



A new genus of Cranaidae from Ecuador (Opiliones: Laniatores)

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Abstract

The new genus *Zannicrananus* is described from the Andes in central Ecuador based on two new species. It is characterized by a guitar-shaped body, short sturdy pedipalpus, unique strong spiniform process in the frontal hump, sexually dimorphic basichelicerite (very strong in male), an erect spine on the cheliceral bulla and paired ventral armature on male coxa IV. *Zannicrananus monoclonius* **sp. nov.**, a species profusely colored in red, yellow and green, is described from Chimborazo Province (Sibambe). *Zannicrananus morlacus* **sp. nov.**, a dull-brown colored species, is the first reported harvestman from Azuay Province (Molleturo). The stylar caps, a novel structure, is described in the male genitalia of Cranaidae.

Key words: Andes, Arachnida, Azuay, Chimborazo, Ecuador, Grassatores, harvestmen, Neotropics

Introduction

The Cranaidae are a gonyleptoid family of harvestmen with less than 200 described species, mainly found in the highlands of South America, as well as in the lower forests of Amazonia. A general treatment of family may be found in Pinto-da-Rocha & Kury (2007). In Ecuador, the cranaiids are represented by the very standard of the family, *Crananus* Simon, 1879, and some unique groups of genera, such as the small *Yania*-like highlanders, and the endemic Heterocranainae, and some Stygnicranainae, otherwise known only from Colombia. In both Andean slopes there are obscure creatures such as *Balزابamba* Mello-Leitão, 1945 and *Bucayana* Mello-Leitão, 1942, and also bizarre species with huge ventral processes arising from stigmatic area, arranged in a multitude of monotypic genera such as *Alausius* Roewer, 1932, *Angistrisoma* Soares & Soares, 1948, *Ventripila* Roewer, 1917 and *Ventrivomer* Roewer, 1913. The eastern part of the country (moist lowland Amazonian forest) has many large bodied species of *Phareicrananus* Roewer, 1913 and the western Pacific semi-dry lowland forests harbor many species of *Guayaquiliana* Mello-Leitão, 1935 and related genera.

A recent expedition of the Arachnology section of the MNRJ to Ecuador as well as study of the QCAZ collection yielded many representatives of Opiliones, including two new species, described below, which are deemed to constitute a new genus of Cranaidae. The new genus for the moment is included in the Cranainae, although none of the four subfamilies of Cranaidae is sharply defined, pending more study on their relationships (see “Discussion” below and also Orrico & Kury 2009).

Methods

Descriptions of colors use the standard names of the 267 Color Centroids of the NBS/IBCC Color System (<http://people.csail.mit.edu/jaffer/Color/Dictionaries#nbs-isc>) as described in Kury and Orrico (2006). Their color names have uppercase initials. Specimens were prepared for SEM with triple ultrasonication in water and detergent, no critical point preparation, gold coated and examined with a JEOL JSM-6390LV at the Center for Scanning Electron Microscopy of Museu Nacional/UFRJ. All measurements are in mm and μm .

Abbreviations of the repositories cited are: MNRJ (Museu Nacional, Rio de Janeiro), MZSP (Museu de Zoologia, Universidade de São Paulo) and QCAZ (Museo de Zoologia, Pontificia Universidad Católica de Quito). Other

abbreviations used: CL = carapace length, CW = carapace width, AL = abdominal scutum length, AW = abdominal scutum width, Tr = trochanter, Fe = femur, Pa = patella, Ti = tibia, Mt = metatarsus, Ta = tarsus.

The posterior part of dorsal scutum, recognizable as the part with parallel straight sides, posterior to the main slope-change caused by the widened convex laterals is here called “*coda*” (from Latin = “tail”, see Fig. 23). Spine-like processes of dorsal scutum, are called simply “spines” as widely used in the literature (more accurately they should be called apophyses of processes, and this name “spine” should be reserved for articulated setae such as the occurring in the edges of pedipalpal tibia and tarsus). High processes are called “spines” (4–5 or more times higher than wide) and low ones “tubercles” (only 2–3 times higher as wide). Likewise, setation of pedipalpus is composed of two kinds of phanera which are both here called “spines”: (1) setiferous tubercles of all articles, in which the thin seta is negligible and the socket is what appears in description and (2) setiferous tubercles of ventro-ectal and ventro-mesal edges of tibia-tarsus, in which the seta is strong and comparable in size to the socket. Tarsal formula is given according to the following paradigm: numbers of tarsomeres in tarsus I to IV, when an individual count is given, order is from left to right side (figures in parentheses denote number of tarsomeres only in the distitarsi I–II).

The head of the stylus in *Z. monoclonius* **sp. nov.** has a pair of dorsal-ventral apical flat pieces, with distal villosities, and applied to each other; the dorsal one is short, horseshoe shaped while ventral part is much longer extending as a sword (Figs. 17–20). To this 2-piece set is herein given the new name **stylar caps**. This structure may be homologous to those found in other cranaids (see “Discussion”).

Systematic accounts

Cranaidae Roewer, 1913—Cranainae Roewer, 1913

Zannicranus new genus

Etymology. From Zanni, one of the masquerade stereotypes of Italian Commedia dell’arte, notable for having a big nose (which strongly resembles the spine in frontal hump which characterizes the genus) + pre-existing generic name *Crananus*. Gender masculine.

Diagnosis. Outline of dorsal scutum in dorsal view guitar-shaped (widest part clearly displaced posteriorly) either with (*Z. morlacus*, Fig. 23) or without defined coda (*Z. monoclonius*, Fig. 3). Frontal hump of carapace with huge spine bent frontwards (Figs. 2, 22). Cheliceral bulla of male with mid-posterior dorsal erect spine (Figs. 2, 22). Tibia-tarsus of pedipalpus rotated ectally (Figs. 11, 30); femur-tibia with dorsal rounded tubercles (Figs. 7–8, 13, 26–27, 32). Femur with dorso-apical short spine (Figs. 8, 27), none of pedipalpal articles specially elongate. Male calcaneus I twice as long as astragalus and thickened. Coxa IV of male with pair of ventro-distal paramedian acuminate tubercles (Figs. 2, 22). Femur IV of male from substraight (Fig. 21) to slightly sinuous (Fig. 1) and with few weak spines. Tarsi III–IV with weak scopula, tarsal claws unpectinated. Tarsal counts, male: 7(3)/12-16(3)/7-9/8-9, female: 6(3)/13(3)/8/9. Truncus penis either straight (*Z. morlacus*, Fig. 33) or clearly angled (*Z. monoclonius*, Fig. 14). Ventral plate of penis strongly angled against truncus (Figs. 14, 33), with wide and shallow V-cleft (Figs. 15–16, 34–35), either guitar-shaped (*Z. monoclonius*, Fig. 15) or subrectangular (*Z. morlacus*, Fig. 34), and with two lateral patches of scale-setae on ventral surface (Figs. 15, 34). Glans sac very long, fanfold, with small conical dorsal process (Figs. 14, 16, 33, 38). Stylus either straight, growing thinner distally (*Z. monoclonius*, Fig. 20) or uniformly thin, sinuous (*Z. morlacus*, Fig. 38). Stylus head either simple, elongate-erythrocyte-shaped (*Z. morlacus*, Figs. 36–37) or complex, with 2 stylar distally-villose caps (*Z. monoclonius*): dorsal horseshoe-shaped (Figs. 19–20) and ventral elongate tapering foliaceous (Figs. 17–18, 20). Sexual dimorphism evident in shape of carapace and basichelicerite (compare Figs. 3 and 6), much stronger in male (females known only for *Z. monoclonius*).

Type species. *Zannicranus monoclonius* **sp. nov.**

Zannicranus monoclonius **sp. nov.**

(Figures 1–20)

Etymology. Species name is a Greek noun in apposition, meaning “one horn”.

Type data. ♂ holotype, 1 ♀ paratype (QCAZ AK 232) Ecuador, Chimborazo, Sibambe, small patch of forest along valley, (02.22059° S, 078.89622° W), alt: 2423 m; 29.iii.2011 A Chagas, A Giupponi & A Kury leg.; 1 ♂ 1 ♀ paratypes (MZSP 42004), same data; 2 ♂ 14 ♀ paratypes (MNRJ 19322), same data. Specimens were collected at night, near a small patch of woods, wandering on gullies near a brook.

Diagnosis. Scutal area I with pair of acuminate tubercles (Figs. 1–4). Scutal area II invading area I (Fig. 3). Spines of area III strong and divergent, almost erect, only slightly bent backwards (Figs. 2, 4). Femur of pedipalpus with ventral row of 6 weak tubercles (Figs. 9–11). Femora I–II of male with row of small spines. Femur IV of male with 4 sub-basal ventro-prolateral spines and 1 sub-distal ventro-retrolateral spine (Fig. 1). Tibia IV of male unarmed. No color dimorphism, female (Fig. 6) same color as male, which is motley and colorful in shades of red, yellow and green (Fig. 1). Stylus with 2 styler caps, dorsal horseshoe-shaped (Fig. 19), ventral long foliaceous (Fig. 18). Male tarsal counts 7(3)/14-16(3)/9/9. Female tarsal counts 6(3)/13(3)/8/9

Description: male holotype QCAZ AK 232 (some illustrations are of male paratype MNRJ 19322, as indicated). Measurements of body (female paratype QCAZ AK 232 in parentheses): CL = 2.9 (2.3), CW = 4.1 (3.3), AL = 3.1 (3.3), AW = 5.8 (5.5).

Dorsum (Figs. 1–4). Dorsal scutum roughly guitar-shaped without long *coda* (parallel-side terminal area) (Figs. 1, 3). Growing higher in lateral view at eye mound and area III (Fig. 2). Carapace wide, roughly rectangular with anterior sides obliquely truncated, carapacial area well-marked, U-shaped with pointed base (Fig. 3). Abdominal scutum steadily growing wider, widest at 2/3 towards end, with sides strongly rounded in dorsal view (Fig. 3). Mesotergum well delimited, following outline of abdominal scutum, divided into 3 areas sparsely covered with granules situated within lighter islands (Fig. 3). Frontal hump well-defined, armed with very high single spine bent frontwards (Fig. 2). Eye mound wide, without median depression, armed with a paramedian pair of acuminate tubercles (Fig. 4). Area I divided into left and right halves, each with posterior border highly convex, armed with a pair of paramedian acuminate small spines and a few granules concentrated along the mid and posterior margins (Fig. 3). Area II unarmed, penetrating deeply into area I and dividing it into 2 halves, posterior border sinuous (Fig. 3). Area III with a pair of paramedian acute high spines (Fig. 4), leaned backwards (Fig. 2), and with outline clearly distorted posteriorly by the base of these spines (Fig. 3). Lateral margins unarmed. Posterior border of scutum smooth and unarmed, strongly convex in the middle (Fig. 3). Free tergites I–III armed each with pair of paramedian tubercles, those of tergite III largest.

Venter (Fig. 5). Coxae I–III transverse parallel, subequal in size. Coxa IV much more robust than any of the others, clearly slanted; ventro-distally with pair of acuminate tubercles. Stigmatic area Y-shaped, with large unobstructed elliptical stigmata.

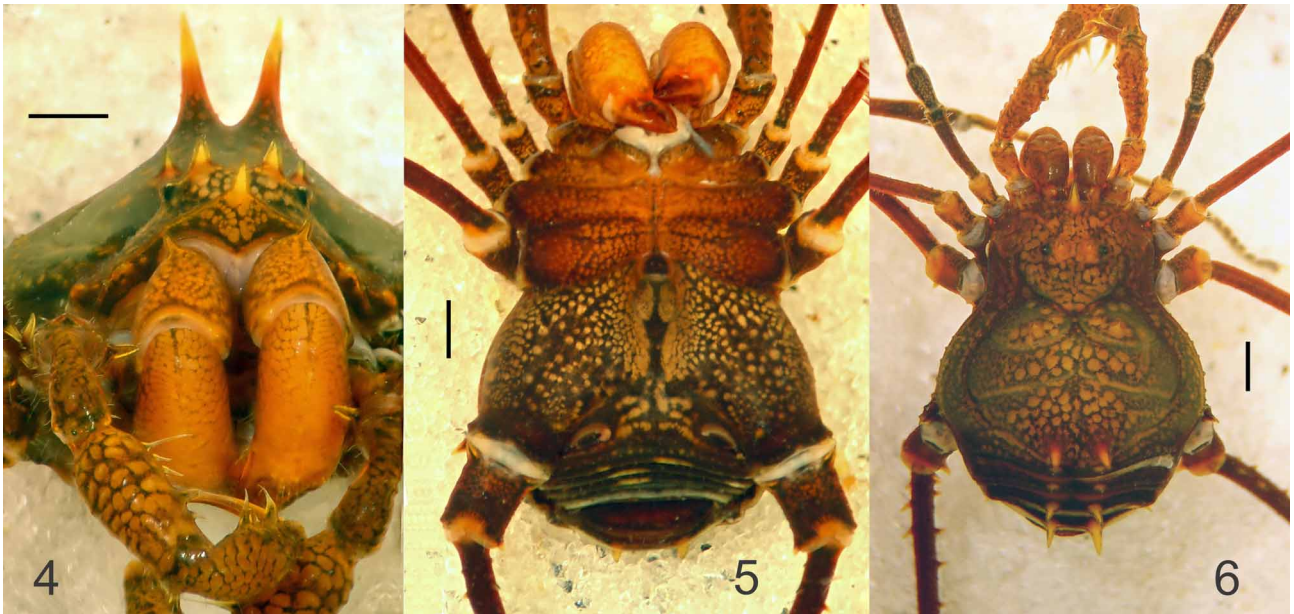
Chelicerae (Figs. 2–4). Basichelicerite strongly developed, wide, smooth, slightly surpassing *in situ* pedipalpal trochanter (Fig. 3). Bulla well-defined, armed with dorso-median posterior erect spine (Figs. 2, 4). Hand only a little swollen, and without remarkable armature.

Pedipalpus (Figs. 7–13). Trochanter with 2 short ventral and 1 large dorsal spines. Femur with 1 ectal row of 8 spines, growing distally, distal one much larger than the others; 1 mesal row of 3 spines, distal one much larger than the others; 1 dorsal row of 6 spines, the 3 most basal ones much larger and 1 ventral row of 6 short tubercles. Patella and tibia dorsally with scattered short tubercles. Tibia ventro-ectal with 2, ventro-mesal with 5 spines. Tarsus ventro-ectal with 3, ventro-mesal with 2 spines. Article measurements: Tr = 1.0, Fe = 3.8, Pa = 1.4, Ti = 2.3, Ta = 2.1, claw = 1.8.

Legs. All leg articles unarmed except femora I, II, IV. Femur I with strong prodorsal sub-basal spine and ventral row of 4 spines, the 2 distalmost much larger. Femur II with strong prodorsal sub-basal spine and ventral row of 3 small spines. Femur IV with 2 sub-basal dorsal spines, 5 small prolateral spines on basal half, 3 small ventral spines on basal half, 1 strong retrolateral subdistal spine. Tibia IV entirely unarmed. Calcaneus I twice as long as astragalus and thickened. All metatarsi with very faint rings. Tarsal counts 7(3)-7(3)/14(3)-16(3)/9-9/9-9. Measurements of legs in Table 1.



FIGURES 1–3. *Zannicranus monoclonius* sp. nov. ♂ holotype, QCAZ AK 232, from Sibambe. 1. Habitus, dorsal view; 2. Body, lateral view; 3. Body, dorsal view. Scale bars = 1 mm.



FIGURES 4–6. *Zannicranus monoclonius* sp. nov. ♂ holotype, QCAZ AK 232, from Sibambe. 4. Body, frontal view; 5. Body, ventral view. 6. ♀ allotype, QCAZ AK 232, from Sibambe, body, dorsal view. Scale bars = 1 mm.



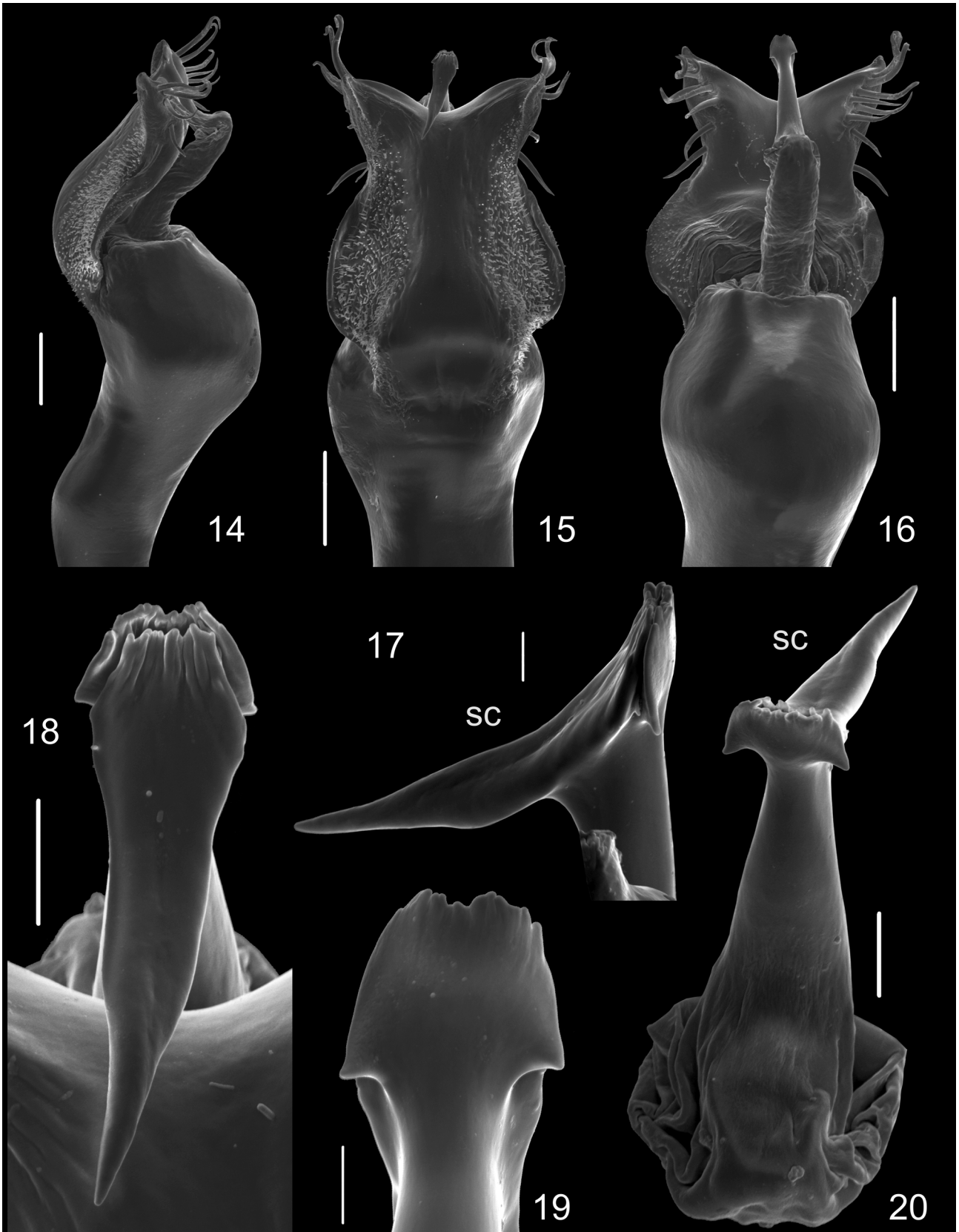
FIGURES 7–10. *Zannicranus monoclonius* sp. nov. ♂ paratype, MNRJ 19322, from Sibambe. Left pedipalpus: 7. Dorso-mesal view; 8. Mesal view; 9. Ectal view; 10. Dorso-ectal view. Scale bars = 1 mm.



FIGURES 11–13. *Zannicranaus monoclonius* sp. nov. ♂ paratype, MNRJ 19322, from Sibambe. Left pedipalpus: 11. Trochanter-femur, ventral view; 12. Patella-tarsus, ventral view; 13. Trochanter-femur, dorsal view. Scale bars = 1 mm.

Color (in alcohol). Legs I–IV and anal opercles uniformly Dark Red (16). Tr, Pp and Ch Strong Orange (50), richly mottled in lighter shades. Carapace anteriorly, anterior laterals of abdominal scutum and coxae of pedipalp and I–III ventrally all with numerous Strong Orange Yellow (68) rounded islands over Deep Red (13) background. Abdominal scutum, coxa IV, stigmatic area and free sternites all with Strong Orange Yellow (68) rounded islands over Moderate Olive (107) background. The olive shade of abdomen penetrates a little medially in the posterior part of carapace, behind the eye mound. Paired spines of frontal hump, eye mound, areas I and III and free tergite III bicolor, basal half Vivid Orange (48) and distal half Brilliant Orange (49), both colors sharply contrasting with olive background.

Male genitalia (Figs. 14–20). Truncus changing direction abruptly at distal part (Fig. 14). Ventral plate of penis strongly leaned against truncus (Figs. 14), with wide and shallow V-cleft (Figs. 15–16), guitar-shaped (Figs. 15–16), and with two lateral patches of scale-setae on ventral surface (Fig. 15). Glans sac very long, fanfold, with small conical dorsal process (Figs. 14, 16). Stylus thick, straight, growing thinner distally (Fig. 20). Stylus head complex, with 2 stylar caps (flat pieces, with distal villosities, and applied to each other), dorsal stylar cap horse-shoe-shaped (Figs. 19–20) and ventral stylar cap elongate tapering foliaceous (Figs. 17–18, 20).



FIGURES 14–20. *Zannicranus monoclonius* sp. nov. ♂ paratype, MNRJ 19322, from Sibambe. Male genitalia: 14. Distal part of penis, lateral view; 15. Same, ventral view; 16. Same, dorsal view. 17. Tip of stylus, lateral view; 18. Styler cap, ventral view; 19. Styler cap, dorsal view; 20. Stylus, dorso-apical view. Scale bars = 100 μ m (Figs. 14–16), 10 μ m (Figs. 17, 19) and 20 μ m (Figs. 18, 20). Abbreviation: sc = styler cap.

Female allotype (Fig. 6). Very similar to male in most respects, including color pattern. Differences are: paired tubercles of free tergites I–III stronger, metatarsus I not thickened, femora III and coxa IV ventrally unarmed, basichelicerite small, cheliceral hand not swollen, femur IV with weaker armature. Tarsal counts 6(3)-6(3)/13(3)-13(3)/8-8/9-9. Measurements of body: CL = 2.3, CW = 3.3, AL = 3.3, AW = 5.5. Measurements of legs in Table 1.

TABLE 1. Measurements of articles of legs I–IV in male holotype and female allotype of *Zannicranaus monoclonius* and holotype of *Z. morlacus*. All measurements are in mm.

species/leg	Tr	Fe	Pa	Ti	Mt	Ta
<i>Z. monoclonius</i> male holotype—leg I	1.0	3.8	1.1	2.4	4.8	1.8
<i>Z. monoclonius</i> male holotype—leg II	1.2	8.7	1.2	5.8	7.1	4.8
<i>Z. monoclonius</i> male holotype—leg III	1.1	6.2	1.7	3.7	6.4	3.1
<i>Z. monoclonius</i> male holotype—leg IV	1.4	8.2	1.8	5.0	9.2	3.8
<i>Z. monoclonius</i> female allotype—leg I	0.7	2.5	1.0	1.8	3.3	1.8
<i>Z. monoclonius</i> female allotype—leg II	1.0	6.6	1.1	4.2	6.0	4.2
<i>Z. monoclonius</i> female allotype—leg III	1.0	5.0	1.4	3.0	4.8	2.7
<i>Z. monoclonius</i> female allotype—leg IV	1.6	6.4	1.4	3.9	7.5	3.3
<i>Z. morlacus</i> male holotype—leg I	1.1	3.7	1.3	2.5	3.8	2.5
<i>Z. morlacus</i> male holotype—leg II	1.1	7.0	1.7	5.1	6.0	5.4
<i>Z. morlacus</i> male holotype—leg III	1.3	6.3	1.8	3.6	5.7	3.1
<i>Z. morlacus</i> male holotype—leg IV	1.9	9.1	2.2	4.9	7.2	3.9

Zannicranaus morlacus sp. nov.

(Figures 21–38)

Etymology. Neo-latinization of Ecuadorian Spanish “morlaco” (a native of Azuay), emphasizing this as the first reported species of Opiliones from Azuay province.

Type data. ♂ holotype (QCAZ AK 0029) Ecuador, Azuay, Molleturo, alt: 3210 m (79°20.426' W, 02°48.221' S) 27.xii.2001, I. Tapia & G. Onore leg.

Diagnosis. Scutal area I unarmed (Figs. 22–23). All areas divided into two halves by longitudinal median groove, but area II not invading area I (Fig. 23). Spines of area III strongly bent backwards, almost horizontal (Figs. 22–23). Femur of pedipalpus with ventral row of 3 strong ventral spines (Figs. 26–29). Femora I–II of male unarmed. Femur IV of male with 1 ventral subdistal spine, 2 prolateral spines (Figs. 21–22). Tibia IV of male with ventral row of spines. Color of body and appendages dull. Stylus without stylar caps, apex shaped as an elongate erythrocyte. Male tarsal counts 7(3)/13(3)/7/8.

Description: male holotype. Measurements of body: CL = 2.9, CW = 4.0, AL = 4.3, AW = 6.1.

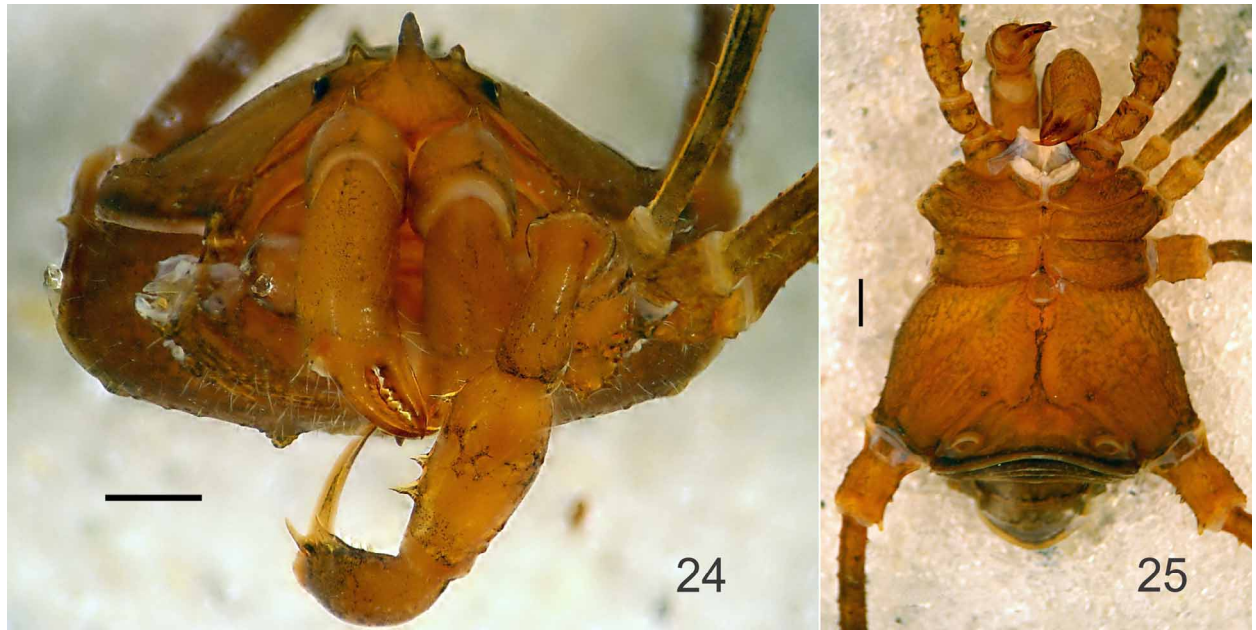
Dorsum. Dorsal scutum roughly guitar-shaped with distinct *coda* (parallel-side terminal area) (Fig. 23). Growing slightly higher in lateral view at eye mound (Fig. 22). Carapace wide, roughly rectangular with anterior sides obliquely truncated, carapacial area well-marked, parabolic-shaped (Fig. 23). Abdominal scutum steadily growing wider, widest at 2/3 towards end, with sides rounded in dorsal view (Fig. 23). Frontal hump well-defined, armed with very high single spine bent frontwards (Figs. 22, 24). Eye mound wide, without median depression, armed with a paramedian pair of acuminate tubercles (Figs. 23–24). Mesotergum well delimited, following outline of abdominal scutum, divided into 3 areas sparsely covered with granules. Area I divided into left and right halves, each with posterior border convex, unarmed. Area II unarmed, not penetrating into area I, posterior border sinuous (Fig. 23). Area III with a pair of paramedian acute spines, strongly bent backwards almost horizontal, and with outline clearly distorted posteriorly by the base of these spines (Figs. 22–23). Lateral margins unarmed. Posterior border of scutum smooth and unarmed, strongly convex in the middle (Fig. 23). Free tergites I–III armed each with 1 row of granules, those of tergite III largest.

Venter (Fig. 25). Coxae I–III fine granular, transverse parallel, subequal in size, touching in midline. Coxa IV much more robust than any of the others, clearly slanted. Stigmatic area Y-shaped, with large unobstructed elliptical stigmata. Coxa IV ventro-distally with pair of acuminate tubercles. Genital opercle elliptical, truncated posteriorly.

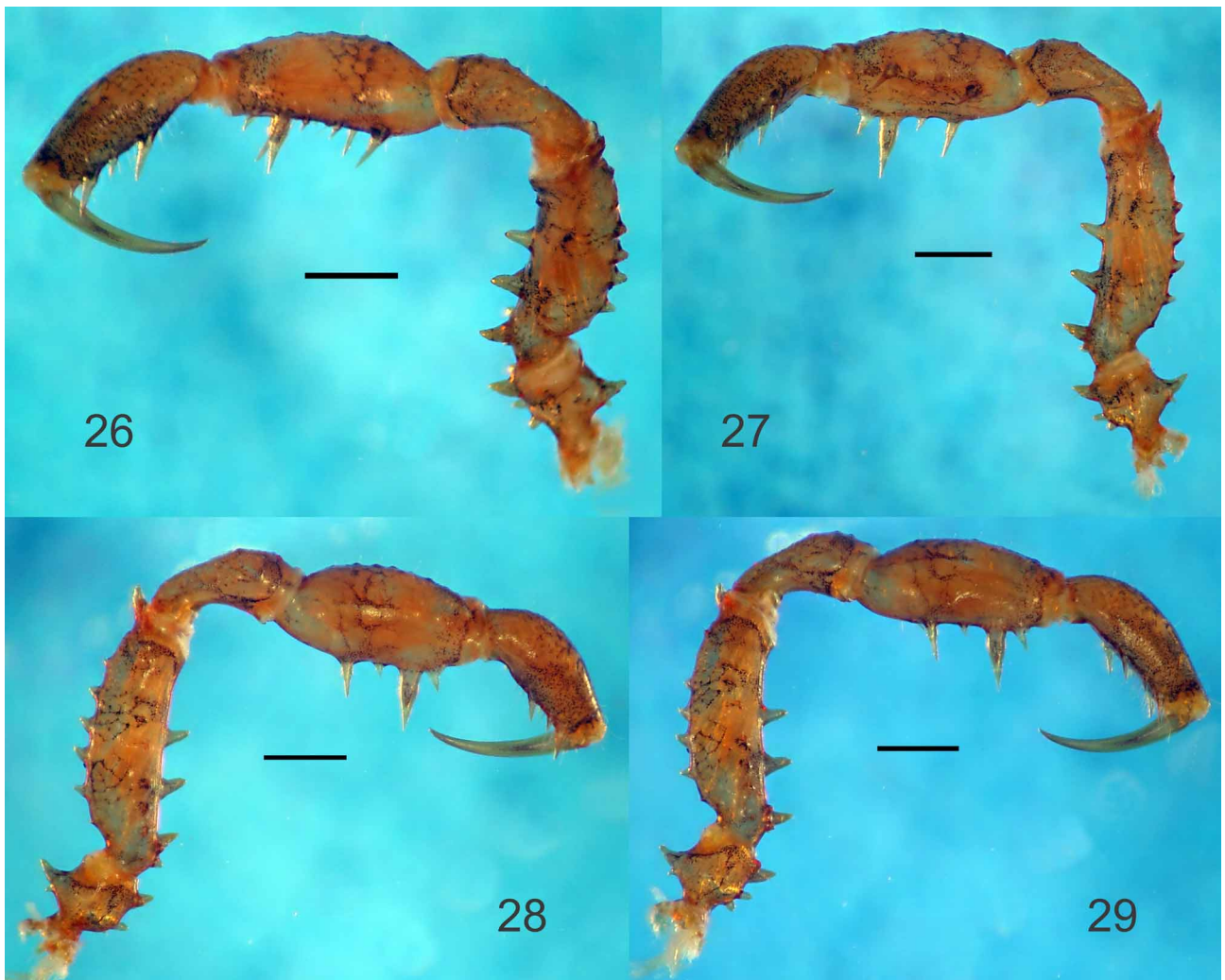
Chelicerae (Figs. 22–25). Basicheicerite well-developed, smooth, slightly surpassing in situ pedipalpal trochanter (Fig. 23). Bulla well-defined, armed with dorso-median posterior erect spine (Figs. 22, 24). Hand only a little swollen, and without remarkable armature.



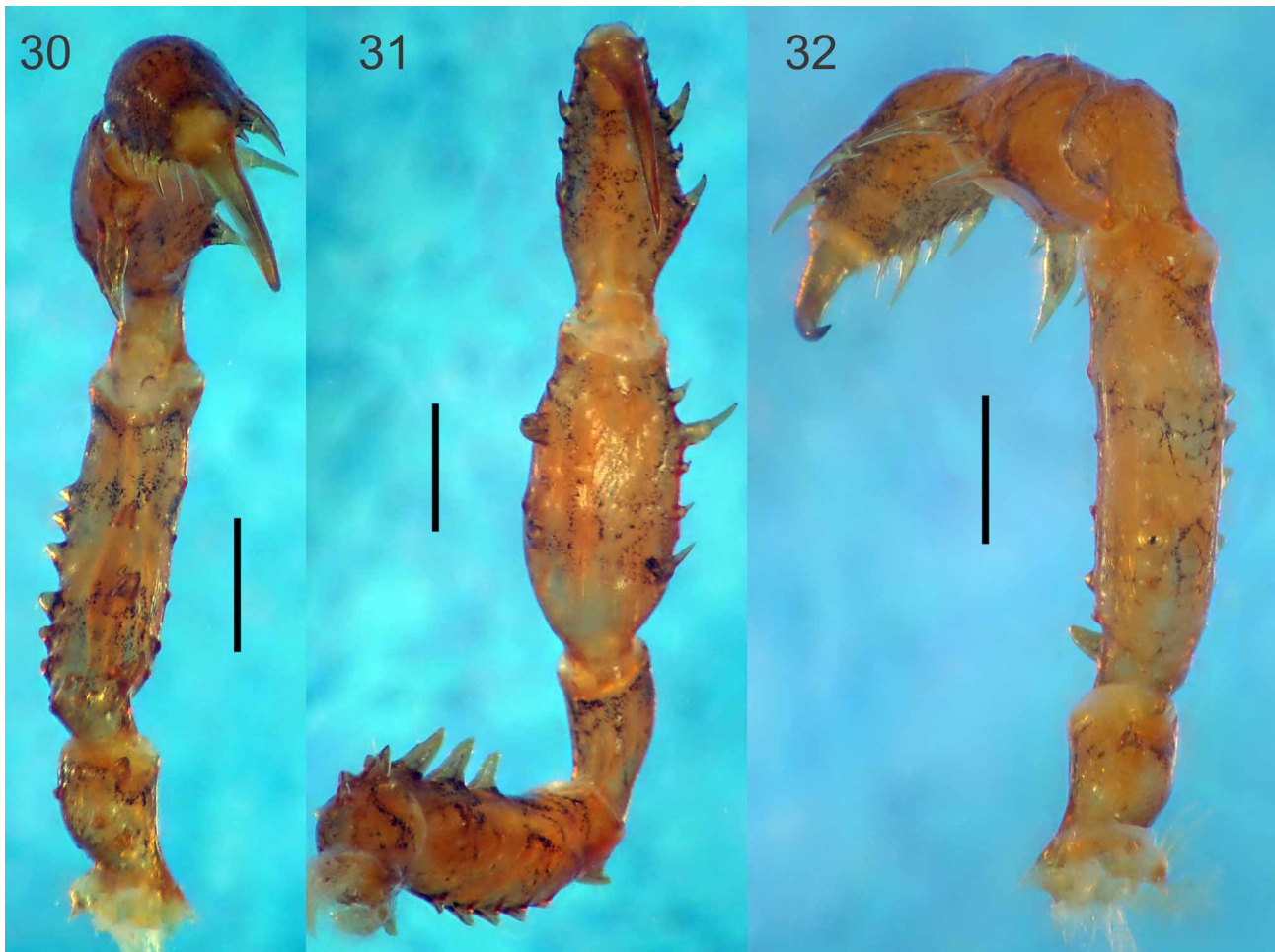
FIGURES 21–23. *Zannicranaus morlacus* sp. nov. ♂ holotype, QCAZ AK 0029, from Molleturo. 21. Habitus, dorsal view; 22. Body, lateral view; 23. Body, dorsal view. Scale bars = 1 mm. Abbreviation: co = coda.



FIGURES 24–25. *Zannicranus morlacus* sp. nov. ♂ holotype, QCAZ AK 0029, from Molleturo. 24. Body, frontal view; 25. Body, ventral view. Scale bars = 1 mm.



FIGURES 26–29. *Zannicranus morlacus* sp. nov. ♂ holotype, QCAZ AK 0029, from Molleturo. Right pedipalpus: 26. Dorso-mesal view; 27. Mesal view; 28. Ectal view; 29. Dorso-ectal view. Scale bars = 1 mm.



FIGURES 30–32. *Zannicranaus morlacus* sp. nov. ♂ holotype, QCAZ AK 0029, from Molleturo. Right pedipalpus: 30. Trochanter-femur, ventral view; 31. Patella-tarsus, ventral view; 32. Trochanter-femur, dorsal view. Scale bars = 1 mm.

Pedipalpus (Figs. 26–32). Trochanter with 3 unequal ventral and 1 large dorsal spines. Femur with 1 ectal row of 6 subequal tubercles; 1 mesal row of 5 tubercles; 1 dorsal row of 4 spines and 1 ventral row of 3 powerful spines. Patella and tibia dorsally with scattered short tubercles. Tibia ventro-ectal with 4 (IiIi), ventro-mesal with 6 (IiiiIi) spines. Tarsus ventro-ectal with 3, ventro-mesal with 3 spines. Article measurements: Tr = 1.3, Fe = 3.0, Pa = 1.6, Ti = 2.5, Ta = 2.2, claw = 1.5.

Legs. All leg articles unarmed except femur and tibia IV. Femur IV with 1 ventral subdistal spine, 2 prolateral spines. Tibia IV with a row of 7 spines, running obliquely from retrolateral to ventral. Calcaneus I twice as long as astragalus and a little thickened, astragalus with 3 rings. Metatarsus II–III each with 12 rings, IV with 23 rings. Tarsal counts 7(3)-7(3)/13(3)-12(3)/7-7/8-8. Measurements of legs in Table 1.

Color (in alcohol). Body and appendages uniform Brownish Orange (54). Legs, posterior part of lateral border of scutum and free tergites/sternites darker shaded.

Male genitalia (Figs. 33–38). Truncus penis straight, without distal walking-stick bend (Fig. 33). Ventral plate of penis subrectangular, strongly leaned against truncus (Figs. 33–34), with wide and shallow V-cleft (Figs. 34–35), and with two lateral patches of scale-setae on ventral surface (Figs. 34). Glans sac very long, fanfold, with small conical dorsal process (Figs. 33, 38). Stylus uniformly thin, sinuous (Fig. 38). Stylus head simple, elongate-erythrocyte-shaped, without opposed flat pieces (“stylar-caps”) (Figs. 36–37).

Female: unknown.



FIGURES 33–38. *Zannicranus morlacus* sp. nov. ♂ holotype, QCAZ AK 0029, from Molleturo. Male genitalia: 33. Distal part of penis, lateral view; 34. Same, ventral view; 35. Same, dorsal view; 36. Stylar cap, ventral view; 37. Stylar cap, lateral view; 38. Glans, lateral view. Scale bars = 100 μ m (Figs. 33–35), 10 μ m (Figs. 36–37) and 50 μ m (Fig. 38).

Discussion

Of the four recognized subfamilies of Cranidae, Stygnicraninae Roewer, 1913 seems to be monophyletic, but in renders Craninae (which has the bulk of described diversity) paraphyletic. Heterocraninae Roewer, 1913 has only two described species, although there are several undescribed ones under study by the author. Prostygnae Roewer, 1913 is the most problematic, with *Prostygna* Roewer, 1913 and related genera clearly very different from most species of *Yania* Roewer, 1919 and related genera. A further complicating factor is that those *Yania*-like

species closely resemble the Agoristenidae Zamorinae Kury, 1997 in external morphology and may be easily confounded with them without study of genitalia (see e.g., Pinto-da-Rocha & Hara 2009).

Male genitalia of Cranaidae is poorly known. Simple schematic line drawings of the distal part of penis started to appear in Avram (1983; 1987, “*Santinezia*”), González-Sponga (1989; 2003, “*Santinezia*”), Pinto-da-Rocha (1994, “*Santinezia*”), Townsend & Milne (2010, “*Santinezia*”), Pinto-da-Rocha & Bonaldo (2011, *Phareicranaus*)—heavily biased towards *Phareicranaus* Roewer 1913 (until recently called *Santinezia* Roewer, 1923, see Pinto-da-Rocha & Bonaldo 2011). The only non-*Phareicranaus* line drawing illustrations of male genitalia of Cranaidae in the literature are Kury (1994, *Yania*, 1995, *Stygnicranaus*; 1996, *Phalangodus*), Pinto-da-Rocha & Kury (2007, *Tryferos elegans* Roewer, 1931 and *Prostygnus vestitus* Roewer, 1913), Orrico & Kury (2009, 3 genera and 4 species of Stygnicranainae), Pinto-da-Rocha & Bonaldo (2011, *Heterocranaus* Roewer, 1913, *Chiriboga* Roewer, 1959, *Metacranaus* Roewer, 1913 and *Ventrisudis* Roewer, 1963). SEM images of cranaid penis appear only in Pinto-da-Rocha & Kury (2003, *Phareicranaus* Roewer, 1913, *Ventrivomer* Roewer, 1913 and many “*Santinezia*”).

While *Prostygnus* has a more generalized penis, even resembling the basic structure of Cosmetidae Koch, 1839 and Stygnidae Simon, 1879, with stylus short and arched and rectangular erect ventral plate, the other cranids possess further specializations such as the loss of the dorsal process of glans. The clade Cranainae + Stygnicranainae was first proposed by Kury (1994) and its known species show many-folded accordion-like glans sac, stylus long and slender, ventral plate dorsally bent, leaned over truncus. Styler caps, apparently very similar to those here described for *Z. monoclonius* also occur in some Stygnicranainae such as *Agathocranaus innocens* (Orrico & Kury 2009, figs 18–19) and in Cranainae, in some species of *Phareicranaus* (Pinto-da-Rocha & Kury 2003, figs 6–7, 17–18 and 22–23). Likewise, the elongate-erythrocyte cap of *Z. morlacus* appears to occur as well in Stygnicranainae such as *Tryferos elegans* and two *Stygnicranaus* (Orrico & Kury 2009, figs 4–5, 10–11, 26–27) and Cranainae such as *Phalangodus anacosmetus* Gervais, 1842 (Kury 1996, figs 3–4), *Santinezia gracilis* and *S. singularis* (Pinto-da-Rocha & Kury 2003, figs 11–12, 33–34). The unusual guitar-shaped ventral plate of *Z. monoclonius* only vaguely resembles a group of Venezuelan *Phareicranaus* (see e.g., figs in Avram 1983; 1987; González-Sponga 2003), while *Z. morlacus* has more a conservative rectangular shaped ventral plate.

Regarding external morphology, *Zannicranaus* does not resemble specially *Phareicranaus* or any other Cranainae, but rather shares some common traits with *Heterocranaus*, such as the rotated pedipalpus, the warty pedipalpal patella-tibia, the sexually dimorphic carapace, much wider in male, including eye mound, even the predominance of greenish hues in body color (at least in *Z. monoclonius*) is strongly suggestive of *Heterocranaus*.

Also it is at least curious that the main characters supporting the unity of *Zannicranaus* are from somatic morphology, while the genitalia is quite different between both species. The differences may be due to autapomorphies, because the general structure is similar, compared to other known cranids. In spite of the differences in genitalia, there is no evidence to relate either species of *Zannicranaus* to other genera instead of considering them closest to one another.

The tibia-tarsus component of pedipalpus in *Zannicranaus* is rotated ectally with respect to trochanter-patella component. This makes the usual representation of pedipalpus in ectal en mesal views insufficient to fully represent this structure, rich in taxonomic characters. I have opted to include a set of seven different illustrations of the pedipalpus (Figs 7–13, 26–32), rotated in several positions, which may serve as a new paradigm to describe species of this and other genera which present this rotation (e.g., *Heterocranaus*). Unfortunately, I failed to choose the same side when dissecting the pedipalps, so the plates show left side for one species and right side for another, creating the inconvenience of one having to mentally flip the images for easier comparison.

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