

# New species and records of spiders (Arachnida: Araneae) from Ecuador

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	based on a small set of previously unstudied specimens collected at Tiputini Biodiversity
Received:	Station in Orellana. These specimens belong to five species in three families: Anapistula
05 June, 2024	tiputiana <b>sp. n.</b> (; Symphytognathidae) and <i>Pseudanapis yasunica</i> <b>sp. n.</b> (;; Anapidae) are
Accepted:	described as new to science, and the hersiliids Neotama obatala Rheims & Brescovit, 2004,
30 June, 2024	Ypypuera crucifera (Vellard, 1924) and Y. vittata (Simon, 1887) are newly recorded in
<b>Published:</b> 21 July, 2024	Ecuador. Illustrations are provided for all treated species.
	Varruprida Amazonia Ananidaa Harriliidaa Orallana Summbutaanathidaa Tinutini
Subject Editor: Ehsan Rakhshani	<b>Keywords:</b> Amazonia, Anapidae, Hersiliidae, Orellana, Symphytognathidae, Tiputini, Yasuní National Park

*Citation*: Zamani, A. & Marusik, Y.M. (2024) New species and records of spiders (Arachnida: Araneae) from Ecuador. *Journal of Insect Biodiversity and Systematics*, 10 (4), 693–702.

# **INTRODUCTION**

More than 900 species in 54 families of spiders are currently known from Ecuador (Dupérré, 2023). Despite being only the ninth largest country in South America and occupying merely 1% of the area of this region, the araneofauna of Ecuador is perhaps the most extensively studied on the continent in terms of the number of species per unit area of the country, and ranks 69<sup>th</sup> amongst all countries worldwide (Zamani et al., 2022; Dupérré, 2023). Nevertheless, the diversity of Ecuadorian spiders remains far from completely known, and new species and records are found rather regularly (e.g., Dupérré & Tapia, 2023). Recently, we had the opportunity to examine a small set of previously unstudied spider specimens, collected at Tiputini Biodiversity Station in Orellana, eastern Ecuador, during 5–7 of February, 1999. Despite the small size of the collection (only seven specimens), it was found to contain two species new to science and three species new to Ecuador, which are described and reported in this paper.

# MATERIAL AND METHODS

Photographs of specimens and their copulatory organs were obtained using an Olympus<sup>®</sup> Camedia E-520 camera attached to an Olympus<sup>®</sup> SZX16 stereomicroscope. Digital images of different focal planes were stacked with Helicon Focus<sup>TM</sup> 8.1.1. Illustrations of macerated epigynes were made after digesting tissues off in a 10% KOH aqueous solution. Leg segments were measured on the dorsal side. Measurements of legs are listed as: total (femur, patella, tibia, metatarsus, tarsus). All measurements are given in millimetres. *Depository.* **USNM** – National Museum of Natural History, Smithsonian Institution, Washington, DC.

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## RESULTS

Taxonomic hierarchy Class Arachnida Lamarck, 1801 Order Araneae Clerck, 1757 Family Anapidae Simon, 1895 Genus Pseudanapis Simon, 1905 Type species. Aanapis parocula Simon, 1899 from Sumatra.

*Comments.* The genus comprises 11 described species distributed across various regions, including Southeast Asia (3 species), Sub-Saharan Africa (2 species), Papua New Guinea (1 species), and the Neotropics (4 species), and it exhibits a wide distribution in the Pacific, with one species introduced to several countries in Europe. Despite its unusual disjunctive distribution, all species known by males exhibit very similar male palps: with two processes extending from the femur, a large patella widening distally, and a very small tibia (smaller than the patella and trochanter). There are no figures illustrating the male palps in ventral view, and it remains unclear where the embolus originates in any of the species except for the generotype and *P. aloha* Forster, 1959. The leg formula varies among males and can be either 1423 or 1243.

## *Pseudanapis yasunica* sp. n. (Fig. 1A–E)

https://zoobank.org/urn:lsid:zoobank.org:act:8A50433E-6489-47A7-9BEA-99CE27465E95

*Type material.* Holotype 3 (USNM), ECUADOR: *Orellana Province:* Tiputini Biodiversity Station, nr Yasuní National Park, transect – T/1 Sta.1, 00°37'55''S 76°08'39''W, 06.II.1999, 220–250 m (T.L. Erwin et al.).

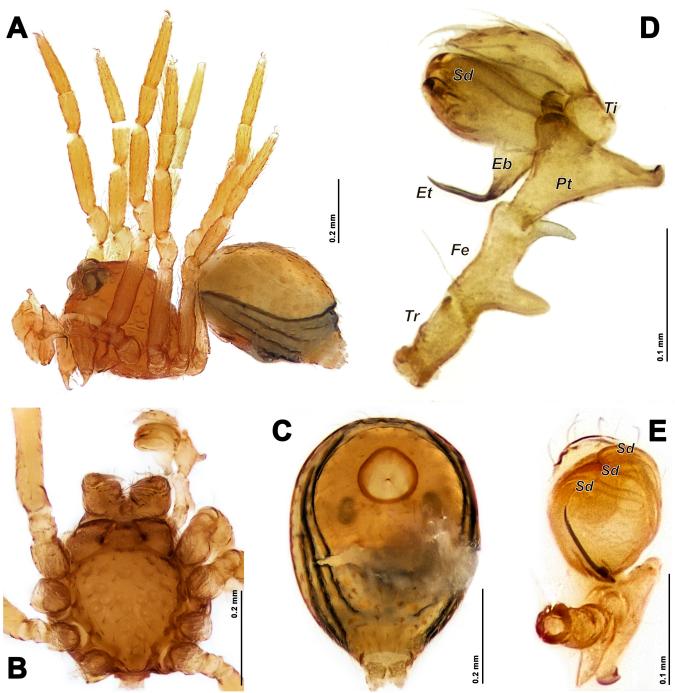
Etymology. The specific epithet is an adjective, referring to Yasuní National Park.

*Diagnosis.* The new species can be distinguished from all congeners by the shape of the embolus, which is strongly extended from the tegulum and bent at a right angle (Fig. 1D; *vs.* the embolus not stretched and adjoining the tegulum). Compared to the only congener known from Ecuador, *P. domingo* Platnick & Shadab, 1979, the new species differs in the shape of the embolus, a larger and longer distal process of the palpal femur, and a hooked dorsal process of the patella (cf. Fig. 1E and Platnick & Shadab, 1979: fig. 53).

**Description.** — Male. Habitus as in Fig. 1A. Total length 0.93. Carapace 0.40 long, 0.30 wide, 0.20 high. Eyes subequal in size, diameter of each ca. 0.06. Carapace, chelicerae, maxillae, labium and sternum orangish brown (Fig. 1A–B). Carapace covered with round pits. Sternum slightly convex. Legs slightly lighter than carapace, without annulations or modifications. Abdomen light beige, with dorsal scutum covering ca. 0.8 of dorsum length, epigastral scutum ca. half of venter length, inframammilary scutum circular, wider ventrally; side of abdomen with pair of long wrinkles and ventral scuta (Fig. 1C). Spinnerets uniformly pale beige. Measurements of legs: I: 1.07 (0.32, 0.13, 0.25, 0.13, 0.24); II: 0.98 (0.29, 0.12, 0.21, 0.13, 0.23); III: 0.86 (0.25, 0.10, 0.18, 0.12, 0.21); IV: 1.06 (0.32, 0.12, 0.26, 0.14, 0.22).

Palp as in Fig. 1D–E; trochanter (Tr) long, twice longer than wide; femur (Fe) 1.5 times longer than trochanter with two processes stretched at right angle, proximal one longer than femur's diameter, distal one smaller, about diameter of femur and thinner than proximal; patella (Pt) triangular, dorsal angle with kind of small bill, distally very wide, 1.25 times longer than patella long and wider than femur long; tibia (Ti) small, as long as wide; cymbium oval; bulb oval; sperm duct (Sd) long, almost straight at retrolateral side of tegulum, making strong loop at anterior part of tegulum and another contra loop forming S-shaped figure (Fig 1E); conductor, if present, indistinct; embolus with wide triangular base (Eb) lacking distinct border with tegulum; tip of embolus (Et) needle-shaped, bent at right angle from base.

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**Figure 1.** *Pseudanapis yasunica* **sp. n.**, holotype  $\mathcal{J}$ . **A.** Habitus, lateral view; **B.** Prosoma, ventral view; **C.** Abdomen, ventral view; **D.** Palp, retrolateral view; **E.** Palp, ventral view. Abbreviations: *Eb* – embolus base, *Et* – embolus tip, *Fe* – femur, *Pt* – patella, *Sd* – sperm duct, *Ti* – tibia, *Tr* – trochanter.

# Female. Unknown.

*Note.* The new species has the same number and position of palpal setae as in the generotype. *Distribution.* Known only from the type locality in Orellana, eastern Ecuador.

# Family Hersiliidae Thorell, 1869

Genus *Neotama* M. Baehr & B. Baehr, 1993 Type species. *Tama variata* Pocock, 1899 from Sri Lanka. *Comments.* A small genus comprising nine species distributed in Indonesia (1 species), India (2 species), Sri Lanka (1 species), South Africa (1 species), and Southern USA and the Neotropics (4 species). It has been well revised by Baehr and Baehr (1993) and Rheims and Brescovit (2004). Only one species, *Neotama mexicana* (O. Pickard-Cambridge, 1893), has been recorded from Ecuador (Rheims & Brescovit, 2004).

## *Neotama obatala* Rheims & Brescovit, 2004 (Fig. 2A–C) *Neotama obatala* Rheims & Brescovit, 2004: 215, figs 17, 74–80 (র্ণ2).

*Material.* ECUADOR: *Orellana Province*: 13 (USNM), Tiputini Biodiversity Station, nr Yasuní National Park, transect – T/1 Sta.1, 00°37'55"S 76°08'39"W, 06.II.1999, 220–250 m (T.L. Erwin et al.); 1<sup>Q</sup> (USNM), same locality and collectors, 05.II.1999.

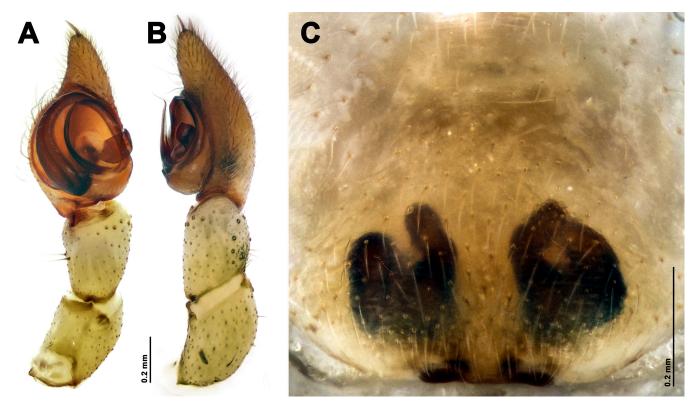
*Comments.* This species was described as a part of a revision of Neotropical hersiliids, and prior to the present contribution, known only from a single taxonomic publication (Rheims & Brescovit, 2004).

Distribution. Peru, Brazil, Guyana, and Ecuador (new record).

# Genus Ypypuera Rheims & Brescovit, 2004

Type species. Tama crucifera Vellard, 1924 from Brazil.

*Comments.* The genus currently comprises three species distributed from Venezuela to Argentina (WSC, 2024). Among them, only *Y. esquisita* Rheims & Brescovit, 2004, known only from females, was described from Ecuador. In the male palp of *Y. crucifera* illustrated here, we noticed modifications in the form of a prolateral outgrowth of the cymbium (*Cy*) and a corresponding pit (*Tp*) on the tibia. Although these characters have not been previously documented within the Hersiliidae, they apparently occur in many species of the family (C.A. Rheims, pers. comm.).



**Figure 2.** *Neotama obatala* Rheims & Brescovit, 2004, male palp (A, B) and epigyne (C). **A**, **C**. Ventral view; **B**. Retrolateral view.

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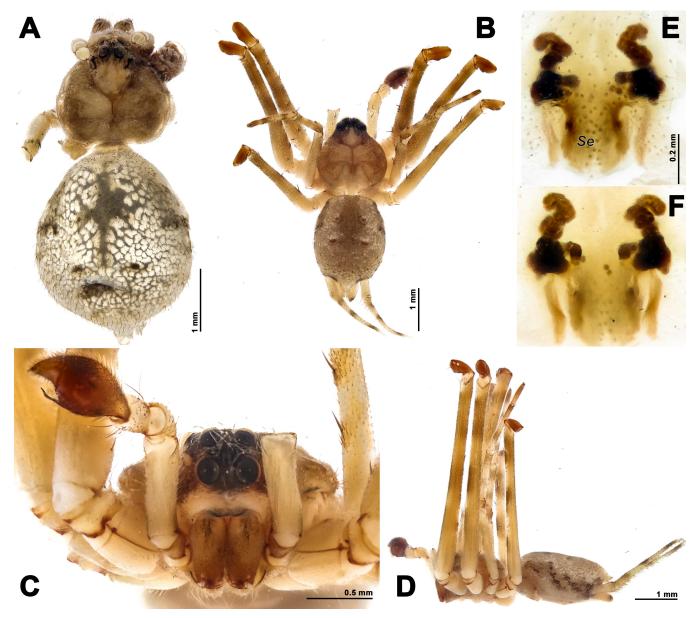
# Ypypuera crucifera (Vellard, 1924) (Figs 3B-D, 4A-D)

*Ypypuera crucifera*: Rheims & Brescovit, 2004: 221, figs 7–10, 13–14, 19–20, 81–87 (♂♀). For a list of six taxonomic references, see WSC (2024).

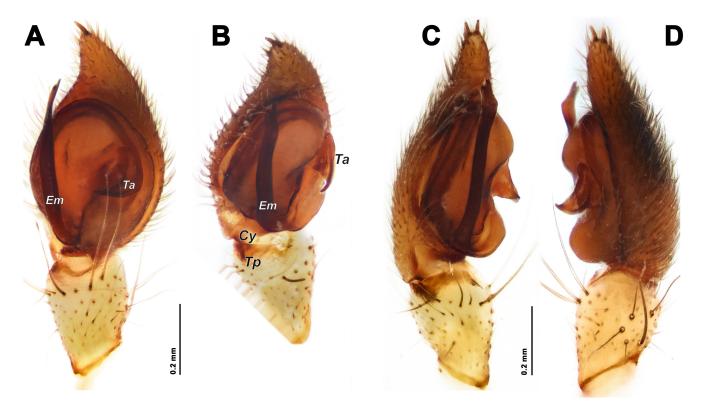
*Material.* ECUADOR: *Orellana Province*: 233 (USNM), Tiputini Biodiversity Station, nr Yasuní National Park, transect – T/1 Sta.1, 00°37'55"S 76°08'39"W, 07.II.1999, 220–250 m (T.L. Erwin et al.).

*Comments.* The male palp illustrated here differs from those illustrated by Rheims & Brescovit (2004) in several aspects: the more elongate basal portion of the tegular apophysis (*Ta*), the more elongate tegulum (length/width approximately 1.21 *vs.* 1.18), and the relatively thinner and longer embolus (*Em*) (cf. Fig. 4A and Rheims & Brescovit, 2004: fig. 84). These differences are considered intraspecific variations (C.A. Rheims, pers. comm.).

*Distribution.* Argentina, Bolivia, Brazil, Paraguay, Peru, and Ecuador (new record).



**Figure 3.** Male of *Ypypuera crucifera* (Vellard, 1924) (B–D), and female of *Y. vittata* (Simon, 1887) (A, E, F). **A**, **B**. Habitus, dorsal view; **C**. Prosoma, frontal view; **D**. Habitus, lateral view; **E**. Epigyne, ventral view; **F**. Idem, dorsal view. Abbreviation: *Se* – septum.



**Figure 4.** *Ypypuera crucifera* (Vellard, 1924), male palp. **A.** Ventral view; **B.** Anteroprolateral view; **C.** Prolateral view; **D.** Retrolateral view. Abbreviations: *Cy* – cymbial prolateral outgrowth, *Em* – embolus, *Ta* – tegular apophysis, *Tp* – tibial pit.

# Ypypuera vittata (Simon, 1887) (Figs 3B-D, 4A-D)

*Ypypuera vittata*: Rheims & Brescovit, 2004: 223, figs 21–22, 35, 88–94 (♂♀). For a list of three taxonomic references, see WSC (2024).

*Material.* ECUADOR: *Orellana Province*: 1<sup>Q</sup> (USNM), Tiputini Biodiversity Station, nr Yasuní National Park, transect – T/1 Sta.1, 00°37'55"S 76°08'39"W, 05.II.1999, 220–250 m (T.L. Erwin et al.).

*Comments.* The epigyne illustrated here differs from that illustrated by Rheims & Brescovit (2004) in copulatory ducts more widely spaced and a more prominent septum (*Se*) (cf. Fig. 3E–F and Rheims & Brescovit, 2004: fig. 94). These differences are considered intraspecific variations (C.A. Rheims, pers. comm.).

*Distribution.* Brazil, Peru, Suriname, and Ecuador (new record).

# Family Symphytognathidae Hickman, 1931

#### Genus Anapistula Gertsch, 1941

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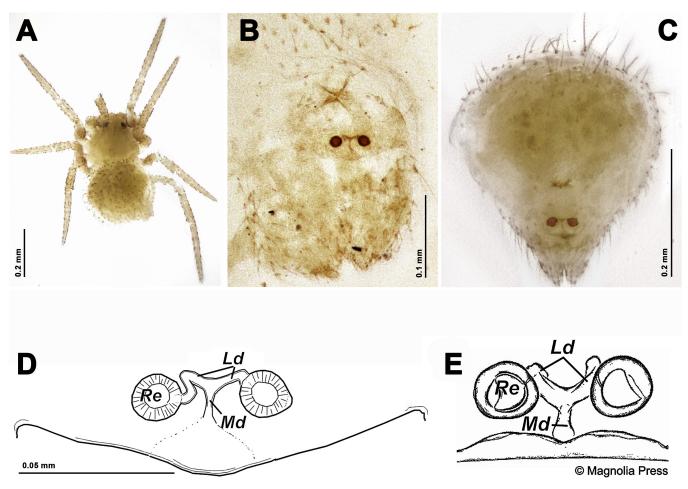
Type species. Anapistula secreta Gertsch, 1941 from Panama.

*Comments.* This genus comprises 28 species distributed in Oceania (5 species), East and Southeast Asia (4 species), China (5 species), Portugal (1 species), Seychelles (1 species), Central and West Africa (2 species), and southern United States and the Neotropics (10 species). Only one species is currently known from Ecuador (Dupérré & Tapia, 2017).

# Anapistula tiputiana sp. n. (Fig. 5A-D)

https://zoobank.org/urn:lsid:zoobank.org:act:D507D7ED-C789-4D4A-B80E-83A9D5517846

*Type material.* Holotype  $\bigcirc$  (USNM), ECUADOR: *Orellana Province:* Tiputini Biodiversity Station, nr Yasuní National Park, transect – T/1 Sta.1, 00°37'55"S 76°08'39"W, 05.II.1999, 220–250 m (T.L. Erwin et al.).



**Figure 5.** *Anapistula tiputiana* **sp. n.**, holotype female (A–D), and *A. equatoriana* Dupérré & Tapia, 2017 (E). **A.** Habitus, dorsal view; **B**, **D**, **E**. Epigyne, dorsal view; **C**. Abdomen, anteroventral. **E**. Reproduced from Dupérré & Tapia (2017). Abbreviations: *Ld* – lateral ducts, *Md* – median duct, *Re* – receptacle.

*Etymology.* The specific epithet is an adjective, referring to the type locality of the new species.

**Diagnosis.** The new species differs from *A. equatoriana* Dupérré & Tapia, 2017, the only other species of *Anapistula* known from Ecuador, in the shape of the epigyne: the lateral ducts (*Ld*) form an almost horizontal line (*vs.* V-shaped), the median duct (*Md*) is longer, and the receptacles are more widely spaced (cf. Fig. 5B–D and 5E). Additionally, the new species can be differentiated from other Neotropical congeners by the trajectory of lateral ducts, and the proportions of receptacles relative to the length of these ducts.

*Description.* — Female. Habitus as in Fig. 5A. Total length 0.50. Carapace 0.24 long, 0.22 wide. Eyes: four in two diads. Body completely pale. Measurements of leg I: 0.67 (0.18, 0.09, 0.13, 0.11, 0.16). Additional information cannot be provided due to the damage inflicted on the specimen during the maceration of the epigyne.

Epigyne as in Fig. 5B–D; receptacles span ca. 1.57 times wider than length of epigynal plate; receptacles spaced by ca. 3 radii (1.5 diameters); lateral ducts (*Ld*) almost straight and forming horizontal line, forming a posterior bent close to receptacles.

# Male. Unknown.

Distribution. Known only from the type locality in Orellana, eastern Ecuador.

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## DISCUSSION

Ecuador is divided into four main natural biogeographic regions: the northern and southwestern Amazon (Oriente), the northern and south-central Andes (Sierra), the Pacific coastal plain (Costa), and the Galápagos Islands (Brito & Borges, 2015). The two new species described in this paper, *Anapistula tiputiana* **sp. n.** and *Pseudanapis yasunica* **sp. n.**, are the second known species of their respective genera from Ecuador and the first ones from the Ecuadorian Amazon. The other species known from Ecuador, *A. equatoriana* and *P. domingo*, are found in drastically different habitats in the Andes and the coastal region, respectively (Platnick & Shadab, 1979; Dupérré & Tapia, 2017). The three hersiliid species reported here for the first time from Ecuador are all widely distributed in South America, so their occurrence in the Ecuadorian Amazon was not unexpected.

The specimens studied represent only a small portion of a very large series collected by the late Terry L. Erwin and his colleagues, which is housed at the USNM. Several new species and new records have been previously published from the material collected in this locality or the nearby Yasuní National Park (e.g., Logunov & Marusik, 2003; Platnick & Dupérré, 2011; Platnick et al., 2013a, 2013b; Platnick & Berniker, 2014; Ott et al., 2019), and there are at least 18 spider species (of Salticidae and Oonopidae) that have their type localities in Tiputini.

## **AUTHOR'S CONTRIBUTION**

The authors confirm their contribution to the paper as follows: A. Zamani, Y. Marusik: Conceptualization; AZ: Microscopic photography; AZ, YM: Writing – original draft; AZ: Writing – review and editing. The authors read and approved the final version of the manuscript.

#### FUNDING

The contribution of Alireza Zamani was supported by a grant from the Turku University Foundation (ID 081820).

## AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the National Museum of Natural History, Smithsonian Institution, Washington, DC and are available from the curator, upon request.

#### ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included plants and arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

#### **CONSENT FOR PUBLICATION**

Not applicable.

#### **CONFLICT OF INTERESTS**

The authors declare that there is no conflict of interest regarding the publication of this paper.

#### ACKNOWLEDGMENTS

Yuri M. Marusik thanks Seppo Koponen for arranging his stay in Turku. Both authors are grateful to the subject editor for diligently handling this manuscript and to the anonymous reviewers for their constructive feedback and valuable suggestions. We would like to extend our sincere gratitude to Dr. Cristina Anne Rheims (Laboratory of Zoological Collections (LCZ), Instituto Butantan, Brazil) for her invaluable comments and insightful feedback on our manuscript, which have significantly enhanced the quality of our work.

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# گونهها و گزارشهای جدید از عنکبوتها (Arachnida: Araneae) از اکوادور

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واژگان كليدى: آمازون، Hersiliidae، Anapidae، اوريانا، Symphytognathidae، تيپوتينى، پارك ملى ياسونى