



A new genus and five new species of Metasarcinae from Peru (Arachnida, Opiliones, Gonyleptidae)

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An emended diagnosis for Metasarcinae is given. The genera *Cajamarca* Roewer, 1952 (Phalangodidae Tricommatinae), *Chacoikeontus* Roewer, 1929 and *Tschaidicancha* Roewer, 1957 (both Gonyleptidae Prostyginae) are transferred to the subfamily. The new genus *Incasarcus* is described for five new species of the Peruvian Department of Cusco. The five new species ***Incasarcus diana* sp. nov.**, ***Incasarcus pictus* sp. nov.**, ***Incasarcus argenteus* sp. nov.**, ***Incasarcus viracocha* sp. nov.** and ***Incasarcus ochoai* sp. nov.** are described and illustrated. A key to the species of *Incasarcus* is given and their distribution is illustrated on a map.

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ADDITIONAL KEY WORDS:—Laniatores – *Cajamarca* – *Chacoikeontus* – *Tschaidicancha* – Tricommatinae – Prostyginae – new species – Cusco.

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INTRODUCTION

The family Gonyleptidae has been recently subject of a restriction in its amplitude. The subfamilies Cranainae, Prostyginae, Heterocranainae and Stygnicranainae have been removed to form the family Cranidae (Kury, 1992a, 1994a), and the previously monotypic subfamily Manaosbiinae has been elevated to familial rank, to include many genera formerly scattered among other families and subfamilies (Kury, 1997). The Cranidae have been also shown to be absent from the Atlantic Forest realm (Kury, 1992b). The Tricommatidae *sensu* Kury (1992a) are restricted to Brazil and Paraguay, while the species of this family cited from Andean realms should be placed in other families, such as Agoristenidae (e.g. *Trinella* Goodnight & Goodnight, 1947), Cranidae (e.g. *Yania* Roewer, 1919) or Gonyleptidae (e.g. *Gephyropachylus* Mello-Leitão, 1932), (Kury, 1992a; Soares & Avram, 1981; Kury, unpubl. data).

The remnant Gonyleptidae still constitute a species-rich group, which stretches from southern Argentina to Costa Rica. The records for the United States and Mexico are misidentifications (Kury, unpubl. data). A cladistic analysis of the larger groups of Gonyleptidae (Kury, 1994b) corroborated the closeness of Cosmetidae and Gonyleptidae, and allowed the recognition of some clades intermediate between both families, three of them described as new subfamilies. The Metasarcinae has been defined as a monophyletic taxon comprising only the genus *Metasarcus* Roewer, 1913, with two species from Bolivia, and placed as the sister group of all other Gonyleptidae (Kury, 1994b). Members of this subfamily show striking similarity with some genera of Cosmetidae, due in particular to the large amount of shared symplesiomorphies, that is, the Metasarcinae departed only a little from the ancestral groundplan of the Cosmetidae + Gonyleptidae.

There are other genera and species currently included in families such as Tricommatidae or Cranidae Prostyginae which should be reallocated to the Metasarcinae. The study of many described and undescribed species of Metasarcinae from Peru, Bolivia and Argentina requires an expansion of its original diagnosis, although the monophyly and the systematic placement of the subfamily are by no means altered with these inclusions.

Acronyms of repositories are American Museum of Natural History, New York (AMNH), California Academy of Sciences, San Francisco (CAS), Museo Argentino de Ciencias Naturales 'Bernardino Rivadavia', Buenos Aires, Argentina (MACN), Museo de Historia Natural - Universidad Mayor de San Marcos, Lima, Peru (MUSM), Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil (MNRJ), Universidad Nacional San Antonio Abad del Cusco, Cusco, Peru (UNC), National Museum of Natural History, Washington (USNM).

The legs are here described as a six faced polygon with a rectangular transverse section. The sides of this rectangle are called dorsal, ventral, ectal (=retrolateral) and mesal (=prolateral). All measurements are in millimeters.

SYSTEMATIC ACCOUNTS

Subfamily Metasarcinae Kury, 1994

Tricommatinae (part): Roewer, 1912: 157; 1923: 121; Mello-Leitão, 1926: 330; Roewer, 1927: 536; 1935: 45; Mello-Leitão, 1935: 92; 1938: 137; Rambla, 1978: 305.

Prostygninae (part): Roewer, 1913: 140; 1923: 449; 1943: 30; Mello-Leito, 1926: 348; Roewer, 1952: 57; Soares *et al.*, 1992: 1.

Mitobatinae (part): Roewer 1913: 284; 1923: 508; Mello-Leitão 1932: 390; Soares & Soares 1949: 224.

Metasarcinae: Kury, 1994b: 349.

Diagnosis. Gonyleptidae with eye mound low, depressed in middle; chelicerae swollen in male; pedipalps longer than body and robustly armed, no article keeled or flattened—all cylindrical or slightly spindle-like; maxillary lobe of leg II small, but clearly defined. Leg I normally built; coxa and trochanter IV unarmed in both sexes; femur IV of male with rows of spines or small denticles; posterior tarsi without tarsal process. Ventral plate of penis well defined, subrectangular, not cleft, with six to eight slender setae on each side, divided in two groups (three in *I. ochoai*); distal part of truncus with pair of large spiny sacs forming wing-like projections; stylus long, with swollen apex, or heavily modified and covered with many rows of setae. Conical dorsal process of glans absent or present.

Distribution. Western South America: Peru, Argentina and Bolivia.

Included genera. *Cajamarca* Roewer, 1952 **new assignment** (originally in Phalangodidae Tricommatinae), *Chacoikeontus* Roewer, 1929 **new assignment** (originally in Gonyleptidae Prostygninae), *Metasarcus* Roewer, 1913 (type genus, originally in Gonyleptidae Mitobatinae, referred to Metasarcinae by Kury, 1994b), *Tschaidicancha* Roewer, 1957 **new assignment** (originally in Gonyleptidae Prostygninae) and *Incasarcus* **nov. gen.** For original diagnoses of the cited genera, see Roewer (1913, 1929, 1952 and 1957).

Remarks. The concepts of Tricommatinae and Prostygninae as proposed by Roewer (1912, 1913, 1923) gave rise to a series of mistaken familial allocations, which are gradually being corrected by subsequent authors. Type species of all the above-cited genera were examined by us and found to match all diagnostic characters for the Metasarcinae as given above. Therefore these genera should be included in this subfamily as here defined.

Material examined. Other than *Incasarcus* spp: *Cajamarca affinis* Roewer, 1957, 1 ♂ 8 ♀ paratypes (AMNH) Peru, '20 Km v. Cajamarca, an Autostrasse n. San Marcos, 2850 m unter steinen, vegetationsarmer Bergland. WKW 12.560', W. Weyrauch, 5.vii.1956. *Chacoikeontus clavifemur* Roewer, 1929 1 ♂ (USNM) Bolivia, Depto. La Paz, Cerro Uchumachi, 7 Km SW Coroico c. 1900 m (16°15'SS 67°21'W), col. Coddington, Griswold, Silva, Larcher, Penaranda, 24–25.xi.1989; 1 ♂ 1 ♀ (USNM), same data. *Tschaidicancha weyrauchi* Roewer, 1957 1 ♂ (CAS 89) Peru, E. crest Carpish Mts. 40 mi SW Tingo Maria, E. I. Schlinger & Edward S. Ross, 17.x.1954.

Genus *Incasarcus* **gen. nov.**

Type species. *Incasarcus diana* sp. nov.

Etymology. The name *Incasarcus* stems from the Incas, who once ruled the region centred on Cusco, combined with the type genus of the subfamily, *Metasarcus*. Gender masculine.

Description. Dorsal scute with subrectangular outline, constricted at scutal groove (=groove 1) and area IV, with sides convex at mesotergum. Anterior and posterior margins of scute straight. Eye mound saddle shaped (i.e. depressed in the middle) with or without minute granules around each eye, without further armature. Frontal hump low, unarmed, well separated from eye mound. Opening of scent glands well visible on each side of cephalothorax. Mesotergum divided in four (I–IV) areas by three grooves (here numbered II–IV). Groove II straight or slightly arched anteriorly and connected to scutal groove by median longitudinal groove. Groove III clearly arched anteriorly. Mesotergal areas I–IV each with a row of minute granules, of which a pair is more or less prominent, the four pairs forming together two virtual arches. Area III furthermore with a more inner pair of paramedian pointed tubercles (absent in *I. ochoai*). Anterior, lateral and posterior margins of scute unarmed. Free tergites I–III variably armed with irregular rows of granules, sometimes with an outstanding pair at free tergite III. Dorsal anal opercle smooth and unarmed. *Venter.* Coxae I–IV each with a transverse row of granules growing stouter from behind. Maxillary lobe of leg II small but clearly defined with two anterior setiferous granules. Stigmatic area smooth, without spines or apophyses, and clearly separated from coxa IV by a groove, stigmata well visible. Free sternites and anal opercle finely granular. Coxae III–IV connected by a few interlocking teeth. *Pedipalpi.* Trochanter armed with ventro-distal or ventro-subdistal setiferous tubercle. Femur with ventro-basal setiferous tubercle, with or without ventral row of more or less robust spines and stout subdistal inner spine. Patella armed with sub-distal mesal spine. Tibia armed with 5–6 (iIiIi-iIiIi-iIiIi- iiIiIi-iIiIiIi) ectal and 4–5 (IiIi) mesal spines. Tarsus armed with 4–8 ((iii)IiIi-iIiIiIi-iIiIiIi-iiIiIiIi-iiiIiIi) ectal and 4–7 ((ii)IiIi(ii)-iIiIiIi) mesal spines. *Chelicerae.* Cheliceral hand sexually dimorphic, swollen in male. *Legs.* Long, without swollen podomeres. Femora I–IV sub-straight. Femur IV of male armed with a row of 20–40 teeth either on ventral, ectal or mesal sides. Patella IV of male with pair of apical spurs, the inner stouter. All other podomeres smooth and unarmed. Distitarsus I with 3–4 and II with 3–5 articles. Distitarsi III and IV without scopulae, with smooth double claws. Tarsal process very small. *Genitalia.* Ventral plate of penis well defined, subrectangular with lateral and distal borders either slightly concave or convex; basal group of marginal setae with two small setae; distal group of marginal setae with 4–7 long setae with curved apex. Distal margin of truncus with a pair of large spiny sacs, curved proximally. Glans membranous, inflatable, without ventral or dorsal processes, bearing a long stylus. Stylus with apex swollen, sometimes bent, fringed by rows of denticles.

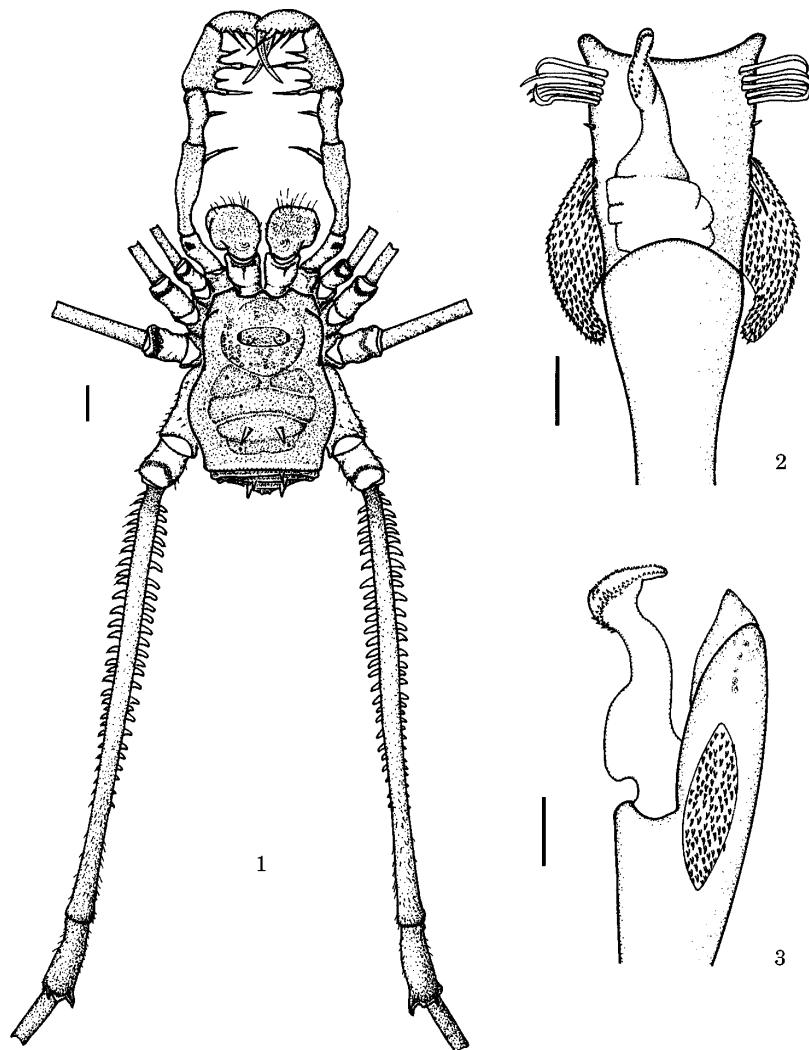
Included species. *Incasarcus diana* sp. nov., *Incasarcus pictus* sp. nov., *Incasarcus argenteus* sp. nov., *Incasarcus viracocha* sp. nov. and *Incasarcus ochoai* sp. nov.

Distribution. Peru, Cusco department.

***Incasarcus diana* sp. nov.**

(Figs 1–10)

Material examined.: 1 ♂ holotype, 2 ♀ paratypes (MUSM 414) Parque Nacional Manu, road Paucartambo-Pilcopata, c. 13°01'40''S 71°16'40''W, 2900 m high, Cusco, Peru, 19.ii.1990 leg. A. Cano & Diana Silva; 1 ♂ 2 ♀ paratypes (MNRJ 5.315, ex-MUSM 410) same locality, 14.ii.1990 leg. D. Silva.



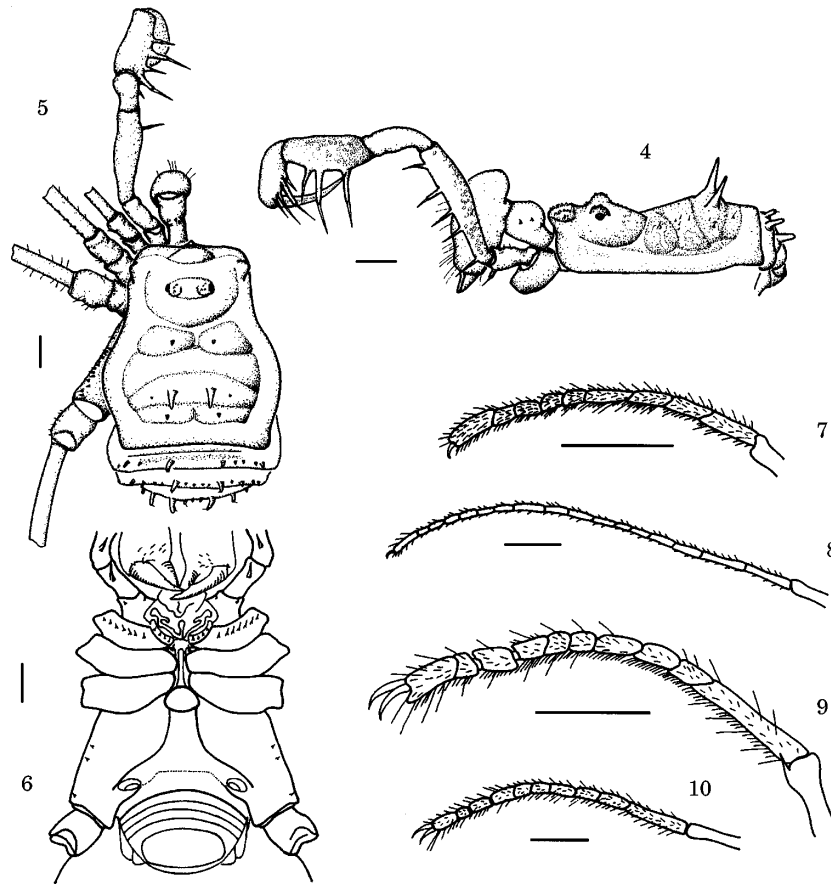
Figures 1–3. *Incasarcus diana* sp. nov., ♂ holotype, 1. habitus, dorsal view; 2. distal part of penis, dorsal view; 3. Ditto, lateral view. Scale bars = 1 mm for Fig. 1; = 0.1 mm for Figs 2, 3.

Etymology. The species is named after Dr Diana Silva D. (MUSM), who collected not only the type series of this species, but also many other interesting Peruvian Laniatores.

Diagnosis. Without white drawings on scute; well developed ectal and mesal rows of teeth on femur IV of male; stylus with apex bulky and curved, fringed with spines. Tarsal articles: Male 9–9/17–15/10–10/11–11, female 8–9/14–16/10–11/11–13.

Description. Male holotype.

Measurements. Cephalothorax 2.24 long, 3.19 wide; abdominal scute 2.31 long, 3.93 wide. Appendage lengths in Table 1.



Figures 4–10. *Incasarcus diana* sp. nov. 4. ♂ holotype, habitus lateral view; 5. ♀ MNRJ 5.315, habitus dorsal view; 6. ♂ holotype, body, ventral view; 7–10. ♂ holotype tarsi I–IV, lateral view. Scale bars = 1 mm.

TABLE 1. Leg measurements of *Incasarcus diana* sp. nov. ♂ holotype

	Tr	Fe	Pa	Ti	Mt	Ta
Leg I	0.9	5.5	1.3	3.8	6.1	2.8
Leg II	1.1	11.5	2.0	5.4	9.8	7.7
Leg III	1.2	9.4	2.0	5.4	9.9	4.3
Leg IV	1.2	12.2	2.2	7.1	14.4	5.2

Dorsum (Figs 1, 4). Area III armed with a pair of erect spines. *Pedipalps* (Figs 1, 2). Armed with stout spines and longer than the body. Trochanter very long, armed with a ventro-distal setiferous tubercle. Femur armed with a basal ventral setiferous tubercle, a row of three ventral spines, and a distal mesal spine. Patella armed with a distal mesal spine. Tibia armed with 5 (iili) ectal and 4 (IiIi) mesal spines. Tarsus armed with 6 ectal (iiIiIi) and 5 (iIiIi) mesal spines. *Legs* (Figs 1, 7–10). Ratio of calcaneus/astragalus length of metatarsi I–IV: 0.77/0.64/0.70/0.38. Tarsal articles:

TABLE 2. Leg measurements of *Incasarcus diana* sp. nov. ♀ paratypes

	Tr	Fe	Pa	Ti	Mt	Ta
Leg I	0.8	5.7	1.4	4.3	6.1	3.2
Leg II	1.0	10.5	1.6	8.2	11.2	7.6
Leg III	1.1	8.6	2.1	5.3	9.0	3.9
Leg IV	1.3	11.5	2.0	7.6	13.7	4.7

9–9/17–15/10–10/11–11. *Colour.* Body with dark yellow background mottled with brown only slightly in chelicerae, pedipalps, trochanters and densely on the rest. Posterior margin of scute and free tergites with a transverse yellow band. Granules of area I and spines of area III situated on yellow spots. Venter uniform mahogany brown, free sternites with darker posterior band. Anal opercles dark brown. *Genitalia* (Figs 2, 3). Ventral plate of penis well defined, rectangular, with distal corners projected. Lateral margins armed with two groups of setae, two basal (II) and seven distal (iiiIIII), the last five setae long and curved. Spiny sacs projected and curved towards the base of penis. Stylus long, with apex forming a club-like structure, fringed by rows of small teeth.

Female (Fig. 5). Stouter than male. All podomeres unarmed. Chelicerae not swollen. Some are coloured like male, with spines of area III light yellow, some have scute and tergites dark brown, with pedipalps, chelicerae and trochanters I–IV orange with sparse darker reticule. Venter and legs are dark yellow to orange, with black reticule either dense or sparse; all free sternites have a black transverse zone. Femoral rings are either well visible or indistinct. Some specimens are coloured very much like females of *I. pictus*, being most easily distinguished by lower tarsal counts. Range of tarsal articles ($n=4$) is: 8–9/14–16/10–11/11–13. Distitarsi I–II each with three articles. Appendage lengths in Table 2.

***Incasarcus pictus* sp. nov.**

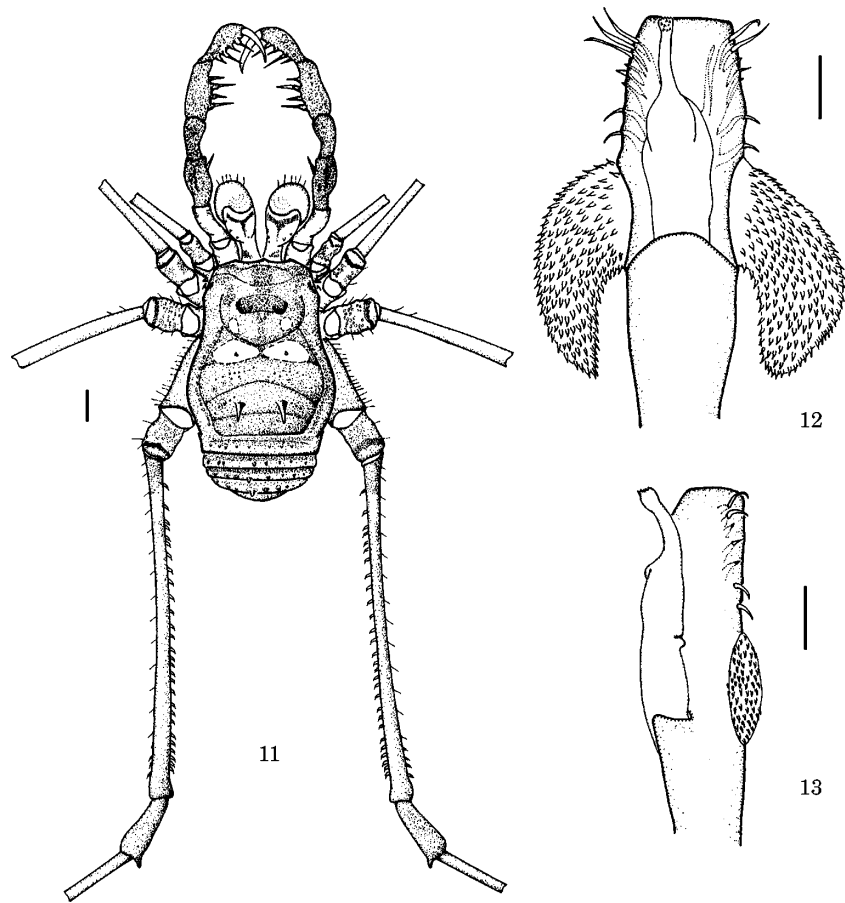
(Figs 11–20)

Material examined. 1 ♂ holotype (MUSM 408) Wiñayhuaina, Inca Trail, c. 13°09'S 72°31'W 2700–3100 m high, Cusco, Peru, 10.ii.1990 leg. D. Silva at night in the woods; 2 ♀ paratypes (MUSM 411) same data.

Remarks. Although the coordinates for Wiñayhuaina and Machu Picchu are roughly the same, and the dots on the map are close together, it appears that this is a case of altitudinal allopatry, since *I. pictus* inhabits the upper part of the upper montane forest, known as Elfin Forest (2700–3100 m), while *I. viracocha* inhabits the lower part of the upper montane forest, known as Cloud Forest (2200–2500 m). In the eastern side of the Peruvian Andes, the upper montane forest covers the elevations between 2000 and 3500 m (Lamas, 1982, and pers. comm.).

Etymology. From Latin *pictus* = spotted, in reference to the white spotted dorsum of the male.

Diagnosis. With white dorsal spots in scute, femur IV of male with weak armature; penis with large spiny sacs; outline of ventral plate rectangular with distal corners

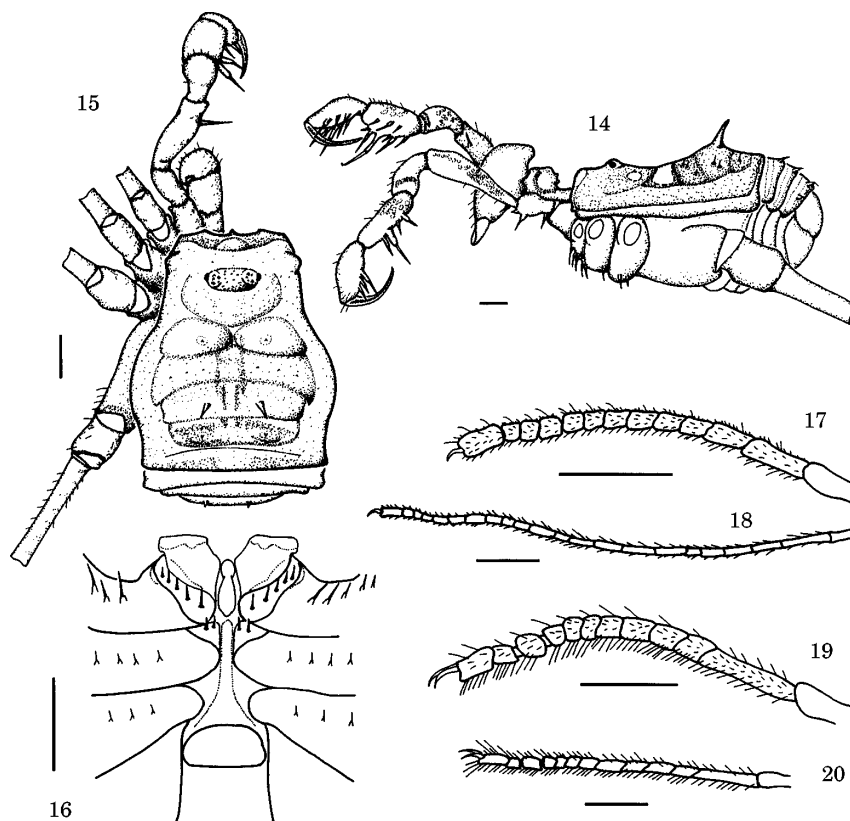


Figures 11–13. *Incasarcus pictus* sp. nov., ♂ holotype, 11. habitus, dorsal view; 12. distal part of penis, dorsal view; 13. Ditto, lateral view. Scale bars = 1 mm for Fig. 11; = 0.1 mm for Figures 12, 13.

not projected; two or three setae in distal part of ventral plate; stylus cranoid-like—long with apex swollen. Tarsal articles male 12–12/19–21/11–11/12–13; female 9–12/19–21/10–11/12–13.

Description. Male holotype. Measurements: Cephalothorax 2.37 long, 3.44 wide; abdominal scute 3.19 long, 4.58 wide. Appendage lengths in Table 3.

Dorsum (Figs 11, 14). Area III armed with a pair of erect spines, other areas and free tergites unarmed, but area I with a pair of larger granules, and free tergites I–III with a row of asymmetrical tubercles each. *Venter* (Fig. 16). Coxae I–III each with a transverse row of setiferous tubercles growing stouter from behind. Maxillary lobe of leg II clearly defined as a small rounded triangle with two setiferous tubercles. *Pedipalps* (Figs 11, 14). Pedipalpal trochanter armed with a ventro-distal spine. Femur armed with a ventro-basal setiferous tubercle, a few ventral setae and a distal mesal stout spine. Patella armed with a mesal setiferous tubercle. Tibia armed with 5 (iIIi) ectal and 4 (IIi) mesal spines. Tarsus armed with 5 ectal (iIIi) and 4 (IIi) mesal



Figures 14–20. *Incasarcus pictus* sp. nov. 14. ♂ holotype, habitus lateral view; 15. ♀ MSUM 411, habitus, dorsal view; 16. ♂ holotype, sternum and coxae I–IV, ventral view; 17–20. ♂ holotype, tarsi I–IV, lateral view. Scale bars = 1 mm.

TABLE 3. Leg measurements of *Incasarcus pictus* sp. nov. ♂ holotype

	Tr	Fe	Pa	Ti	Mt	Ta
Leg I	0.9	5.4	1.4	3.7	5.8	3.2
Leg II	1.0	10.6	2.1	7.6	11.6	6.6
Leg III	1.2	8.6	2.1	5.2	9.1	3.6
Leg IV	1.3	11.6	2.5	7.3	13.8	3.6

spines. *Legs* (Figs 11, 17–20). Femur IV with a mesal row of about 30 small teeth in almost all its length, and only a few very small ectal apical teeth. Ratio of calcaneus/ astragalus length of metatarsi I–IV: 1.20/1.06/1.07/0.62. Tarsal articles 12–12/19–21/11–11/12–13. Distitarsus I with 4 (Fig. 17) and II with 5 (Fig. 18) articles. *Colour*. Dorsal scute with two pairs of white spots—a pair of small rounded spots in the cephalothorax behind the eye mound and a pair of large spots fused in the middle covering all area I. *Genitalia* (Figs 12, 13). Ventral plate of penis rectangular, elongate, not cleft, bearing two groups of slender setae in lateral margins, two basal (II) and five (iiiII) or six (iiiIII) distal. Stylus long, with swollen tubercular apex.

TABLE 4. Leg measurements of *Incasarcus pictus* sp. nov. ♀ paratypes

	Tr	Fe	Pa	Ti	Mt	Ta
Leg I	0.9	5.2	1.5	3.9	5.4	2.8
Leg II	1.0	10.1	1.9	7.7	10.3	7.1
Leg III	1.2	8.3	2.2	5.3	8.6	2.8
Leg IV	1.2	11.0	2.4	6.8	12.1	4.3

Female (Fig 15). Femur and patella IV unarmed. Body colour mahogany brown, including spines of area III, shaded in black in the areas I–II, IV–V and in free tergites. Legs mahogany brown with wide black rings. Average of tarsal articles ($n=2$): 9–12/19–21/10–11/12–13. Distitarsus I with 3 articles, distitarsus II with 3–4 articles. Appendage lengths in Table 4.

***Incasarcus ochoai* sp. nov.**

(Figs 21–31)

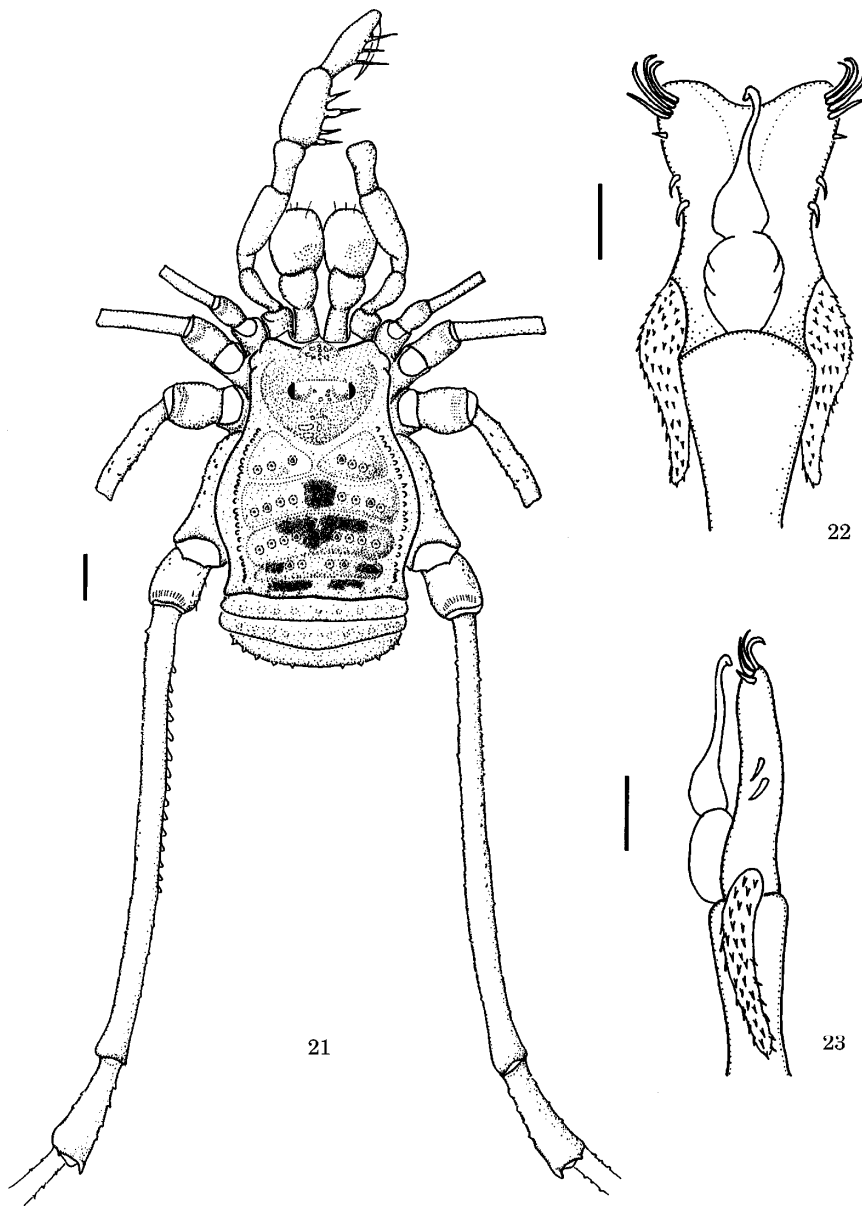
Material examined. ♂ holotype (MACN 9551); 1 ♀ paratype (MACN 9552); 1 ♀ paratype (UNC 01050): Yanacocha, Huayocari [Huayoccare 13°20'S 72°02'W, 3000–4000 m], distrito Huayllabamba, provincia Urubamba, departamento Cusco, Peru; 14.xi.1992, J. C. Chaparro. 2 ♀ paratypes (MACN 9553); 2 ♂ paratypes (MACN 9554); ♂ paratype (MNRJ 5401); ♀ paratype (MNRJ 5402): same locality, 17.vi.1995 leg. J. A. Ochoa C.. 1 ♀ paratype (UNC 01051) same locality and collector, 17.ix.1994; 1 ♀ paratype (UNC 01052) Abra de Acanacu, provincia Paucartambo [c. 13°10'S 71°25'W, 3000–4000 m], departamento Cusco, Peru, 10.xii.1974, leg. O. Ochoa M.

Etymology. The species name is thankfully dedicated to Prof. Oscar Ochoa M. (UNC) who loaned precious material of Peruvian Opiliones for study.

Diagnosis. All mesotergal areas unarmed in male and female. Body colour alike in both sexes, yellowish brown, with darker flecks and reticle in body and podomeres. Femur IV of male with a single row of 36–38 spines. Tarsal articles: male 8–10/18–19/9–11/10–13; female 8–9/13–16/9–10/10–12.

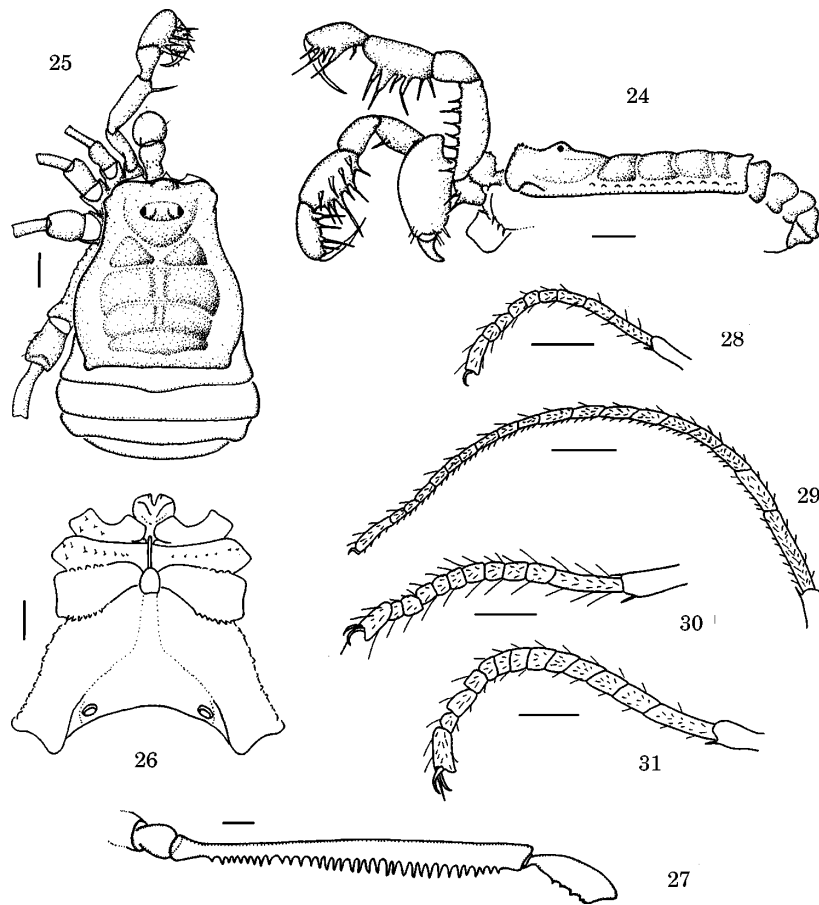
Description. Male holotype. Measurements: Cephalothorax 2.57 long, 3.60 wide; abdominal scute 6.18 long, 4.94 wide. Appendage lengths in Table 5.

Dorsum (Figs 21, 24). Mesotergum finely granular, all areas unarmed, with transverse rows of granules surrounded by yellowish circle, area I with 3–4 granules, II with 4–5, III with 4, IV with 4–5. *Venter.* Sternum and coxae as in Fig 26. *Pedipalps* (Figs 21, 24). Trochanter with stout ventro distal setiferous tubercle, femur with 7 equally sized ventral tubercles, patella with small mesodistal granule, tibia with 5–6 ectal (iIiIi) and 4 mesal (IIiI) spines, tarsus with 6 ectal (iIiIi) and 6 mesal (iIiIi) spines. *Legs* (Figs 21, 27–31). Trochanter IV with small granules. Femur IV slightly curved, with a ventral row of about 36–38 small teeth in almost all its length, dorsal border with small granules. Ratio of calcaneus/astragalus length of metatarsi I–IV: 0.96/0.76/0.84/0.48. Tarsal articles ($n=4$): 8–10/18–19/9–11/10–13. Distitarsus I with 3 and II with 3–4 articles. *Colour.* Body background colour yellowish brown,



Figures 21–23. *Incasarcus ochoai* sp. nov., ♂ holotype, 21. habitus, dorsal view; 22. distal part of penis, dorsal view; 23. Ditto, lateral view. Scale bars = 1 mm for Fig. 21; = 0.1 mm for Figures 22–23.

mesotergum, posterior margin, free tergites, legs and sternites with darker spots (major granules of mesotergal areas circled in yellow), prosoma, pediplaps and chelicerae with darker reticle. *Genitalia* (Figs 22, 23). Truncus slender, not globulous, ventral plate with distal border slightly concave, lateral margins with three groups of setae, 2 basal (II), 1 intermediate (I) and 4 distal (III), these with curved apex; spiny sacs poorly developed, curved basally; stylus slender, sinuous, with apex curved ventrally.



Figures 24–31. *Incasarcus ochoai* sp. nov. 24. ♂ holotype, habitus lateral view; 25. ♀ paratype, habitus, dorsal view; 26. ♂ holotype, sternum and coxae I–IV, ventral view; 27. ♂ holotype, trochanter to patella of leg IV, ventro-lateral view; 28–31. ♂ holotype, tarsi I–IV, lateral view. Scale bars = 1 mm.

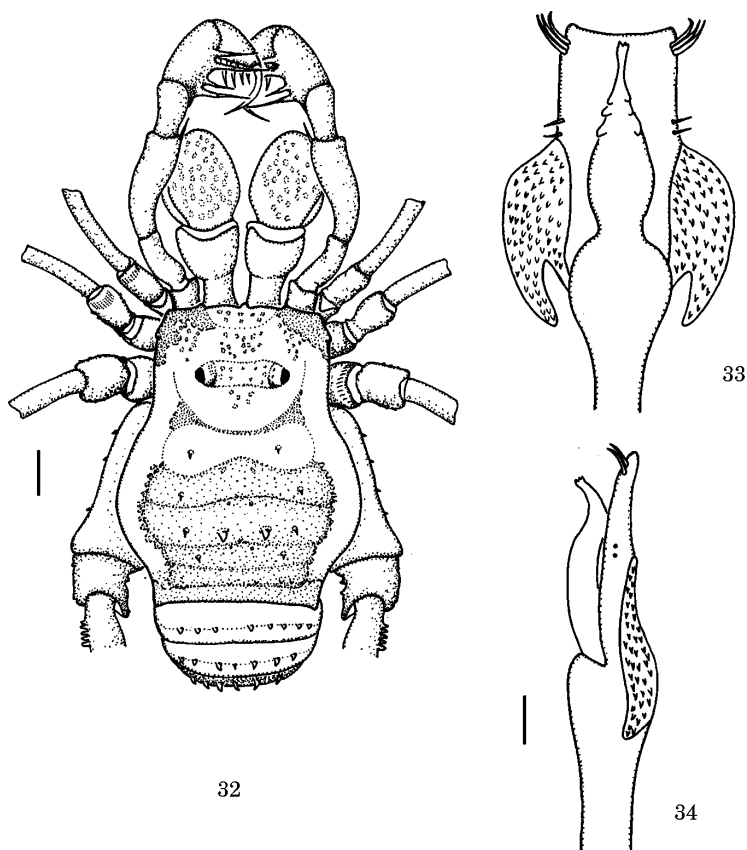
TABLE 5. Leg measurements of *Incasarcus ochoai* sp. nov. ♂ holotype

	Tr	Fe	Pa	Ti	Mt	Ta
Leg I	0.9	4.5	1.5	4.1	5.4	2.4
Leg II	1.1	9.4	2.1	7.4	8.5	7.4
Leg III	1.0	8.2	2.4	5.4	8.8	3.3
Leg IV	1.5	10.5	2.7	7.7	11.7	4.3

Female (Fig. 25). Colour similar to male, chelicerae weaker, femur IV without rows of spines, mesotergal areas unarmed, with larger granules as follows: area I with 2, II with 2, III with 4, IV with 2. Free tergites as in male, pedipalpal trochanter and patella as in male, femur with 8 subequal setiferous tubercles, tibia with 6 ectal

TABLE 6. Leg measurements of *Incasarcus ochoai* sp. nov. ♀ paratype

	Tr	Fe	Pa	Ti	Mt	Ta
Leg I	0.8	4.4	1.4	3.8	5.2	2.6
Leg II	1.0	8.5	2.0	7.7	9.7	6.9
Leg III	1.1	7.9	2.1	5.2	8.0	3.5
Leg IV	1.3	10.3	2.3	7.3	11.1	3.9



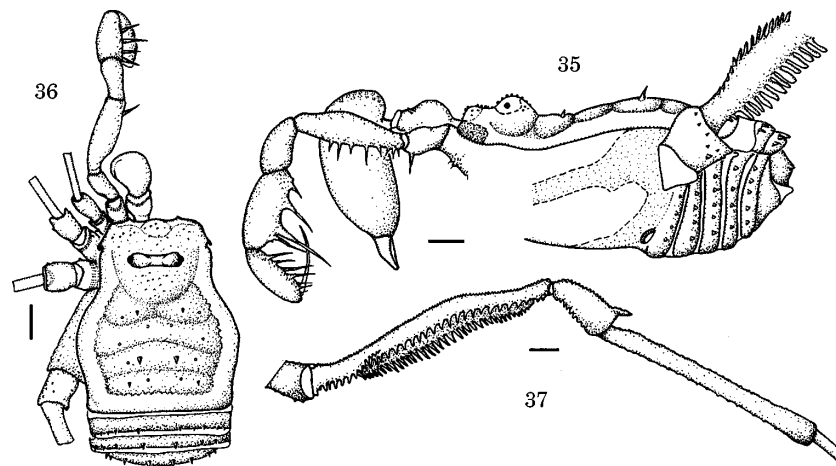
Figures 32–34. *Incasarcus argenteus* sp. nov., ♂ holotype, 32. habitus, dorsal view; 33. distal part of penis, dorsal view; 34. Ditto, lateral view. Scale bars = 1 mm for Fig. 32; = 0.1 mm for Figs 33, 34.

(iIiIi) and 4–5 mesal (IiIi) spines, tarsus with 8 ectal (iiIiIi) and 5 mesal (iIiIi) spines. Tarsal articles ($N=6$): 8–9/13–16/9–10/10–12. Appendage lengths in Table 6.

***Incasarcus argenteus* sp. nov.**

(Figs 32–37)

Material examined. ♂ holotype (MACN 9549), 1 ♀ paratype (MACN 9550): Abra de Málaga, Canchayoc, distrito Ollantaytambo [c. 13°16'S 72°16'W], provincia Urubamba, Departamento Cusco, Peru, 3000 m high, 27.viii.1995 leg. J. A. Ochoa.



Figures 35–37. *Incasarcus argenteus* sp. nov. 35. ♂ holotype, habitus lateral view; 36. ♀ paratype, habitus, dorsal view; 37. ♂ holotype, trochanter to tibia of leg IV, ventro-lateral view. Scale bars = 1 mm.

TABLE 7. Leg measurements of *Incasarcus argenteus* sp. nov. ♂ holotype

	Tr	Fe	Pa	Ti	Mt	Ta
Leg I	0.9	4.9	1.5	4.1	5.2	3.1
Leg II	1.0	9.3	2.1	7.3	9.3	7.2
Leg III	1.1	7.4	2.1	6.0	8.2	3.6
Leg IV	1.5	8.2	2.3	8.0	10.5	4.5

Etymology. From Latin *argenteus* = silvery, due to the beautiful silver coloured ornamentation.

Diagnosis. Male with prosoma, area I and lateral margin of scute silvery white. Chelicerae strongly swollen, cheliceral hand with small dorsal pits. Femur IV with ectal row of 31–32 spines and mesal row of 35–37 spines. Areas I to IV armed in male, in female, armed areas are I–II and II. Tarsal counts: 9–10/16–19/10–11/12–13.

Description. Male holotype. *Measurements:* cephalothorax 3.09 long, 4.12 wide; abdominal scute 4.22 long, 5.97 wide. Appendage lengths in Table 7.

Dorsum (Figs 32, 35). Areas I–IV with a pair of lateral small spines, area III also with a pair of paramedian larger spines. Free tergites I–III with a transverse row of pointed tubercles each, in tergites II–III curved to inner side. *Pedipalps* (Figs 32, 35). Trochanter with a ventro distal tubercle; femur with a row of 7–8 ventral spines, some blunt, some setiferous; patella with small mesodistal spine; tibia with 5–6 ectal (iIiIiI) and 4 mesal (IiIi) spines; tarsus with 7 ectal (iIiIiI) and 7 mesal (iIiIiii) spines. *Legs* (Figs 32, 37). Trochanter IV with ventral granules, femur sigmoid in dorsal view, with two ventral rows of spines: ectal row of 31–32 teeth (divided in two sectors, a short in proximal third rapidly disappearing and a longer distal sector);

TABLE 8. Leg measurements of *Incasarcus argenteus* sp. nov. ♀ paratype

	Tr	Fe	Pa	Ti	Mt	Ta
Leg I	0.9	3.6	1.4	3.6	4.5	2.7
Leg II	0.9	7.4	1.8	6.7	8.8	5.7
Leg III	1.1	6.7	2.1	5.4	7.6	3.6
Leg IV	1.2	9.8	2.4	6.7	10.0	4.1

mesal row of 35–37 small teeth in almost all its length. Ratio of calcaneus/astragalus length of metatarsi I–IV: 1.00/0.72/0.81/0.46. Tarsal articles: 10–10/18–19/10–10/12–13. Distitarsi I–II 3 jointed. *Colour*. Prosoma (excepted anterolateral corners), area I, anterior two thirds of lateral margin, free tergites I–II, coxa IV and sternites silvery white. Rest of prosoma and mesotergum dark brown; legs I–III, anal opercle and pedipalps dark brown; leg IV and chelicerae yellowish brown. *Genitalia* (Figs 33, 34). Truncus swollen at distal part just before ventral plate. Ventral plate rectangular, with two groups of marginal setae: two basal (ii) and three distal (III), these with curved apex. Spiny sacs large, curved to base of truncus. Stylus long, with apex slightly curved ventrally bearing a group of denticles.

Female (Fig. 36). General background colour light brown with black reticule in body and appendages. No silver spots as in male; spines and larger mesotergal granules circles in yellow. Chelicerae not swollen as in male. Femur IV unarmed. Ratio of calcaneus/astragalus length of metatarsi I–IV: 1.2/0.60/0.71/0.46. Tarsal articles ($n=1$): 9–9/16–18/10–11/12–12. Distitarsus I three-jointed, II 3–4-jointed. Mesotergal area I with two small median spines, II unarmed, III with two large median spines, IV with 2 lateral spines. Free tergites as in male. Pedipalpal tibia with 6 ectal (iiIIIi) and 4 medial (IiIi) spines; tarsus with 7 ectal (iiiIiIi) and 7 medial spines. Appendage lengths in Table 8.

***Incasarcus viracocha* sp. nov.**

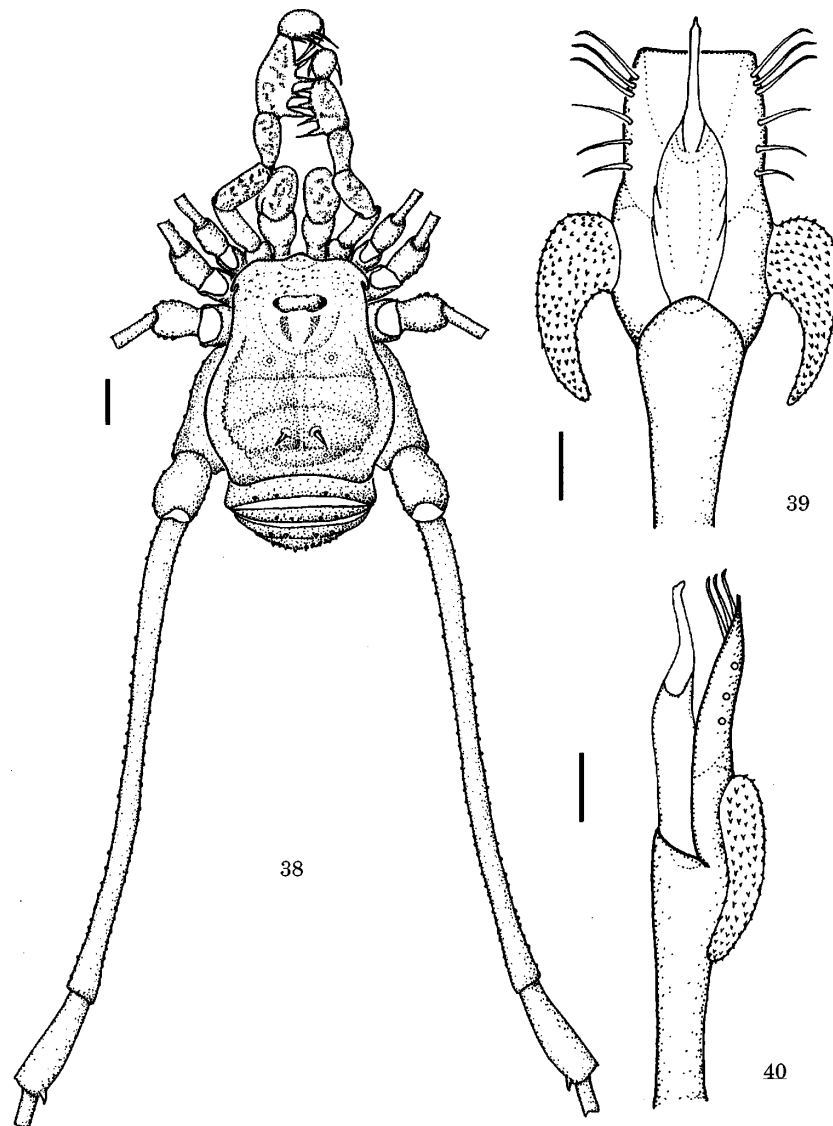
(Figs 38–43)

Material examined. ♂ holotype (MACN 9547), ♀ paratype (MACN 9548), 2 ♀ paratypes (MNRJ 5400) and 2 ♀ paratypes (UNC 01049): Machu Picchu [c. 13°07'S 72°34'W, 2200 m–2500 m], provincia Urubamba, departamento Cusco, Peru, 25.ii.1994 leg. J. A. Ochoa & J. Achichuala.

Etymology. This species is named after Viracocha, the great god of the Incas.

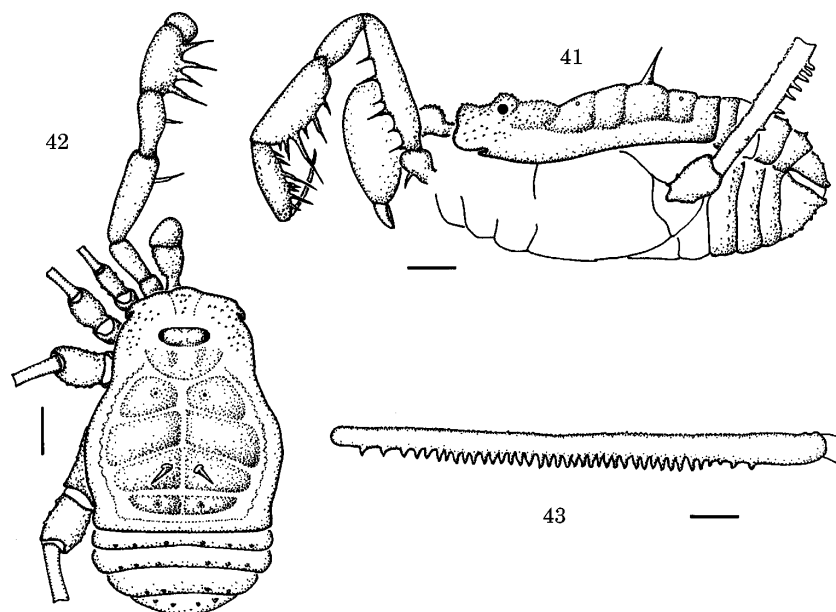
Diagnosis. Male and female with only area III armed; areas I–IV with a more prominent pair of paramedian granules. Male and female of the same colour, yellowish brown, with darker shade or reticule in body and podomeres. Femur IV of male with a single row of 38–39 spines. Tarsal counts: ♂ 11–11/21–22/11–11/14–15, ♀ 9–10/15–20/10–12/12–13.

Description. Male holotype. *Measurements*: cephalothorax 2.36 long, 3.29 wide; abdominal scute 5.66 long, 4.42 wide. Appendage lengths in Table 9.



Figures 38–40. *Incasarcus viracocha* sp. nov., ♂ holotype, 38. habitus, dorsal view; 39. distal part of penis, dorsal view; 40. Ditto, lateral view. Scale bars = 1 mm for Fig. 38; = 0.1 mm for Figs 39, 40.

Dorsum (Figs 38, 41). All mesotergal areas (Fig. 38) finely granular, area III with two high erect spines. Free tergites I–III with a transverse row of small granules. *Pedipalps* (Figs 38, 41). Trochanter with small ventro distal setiferous tubercle; femur with 6 or 7 ventral tubercles, some blunt, others setiferous; patella with small mesodistal tubercle; tibia with 6 ectal (iili) and 4 mesal (li) spines; tarsus with 8 ectal (iiiIii) and 6 mesal (iIiiIi). *Legs* (Figs 38, 43). Trochanter IV finely granular; femur IV substraight with a ventral row of about 38–39 small teeth in almost all its length, the proximal and the distal smaller. Ratio of calcaneus/astragalus length of metatarsi I–IV: 0.93/0.58/0.75/0.44. Tarsal articles ($n=1$): 11–11/21–22/11–11/



Figures 41–43. *Incasarcus viracocha* sp. nov. 41. ♂ holotype, habitus lateral view; 42. ♀ paratype, habitus, dorsal view; 43. ♂ holotype, femur of leg IV, ventro-lateral view. Scale bars = 1 mm.

24–15. Distitarsus I 3-jointed, distitarsus II 3 to 4-jointed. *Colour*. Body and appendages yellowish brown, mesotergum, lateral and posterior margins, free tergites and sternites and legs with dark shade; prosoma, pedipalps and chelicerae with black reticle. *Genitalia* (Figs 39, 40). Truncus not globose, ventral plate convex rectangular, lateral margins with two groups of setae, 3 basal (III) and 3 distal (III), these with curved apex. Spiny sacs large, curved to base; stylus long, sinuous, with small spine at apex.

Female (Fig. 42). Colour similar to male; chelicerae smaller; femur IV unarmed. Mesotergal armature and free tergites as in male. Pedipalps: femur with ventral row of 5 tubercles (iiii) some blunt, some setiferous; tibia with 6 ectal (iIiIi) and 4 mesal (IiIi) spines; tarsus with 4 ectal (IiIi) and 6 medial (iiIiIi) spines. Tarsal articles ($n=5$): 9–10/15–20/10–12/12–13. Appendage lengths in Table 10.

KEY TO THE MALES OF THE FIVE SPECIES OF *INCASARCUS*

1. Femur IV with two rows (ectal and mesal) of teeth; posterior margin of scute with yellowish white transverse stripe 2
 Femur IV with only one ventral row of teeth; posterior margin of scute without transverse stripe 3
2. Area I, prosoma, lateral and posterior scutal margins and venter glossy silvery white, sharply contrasting with dark brown background; spines of area III short and blunt *I. argenteus*
 Body dark yellow with brown reticule; spines of area III long and sharp
 *I. diana*

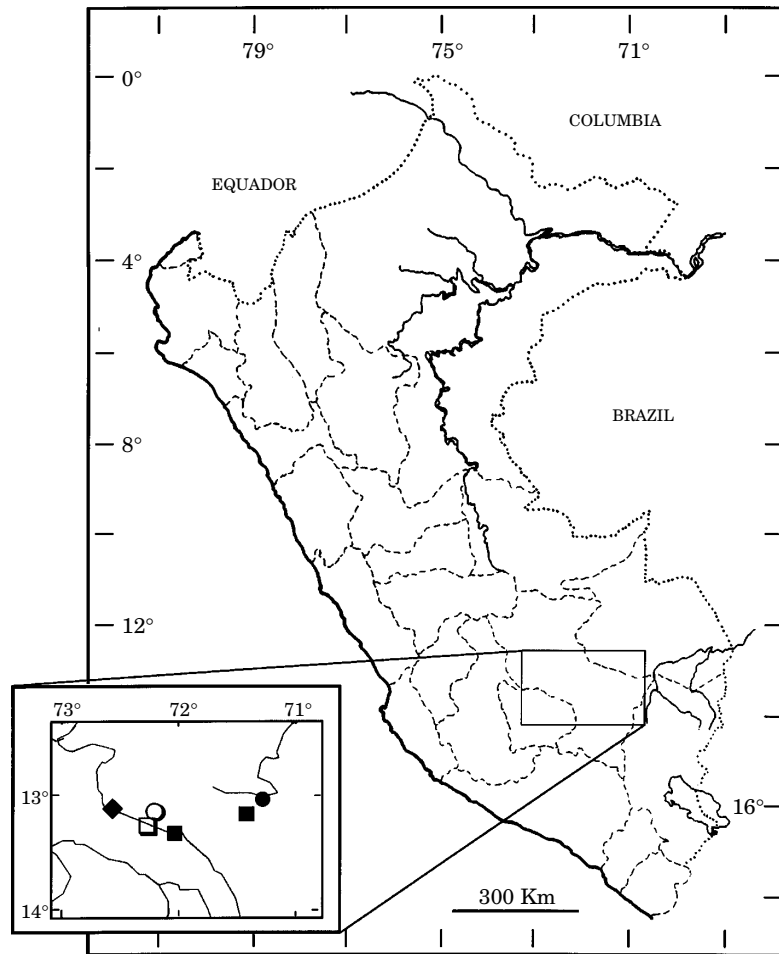


Figure 44. Peru, Departamento Cusco, showing the distribution of the species of *Incasarcus* gen. nov.: (●) *Incasarcus diana* sp. nov., (○) *Incasarcus pictus* sp. nov., (■) *Incasarcus ochoai* sp. nov., (□) *Incasarcus argenteus* sp. nov. and (◆) *Incasarcus viracocha* sp. nov.

TABLE 9. Leg measurements of *Incasarcus viracocha* sp. nov. ♂ holotype

	Tr	Fe	Pa	Ti	Mt	Ta
Leg I	0.7	4.5	1.4	4.2	6.2	3.2
Leg II	1.1	9.0	2.0	8.5	10.6	7.4
Leg III	1.0	8.4	2.1	5.5	9.3	3.7
Leg IV	1.1	9.8	2.3	7.5	12.4	4.5

- 3. Area III unarmed *I. ochoai*
 Area III with a pair of paramedian spines 4
- 4. Area I entirely white, sharply contrasting with the other areas; distitarsus I with 4 articles *I. pictus*
 Area I coloured as all other areas; distitarsus I with 3 articles *I. viracocha*

TABLE 10. Leg measurements of *Incasarcus viracocha* sp. nov. ♀ paratype

	Tr	Fe	Pa	Ti	Mt	Ta
Leg I	0.9	5.2	1.3	3.9	5.2	2.2
Leg II	1.0	9.9	1.5	7.9	10.3	6.9
Leg III	1.0	8.9	2.0	5.2	8.4	3.3
Leg IV	1.4	11.5	2.3	7.1	12.2	3.6

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