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Authors: Lecigne, Sylvain, Lips, Josiane, Moutaouakil, Soumia, and Oger, Pierre

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Two new cave-dwelling spider species from the Moroccan High Atlas (Araneae: Liocranidae, Theridiidae)

Sylvain Lecigne, Josiane Lips, Soumia Moutaouakil & Pierre Oger

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Abstract. During a scientific internship in a mountainous area near Agadir, several caves were prospected; the sampled material included several spider species. Morphological and taxonomical analysis revealed two new species to science: an anophthalmic troglobiont species, *Agraecina agadirensis* **spec. nov.** (description based on three females) and a new member of the genus *Steatoda* in the Mediterranean region, *Steatoda ifricola* **spec. nov.** (description based on both sexes). Diagnoses, drawings and photos are presented.

Keywords: Agadir, comb-footed spiders, Ida Outanane Massif, spiny-legged sac spiders, taxonomy, troglobiont species

Zusammenfassung. Zwei neue höhlenbewohnenden Spinnenarten aus dem marokkanischem Hohen Atlas (Araneae: Liocranidae, Theridiidae). Während eines wissenschaftlichen Praktikums im Gebirge nah Agadir wurden mehrere Höhlen besucht. Das dort gesammelte Material enthielt mehrere Spinnenarten. Die morphologische und taxonomische Untersuchung erbrachte zwei neue Arten für die Wissenschaft: eine augenlose troglobionte Art, *Agraecina agadirensis* **spec. nov.** (drei Weibchen) und eine neue Vertreterin der Gattung in der mediterranen Region, *Steatoda ifricola* **spec. nov.** (beide Geschlechter). Diagnosen, Zeichnungen und Fotos werden präsentiert.

ملخص. نوعان جديدان من العناكب الكهفية في الأطلس الكبير المغربي (Araneae: Liocranidae, Theridiidae)
أثناء تدريب علمي في المنطقة الجبلية قرب مدينة أكادير، تم استكشاف عدة كهوف وأخذ العديد من العينات التي تضمنت أنواعا مختلفة من العناكب. أظهر التحليل المورفولوجي والتصنيفي في المختبر نوعين جديدين للعلم: نوع ضامر العينين و متكيف مع ظروف الحياة في الكهوف، *Agraecina agadirensis* **spec. nov**. (تم وصفه بناء على عينة من ثلاث إناث) ، وعضو جديد من جنس *Steatoda* في منطقة البحر الأبيض المتوسط، *Steatoda ifricola* **spec. nov**. (تم وصفه اعتمادا على كلا الجنسين). تجدون في هذه المقالة خريطة موقع الإستكشاف وكذا صور ورسومات العينات مع تفاصيل التشخيص.

The araneofauna of Morocco is still only very partially known; this is all the more so with respect to cave spiders. The present work illustrates this and provides the description of two new species for science.

Currently, the genus *Agraecina* includes seven species: *A. canariensis* Wunderlich, 1992 from the Canary Islands; *A. cristiani* (Georgescu, 1989), found in a cave in Romania; *A. hodna* Bosmans, 1999 from Algeria; *A. lineata* (Simon, 1878) distributed from the Western Mediterranean to Kazakhstan; *A. rutilia* (Simon, 1897) from Sierra Leone; *A. salsicola* Bosmans & Boubakri, 2020 from Tunisia, a newly described salt marsh species and *A. scupiensis* Deltshev, 2016 from North Macedonia (World Spider Catalog 2020). *Agraecina agadirensis* **spec. nov.** (Fig. 1a) is the third troglobiont species of the genus (with *A. canariensis* and *A. cristiani*) and the second one to be anophthalmic (as is *A. cristiani*). The new taxon is compared to other species of this genus.

The second new species belongs to the genus *Steatoda* Sundevall, 1833; currently including 120 species, of which twelve are present in the Mediterranean region: *S. albomaculata* (De Geer, 1778), *S. ephippiata* (Thorell, 1875), *S. erigoniformis* (O. Pickard-Cambridge, 1872), *S. grossa* (C. L. Koch, 1838), *S. latifasciata* (Simon, 1873), *S. maura* (Simon, 1909), *S. moerens* (Thorell, 1875), *S. nobilis* (Thorell, 1875), *S. paykulliana* (Walckenaer, 1806), *S. trianguloides* Levy, 1991 and *S. triangulosa* (Walckenaer, 1802), and in North Africa (*S. venator* (Audouin, 1826)) (Nentwig et al. 2020, World Spider Catalog 2020). The genus *Steatoda* constitutes a group of spiders occurring in a variety of habitats. We describe *S. ifricola* **spec. nov.** (Fig. 1b), only known from caves in the Moroccan High Atlas (Fig. 3a).

Sylvain LECIGNE, 406, rue d'Aubencheul, 59268 Fressies, France;
E-mail: lecigne.sylvain@bbox.fr
Josiane LIPS, 4, avenue Allende, 69100 Villeurbanne, France;
E-mail: josiane.lips@free.fr
Soumia MOUTAOUAKIL, Muséum d'Histoire Naturelle de Marrakech, FSSM, Université Cadi Ayyad, Morocco; E-mail: moutaouakil.soumia@gmail.com
Pierre OGER, rue du Grand Vivier 14, 4217 Waret l'Évêque, Belgium;
E-mail: pierre55@skynet.be

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Material and methods

During a scientific and technical internship, samples were collected in autumn 2019 from several caves (Fig. 2) from the mountains of the Moroccan High Atlas (Agadir region, Fig. 3a), including: Ifri N'Telmate, Ifri N'Taghrat and the two distinct areas of Imi Ougoug: Ifri Ouado ("Araignées" cave) and "Chauves-souris" cave (Fig. 3b).

Specimens were collected by hand and preserved in situ in 96% ethanol. Epigynes were dissected and cleaned using lactic acid. Photographs of genitalia were taken under the microscope. For measurements, an ocular micrometer was used; all measurements are in millimetres (mm). Geographical coordinates are presented in the WGS 84 system. For identification we relied on several bibliographical and data sources: Levy & Amitai (1982), Georgescu (1989), Wunderlich (1992), Weiss & Sárbu (1994), Levy (1998), Van Keer & Bosmans (2010), Le Péru (2011), Nentwig et al. (2020), Oger (2020), Quasin et al. (2019), Boubakri et al. (2020).

Abbreviations

A – atrium; C – conductor; CD – copulatory ducts; CH – clypeus height; E – embolus; fe – femur; FL – fovea length; J – juvenile; PL – prosoma length; PP – paracymbial projection; PW – prosoma width; S – septum; SL – sternum length; SMF – Senckenberg Museum Frankfurt; SP – spermatheca; SW – sternum width; ta – tarsus; TTA 1 – theridiid tegular apophysis 1; TTA 2 – theridiid tegular apophysis 2.

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Fig. 1: Photos of the new species. **a.** *Agraecina agadirensis* **spec. nov.**, female, dorsal view (Morocco, Tizgui, Imi Ougoug, Ifri Ouado cave) (photo: B. Lips); **b.** *Steatoda ifricola* **spec. nov.**, female paratype, ventral view (Morocco, Paradise Valley, Ifri Taghrat Wankrim cave) (photo: J. Lips)



Fig. 2: Locations where the two new species were discovered. **a.** Cave of Ifri Ouado (Imi Ougoug), entrance; **b.** Ifri n'Telmate, porch; **c.** Idem, inside gallery of the cave; **d.** Cave of Ifri Taghrat (photo: B. Lips)

Results and discussion

Description of new species

***Agraecina agadirensis* spec. nov.** (Figs 1a, 4a-h, 5a-b)

The specimens collected have somatic and genital characters that correspond well to those of the genus *Agraecina* Simon, 1932 (Araneae: Liocranidae). These include the presence of only two pairs of ventral spines on metatarsi I and II, simple genital organs (Bosmans 1999, Deltshev & Wang 2016),

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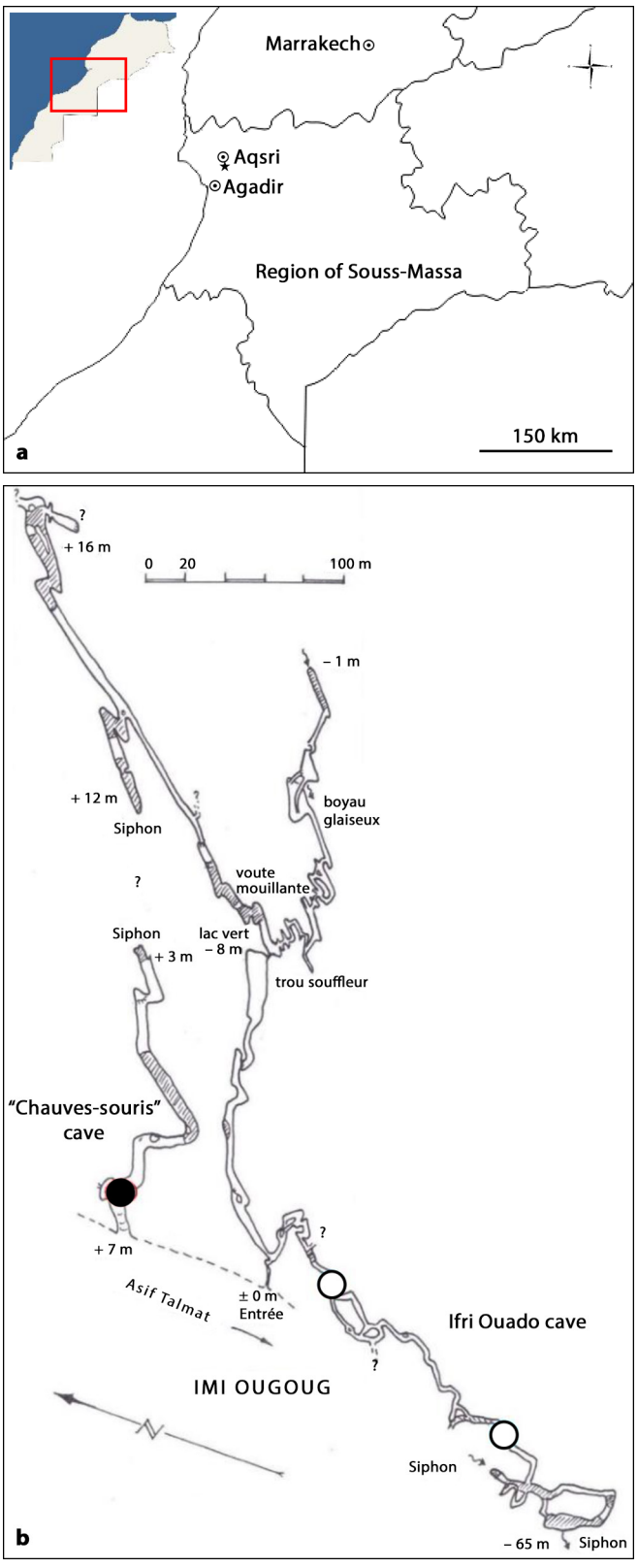


Fig. 3: Geographical locations of the new species. **a.** Study area, star (source: https://d-maps.com); **b.** Sampling sites, Imi Ougoug cave: *Agraecina agadirensis* **spec. nov.**, white circle; *Steatoda ifricola* **spec. nov.**, black circle (map: B. Lips, locations: S. Moutaouakil)

i.e. a weakly sclerotized epigyne with an ill-defined median septum, as well as small spermathecae, connected to a wide, longitudinally oriented copulatory duct (Bosselaers 2009).

Type material. Holotype: 1 ♀, MOROCCO: region of Souss-Massa, prefecture of Agadir Ida-Outanane, caïdat of Taghazout, county of Aqsri, village of Tizgui, Ifri Ouado cave (Imi Ougoug) (9.46710°W, 30.61229°N, 770 m a.s.l.), on stony ground (near a small stream), hand collecting, 30. Dec. 2019, leg. S. Moutaouakil (will be deposited in the SMF). Paratype: MOROCCO: same locality, 1 ♀, 30. Dec. 2019, leg. S. Moutaouakil (will be deposited in the SMF). Remark: opisthosoma and epigyne detached.

Other material examined. MOROCCO: same locality, 2 j, 28. Oct. 2019 (leg. L. Laadousse & S. Moutaouakil, coll. P. Oger) same locality, 1 j, 30. Oct. 2019 (leg. S. Moutaouakil, coll. P. Oger); same locality, 1 ♀, 29. Dec. 2019 (leg. S. Moutaouakil, coll. P. Oger).

Etymology. The name of the species refers to "Agadir", the prefecture of the region of Morocco where it was discovered.

Diagnosis. Considering the somatic characteristics, the new species (Fig. 1a) most closely resembles *A. cristiani* in the lack of eyes and general colouration being light orange to pale yellowish (Figs 4a-c). The epigyne/vulva differs from all known species of the genus. However, the epigyne of the new species most closely resembles *A. scupiensis*, but the median septum is not strongly narrowing posteriorly and the openings (atriums) are not curved anteriorly. The vulva differs in the shape and the width of the sclerotized anterior margin of the atria and in the size of the spermathecae which are conspicuously less elongated anteriorly (Figs 4g-h, 5a-b).

Description. As mentioned in introduction, the somatic and genital characters of the new species correspond to those of the genus *Agraecina*.

Female

Measurements (n = 3) (min.–max. (average))**.** Total length 4.64-5.64 (5.23); prosoma: length 2.10–2.63 (2.39), width 1.57–1.97 (1.77), 1.35 times longer than wide; FL 0.35–0.48 (0.43), FL/PL 0.17–0.20 (0.18), anterior end 1.47–1.58 (1.52) from front edge of prosoma; SL 1.12–1.33 (1.24), SW 0.90–1.08 (1.01), SL/SW 1.23–1.24 (1.23).

Colour. General colouring whitish to pale yellow. Anterior edge of the prosoma and chelicerae darker, fovea brown.

Prosoma. Carapace: anterior part of the cephalic region with long setae, labium as long as wide.

Eyes. Completely absent.

Chelicerae. Basal segment with long setae on the antero-internal side, anterior margin with 3 teeth, largest one in the middle and distal smallest, posterior margin with 2 teeth (Fig. 4e), smallest proximal; fangs stout.

Legs. Length of legs order: IV/I/II/III. Tibiae I–II and metatarsi I–II with two pairs of ventral spines. Claws, number of teeth in the following order I/II/III/IV: 6/6/4/4. Pedipalp: tarsi ventrally with long and dense setae. Trochanters notched.

Opisthosoma. Surface covered with thin adpressed hairs.

Epigyne (Figs 4g, 5a)**.** Only weakly sclerotized on the anterior margins of the A, median septum well-defined with parallel margins (Fig. 4g) that separates the two A. The latter large (greater length about 0.18, greater width about 0.12), their anterior margin oblique with the anterolateral edges directed forward. SP visible through integument.

Vulva (Figs 4h, 5b)**.** SP inclined outwards at about 50°, relatively short (ratio length SP/ shorter length of the CO 0.78-0.85) (Fig. 4h, black dotted-lines), not or hardly curved, not touching in the middle.

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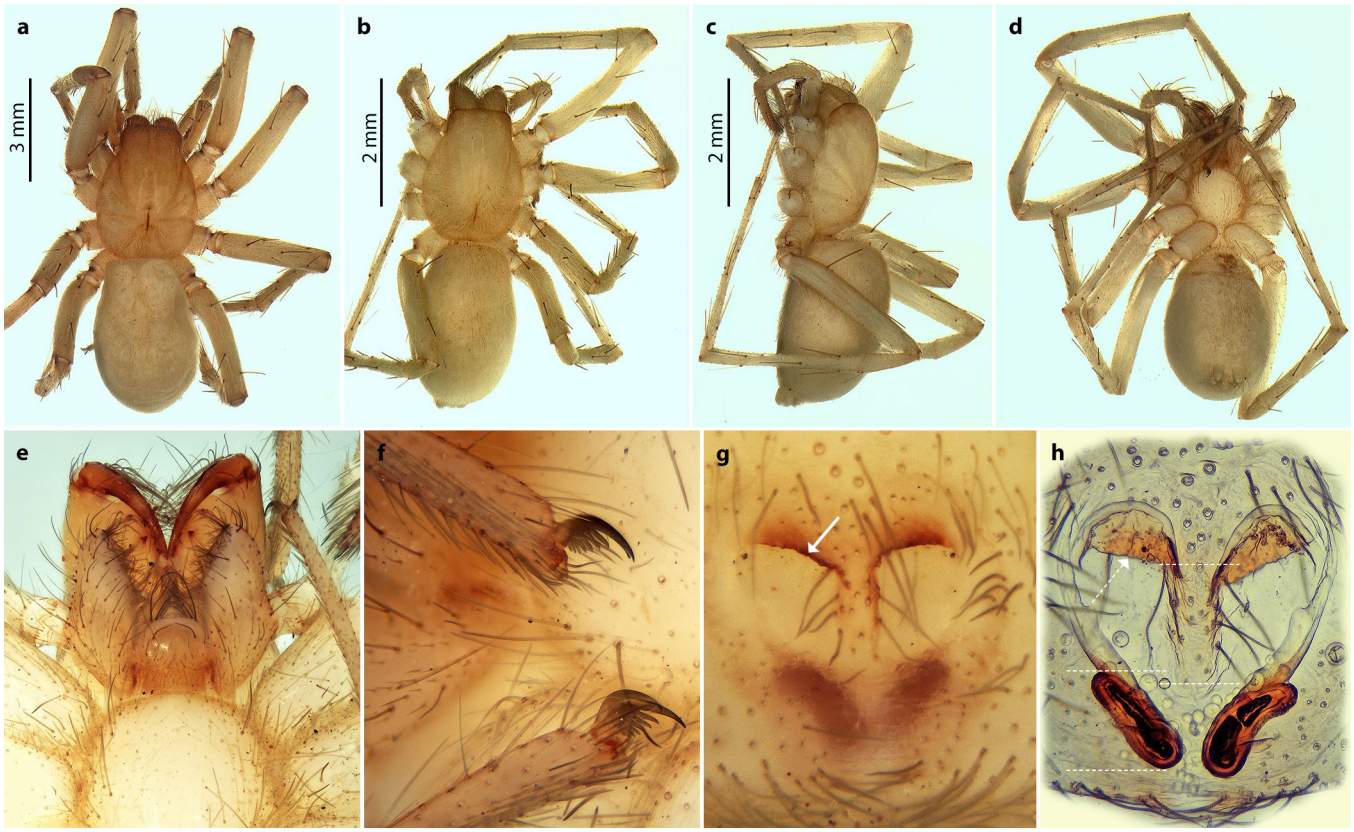


Fig. 4: *Agraecina agadirensis* **spec. nov.**, female. **a.** Holotype, dorsal view; **b-h.** Paratype. **b.** Dorsal view; **c.** Lateral view; **d.** Ventral view; **e.** Prosoma, ventral view; **f.** Tarsal (ta. I) claws; **g.** Epigyne (black arrow: front margin of an atrium); **h.** Vulva, dorsal view (black arrow dotted-line: slerotized front margin of an atrium; black dotted-lines: relative lengths of the spermatheca (from above) and the atrium) (photos: P. Oger)

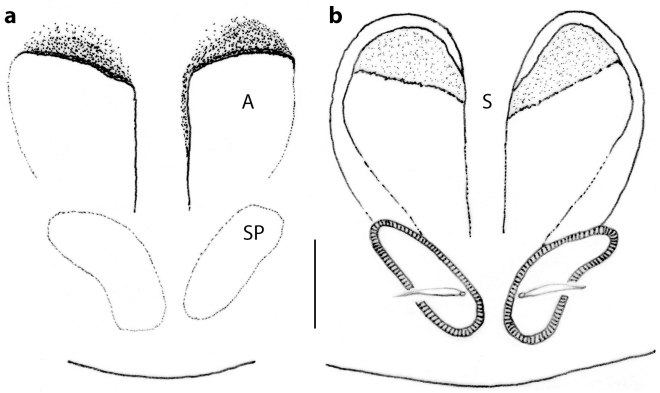


Fig. 5: *Agraecina agadirensis* **spec. nov.**, female, holotype. **a.** Epigyne; **b.** Vulva, dorsal view. Scale line = 0.1 mm. Abbreviations: A – atrium; S – septum; SP – spermatheca (drawings: S. Lecigne)

Male

Unknown.

Distribution and habitat. Only known from the type locality (Tizgui, Morocco) (Fig. 3); in one cave (Imi Ougoug, Ifri Ouado) in the High Atlas Mountains (Fig. 2a).

***Steatoda ifricola* spec. nov.** (Figs 1b, 6a-g, 7a-f, 8a-e)

Type material. Holotype: 1 ♂, MOROCCO: region of Souss-Massa, prefecture of Agadir Ida-Outanane, caïdat of Taghazout, county of Aqsri, village of Tizgui, Ifri N'Telmate cave (9.48244°W, 30.59978°N, 630 m a.s.l.), web between boulders (very dry cave), hand collecting, 27. Dec. 2019, leg. S. Moutaouakil (will be deposited in the SMF). Remark: left pedipalp detached. Paratype: 1 ♀, MOROCCO: region of Souss-Massa, prefecture of Agadir Ida-Outanane, caïdat of Taghazout, Paradise Valley, Ifri Taghrat Wankrim cave (9.51582°W, 30.59151°N, 380 m a.s.l.), same habitat, hand collecting, 4. Nov. 2019, leg. J. Lips (will be deposited in the SMF).

Other material examined. MOROCCO: same locality as holotype, Ifri N'Telmate cave (same coordinates), hand collecting, 1 ♂, 27. Dec. 2019 (leg. S. Moutaouakil, coll. P. Oger); same locality as the holotype, Ifri Imi Ougoug cave, "Grotte des Chauves-souris" area (between the entrance and the first lake) (9.46712°W, 30.61289°N, 780 m a.s.l.), web between boulders, hand collecting, 1 ♀, 28. Dec. 2019 (leg. J. Lips, coll. P. Oger); 1 ♀, same locality as paratype, Ifri Taghrat Wankrim cave (same coordinates), same habitat, hand collecting, 4. Nov. 2019 (leg. J. Lips, coll. P. Oger).

Etymology. The name of the species is derived from the word "Ifri" which, in the Maghreb, refers to a cave.

Diagnosis. Male palp of the new species most closely resembles *S. triangulosa* but, in prolateral view, the cymbium of the latter is about as long as the tibia; in *S. ifricola* the cymbium is distinctly longer than the tibia (Fig. 6e-g). *Steatoda ifricola* also differs by the presence of TTA 2 (Fig. 8b-c). The theridiid tegular apophysis of *S. triangulosa* shows a rounded base and the tip is hook-shaped; TTA 1 of *S. ifricola* is wide at the base but not rounded and the tip is barely bent (Fig. 8a,c). The embolus of *S. triangulosa* shows two parts, the second one is filiform and barely attains the height of the tegular apophysis while that of *S. ifricola* is evenly tapered and markedly extending beyond the tip of TTA 1 (Fig. 8c). Finally, male of *S. ifricola* can be separated from all other *Steatoda* species by the

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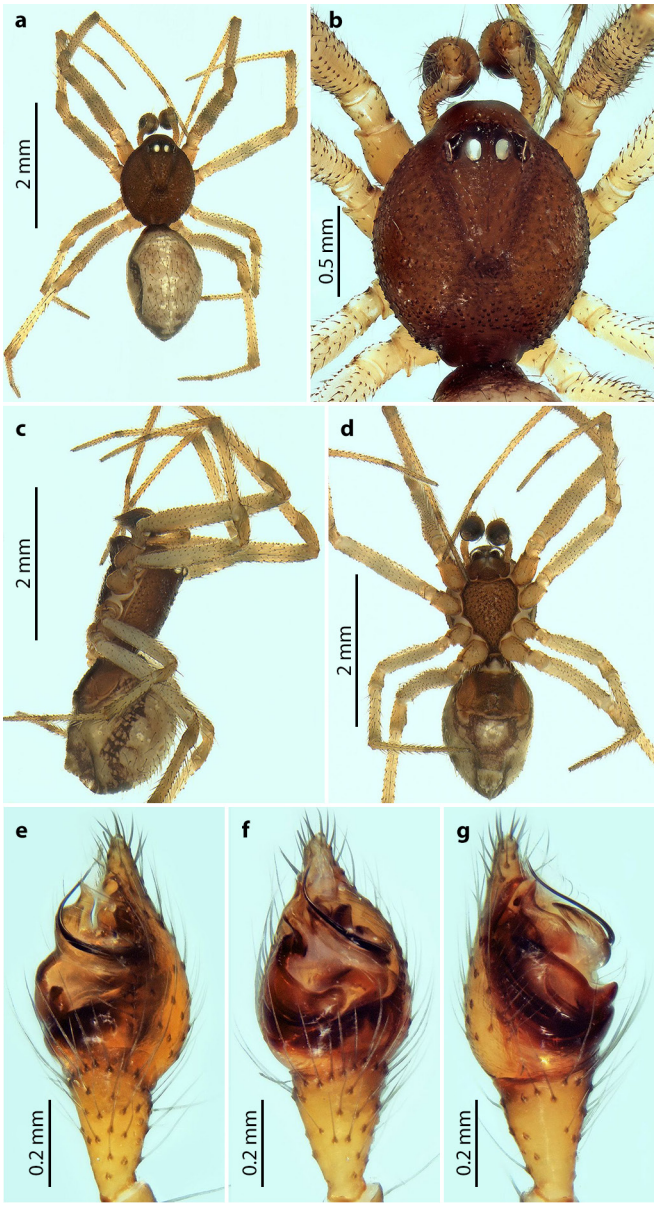


Fig. 6: *Steatoda ifricola* **spec. nov.** male holotype. **a.** Dorsal view; **b.** Prosoma, dorsal view; **c.** Lateral view; **d.** Ventral view; **e.** Palp, retrolateral view; **f.** Idem, ventral view; **g.** Idem, prolateral view (photos: P. Oger)

size and shape of both the two theridiid tegular apophyses, the conductor and the embolus.

The epigyne/vulva also shows some similarities with *S. triangulosa*, but the atrium of *S. ifricola* is larger and presents no interruption of its anterior margin (Fig. 7d-e); the spermathecae of *S. ifricola* are round, neither oval nor oblique (Fig. 7f, 8e). *Steatoda grossa* has a similar vulva but lacks the wide sclerotized median structure present in *S. ifricola* (Fig. 8d). The epigyne of *S. trianguloides* appears to be relatively simple (sensu Bosmans et al. 2019: Fig. 19c) and, unlike *S. ifricola,* it does not have a flattened ellipse-like atrium nor a sclerotized rim at posterior edge of the epigynal plate. Females (Fig. 7) can be distinguished from all other *Steatoda* species by the peculiar pattern and by the shape both of the epigyne (especially the large transverse atrium and the absence of median outgrowth or septum) and the wide sclerotized median structure separating the spermathecae.

Description. Specimens collected clearly belong to *Steatoda* (sensu Levy & Amitai 1982). The carapace is longer than wide, rugose in males, and with a distinct fovea. The male stridulatory ridges on the posterior part of carapace; the lateral eyes not separated. Chelicerae with one promarginal tooth. Legs I longest, legs III shortest. The opisthosoma nearly oval, longer than wide, in the male with sclerotized ridges above pedicel anteriorly. Opisthosoma purplish black with a white anterior belt and with additional dorsal pattern of spots (less marked in male).

Male (Figs 6a-g, 8a-c)
Measurements (n = 2)**.** Total length 3.3–3.5; prosoma: length 1.42–1.48, width 1.19–1.25, 1.19 times longer than wide; SL 0.94–0.97, SW 0.73–0.77, sternum distinctly longer than wide, SL/SW 1.26–1.29; CH 0.35–0.36; fe I 2.00–2.23 long.
Colour. Prosoma, chelicerae, sternum, labium and gnathocoxae light to deep brown, sternum darker at the edges; legs yellowish with vague darker areas (two in the distal half of femorae I and II, one in patellae as well as distally in tibiae and metatarsi).
Prosoma. Carapace with distinct granulation; fovea deep, round; chelicerae relatively slender, armed with one discrete promarginal tooth; sternum broadest between coxae I and II and extending beyond coxa IV where it widens markedly, finely punctuated with black at the insertion of the setae; labium triangular, evenly rounded anteriorly, 1.2 times wider than long.
Eyes. Anterior eye row recurved, posterior eye row straight.
Opisthosoma. With indistinct pattern, general cream colouring, with three more or less distinct median white spots, a brown band on the flanks running backwards over the spinnerets, ringed with brown; ventrally, a white spot behind the epigastric furrow surrounded by a dark band.
Palp (Figs 6e-g, 8a-c)**.** Cymbium distinctly longer than palpal tibia (in prolateral view, ratio length of cymbium / maximum length of tibia about 1.6); cymbium 0.52 long; bulbus with two tegular apophyses, TTA 1 at prolateral side, very wide at the base (Fig. 8c), relatively short, barely extending beyond the distal edge of the bulbus, curved, the terminal part slightly pointing ventrally; TTA 2 at retrolateral side, base wide, extending below the embolus by a thin curved lamellar projection (Fig. 8b); embolus curved and almost reaching tip of cymbium (Fig. 8a); conductor membranous, ovoid in lateral views, with bluntly rounded tip reaching tip of cymbium; retrolateral distal edge of alveolus with internal projection (Fig. 8b-c).

Female (Figs 1b, 7a-f, 8d-e)
Measurements (n = 3) (min.–max. (average)). Total length 3.9–4.1 (4.0); prosoma: length 1.70–1.99 (1.81), width 1.43–1.76 (1.55), 1.17 times longer than wide; SL 1.10–1.33 (1.20), SW 0.83–0.98 (0.88), sternum distinctly longer than wide, SL/SW 1.32–1.41 (1.36); CH 0.36; fe I 2.77–3.30 (3.04) long.
Colour. Prosoma sternum and chelicerae light brown, the latter darker apically, labium and gnathocoxae light brown (pale on their anterior edges), sternum darker at the edges; legs as in males. Opisthosoma (Fig. 7a-b) purple, dorsally with a white anterior belt and several series of white spots (one

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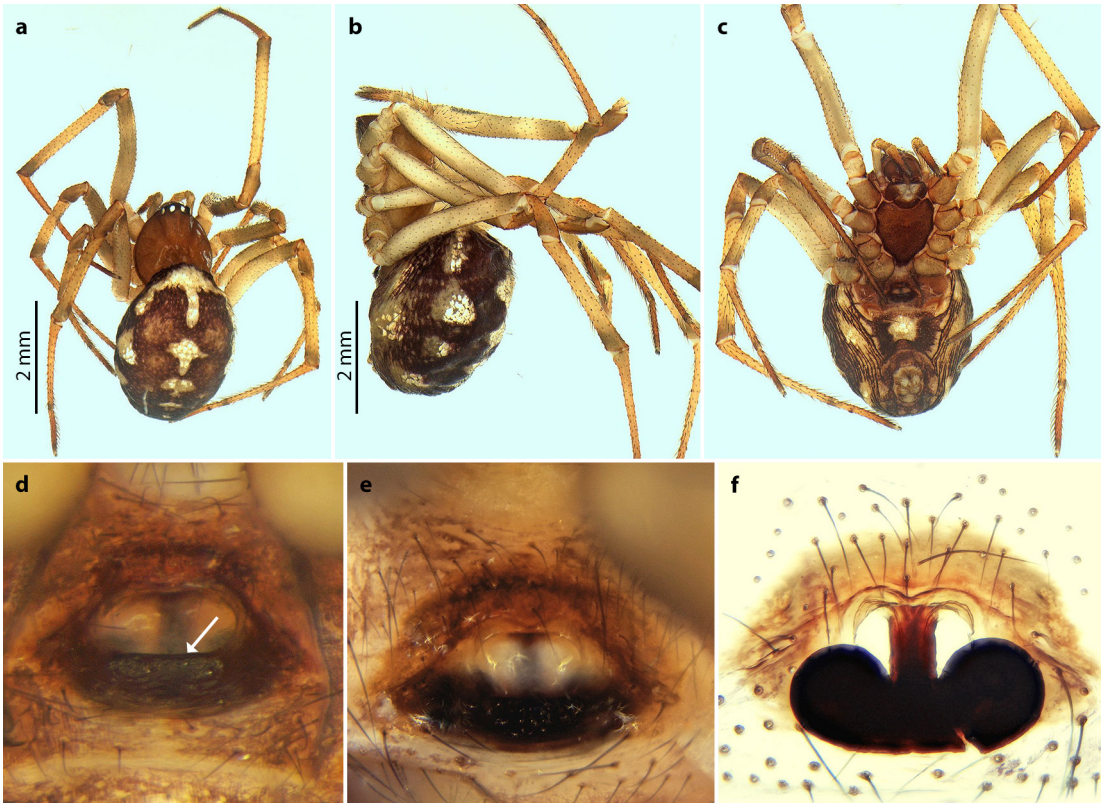


Fig. 7: *Steatoda ifricola* **spec. nov.** female: **a-d.** Paratype. **a.** Dorsal view; **b.** Lateral view; **c.** Ventral view; **d.** Epigyne (white arrow, strongly sclerotized rim of the atrium). **e-f.** Female (Morocco, Imi Ougoug cave, "Grotte des Chauves-souris" area). **e.** Epigyne; **f.** Vulva, dorsal view (photos: P. Oger)

median line of three spots almost touching, two lateral lines consisting of three clearly separated spots, laterally one line of two spots (Fig. 1b) (sometimes less clearly visible); ventrally, a white spot behind the epigastric furrow (Fig. 7c).

Prosoma. Carapace smooth, cephalic part with long setae; fovea shallow; otherwise as in male.

Eyes. Anterior eye row recurved, posterior eye row slightly recurved.

Epigyne (Fig. 7d-e)**.** Consisting of a large atrium wider than long (ratio width/length about 1.4), no septum, internal median structure visible through integument; posterior edge of epigynal plate dark brown, forming a strongly sclerotized rim (Fig. 7d, white arrow) with ridges posteriorly. This sclerotized structure does not reach the epigastric furrow.

Vulva (Fig. 7f)**.** SP round, blackish and massive, separated by a wide sclerotized median structure, anteriorly with an arch made up of two segments.

Distribution and habitat. Only known from two nearby localities of Morocco (Fig. 3); in three natural dry caves in the High Atlas Mountains (Fig. 2b-d).

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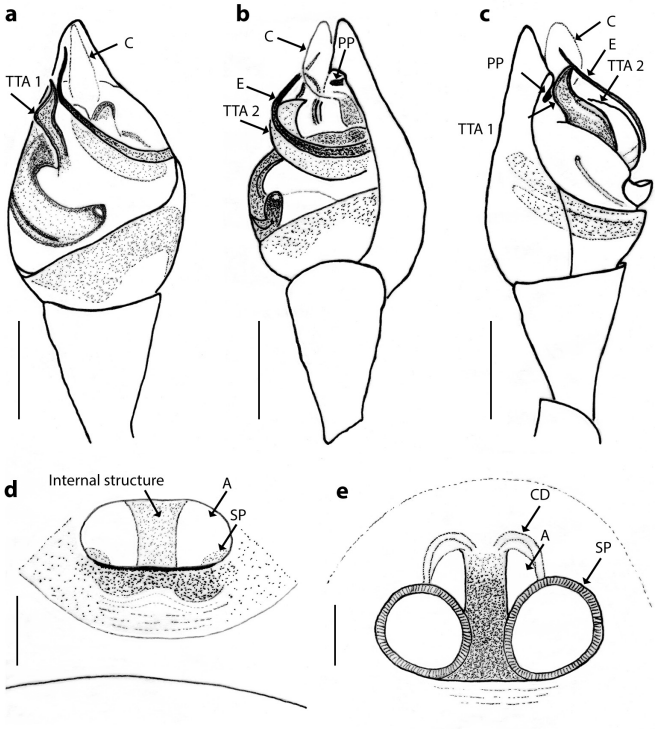


Fig. 8: *Steatoda ifricola* **spec. nov. a-c.** Male, holotype, scale lines = 0.2 mm. **a.** Pedipalp, ventral view; **b.** Idem, retrolateral view; **c.** Idem, prolateral view; **d-e.** Female, scale lines = 0.1 mm; **d.** Paratype, epigyne; **e.** Female (Morocco, Imi Ougoug cave, "Grotte des Chauves-souris" area), vulva, dorsal view. Abbreviations: A – atrium; C – conductor; CD – copulatory ducts; E – embolus; PP – paracymbial projection; SP – spermatheca; TTA 1 – theridiid tegular apophysis 1; TTA 2 – theridiid tegular apophysis 2 (drawings: S. Lecigne)

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References

Bosmans R 1999 The genera *Agroeca*, *Agraecina*, *Apostenus* and *Scotina* in the Maghreb countries (Araneae: Liocranidae). – Bulletin de l'Institut Royal des Sciences Naturelles de Belgique 69: 25-34

Bosmans R, Van Keer J, Russell-Smith A, Hadjiconstantis M, Komnenov M, Bosselaers J, Huber S, McCowan D, Snazell R, Decae A, Zoumides C, Kielhorn K-H & Oger P 2019 Spiders of Cyprus (Araneae). A catalogue of all currently known species from Cyprus. – Newsletter of the Belgian arachnological Society 34, Supplement: 1-173

Bosselaers J 2009 Studies in Liocranidae (Araneae): redescriptions and transfers in *Apostenus* Westring and *Brachyanillus* Simon, as well as description of a new genus. – Zootaxa 2141: 37-55 – doi: 10.11646/zootaxa.2141.1.3

Boubakri A, Bosmans R, Pétillon J & Achouri MS 2020 Description of a new *Agraecina* species from Tunisia (Araneae: Liocranidae), with a review of all species of the genus. – Zootaxa 4772: 195-200 – doi: 10.11646/zootaxa.4772.1.9

Deltshev C & Wang CX 2016 A new *Agraecina* spider species from the Balkan Peninsula (FYR Macedonia) (Araneae: Liocranidae). – Zootaxa 4117: 135-140 – doi: 10.11646/zootaxa.4117.1.8

Georgescu M 1989 Sur trois taxa nouveaux d'aranéides troglobies de Dobrogea (Roumanie). – Miscellanea Speologica Romanica 1: 85-102

Le Peru B 2011 The spiders of Europe, a synthesis of data: Volume 1, Atypidae to Theridiidae. – Mémoires de la Société Linnéenne de Lyon 2: 1-522

Levy G 1998 Araneae: Theridiidae. Fauna Palaestina, Arachnida III. The Israel Academy of Sciences and Humanities, Jerusalem. 228 pp.

Levy G & Amitai P 1982 The cobweb spider genus *Steatoda* (Araneae, Theridiidae) of Israel and Sinai. – Zoologica Scripta 11: 13-30 – doi: 10.1111/j.1463-6409.1982.tb00515.x

Nentwig W, Blick T, Bosmans R, Gloor D, Hänggi A & Kropf C 2020 araneae – Spiders of Europe, version 08.2020. – Internet: https://www.araneae.nmbe.ch (14. Aug. 2020) – doi: 10.24436/1

Oger P 2020 Les araignées de Belgique et de France. – Internet: http://arachno.piwigo.com (14. Aug. 2020)

Quasin S, Siliwal M & Uniyal VP 2019 First report of *Steatoda cingulata* (Thorell, 1890) (Araneae: Theridiidae) from Nanda Devi Biosphere Reserve, Western Himalaya. – Munis Entomology and Zoology 14: 638-642

Van Keer J & Bosmans R 2010 Description of the male of *Steatoda ephippiata* (Araneae: Theridiidae). – Arachnologische Mitteilungen 39: 22-24 – doi: 10.5431/aramit3903

Weiss I & Sárbu S 1994 Die Höhlenspinne *Agraecina cristiani* (Georgescu, 1989) n. comb. (Arachnida, Araneae, Liocranidae). – Verhandlungen des Naturwissenschaftlichen Vereins in Hamburg, Neue Folge 34: 249-257

World Spider Catalog 2020 World spider catalog. Version 21.5. Natural History Museum, Bern. – Internet: https://wsc.nmbe.ch (14. Aug. 2020) – doi: 10.24436/2

Wunderlich J 1992 Die Spinnen-Fauna der Makaronesischen Inseln: Taxonomie, Ökologie, Biogeographie und Evolution. – Beiträge zur Araneologie 1: 1-619

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