reaching more than half of embolus length: 0, absent. 1, present. (12)—Male palpal bulb with prolateral superior keel and apical keel apically fused: 0, prolateral superior keel and apical keel not completely fused. 1, prolateral superior keel and apical keel completely fused. (13)—Male tibial apophysis shape: 0, two straight branches originated from common base, retrolateral branch slightly narrow in its median region. 1, two convergent branches originated from common base, tapering distally, prolateral branch is thickened. 2, two straight branches originated from common base, retrolateral lacks median narrowing. 3, two convergent branches which do not originate from common base, retrolateral with median narrowing. (14)—Male tibial apophysis: 0, present, normal size. 1, present, very reduced. 2, absent. (15)—Flexion of metatarsus I of males: 0, touching side of retrolateral branch. 1, touching apex of retrolateral branch. 2, closing between two branches, thus contacting inner face of both branches. (16)—Number of male tibial apophysis branches: 0, two branches. 1, one branch. (17) —Fusion of spermathecae: 0, spermathecae separated. 1, spermathecae fused in small area. 2, spermathecae widely fused, but still presenting vestiges of two spermathecae in the distal region. 3, spermathecae completely fused, i.e., no vestige of two spermathecae. (18)—Spermatheca shape: 0, not subspheric. 1, subspheric. (19)—Spermathecae length: 0, short. 1, long, at least twice as long as heavily sclerotized area. (20)—Spermathecae stalk: 0, stalk narrower than spermathecae bulb. 1, stalk as wide as spermathecae bulb. (21)—Trochanteral stridulatory hairs: 0, absent. 1, present. (22)—Coxal stridulatory hairs: 0, absent. 1, present. (23)—Type III urticating hair in females: 0, present. 1, absent. (24)—Type I urticating hair morphology: 0, "A" region longer or as long as the "B" region. 1, "A" region shorter than "B" region. (25)—Type I urticating hair: 0, present. 1, absent. (26)—Tibiae IV: 0, normal. 1, thickened. (27)—Color pattern: 0, variable, commonly a homogeneous black or dark brown. 1, carapace dark brown with thoracic region gradually lighter, femora black, patellae, tibiae, and metatarsi I and II laterally pinkish. (28)—Male leg length and diameter: 0, normal legs. 1, long and narrow legs. (29) —Female carapace marginal hairs: 0, covered with short marginal stiff hairs, pointing out. 1, covered by long marginal soft hairs, many pointing to inner carapace region. (30)—Female carapace hair cover: 0, short hairs, mainly on cephalic region. 1, very long, curly, scattered hairs, mainly on cephalic region. (31)—Male palpal tibia retrolateral process: 0, absent. 1, present. (32)—Spine row on male dorsal palpal tibia apex: 0, male dorsal palpal tibia apex without row of spines. 1, male dorsal palpal tibia apex with a row of 5 or more spines. (33)—Spines on male palpal tibia apex: 0, 1 to 3 scattered apical prolateral spines. 1, 5 or more apical prolateral closely positioned spines. (34)—Male metatarsus I: 0, straight. 1, curved. (35)—Scopulae on retrolateral femora IV face: 0, absent. 1, present.

Computer methods: A data matrix (Table 1) with 35 characters and 32 taxa was analyzed with Nona 2.0 for Windows (Goloboff 1998) and X-Pee-Wee 1.3 for Windows (Goloboff 1997). The commands h100, h/20, amb- and mult*50 were used. Concavities 1 to 6 were used with Pee-Wee. Characters 2, 4, 8 and 17 were treated both as additive and non-additive and the results were compared. This is discussed fully below in Cladistics.

## Taxonomy

### *Pterinopelma* Pocock 1901 revalidated

*Pterinopelma* Pocock 1901: 551 (type species by monotypy *Eurypelma vitiosa* Keyserling 1891, holotype male, Brazil, Taquara, in BMNH, examined); Mello-Leitão 1923: 183, 1943: 153; Petrunkevitch 1928: 80; 1939a: 261; 1939b: 567; Bonnet 1958: 3827; Gerschman & Schiapelli 1978: 86; Valerio 1980: 276.

**Diagnosis.** *Pterinopelma* resembles *Lasiodora* C. L. Koch 1850, *Vitalius* and *Nhandu* Lucas 1983 by the combined absence of accessory prolateral keels and presence of prolateral superior, prolateral inferior, retrolatral and apical palpal keels in males (Figs 1–3, 7–9); and by the spermathecae short, separated by a heavily sclerotized short area in females (Figs 6, 13). Both sexes are distinguished from those of *Lasiodora* by the absence of stridulatory hairs on the prolateral coxae. From *Nhandu* and *Vitalius* the males are distinguished by the presence of denticles in the prolateral inferior keel (Figs 3, 9) and the weakly developed or absent subapical keel (Figs 1–3). Females can be distinguished from *Nhandu* by the absence of long setae on the carapace and from *Vitalius* either by the presence of uticating hair type III on the abdomen (*P. sazimai* **sp. nov.**), or by having a sternum wider than long (*P. vitiosum*) (Fig. 5).

**TABLE 1.** Data matrix showing distribution of character states used in cladistic analysis. (?=unknown, - = non-applicable, both treated as missing data in cladistic analysis).

| Character | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 3 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Taxa | | | | | | | | | | | 1 | | | | | | | | | | 1 | | | | | | | | | | 1 | | | | |
| *A. seemani* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *S. hoffmani* | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | ? | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ? | ? | 0 |
| *P. cancerides* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| *C. portoricae* | 0 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *A. geniculata* | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | - | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| *A. sternalis* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | - | 0 | - | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| *Pamphobeteus* sp. | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| *B. emilia* | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 3 | - | - | - | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| *X. immanis* | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| *T. blondi* | - | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | - | 2 | - | - | 3 | - | - | - | 0 | 1 | 1 | - | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| *T. apophysis* | - | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 3 | - | - | - | 0 | 1 | 1 | - | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| *E. campestratus* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| *E. weijenberghi* | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| *P. amazonicus* | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| *P. anomalus* | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| *P. multicuspidatus* | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| *Lasiodora* spp. | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| *N. carapoensis* | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | - | 2 | - | - | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| *N. tripepii* | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| *N. coloratovillosus* | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| *N. cerradensis* | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |
| *V. sorocabae* | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| *V. wacketi* | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| *V. dubius* | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| *V. roseus* | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | - | 1 | - | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| *V. vellutinus* | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | - | 1 | - | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| *V. longisternalis* | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| *V. lucasae* | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| *V. buecherli* | 1 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| *V. paranaensis* | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| *P.sazimai* | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| *P. vitiosum* | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |

**Redescription.** Carapace slightly longer than wide, cephalic region slightly raised to clearly raised, convex. Cephalic and thoracic striae shallow or deep. Fovea straight, shallow (*P. vitiosum*) or deep (*P. sazimai* **sp. nov.**). Chelicerae without rastellum, basal segments with 9 to 11 teeth. Eye tubercle distinct, wider than long. Clypeus absent (female *P. vitiosum*) or narrow. Anterior eye row procurved, posterior slightly recurved. AME rounded, ALE, PLE and PME oval. Labium subquadrate, slightly wider than long, with numerous (90–155) cuspules on its anterior third. Maxila subretangular, anterior lobe distinctly produced into a conical process, inner angle bearing numerous cuspules (100–200). Sternum longer than wide (*P. sazimai* **sp. nov.**) or as long as wide (*P. vitiosum*), anterior sigilla on sternum/labium edge not visible. Sternal sigilla less than one diameter from margin (*P. sazimai* **sp. nov.**) or sigilla not visible (*P. vitiosum*). PMS one-segmented, short; PLS three-segmented, basal segment longer than apical, both longer than median. Apical segment digitiform. STC with a median row of few small teeth. Tarsi I–III fully scopulated, IV divided by row of setae. Metatarsi I–II 2/3 to 4/5 scopulated, metatarsus III scopulated 1/3 to 1/2 its length, metatarsus IV apically scopulated, not divided by a row of setae. Femur IV with retrolateral scopula. Prolateral leg coxae and retrolateral palpal trochanter without stridulatory hairs. Male tibial apophysis with straight branches (*P. sazimai* **sp. nov.**) or retrolateral branch slightly curved (*P. vitiosum*) originating from common base, prolateral branch not thickened. Metatarsus I strongly (*P. sazimai* **sp. nov.**) or slightly (*P. vitiosum*) curved, when flexed touches retrolateral branch laterally (*P. vitiosum*) or apex of retrolateral branch (*P. sazimai* **sp. nov.**). Male palpal bulb pyriform, embolus long, slightly flattened distally. Prolateral keels present, extremely reduced in *P. sazimai* **sp. nov.** PS forms embolus edge distally. PI with series of unequal denticles. AC absent. R not pronounced. A short. SA poorly developed (*P. vitiosum*) or absent (*P. sazimai* **sp. nov.**). Spermathecae short, separated by heavily sclerotized short area. SS narrower than SB. Type I urticating hair in males and females with region "A" longer or equal to region "B". Type III (*P. sazimai* **sp. nov.**) or absent (*P. vitiosum*) in males and females. Carapace covered by short slender hairs; bordered by hairs pointing out from carapace center. Tibiae IV non-incrassated. Coxae and sternum covered by long hairs (*P. vitiosum*) or short hairs (*P. sazimai* **sp. nov.**). General color pattern brown (*P. vitiosum*), black (male *P. sazimai* **sp. nov.**) or with iridescent blue setae (*P. sazimai* **sp. nov.** female).

### ***Pterinopelma vitiosum*** **(Keyserling 1891) comb. rev.**

(Figs 1–6, 19; Table 2)

*Eurypelma vitiosum* Keyserling 1891: 21, pl. 1, f.5 (holotype male from Brazil, Taquara, in BMNH, examined); Simon 1903: 937; Petrunkevitch 1911: 65, 776; Roewer 1942: 242, 1954: 1508.

*Eurypelma mollicomum*: Simon 1892: 167 nec Ausserer, 1875.

*Pterinopelma vitiosum*: Pocock 1901: 551, 1903: 108; Mello-Leitão 1923: 190, 1943: 153; Petrunkevitch 1928: 80, 1939: 261; Bonnet 1955: 1831; Capocasale 1980: 5.

*Eupalaestrus vitiosum*: Pérez-Miles 1992: 34; Platnick, 2010. First considered as *nomen dubium* by Pérez-Miles 1992: 34.

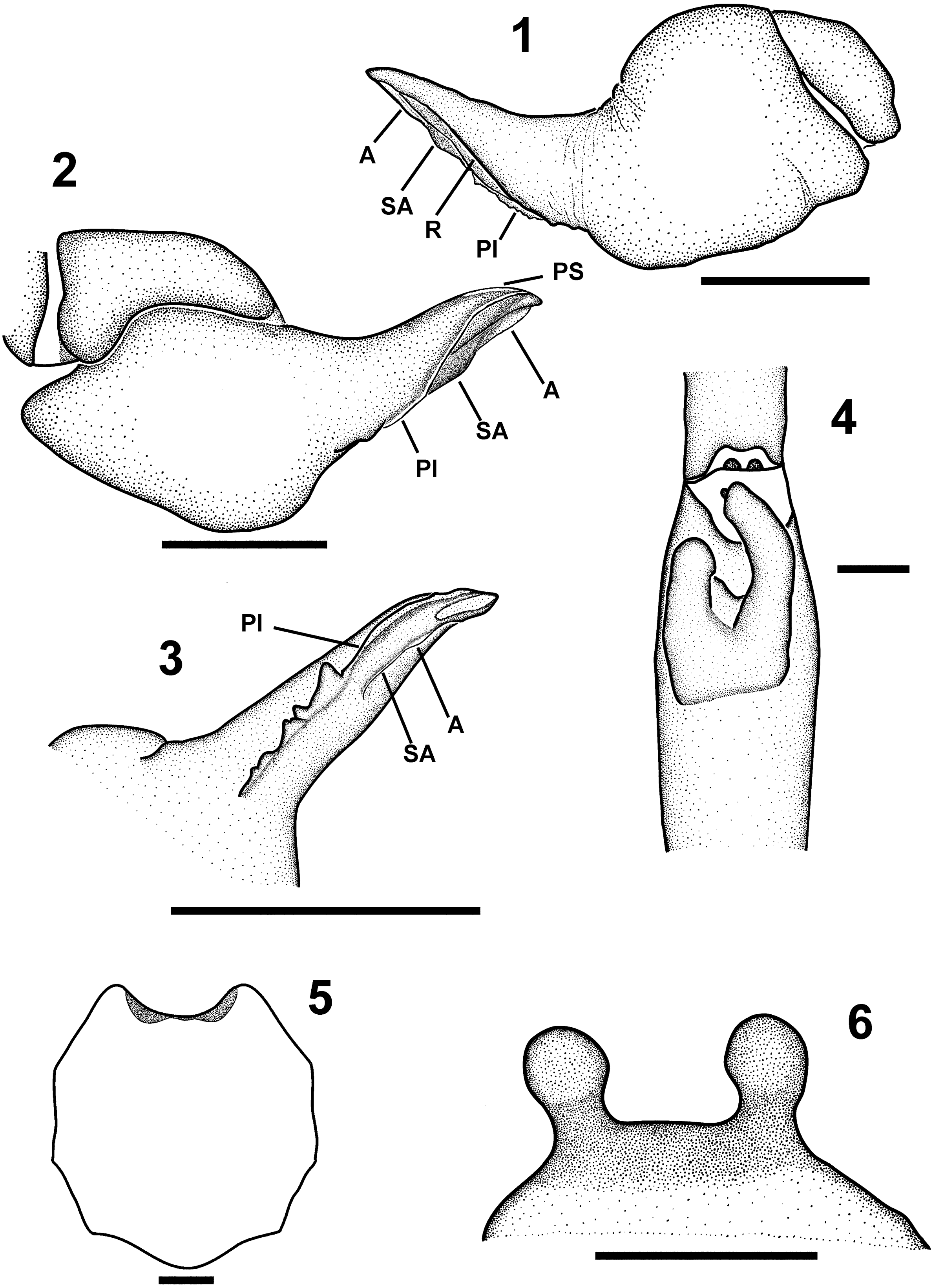
**Diagnosis.** Males differ from those of *P. sazimai* by the better developed palpal bulb keels (Fig 1–3) and the metatarsus I touching the retrolateral side of the retrolateral tibial apophysis when folded. Females differ from those of *P. sazimai* by the absence of type III urticating hairs, the sternum being as long as wide (Fig. 5, Table 1) and the absence of a blue iridescence on the setae covering the body.

**Material examined.** Holotype, 1 male from Brazil, *Rio Grande do Sul*, Taquara [S29°38' W50°47'], Dr. v. Ihering leg., (BMNH 1890.7.1.390).

**Additional material examined.** BRAZIL: *Rio Grande do Sul*: Canela [S29°21' W50°48'], MCTP 1520, 1 male, J.W. Thomé, 1991; Caxias do Sul [S29°10' W51°10'], 1 female, MCN 22102, F. Becker, 18 December 1991; Encantado [S29°14' W51°52'], 1 male, MCN 22145, L. Dacroce, 17 April 1992; Itaúba, Arroio do Tigre [S29°19' W53°04'], 1 male, MCN 7963, H. Bischoff, 19 April 1978; MCN 7943, 1 male, M.H. Galileo, 18 April 1978; MCN 17732, MCN 17731, 2 females, A.A. Lise, 11 April 1978.

**Redescription.** Male MCN 7963. Carapace 10.55 long, 10.15 wide, chelicerae 4.46. Legs (femur, patella, tibia, metatarsus, tarsus, total): I: 10.72, 5.31, 8.13, 7.42, 4.85, 36.43. II: 9.82, 4.94, 7.38, 6.90, 4.49, 33.53. III: 8.17, 4.03, 5.98, 7.32, 4.93, 30.13. IV: 10.08, 4.42, 8.64, 10.69, 5.25, 39.08. Palp: 6.54, 3.61, 5.53, –, 2.29, 17.97. Midwidths: femora I–IV=2.11, 2.09, 2.30, 1.85, palp=1.3; patellae I–IV=2.09,1.80, 1.87, 1.72, palp=1.91; tibiae I–IV=1.7, 1.68, 1.50, 1.57, palp=2.03; metatarsi I–IV=1.26, 1.10, 1.30, 1.20 tarsi I–IV=1.14, 0.90, 1.05, 1.24, palp=1.28. Abdomen 12.60 long, 7.42 wide. Spinnerets: PMS, 1.53 long, 0.41 wide, 0.60 apart; PLS, 2.13 basal, 1.54 middle, 1.88 distal; midwidths 0.93, 0.70, 0.51, respectively.

Carapace: length to width 1.04; cephalic area moderately raised, thoracic striae shallow. Fovea: shallow, straight, 1.52 wide. Carapace covered with short, slender, dense setae and bordered with stiff setae pointing out.




**FIGURES 1–6**. *Pterinopelma vitiosum*. (1–5) Male, MCN 7963, (1–3) left palpal bulb, (1) retrolateral, (2) prolateral), (3) ventral. (4) Left leg I tibial apophysis, ventral. (5) Sternum. (6) Female, MCN 17732, Spermathecae. A = apical keel, PI = prolateral inferior keel, PS = prolateral superior keel, R = retrolateral keel, SA = subapical keel. Scale bar = 1 mm.

Eyes and eye tubercle: tubercle 0.38 high, length 1.20, width 1.59. Clypeus 0.05 wide. Anterior row procurved, posterior slightly recurved. Sizes and inter-distances: AME 0.29, ALE 0.36, PME 0.16, PLE 0.31, AME–AME 0.27, AME–ALE 0.14, AME–PME 0.15, ALE–ALE 1.00, ALE–PME 0.21, PME–PME 0.78, PME–PLE 0.03, PLE–PLE 1,07, ALE–PLE 0.08, AME–PLE 0.30. Ratio of eye group width to length 1.97.

Maxillae: length to width: 1.59. Cuspules: 100─150 spread over ventral inner heel. Lyra absent. Labium: length 2.02, width 2.11, with *ca.* 100 cuspules spaced by less than one diameter from each other on anterior third center. Labio-sternal groove shallow, flat, without visible sigilla.

Chelicerae: rastellum absent, basal segments with 10 and 9 teeth on right and left side, respectively, both with series of basal denticles.

Sternum (Fig. 5): length 5.00, width 5.11. Porterior angle rounded, not separating coxae IV. Sigilla: not visible. Legs: legs formulla: IV I II III. Clavate trichobothria: on distal 2/3 of tarsi I–IV. Leg coxae: with sparse soft setae; stridulatory or modified setae lacking.

Scopula: Tarsi I–III fully scopulate. Tarsus IV divided by row of setae. Metatarsi I─ II 2/3 scopulate; III 1/2, IV ascopulate. Spines: palp: femur 0, patella 0, tibia p0-1-5(3ap); leg I: femur 0, patella 0, tibia p1-0-0; leg II: femur 0, patella 0, tibia v1-1-3ap, p0-1-0; metatarsus v1-1-3ap, p0-1-0 leg III: femur 0, patella 0, tibia p1-1-1, r1-1-0, metatarsus p0-1-0, r0-0-1, leg IV: femur 0, patella 0, tibia v1-2-3(2ap), p0-1-0, r1-1-0, metatarsus d0-0-1a, v2-3-4(3ap), p1-2-1, r1-2-2ap. Claws: ITC entirely absent; STC with small teeth.

Urticating hairs: Type I with region "A" longer than region "B" on abdomen dorsum.

Palp (Figs 1–3): palpal bulb pyriform, embolus long, slightly flattened laterally at distal region. Prolateral keels present. PS forming embolus edge distally. PI long, with series of unequal denticles on its basal and central areas. A present, short. R present, rounded. SA present, but inconspicuous.

Tibial apophysis (Fig. 4) with two branches originating from common base, retrolateral longest, and with slight distal curvature; prolateral straight.

Metatarsus I slightly curved, when folded touches retrolateral tibial apophysis branch laterally.

Color pattern: Carapace dark brown with light brown hairs on its border. Coxae, labium, sternum and maxila dark brown. Legs dark brown with light brown long setae. Leg rings and stripes inconspicuous. Abdomen dorsally black with light brown long setae, ventrally black.

**TABLE 2.** Lengths and widths (in mm), median and standard deviation (SD) of carapace and sternum in *Pterinopelma vitiosum* specimens.

| Individual | Sex | Sternum length | Sternum width | Sternum length / width |
|---|---|---|---|---|
| MCN 17732 | Female | 5.53 | 5.72 | 0.97 |
| MCN 7963 | Male | 5.00 | 5.11 | 0.98 |
| MCN 22145 | Male | 6.85 | 6.62 | 1.03 |
| MCN 22102 | Female | 6.73 | 7.20 | 0.93 |
| MCN 17731 | Female | 6.09 | 5.96 | 1.02 |
| MCN 7943 | Male | 5.35 | 5.50 | 0.97 |
| MCP 1520 | Male | 6.38 | 6.58 | 0.97 |
| | | | Median | 0.98 |
| | | | SD | 0.033 |

**Description.** Female. MCN 17732. Carapace 11.01 long, 10.16 wide, chelicerae 4.32. Legs (femur, patella, tibia, metatarsus, tarsus, total): I: 9.04, 5.41, 6.56, 4.86, 3.90, 29.77. II: 7.75, 4.73, 5.53, 4.90, 3.78, 26.69. III: 6.92, 4.04, 4.77, 4.59, 3.47, 23.79. IV: 8.85, 4.46, 6.89, 7.60, 3.84, 31.64. Palp: 6.95, 3.90, 4.81, –, 4.25, 19.91. Mid-widths: femora I–IV=1.67, 1.47, 1.56, 1.05, palp=1.32; patellae I–IV=2.0, 1.92, 1.75, 1.64, palp=1.81; tibiae I–IV=1.76, 1.64, 1.48, 1.44, palp=1.60; metatarsi I–IV=1.65, 1.48, 1.25, 1.08; tarsi I–IV=1.60, 1.41, 1.17,1.28, palp=1.55. Abdomen 12.62 long, 9.98 wide. Spinnerets: PMS, 2.21 long, 0.80 wide, 0.8 apart; PLS, 2.44 basal, 1.45 middle, 1.89 distal; midwidths 1.07, 0.82, 0.58, respectively.

As in male, except:

Carapace: length to width 1.08; cephalic area raised, thoracic striae deep. Fovea: shallow, straight, 1.85 wide. Carapace with soft long setae pointing out.

Eyes and eye tubercle: tubercle 0.38 high, length 1.35, width 2.01. Clypeus absent. Sizes and inter-distances: AME 0.25, ALE 0.52, PME 0.18, PLE 0.29, AME–AME 0.28, AME–ALE 0.26, AME–PME 0.19, ALE–ALE 0.98, ALE–PME 0.65, PME–PME 0.93, PME–PLE 0.40, PLE–PLE 1.23, ALE–PLE 0.17, AME–PLE 0.46. Ratio of eye group width to length 1.85.

Maxillae: length to width: 1.39. Cuspules: 100─200 spread over ventral inner heel. Labium: length 1.83, width 2.62. Sternum: length 5.53 width 5.72.

Legs: Scopula: Tarsi I–III fully scopulate, IV divided by a row of 4-5 setae. Metatarsi I–II 4/5 scopulate; III 1/2, IV 1/4 distal scopulate. IV not divided by row of setae. Spines: palp: femur p0-0-1, patella 0, tibia v1-2-2ap, p1-2-2; leg I: femur p0-0-1, patella 0, tibia v0-0-1ap, metatarsus v0-0-1ap; leg II: femur p0-0-1, patella 0, tibia v0-1-0, p-1-1-1; metatarsus v1-0-3ap, p0-1-0; leg III: femur r0-0-1, patella 0, tibia v0-1-2ap, p1-1-1, r1-1-1, metatarsus v1-2-3ap, p1-1-1, r0-1-2; leg IV: femur 0, patella 0, tibia v0-1-2ap, r0-0-2, metatarsus v2-4-6(3ap), p0-0-1, r0-3-3 .

Genitalia: Two short spermathecae separated by heavily sclerotized short area, spermathecal stalk narrower than spermathecal bulb (Fig. 6).

Color: Abdomen ventrally brown.

**Distribution.** Brazil, northern of the State of Rio Grande do Sul (Fig. 19). In this region, the altitude ranges from a few meters to more than 800 meters a.s.l. The vegetation comprises Subcaducifolious Atlantic Forest with *Araucaria angustifolia* and patches of "campo" (IBGE 1977).

### ***Pterinopelma sazimai*** **sp. nov.**
(Figs 7–19)

**Holotype.** Female, Brazil, state of Bahia, Andaraí, Parque Nacional da Chapada Diamantina (S12°46'9.21" W41°28'6.79"), 1.262 m a.s.l., ZUEC, Fukushima, C. S., Bertani, R. & Nagahama, R. H., 17 February 2008. **Paratypes:** female, Brazil, state of Minas Gerais, Santana do Riacho, Parque Nacional da Serra do Cipó [S19°17' W43°35'], ZUEC, I. Sazima *et al.*, 13–15 December 1971; two males IBSP 111631, same locality, M.T.V.A. Campos, May 1993.

**Additional material examined.** Three juveniles, Brazil, state of Bahia, Mucugê, Parque Nacional da Chapada Diamantina (S 12º 45’4.18" W 41º 30’3.73"), Bertani, R., Fukushima, C. S. & Nagahama, R. H., 17 February 2008, are maintained alive in the laboratory.

**Etymology.** The specific name is a patronym in honor of Dr. Ivan Sazima, an important Brazilian zoologist who was the first researcher to collect exemplars of this species in the decades of 1970 and 1980. These specimens remained as the sole exemplars of the species known for a long time.

**Diagnosis.** Males differ from those of *P. vitiosum* by the weakly developed palpal bulb keels (Figs 7–9) and the strongly curved metatarsus I (Fig. 10) touching the apex of the retrolateral tibial apophysis when folded. Females differ from those of *P. vitiosum* by the presence of type III urticating hairs, the sternum longer than wide (Fig. 12) and the presence of a blue iridescence on the setae covering the body (Fig. 14).

**Description.** Female (holotype). Carapace 22.18 long, 19.71 wide, chelicerae 9.39. Legs (femur, patella, tibia, metatarsus, tarsus, total): I: 15.10, 9.48, 12.30, 10.72, 8.86, 56.46. II: 14.55, 9.07, 11.64, 10.56, 8.94, 54.76. III: 13.61, 8.99, 10.44, 11.87, 8.59, 53.50. IV: 16.33, 8.85, 13.37, 18.52, 8.57, 65.64. Palp: 11.74, 7.04, 9.22, –, 8.84, 36.84. Midwidths: femora I–IV=3.48, 4.18, 4.25, 3.82, palp=3.10; patellae I–IV=3.95, 3.72, 3.71, 3.82, palp=3.25; tibiae I–IV=3.23, 2.98, 3.14, 2.91, palp=3.14; metatarsi I–IV=2.15, 2.18, 2.07, 1.91; tarsi I–IV=2.07, 2.13, 2.16, 2.14, palp=2.38. Abdomen 23.10 long, 17.89 wide. Spinnerets: PMS, 2.12 long, 1.09 wide, 1.20 apart; PLS, 3.64 basal, 2.69 middle, 3.32 distal; midwidths 1.66, 1.53, 1.06, respectively.

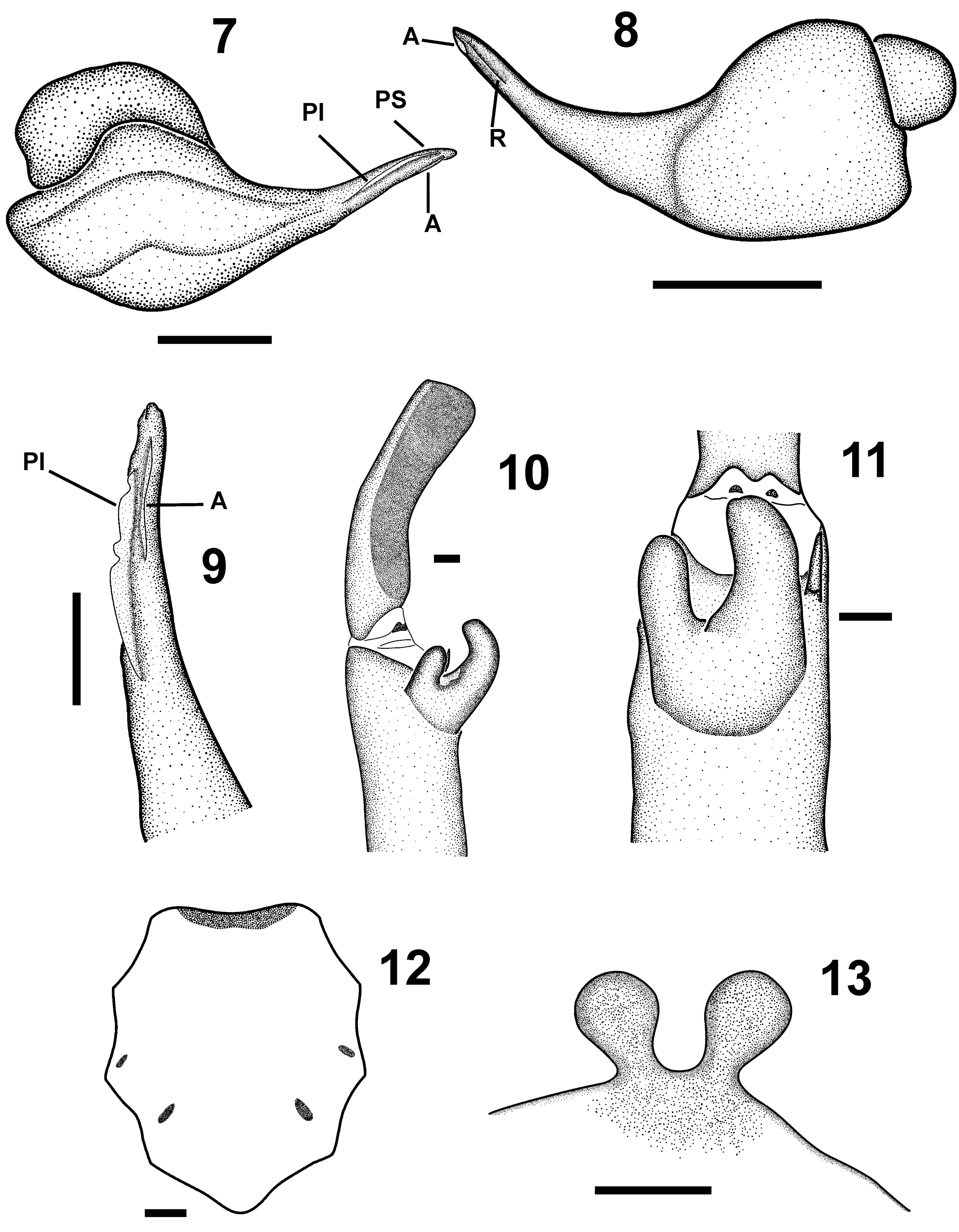
Carapace: length to width 1.12; cephalic area raised, thoracic striae deep. Fovea: deep, straight, 2.74 wide. Carapace covered with short, slender, dense setae and bordered with long setae pointing out.

Eyes and eye tubercle: tubercle 1.09 high, length 2.11, width 3.07. Clypeus 0.55. Anterior row procurved, posterior slightly recurved. Sizes and inter-distances: AME 0.46, ALE 0.64, PME 0.31, PLE 0.78, AME–AME 0.81, AME–ALE 0.36, AME–PME 0.39, ALE–ALE 1.98, ALE–PME 0.59, PME–PME 1.37, PME–PLE 0.20, PLE–PLE 2.10, ALE–PLE 0.52, AME–PLE 0.43. Ratio of eye group width to length 1.74.

Maxillae: length to width: 1.59. Cuspules: between 100─200 spread over ventral inner heel. Lyra absent. Labium: length 2.74, width 3.35, with 155 cuspules spaced by less than one diameter from each other on anterior third center. Labio-sternal groove deep, flat, without evident sigilla.

Chelicerae: rastellum absent, basal segments with 11 and 10 teeth on promargin, on the left and right chelicera, respectively; and denticles on basal area.

Sternum (Fig. 12): length 10.53, width 6.87. Porterior angle rounded, not separating coxae IV. Sigilla: three pairs, all rounded, less than one diameter from margin.




**FIGURES 7─13**. *Pterinopelma sazimai* **sp. nov.** (7─12) Male, paratype, (7─9) left palpal bulb, (7) prolateral, (8) retrolateral), (10─11) Left leg I tibial apophysis, (10) prolateral, (11) ventral. (12) Sternum. (13) Female, holotype, spermathecae. A = apical keel, PI = prolateral inferior keel, PS = prolateral superior keel, R = retrolateral keel. Scale bar = 1 mm.


**FIGURES 14–16**. *Pterinopelma sazimai* **sp. nov.** (14) Female, holotype. (15) Male, paratype. (16) Juvenile. Photos: 14, 16, C. S. Fukushima; 15, R. Bertani.

Legs:formulla: IV I II III. Clavate trichobothria: on distal 2/3 of tarsi I–IV. Leg coxae: with sparce soft setae; stridulatory or modified setae lacking. Scopula: Tarsi I–IV fully scopulate; IV divided by rows of setae. Metatarsi I–II fully scopulated; III 1/3, IV 1/5 distal scopulate. Metatarsi IV not divided by row of setae. Spines: palp: femur p0-0-1ap, patella 0, tibia v0-0-2ap, r0-0-1; leg I: femur 0, patella 0, tibia v0-1-2ap, p0-0-2ap, metatarsus v0-0-1ap; leg II: femur 0, patella 0, tibia d0-1-0, r0-0-1ap, p0-0-1ap; metatarsus v0-0-3ap, p0-0-1ap; leg III: femur 0, patella 0, tibia v0-1-2ap, p0-0-1, metatarsus v0-2-3ap, p1-2-1ap, r0-0-1(1ap); leg IV: femur 0, patella 0, tibia v1-1-2ap, p1-1-0, r0-1-2(1ap), metatarsus d0-0-1ap, v3-5-5(3ap), p0-1-1, r0-1-2ap. Claws: ITC absent from all legs; STC with small teeth.


**FIGURES 17–18**. *Pterinopelma sazimai* **sp. nov.** Habitat in Parque Nacional da Chapada Diamantina, Andaraí, State of Bahia, Brazil. (17) General view of "campo rupestre" at tip of "Chapada" formation, 1.300 m a. s. l. (18) General view of "Chapada" formation. Photos: C. S. Fukushima.

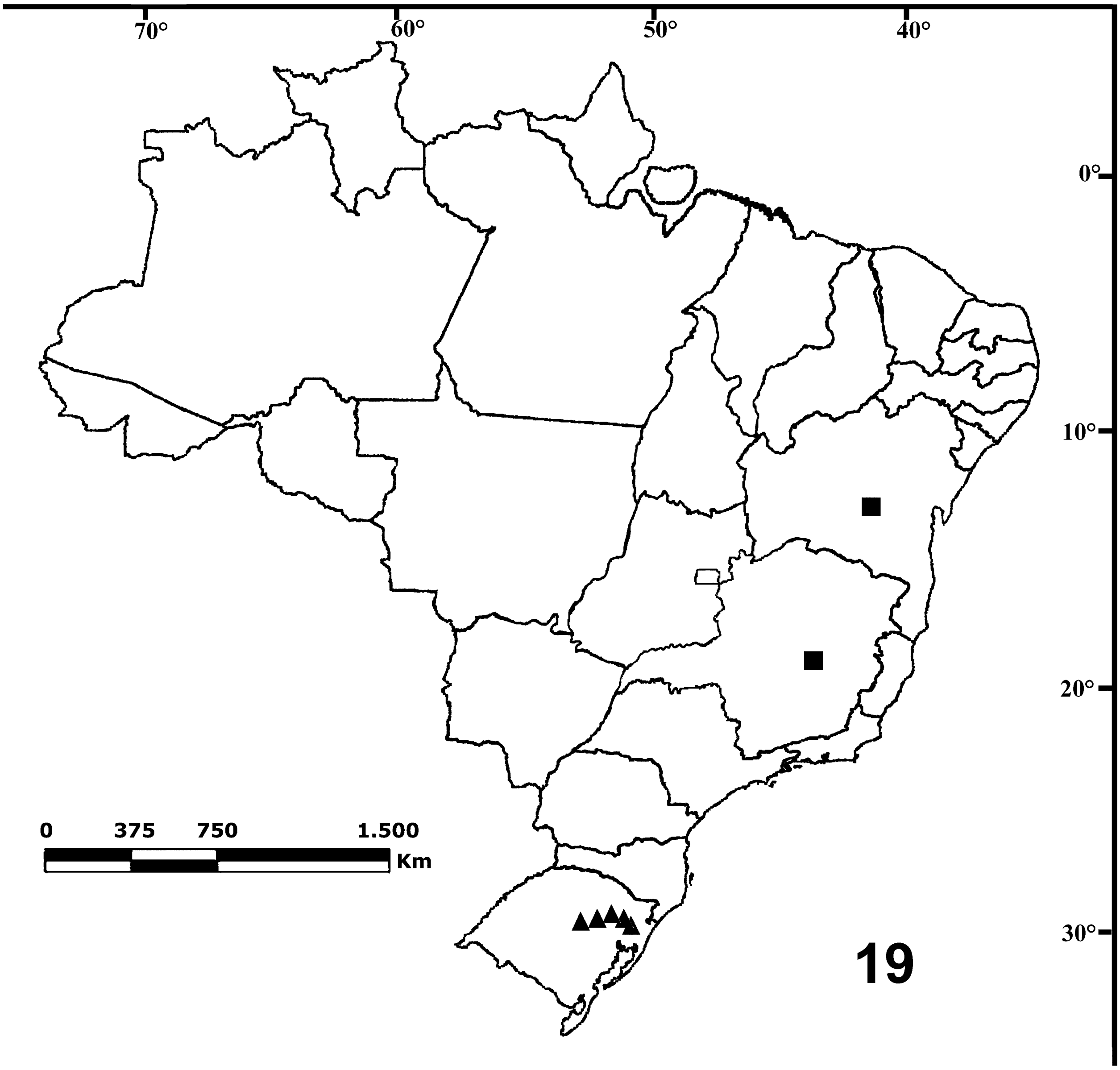



**FIGURE 19.** Map showing records of *Pterinopelma vitiosum* (triangles) and *P. sazimai* **sp. nov.** (squares) in Brazil.

Urticating hairs: Type I and III on abdomen dorsum; III on posterior and central area of abdomen and I on surronding area. Type I with region "A" longer than region "B".

Genitalia (Fig. 13): Two short spermathecae separated by heavily sclerotized short area, spermathecal stalk narrower than spermathecal bulb.

Color (Fig. 14): Carapace, coxae, labium, sternum and maxila black. Legs with black short setae and long golden setae. Femora, patellae and tibiae with distal pale rings and inconspicuous stripes on patellae. All the body with blue iridescence. Abdomen black with long red setae on dorsal area.

**Description.** Male (largest paratype). Carapace 16.46 long, 16.03 wide, chelicerae 7.14. Legs (femur, patella, tibia, metatarsus, tarsus, total): I: 14.51, 8.54, 11.35, 9.87, 8.59, 52.86. II: 14.43, 6.52, 10.23, 9.69, 4.57, 45.44. III: 12.30, 5.80, 9.31, 9.88, 7.29, 44.58. IV: 15.63, 6.44, 12.67, 16.14, 7.77, 58.65. Palp: 9.05, 4.03, 8.79, –, 3.01, 24.88. Midwidths: femora I–IV=3.46, 3.30, 3.83, 3.29, palp=2.41; patellae I–IV=3.43, 3.26, 3.18, 3.21, palp=2.74; tibiae I–IV=3.20, 2.69, 2.76, 2.68, palp=3.03; metatarsi I–IV=1.62, 1.78, 1.62, 1.64; tarsi I–IV=1.56, 1.49, 1.54, 1.33, palp=2.37. Abdomen 15.37 long, 9.64 wide. Spinnerets: PMS, 2.04 long, 0.91 wide, 0.69 apart; PLS, 3.29 basal, 1.95 middle, 2.72 distal; midwidths 1.20, 1.07, 0.84, respectively.

As female, except:

Carapace: length to width 1.02; cephalic area slightly raised. Fovea 3.21 wide.

Eye tubercle 0.77 high, length 2.17, width 2.68. Clypeus 0.64. Anterior eye row procurved, posterior slightly recurved. Sizes and inter-distances: AME 0.43, ALE 0.49, PME 0.29, PLE 0.42, AME–AME 0.56, AME–ALE 0.39, AME–PME 0.22, ALE–ALE 1.97, ALE–PME 0.52, PME–PME 1.31, PME–PLE 0.19, PLE–PLE 2.13, ALE–PLE 0.45, AME–PLE 0.71. Ratio of eye group width to length 2.12.

Maxillae: length to width: 1.92. Labium: length 2.33, width 2.54, with *ca.* 90 cuspules. Chelicerae: rastellum absent, basal segments with 11 teeth on promargin on both sides. Sternum: length 7.51, width 6.25.

Legs: Scopula: Metatarsi III 1/2 scopulated. Spines: palp: femur p0-0-1ap, patella p0-2-0, tibia v1-0-0, p2-2-2(1ap); leg I: femur p1-0-2, patella p0-1-0, tibia v1-2-0, p1-0-0, metatarsus v0-0-1a, p1-1-0, r0-0-2(1ap); leg II: femur r0-0-1ap, patela p0-1-0, tibia v2-3-2ap, p2-2-121ap), r1-1-2 (1ap); metatarsus v3-3-1ap, p1-1-2ap, r1-1-2(1ap); leg III: femur p0-0-1ap, r0-1-1, patella p1-1-1, r0-1-0, tibia v2-2-4(3ap), p3-2-4(1ap), r2-1-1; metatarsus v4-2-4ap, p3-1-5(4ap), r1-1-3(1ap); leg IV: femur p0-1-0, r0-0-1, patella p0-1-0, r0-1-0, tibia v3-6-6(3ap), p4-2-2ap, r1-1-2(1ap), metatarsus v5-4-9(3ap), p3-4-10(3ap), r0-2-5(1ap).

Palp (Figs 7–9): palpal bulb pyriform, embolus long, narrow, slightly flattened laterally at distal region. Prolateral keels present, the PS forming the embolus edge distally. PI long, with series of unequal denticles on its distal portion. A short. R rounded. SA absent. All keels extremely reduced.

Tibial apophysis on I with two straight branches originating from common base, retrolateral longest (Figs 10─11). Metatarsus I strongly curved, when folded touches apex of retrolateral tibial apophysis branch.

Color pattern (Fig. 15): As in female, but without blue iridescence.

**Distribution.** Brazil, States of Bahia and Minas Gerais, on the "Serra do Espinhaço" range and its disjunctions (from 21°10' to 10° S) (Fig. 19).

**Natural history.** Individuals were collected on campo rupestre areas (Figs 17–18), which are characterized by their height above sea level (above 900m), in association with a high degree of outcropping and consequent reduction of soil depth (Giulietti & Pirani 1988). Juveniles (Fig. 16) were found under rocks, during the day (25ºC and 64% relative humidity of air), on a campo rupestre area at about 1300m a.s.l. The female holotype was crossing a trail, in the afternoon (4 p.m.).

## Cladistics

A single tree (fit = 2998.0, length = 90) was obtained with concavity 6 on X-Pee-Wee with all characters non-additive (Fig. 20, Table 3). Searches with concavities 5 (fit = 2932.9, length = 90), 4 (fit = 2847.1, length = 90) and 3 (fit = 2727.8, length = 90) resulted in a single tree with the same topology of concavity 6. Concavities 1 (fit = 2264.2, length = 93) and 2 (fit = 2554.6, length = 93) resulted in 21 and 8 trees, respectively. The strict consensus of these trees differs from those having concavities 3 to 6 by having a clade with most *Vitalius* species collapsed in a polytomy with the monophyletic genus *Nhandu*.

**TABLE 3.** Characters, Fits, Steps and Extra Steps for characters of cladogram of Fig. 20.

| Character | Fit | Steps | Extra Steps | Character | Fit | Steps | Extra Steps |
|---|---|---|---|---|---|---|---|
| 1 | 66.7 | 4 | 3 | 19 | 100 | 1 | 0 |
| 2 | 100 | 2 | 0 | 20 | 100 | 1 | 0 |
| 3 | 85.7 | 2 | 1 | 21 | 100 | 1 | 0 |
| 4 | 85.7 | 3 | 1 | 22 | 75.0 | 3 | 2 |
| 5 | 85.7 | 2 | 1 | 23 | 60.0 | 5 | 4 |
| 6 | 100 | 1 | 0 | 24 | 100 | 1 | 0 |
| 7 | 85.7 | 2 | 1 | 25 | 100 | 1 | 0 |
| 8 | 100 | 2 | 0 | 26 | 75.0 | 3 | 2 |
| 9 | 100 | 1 | 0 | 27 | 85.7 | 2 | 1 |
| 10 | 75.0 | 3 | 2 | 28 | 75.0 | 3 | 2 |
| 11 | 75.0 | 3 | 2 | 29 | 85.7 | 2 | 1 |
| 12 | 100 | 1 | 0 | 30 | 85.7 | 2 | 1 |
| 13 | 85.7 | 4 | 1 | 31 | 100 | 1 | 0 |
| 14 | 85.7 | 3 | 1 | 32 | 100 | 1 | 0 |
| 15 | 50.0 | 8 | 6 | 33 | 50.0 | 7 | 6 |
| 16 | 100 | 1 | 0 | 34 | 50.0 | 7 | 6 |
| 17 | 100 | 3 | 0 | 35 | 75.0 | 3 | 2 |
| 18 | 100 | 1 | 0 | | | | |

The analyses considering the characters 2, 4, 8 and 17 additive and using concavities 3 to 6 resulted in a single tree with the same topology (fits = 2697.8, 2820.4, 2909.1 and 2976.6 for concavities 3, 4, 5 and 6, respectively; lenght = 92 for all them). The analyses that also consider those characters additive but use concavities 1 (fit = 2230.9, length 95) and 2 (fit = 2521.3, length = 95) presented as result 11 and 16 trees, respectively. The consensus tree obtained using concavities 1 and 2 differed from the single trees obtained with concavities 3 to 6 by having a polytomy including the *Vitalius* species and the monophyletic genus *Nhandu*. Differences among trees having some characters additive and all non-additive concern the clade *B. emilia* (White 1856) (*Pamphobeteus* Pocock 1901 + *Xenesthis* Simon 1891) (*T. blondi* (Latreille 1804) + *T. apophysis* (Tinter 1991)), which appeared as sister-group of *Nhandu* + *Vitalius* in the analyses having some characters additive, and collapsed in a basal tricotomy when all characters are non-additive (Fig. 20).

Analyses having all characters with the same weight obtained with Nona resulted in 90 trees (length = 130, consistency index = 33, retention index = 51) when all characters were considered non-additive, and 74 trees (length = 123, consistency index = 35, retention index = 58) with some characters additive. The topology of the strict consensus trees of the two types of analyses are similar and presented a large polytomy having the species of *Pterinopelma* collapsed with all species of *Vitalius* (some forming monophyletic clades), *Proshapalopus* Mello-Leitão 1923, *Lasiodora* spp., and with monophyletic genera *Nhandu* and *Eupalaestrus*, together with the clade *B. emilia* (*Pamphobeteus* + *Xenesthis*) (*T. blondi* + *T. apophysis*).

The results were robust for the searches using implied weights, but not with all characters with equal weight. However, the conflict of characters is resolved even with the minor influence of weighting, i. e., with concavity 6, resulting in an almost completely resolved tree. As pointed out by Ramirez (2003), equal weights gives low performance, and implied weights using concavities 1 and 2 normally give bizarre solutions; the better performance comes from those with the mildest weighting functions. Thus, the preferred tree (Fig. 20) is the one obtained with X-Pee-Wee with all characters non-additive and concavity 6. Furthermore, it is the shortest tree with highest fit obtained from all methods and concavities used.

The preferred tree shows that *Pterinopelma* is a monophyletic genus having as sister-group the clade *Lasiodora* (*Nhandu* + *Vitalius*) having as synapomorphy the presence of a denticulate row in the prolateral inferior keel (Node

47, Table 4), with convergence in *Aphonopelma seemani* (F. O. P.-Cambridge 1897) and *Sphaerobothria hoffmani* Karsch 1879.

**TABLE 4**. Synapomorphies for cladogram of Fig. 20.

| Taxa or Node | Character | Change | Taxa or Node | Character | Change | Taxa or Node | Character | Change |
|---|---|---|---|---|---|---|---|---|
| *S. hoffmanni* | 15 | 0 → 1 | *V. lucasae* | 10 | 0 → 1 | Node 41 | 20 | 0 → 1 |
| *P. cancerides* | 22 | 0 → 1 | | 26 | 0 → 1 | Node 42 | 3 | 0 → 1 |
| | 34 | 0 → 1 | *V. buecherli* | 28 | 0 → 1 | | 29 | 0 → 1 |
| *C. portoricae* | 13 | 0 → 3 | *P. sazimai* | 5 | 1 → 0 | | 30 | 0 → 1 |
| | 28 | 0 → 1 | *P. vitiosum* | 15 | 1 → 0 | Node 43 | 1 | 1 → 0 |
| | 35 | 1 → 0 | | 23 | 1 → 0 | Node 44 | 3 | 0 → 1 |
| *A. geniculata* | 1 | 0 → 1 | | 33 | 0 → 1 | Node 45 | 14 | 0 → 1 |
| *A. sternalis* | 33 | 0 → 1 | Node 32 | 16 | 0 → 1 | Node 46 | 27 | 0 → 1 |
| *B. emilia* | 15 | 0 → 1 | | 18 | 0 → 1 | Node 47 | 7 | 0 → 1 |
| | 34 | 0 → 1 | Node 33 | 31 | 0 → 1 | Node 50 | 13 | 0 → 1 |
| | 35 | 1 → 0 | Node 34 | 21 | 0 → 1 | | 34 | 1 → 0 |
| *X. immanis* | 34 | 0 → 1 | Node 35 | 4 | 0 → 2 | Node 51 | 15 | 1 → 0 |
| *T. blondii* | 14 | 0 → 2 | | 15 | 0 → 2 | | 23 | 1 → 0 |
| *P. amazonicus* | 23 | 1 → 0 | Node 36 | 9 | 0 → 1 | Node 52 | 1 | 0 → 1 |
| | 26 | 0 → 1 | | 12 | 0 → 1 | | 2 | 0 → 1 |
| | 30 | 0 → 1 | | 22 | 0 → 1 | Node 53 | 4 | 1 → 2 |
| | 33 | 0 → 1 | | 25 | 0 → 1 | Node 54 | 17 | 0 → 1 |
| *P. multicuspidatus* | 13 | 0 → 1 | Node 37 | 11 | 0 → 1 | Node 55 | 5 | 0 → 1 |
| | 15 | 1 → 0 | | 26 | 0 → 1 | | 15 | 0 → 1 |
| | 27 | 0 → 1 | | 33 | 0 → 1 | Node 56 | 4 | 0 → 1 |
| *Lasiodora spp.* | 22 | 0 → 1 | Node 38 | 1 | 0 → 1 | | 8 | 0 → 1 |
| *N. carapoensis* | 14 | 0 → 2 | | 24 | 0 → 1 | Node 58 | 2 | 0 → 2 |
| | 23 | 1 → 0 | | 28 | 0 → 1 | | 8 | 0 → 2 |
| | 34 | 1 → 0 | | 32 | 0 → 1 | | 13 | 0 → 2 |
| *N. tripepii* | 15 | 1 → 0 | Node 39 | 6 | 0 → 1 | Node 60 | 7 | 1 → 0 |
| *V. sorocabae* | 29 | 0 → 1 | Node 40 | 19 | 0 → 1 | | 23 | 0 → 1 |
| *V. roseus* | 33 | 0 → 1 | | 33 | 0 → 1 | | 35 | 0 → 1 |
| *V. longisternalis* | 33 | 0 → 1 | | | | | | |

## Taxonomic discussion

*Pterinopelma* is a taxonomically problematic genus which was considered either a junior synonym of *Eurypelma* (Simon 1903; Roewer 1942), *Aphonopelma* (sub *Rhechostica*, Raven 1985) or *Eupalaestrus* (Pérez-Miles 1992). One of the difficulties in proposing a taxonomic position for the genus is that only the male holotype was known, and parts of the specimen are missing. Pérez-Miles (1992) suggested that *P. vitiosum* should be a junior synonym of *Eupalaestrus weijenberghi*, since he found no substantial differences between the two species. However, he preferred to consider *Pterinopelma vitiosum* a *nomen dubium*. He reasoned that the shape of metatarsi of leg IV was considered essential to diagnose the genus *Eupalaestrus* by Raven (1985), and those structures are missing in the holotype of *P. vitiosum* (Pérez-Miles 1992). The discovery of some recently collected specimens of both sexes allows a reinterpretation of the taxonomic position of the species, which is discussed below.

**TABLE 5.** Key characters shared by *Pterinopelma* and related genera.

| | *Aphonopelma* | *Sphaerobothria* | *Eupalaestrus* | *Proshapalopus* |
|---|---|---|---|---|
| 1. | not thickened* | not thickened* | thickened | not thickened* / thickened |
| 2. | small* | small* | small* | small* |
| 3. | without denticles* / with denticles | with denticles | without denticles | without denticles |
| 4. | absent* | absent* | not pronounced | not pronounced |
| 5. | absent* | absent* | row of denticles | sharp keel |
| 6. | absent* | absent* | absent* | present |
| 7. | conical | conical | slightly flattened | slightly flattened |
| 8. | straight* | ? | straight* | straight / curved |
| 9. | side* | apex | side* | side*, apex |
| 10. | not fused* | not fused* | not fused* | not fused* |
| 11. | absent* | absent* | absent* | absent* |
| 12. | absent | absent* | present | absent* / present |
| 13. | short hairs* | short hairs* | short hairs* | short hairs* / long hairs |
| 14. | absent* | absent* | present | present |

continued.

| | *Lasiodora* | *Vitalius* | *Nhandu* | *Pterinopelma* |
|---|---|---|---|---|
| 1. | not thickened* | not thickened* / thickened | not thickened* | not thickened* |
| 2. | small* | intermediate | intermediate | small* |
| 3. | without denticles | without denticles | without denticles | with denticles |
| 4. | sharp | sharp | sharp | not pronounced |
| 5. | sharp keel | sharp keel | sharp keel | weakly developed / absent* |
| 6. | absent* | absent* | absent* | absent* |
| 7. | slightly flattened | slightly flattened | slightly flattened | slightly flattened |
| 8. | straight* | curved, straight*, reduced | straight*, absent | straight* |
| 9. | apex | side* | apex | side*, apex |
| 10. | fused | fused | fused | fused |
| 11. | present | absent* | absent* | absent* |
| 12. | present | absent* | present | absent* / present |
| 13. | short hairs* | short hairs* | long hairs | short hairs* |
| 14. | present | present | present | present |

Characters (plesiomorphic states are indicated by an asterisk*) = 1, leg IV tibiae = not thickened*, thickened; 2, male bulb apical keel size = small*, intermediate; 3, prolateral inferior keel = without denticles*, with denticles; 4, male bulb retrolateral keel = absent*, not pronounced, sharp; 5, male bulb subapical keel = absent*, formed by row of denticles, sharp keel; 6, male bulb accessory prolateral keel = absent*, present; 7, embolus distal shape = conical*, slightly laterally flattened; 8, male tibial apophysis on leg I = straight*, curved, reduced, absent; 9, flexion of metatarsus I in males = touching the side of the retrolateral branch*, on the retrolateral branch apex; 10, fusion of spermathecae = not fused*, fused in small area; 11, coxal stridulatory hairs = absent*, present; 12, type III urticating hairs in females = present*, absent; 13, female carapace hair covering = with short hairs*, with long curly hairs; 14, scopulae on retrolateral femur IV = absent*, present.

The male of *Pterinopelma vitiosum* has a tibial apophysis (Fig. 4) similar to *Eupalaestrus* species and a row of denticles in the male palpal bulb. However, these denticles are not positioned in a row just after the apical male palpal bulb keel, as in *Eupalaestrus* species (Bertani 2001). They are on the prolateral inferior keel (Fig. 3), in a similar way to the distantly related genera *Aphonopelma* and *Sphaerobothria* (Bertani 2001). Females have the area between the two spermathecae strongly sclerotized (Fig. 6), resembling specimens of *Lasiodora*, *Vitalius* and *Nhandu*, but not *Eupalaestrus* specimens, in which they are weakly sclerotized (Bertani, 2001). Furthermore, the tibiae and metatarsi IV are of normal diameter in *P. vitiosum* males and females, whereas they are incrassate in *Eupalaestrus* species.

As already discussed above in the cladistic section, *Pterinopelma* is closely related to the genera *Lasiodora*, *Nhandu* and *Vitalius*. It is distinguished from *Lasiodora* by lacking stridulatory setae on the prolateral coxae in both males and females. *Pterinopelma* males have a more long and slender palpal bulb embolus (Figs 1─3, 7─9) than in *Vitalius* and *Nhandu* individuals, and with less developed keels. Particularly, the apical, subapical and retrolateral keels are either weakly developed or entirely absent. Moreover, male specimens of *Pterinopelma* have denticles on the prolateral inferior keel (Figs 3, 9), absent in *Vitalius* and *Nhandu*. *Pterinopelma* females have spermathecae (Figs 6, 13) very similar to those of *Vitalius* and some *Nhandu* species. But they lack the long curly setae on the carapace of *Nhandu* females. From *Vitalius* females they can be distinguished only by the presence of urticating hair type III (*P. sazimai* **sp. nov.**) or by the sternum as long as wide (*P. vitiosum*) (Fig. 5). Other female characters seem to be very conservative in *Pterinopelma*, *Vitalius* and *Nhandu*.

The cladistic analysis confirms the monophyly of the genus, and support our revalidation of the genus *Pterinopelma*.

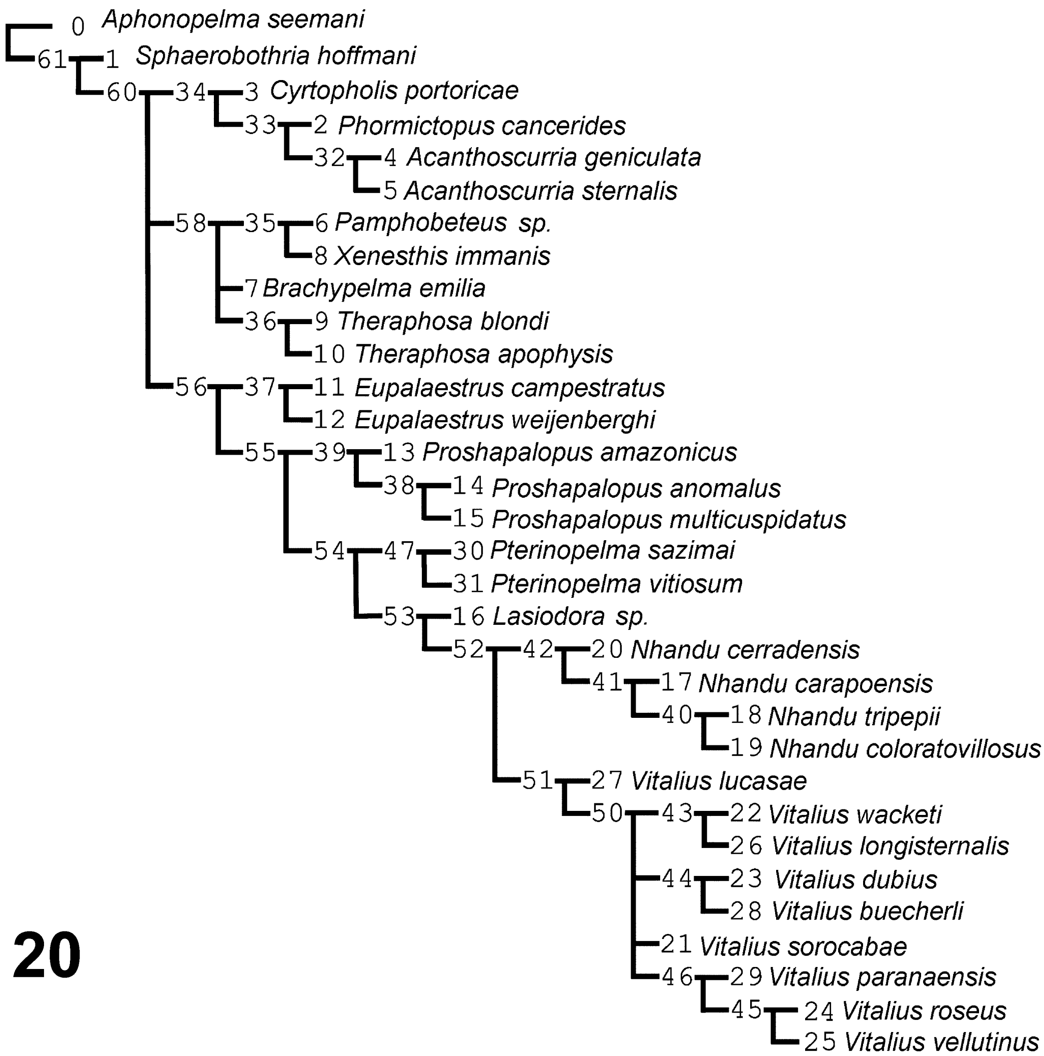



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**FIGURE 20**. Single tree obtained with X-Pee-Wee, all characters non-additive and concavity 6. Fit = 2998.0, length = 90.

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