



## Occurrence and redescription of *Sipalolasma arthropophysys* (Gravely, 1915) (Araneae: Barychelidae: Barychelinae) from India

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**Abstract:** During a recent biodiversity survey a rare Brush-footed trapdoor spider, *Sipalolasma arthropophysys* (Gravely, 1915) was recorded from the State of Andhra Pradesh, India for the first time and the second record from India. A detailed description with photographs and illustrations of the male is provided.

**Keywords:** Andhra Pradesh, Ananthagiri, Brush-footed trapdoor spider

### INTRODUCTION

The Brush-footed trapdoor spider family Barychelidae is represented worldwide by 44 genera and about 303 species, of which *Diplothele gravelyi* Siliwal et al., 2009, *D. tenebrosus* Siliwal et al., 2009, *D. walshi* O. Pickard-Cambridge, 1890, *Sason andamanicum* Simon, 1888, *S. rameshwaram* Siliwal & Molur, 2009, *S. robustum* O. Pickard-Cambridge, 1883, *Sasonichus sullivanii* Pocock, 1900 and *Sipalolasma arthropophysys* (Gravely, 1915) are reported from India (Gravely 1935; Pocock 1900; Platnick 2009; Siliwal et al. 2009; Siliwal & Molur 2009).

The genus *Sipalolasma* Simon, 1892 is found in Africa, Malaysia, India and Sri Lanka, and represented by nine species. The five species recorded from Asia are: *S. aedificatrix* Abraham, 1924, *S. arthropophysys* (Gravely, 1915), *S. ellioti* Simon, 1892, *S. greeni* Pocock, 1900, and *S. ophiensis* Abraham, 1924. Of these, only *S. arthropophysys* occurs in India but little is known about it. During a biodiversity inventory survey conducted by the World Wide Fund for Nature-India (WWF-India), Andhra Pradesh State Office (APSO) in collaboration with Andhra Pradesh Tourism Development Corporation (APTDC), Hyderabad, we collected a male and identified it as *S. arthropophysys* albeit with some variations. This is the second record of *S. arthropophysys* from India and the first recorded from the State of Andhra Pradesh, India (Image 1). A detailed description is provided using the same characters as used by Raven (1994).

### MATERIAL & METHODS

The measurements taken follow Raven (2005). It is given in millimetres,

**Abbreviations:** ALE - anterior lateral eye; AME - anterior median eye; m - median; MOQ - median ocular quadrate; p - prolateral; PLE - posterior lateral eye; PME - posterior median eye; PLS - posterior lateral spinnerets; PMS - posterior median spinnerets; r - retrolateral; ZSI/FBRC/A - Zoological Survey of India, Fresh-water Biology Regional Center, Arachnid.



**Image 1.** Satellite image showing a map depicting records of *S. arthropophysis* (Gravely, 1915) in two Indian states.

and was rounded off to one decimal where appropriate and were taken with a digital dial calipers with an error of 0.01mm. Photographs of the preserved specimen were taken with a Nikon Coolpix S550 mounted directly on the eye piece of a Lawrence & Mayo stereomicroscope illuminated with a 100 watt light source; only minor colour corrections of the photos has been done. Illustrations were made with camera lucida attached to Olympus SZX 12 stereo zoom microscope. The specimen is deposited in the collections of the Zoological Survey of India, Fresh-water Biology Regional Center, Arachnid section (ZSI/FBRC/A), Hyderabad, Andhra Pradesh, India.

## TAXONOMY

**Barychelidae Simon, 1889**

**Barychelinae Simon, 1889**

***Sipalolasma* Simon, 1892**

*Sipalolasma* Simon, 1892: 123; Pocock 1900: 176; Benoit 1966: 236; Raven 1985: 113; Platnick 1989: 94.

*Cyclopelma* Benoit, 1965: 302; Raven 1985: 151 (synonym).

**Type species:** *Sipalolasma ellioti* Simon, 1892.

## Diagnosis

ALE not close to clypeal edge; ocular area as wide as long or slightly wider behind; fovea a deep circular pit or transverse or pro-curved or slightly re-curved; four spinnerets; tibial spur present in male; labium and maxilla with cuspules; claw tufts absent from female palp; body size 15-29 mm (Raven 1985; Dippenaar-Schoeman 2002).



**Image 2.** *Sipalolasma arthropophysis* male (ZSI/FBRC/A-25). A - Dorsal view; B - Ventral view (scale 5mm)

## Distribution

Africa (Afrotropical region, including from Mozambique, Ethiopia, South Africa and the Democratic Republic of Congo), Malaysia, India and Sri Lanka.

## *Sipalolasma arthropophysis* (Gravely, 1915)

(Figs. 1-2, Images 2-6)

*Sasonichus arthropophysis* Gravely, 1915: 264, pl. 15, fig. 2; type specimen may be in ZSI, Kolkata not examined; Gravely 1921: 404, pl. 10, fig. 12.

*Sipalolasma athrapophysis* Raven, 1985: 116 (synonymy).

## Material examined

1 male, 25.vii.2009, Ananthagiri, Vishakapatnam District, Andhra Pradesh, India, 18°15'N & 82°59'E, 1190m, coll. S.M. Maqsood Javed, ZSI/FBRC/A-25.

## Diagnosis (Male)

ALE not close to clypeal edge; ocular area slightly wider behind; fovea transverse to slightly recurved; pair of enlarged tibial spur present in male; promarginal area of chelicera with 9-10 irregular sized teeth; cuspules on labium (ca. 4-5) and maxilla ca. 28-31; claw tufts present on all legs; body size 11-24 mm (Gravely 1915; Raven 1985).

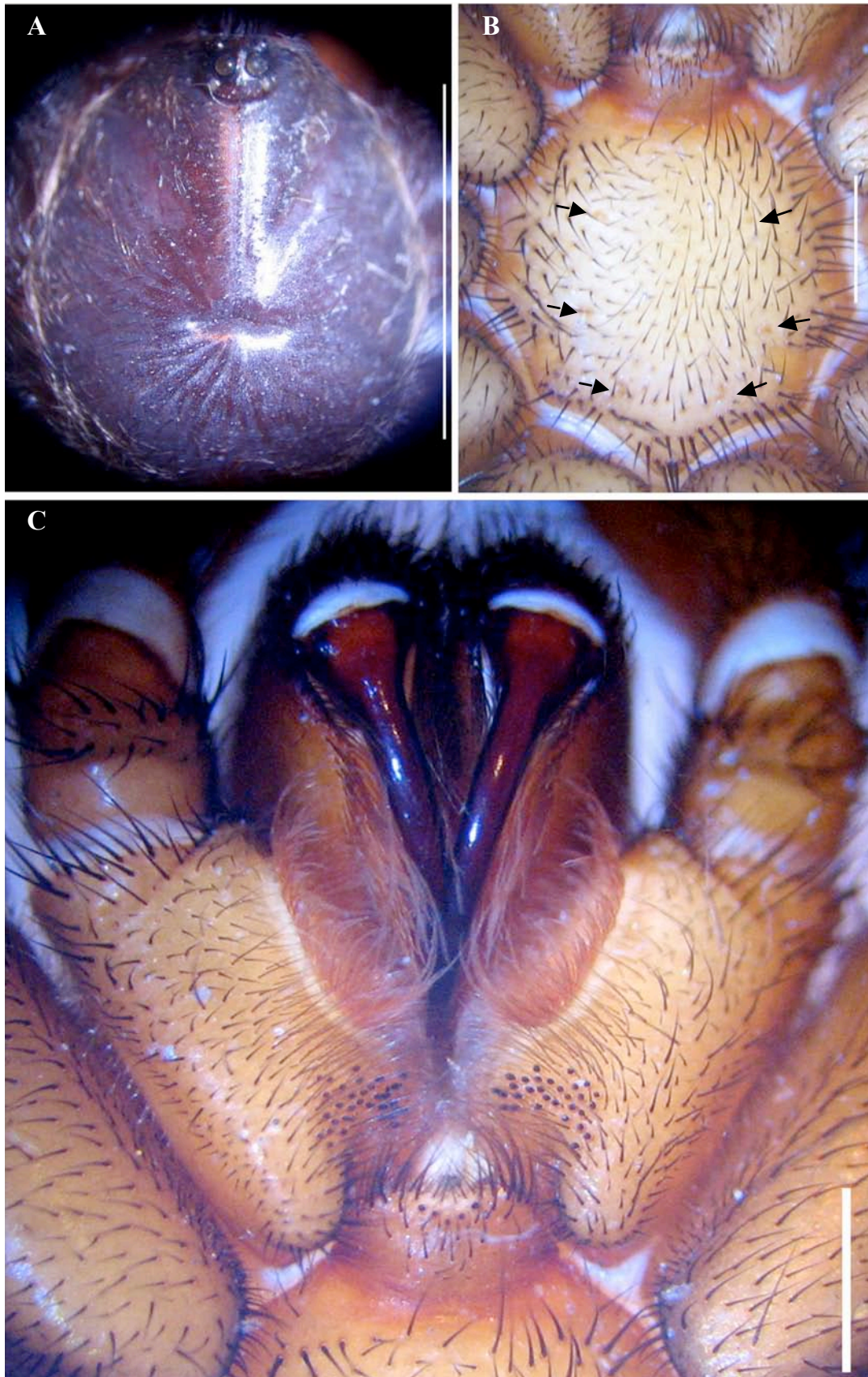
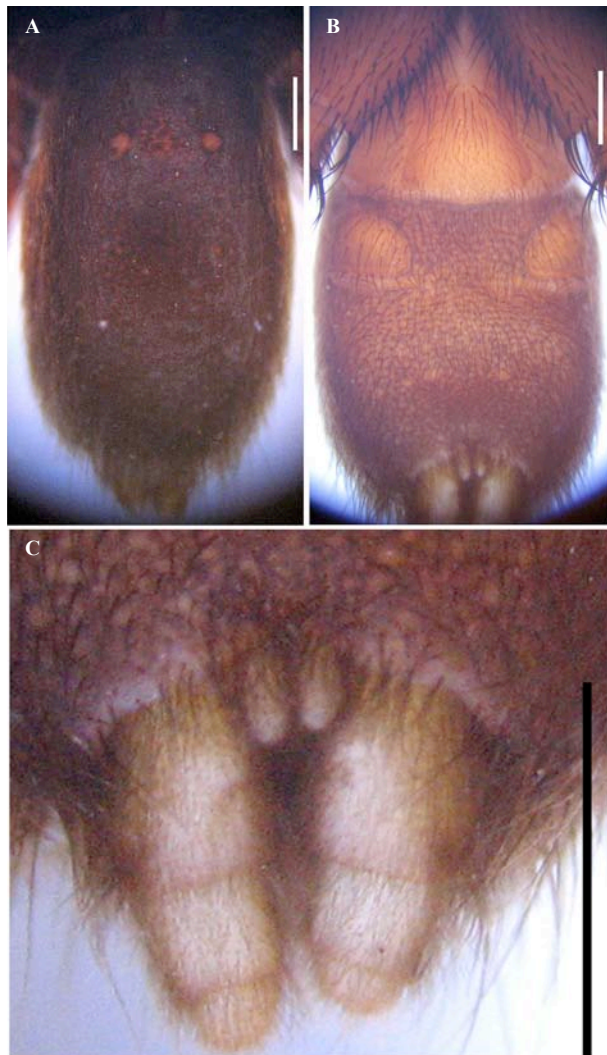


Image 3. *S. arthropophys* male (ZSI/FBRC/A-25). A - Carapace, dorsal view; B - Sternum, dorsal view (arrows pointing sigilla); C - Maxillae and labium, dorsal view. (scale for A, B = 5mm; C = 1mm)



**Image 4. *S. arthropophysis* male (ZSI/FBRC/A-25).** A- Abdomen, dorsal view; B- Abdomen, ventral view; C- Spinnerets, ventral view. (scale 1mm)

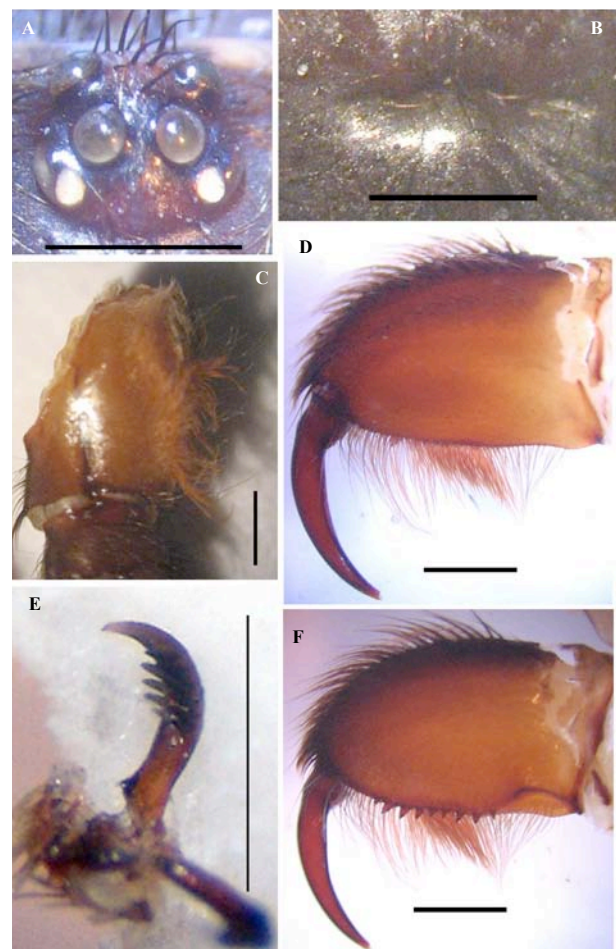
**Description of male**

Carapace (excluding chelicerae) 6.13 long, 5.60 wide, chelicerae 3.20 long (after dissection 3.60). Abdomen 5.62 long, 3.39 wide. Spinnerets: PMS, 0.22 long, 0.6 wide, 0.4 apart; PLS, 0.42 basal, 0.30 middle, 0.20 distal (PLS = 0.92); midwidth: 0.12, 0.8, 0.5 respectively. Legs (including palpi) morphometry is given in Table 1.

Carapace (Images. 2A, 3A, 5B): length to width 1.09; ovate; uniform dark brown (brick red in life) with light brown hairs (golden in life) on margin, uniform cover of short dull brown hairs and short black setae or thorns scattered in between; clypeus 0.40 long, slanting downwards below ALE; fovea prominent, transverse and slightly re-curved; group of long and strong forward projecting black setae present between ALE; long black setae radiates from fovea to carapace edges (impression of tubercles distinct even after some setae were lost), the setae between ocular tubercle and fovea forms a prominent straight line.

**Table 1. Morphometry of legs and palp of *S. arthropophysis*, male, ZSI/FBRC/A-25 (measurements in mm)**

Leg parts	I	II	III	IV	Palp
Femur	4.80	4.54	4.12	5.70	2.60
Patella	3.20	2.56	2.23	2.58	1.62
Tibia	3.76	3.17	2.85	4.59	2.30
Metatarsus	4.14	3.55	4.22	6.58	-
Tarsus	1.85	1.82	1.75	1.79	1.02
Patella + Tibia	6.96	5.73	5.58	7.17	-
Metatarsus + Tarsus	5.99	5.57	6.45	8.37	-
<b>Total</b>	<b>17.75</b>	<b>15.64</b>	<b>15.17</b>	<b>21.24</b>	<b>7.54</b>
<b>Midwidth</b>					
Femur	1.75	1.75	1.61	1.74	0.77
Tibia	1.21	1.20	1.18	1.18	1.04



**Image 5. *S. arthropophysis* male (ZSI/FBRC/A-25).** A - Arrangement of eyes, ocular tubercle; B - Fovea; C - Maxilla, prolateral view; D - Cheliceral, retrolateral face; E - Claw, showing small denticle (ca. 6) on one side; F - Cheliceral, prolateral face. (scale for A-D & F = 1mm; E = 0.5mm).

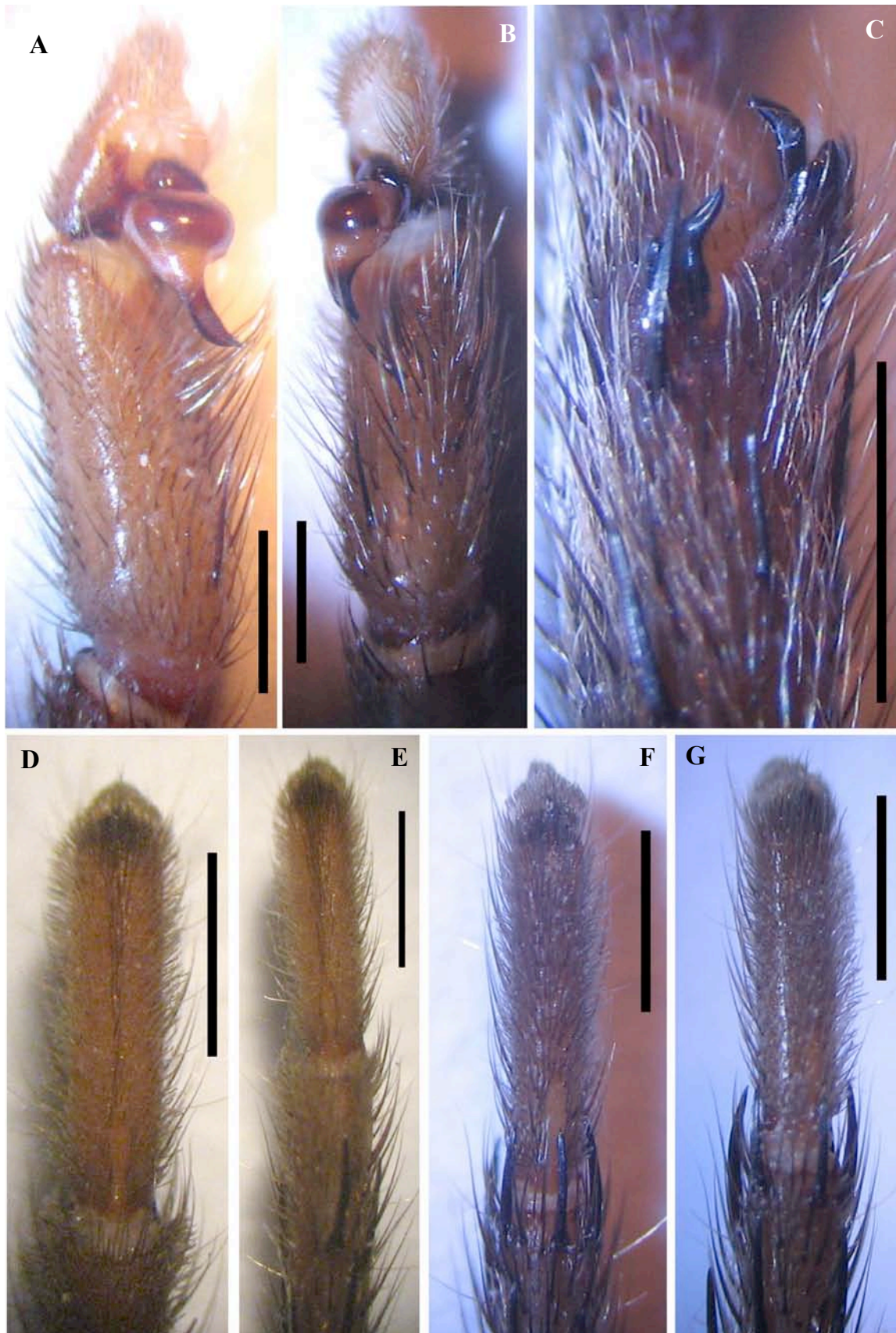


Image 6. *S. arthropophysis* male (ZSI/FBRC/A-25). A - Palp, retrolateral view; B - Palp, prolateral view; C - Tibial spurs; D-G - Leg tarsus (I-IV), ventral view showing divided scopulae. (scale 1mm)

**Eyes (Image 5A, Fig. 1B):** Eye tubercle distinct, as long as wide; ALE not close to clypeal edge; AME close to posterior eyes row; anterior eye row strongly procurved; posterior eye row slightly recurved. Eye group 1.20 long, 1.42 wide (ratio width to length 1.88). AME clearly larger than rest, ALE bigger than PLE and PME clearly smaller than others. Eye diameter: ALE, 0.20; AME, 0.24; PLE, 0.18; PME, 0.09. MOQ, 0.51 long, front width 0.70, back width 0.79. Distance between ALE–ALE: 0.33, AME–AME: 0.14.

**Maxillae (Images 3C, 5C, Figs. 1A & D):** Prolateral face smooth, glabrous, without lyra or setae; tuft of hair present on margin. Cuspules ca. 31/28 (left/right) in anterior corner, of these ca. 6 large at margin.

**Labium (Images 3C, Figs. 1A & E):** About five cuspules in single procurved row on anterior part. Labiosternal groove broad with two separate large sigilla. Few small setae at center and very long in anterior half.

**Chelicerae (Images 5D & F, Figs. 2A & B):** Reddish-brown; lyra absent; spicules sparse and thin row on anterior prolateral region starts from base to base of fang; prolateral and retrolateral faces flat; promarginal area with 9 irregular sized teeth.

**Sternum (Images 2B, 3B, Fig. 1E):** 2.62 long, 2.80 wide. Almost circular, high in center, sloping gradually, covered with dense, black setae. Posterior angle sharp, but not extending between coxae IV. Setae marginal more dense and thorn-like. Pedicel pallid and not easily seen. Sigilla, three pairs, oval, very small and more centrally positioned, posterior largest, four lengths apart; middle pair not exactly half size of posterior, anterior exactly half size of posterior.

**Palp (Images 6A & B, Figs. 2D & E):** Short in comparison with legs. Cymbium straight, bi-lobed. Bulb round and enlarged, embolus with broad base and slightly twisted with pointed tip, flat and curved downwards (left bulb is with deformity). Four enlarged spines on prolateral tibia and one close to base on ventral side.

**Legs (Images 5E, 6E–G, Figs. 1C, 2C):** 4123. With rows of long and short hairs intermingled with strong setae and spines. Tarsi I–IV with scopulae entire divided by band of 2–4 setae, metatarsi I–IV with scopulae sparse on anterior region. Coxal bases as seen from above, (with I clearly widest, about 1.3 times length of II; IV as wide as I) Claw tufts on all legs. Tarsi I–IV with two claws, each claw with two rows (6 inner/4 outer) of small denticles. Pair of tibial spurs on leg I, base of distal spur with enlarged blunt tubercles, basal spur with long stout spine (left side tibia of leg I devoid of spurs and tubercle, may be absent through damage). Spines on all legs: I (Metatarsus ventral: 4 m & p 2, r 4; Tibia dorsal/ventral: 2 m/p 2, r 3); II (Metatarsus ventral: 4 m & p 2, r 4; Tibia dorsal/ventral: 2 m/p 3, r 3); III (Metatarsus dorsal/ventral: 2 m/4 m & p 3, r 3; tibia dorsal/ventral: 2 m/6 m [3 on distal end] & p 2, r 2; patella dorsal: p 2, r 2; femur dorsal: 2 m & p 2, r 2); IV (Metatarsus dorsal/ventral: 2 m/6 m [2 on

distal end] & p 5, r 5; tibia dorsal/ventral: 2 m/6 m [3 on distal end] & p 5, r 4; patella dorsal: p 2, r 2; femur dorsal: 2 m & p 2, r 2). Elsewhere absent. Patellae of legs I–IV with knob at base and straight suture up to distal end on retro-lateral face.

**Abdomen (Images 4A & B):** Longer than wide, dark brown, dorsally covered with thick mat of dark brown hair with large golden hairs (but, after a few days of preservation hair lost and exposed cuticle dorsally), ventrally thick mat of uniform brown hairs and anterior portion above epigastric furrow almost bare with very few light brown hairs; pair of sigilla on anterior dorsal side.

**Spinnerets (Image 4C, Fig. 1E):** Two pairs with thick dull brown hair. Apical end of PLS, dome-shaped.

### Variation

The new material of *Sipalolasma arthropophysis* from Andhra Pradesh differs from that illustrated by Gravely (1915) in morphometry; number of spines on the pro-marginal area of chelicera and cuspules on labium; embolus of bulb not much twisted; spines near the tibial spurs are little enlarged.

### Distribution

Barkul in southeastern Orissa; Ananthagiri Hills (18°15'N, 82°59'E), northeastern Andhra Pradesh, India.

### Natural history

A male was found under a medium-size (about 1m diameter) boulder on a mountain slope from a well camouflaged U-shaped burrow with two openings (burrow unfortunately destroyed while flipping the boulder). Gravely (1921) described a burrow constructed among stones and more or less loose soil and rubbish among the roots of *Ficus bengalensis* and *Ficus religiosa*, etc. It consists of a short and almost straight tube, somewhat wider in the middle and closed at each end by a trapdoor which is always hinged on the lower side, so that it hangs open when not held in place by the spider. Empty burrows are thus somewhat conspicuous objects, the whitish lining of the trap-door contrasting with the mouth of the dark burrow above it. The trapdoor of a full grown spider is about 10mm in diameter. Males were found only up to August (Gravely 1921).

### DISCUSSION

Gravely (1915) described *S. arthropophysis* based on a single male specimen, and in 1921, he described a female with notes on their natural history. Here information on a second male specimen based on a record from Andhra Pradesh, India is provided. This species seems to be endemic to eastern parts of India. However we recorded several variations between the two specimens, when compared with the description provided by Gravely

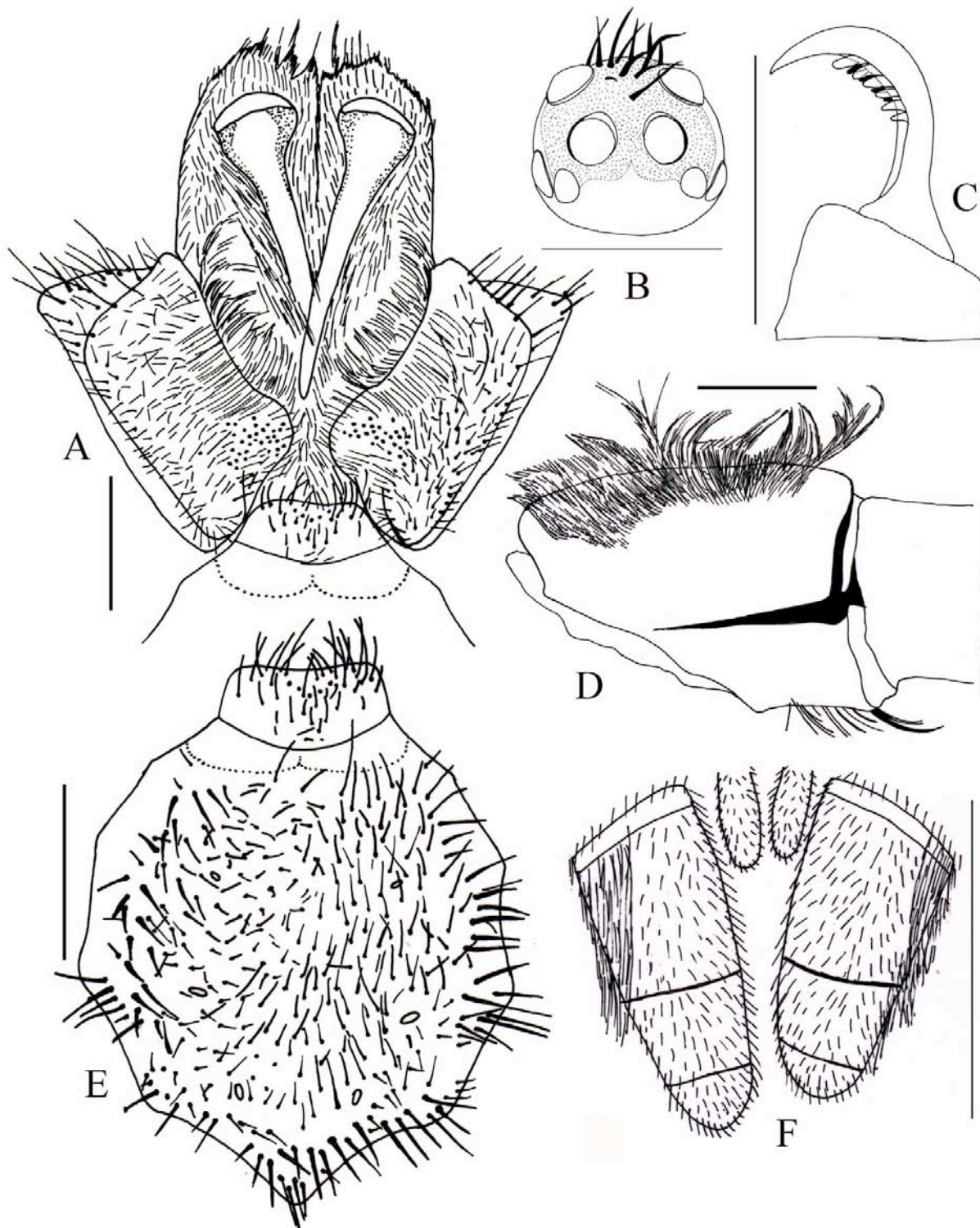
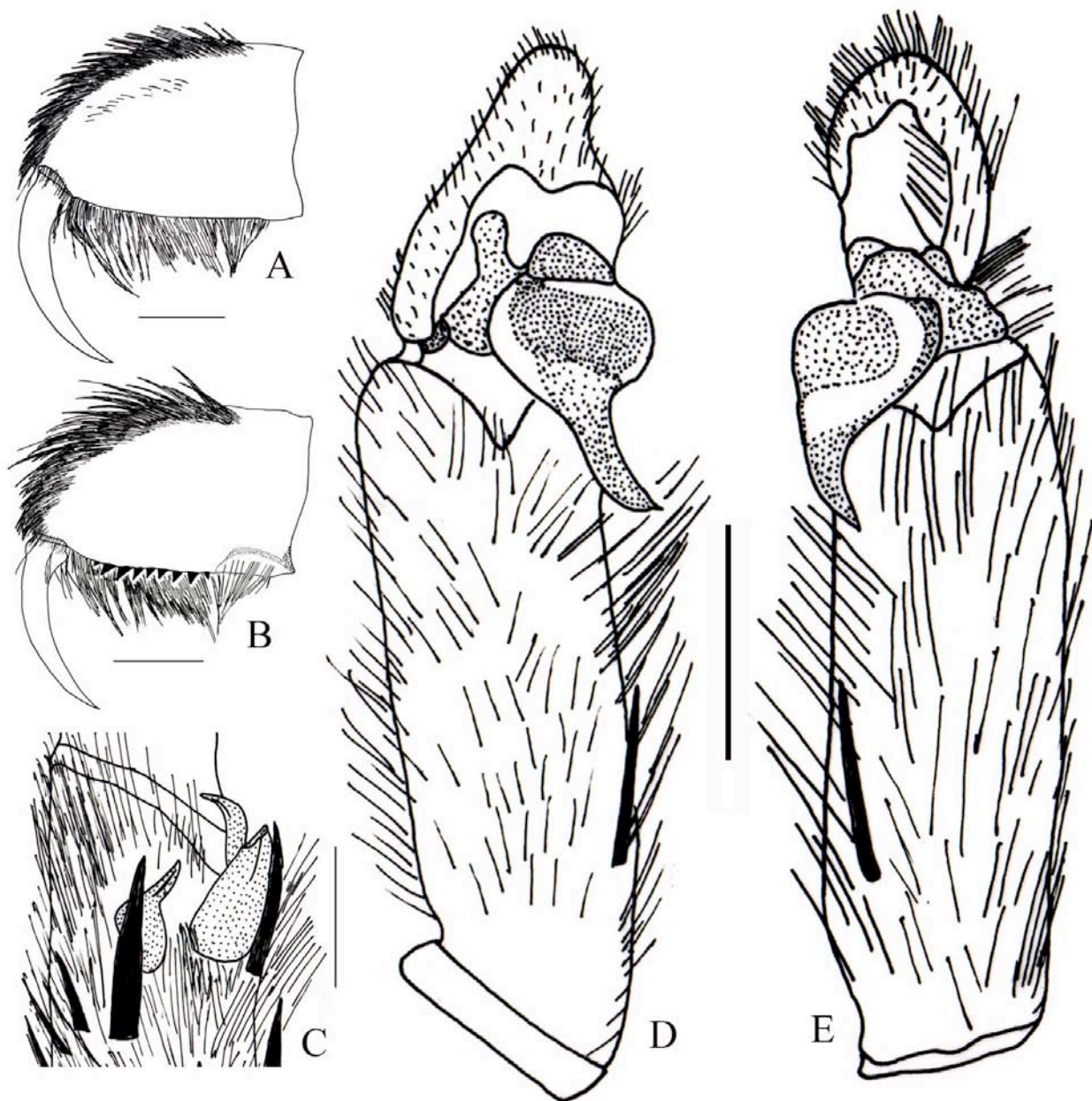


Figure 1. *S. arthropophysis* male. A - Maxillae and labium, dorsal view; B - Arrangement of eyes, ocular tubercle; C - Claw, inner view showing small denticles (ca. 6/4) on inner/outer side; D - Maxilla, prolateral view; E - Sternum, dorsal view; F - Spinnerets, ventral view, . (scale for C = 0.5mm; A, B & D-F = 1mm)



**Figure 2.** *S. arthropophysis* male. A. Celicerae, retrolateral face. B. Celicerae, proterolateral face. C. Tibial spurs. D. Palp, retrolateral view. E. Palp, proterolateral view. (scale for C = 0.5mm; A, B, D, E = 1mm)

(1915), and as more specimens become available the level of variation will reveal whether they are one or two species. Presently the specimens recorded were from different heights above sea level and 135km apart with difference in habitat selection.

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