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A new species of *Cyrtopholis* Simon, 1892 from Montserrat, with notes on some other Caribbean theraphosines (Araneae: Theraphosidae)

Danniella Sherwood*

Ray Gabriel

Arachnology Research Association, London

*also: Fundación Ariguanabo,

San Antonio de los Baños, Cuba

email: danni.sherwood@hotmail.com

Karl Questel

Agence territoriale de l'environnement de Saint-Barthélemy,

Saint Barthélemy, Lesser Antilles

Christine Rollard

Elise-Anne Leguin

Muséum national d'Histoire naturelle,

Paris, France

Abstract

A new species of the Caribbean genus *Cyrtopholis* Simon, 1892, *Cyrtopholis montserrat* **sp. nov.** is described from the United Kingdom Overseas Territory (UKOT) of Montserrat, based on both sexes. *Cyrtopholis femoralis* Pocock, 1903 is redescribed from the holotype male with the first figures of the genitalia of this Montserrat endemic spider presented. The endemic Saint Barthélemy species *Cyrtopholis antillana* Thorell, 1894 **stat. rev.** is revalidated from synonymy with *Cyrtopholis bartholomaei* (Latreille, 1832) and non-type specimens of both sexes are described and diagnosed. *Cyrtopholis innocua* (Ausserer, 1871), *C. intermedia* (Ausserer, 1875), *C. ischnoculiformis* (Franganillo, 1926), and *C. obsoleta* (Franganillo, 1935) are proposed as **nomina dubia**, and *Cyrtopholis respinus* Franganillo, 1935 is confirmed as a **nomen nudum**.

Keywords: morphology • tarantula • taxonomy

Introduction

The genus *Cyrtopholis* Simon, 1892 currently contains twenty-two species (World Spider Catalog 2024) distributed among some of the islands in the Caribbean sea: *Cyrtopholis bartholomaei* (Latreille, 1832) purportedly from Antigua, Saint Thomas, and Saint Barthélemy; *C. bonhotei* (F. O. Pickard-Cambridge, 1901) from the Bahamas; *C. annectans* Chamberlin, 1917 from Barbados; *C. anacanta* Franganillo, 1935, *C. bryantae* Rudloff, 1995a, *C. gibbosa* Franganillo, 1936a, *C. innocua* (Ausserer, 1871), *C. ischnoculiformis* (Franganillo, 1926), *C. major* (Franganillo, 1926), *C. obsoleta* (Franganillo, 1935), *C. plumosa* Franganillo, 1931a, *C. ramsi* Rudloff, 1995b, *C. regibbosa* Rudloff, 1994, and *C. unispina* Franganillo, 1926 from Cuba; *C. agilis* Pocock, 1903 and *C. cursor* (Ausserer, 1875) from Hispaniola; *C. jamaicola* Strand, 1908 from Jamaica; *C. femoralis* Pocock, 1903 from Montserrat; *C. culebrae* (Petrunkevitch, 1929b) and *C. portoricae* Chamberlin, 1917 from Puerto Rico; *C. intermedia* (Ausserer, 1875) from South America, and *C. flavostriata* Schmidt, 1995 from the British and US Virgin Islands.

Cyrtopholis currently contains seven species described from both sexes, three species described only from males, nine species only from females, one based on a juvenile female, and two where it is not even apparent what sex the specimen is. In almost all these cases, the descriptions are of species from Cuba (Fabiano-da-Silva *et al.* 2020; World Spider Catalog 2024).

In this work, we describe a new species of *Cyrtopholis* from the island of Montserrat, a United Kingdom Overseas Territory (UKOT), and redescribe the previously recorded *C. femoralis*. Furthermore, we propose revised status for several other Caribbean theraphosids as a first step to address the significant lack of taxonomic knowledge found in the genus *Cyrtopholis*.

Material and methods

Specimens were examined under a binocular microscope, photographs of palpal bulbs, tibial apophyses and spermathecae were made using a Leica M125C auto-mountage with images stacked using Helicon Focus software. Description style follows Sherwood *et al.* (2020). Abbreviations, Repositories of material examined: BMNH = Natural History Museum, London, IES = Instituto de Ecología y Sistemática, La Habana, Cuba, MNHC = Museo Nacional de Historia Natural de Cuba, La Habana, Cuba; MNHN = Muséum National d'Histoire Naturelle, Paris, France, NHMW = Naturhistorisches Museum Wien, Vienna, Austria, NHRS = Naturhistoriska Riksmuseet, Stockholm, Sweden, OUMNH = Oxford University Museum of Natural History, Oxford. Type material of the new species is deposited in BMNH. Structures: ALE = anterior lateral eyes, AME = anterior medial eyes, PLE = posterior lateral eyes, PME = posterior medial eyes; PB = prolateral branch (of tibial apophyses); RB = retrolateral branch (of tibial apophyses). Other: coll. = collector; det. = determined by; LHS = left hand side; RHS = right hand side. Leg spine terminology follows Petrunkevitch (1925) with the modifications proposed by Bertani (2001): d = dorsal, v = ventral, r = retrolateral, p = prolateral. Palpal bulb keel terminology follows Bertani (2000) and Gabriel (2016): A = apical keel, PAc = prolateral accessory keel; PI = prolateral inferior keel, PS = prolateral superior keel, TH = tegular heel, with an addition proposed by Gabriel & Sherwood (2020): PC = prolateral crease. Leg formulae starts with the longest leg to the shortest in order of decreasing size, e.g. 4,1,2,3. Urticating setae terminology follows Cooke, Roth & Miller (1972). All measurements in mm.

The following additional type material was examined for this work: holotype ♂ *Cyrtopholis agilis* (BMNH[18]55.1), Santa Domingo; syntypes 2♂♂ *Lyrosceles bonhotei* (BMNH 1899.6.20.2-3), Nassau, Bahamas, coll. J. L. Bonhote; syntypes 8♀♀ *Cyrtopholis cursor* (BMNH 1890.7.1.357), St Domingo, Keyserling collection.

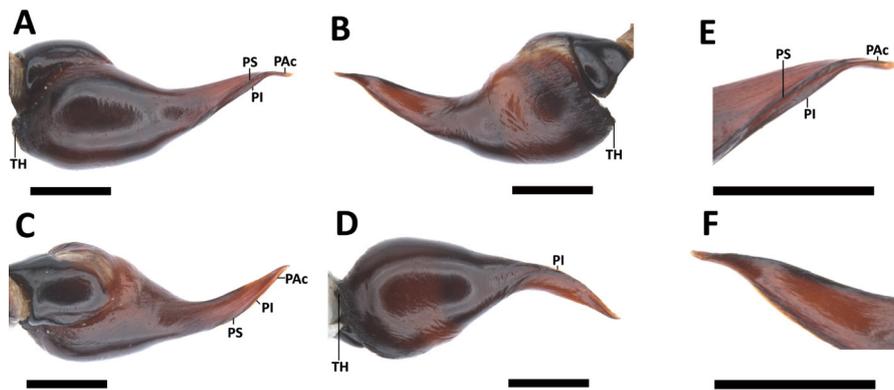


Fig. 1: *Cyrtopholis antillana* Thorell, 1894 stat. rev., non-type male (MNHN AR-17726), palpal bulb (left-hand side). **A** prolateral view; **B** retrolateral view; **C** dorsal view; **D** ventral view; **E** close-up of embolus, prolateral view; **F** close-up of embolus, retrolateral view. Scale bars = 1 mm.

***Cyrtopholis antillana* Thorell, 1894 stat. rev. (Figs. 1–5)**

Cyrtopholis antillana Thorell, 1894: 25.

Cyrtopholis venator: Pocock, 1903: 96 (misidentification).

Cyrtopholis bartholomaei: Petrunkevitch, 1929a: 519 (misidentification).

Type material: Lectotype (designated herein) ♂ and paralectotypes 1♀, 1 imm. (NHRS AJLB000002210), Saint Barthélemy, Mus. Holm ded., Tamerlan Thorell collection No. 24, examined by photographs.

Diagnosis: *Cyrtopholis antillana* stat. rev. most closely resemble males of *C. bartholomaei* but can be differentiated by the thinner and longer RB (RB thicker and shorter in *C. bartholomaei*) and the comparatively longer embolus (embolus comparatively shorter in *C. bartholomaei*). Males can be differentiated from other congeners as follows: from *C. agilis* by absence of a crest on the prolateral keel (crest present in *C. agilis*), from *C. annectans* by the embolus thinning in apical quarter (only thinning slightly near sperm pore in *C. annectans*), from *C. bonhotei* by absence of a palpal tibial apophysis (present in *C. bonhotei*), from *C. bryantae*, *C. gibbosa*, and *C. regibbosa* by the absence of a foveal protuberance (present in *C. bryantae*, *C. gibbosa*, and *C. regibbosa*), from *C. flavostriata* by the wider embolus when seen from dorsal and ventral views (embolus width thin in dorsal and ventral views in *C. flavostriata*), from *C. portoricae* by the embolus not thinning consistently and abruptly in apical half (apical half of embolus thinning notably towards apex in *C. portoricae*), and from *C. ramsi* by the tip of the embolus curved downwards (tip of embolus straight in *C. ramsi*). The female of *C. bartholomaei* is not yet satisfactorily described, therefore cannot be compared.

	I	II	III	IV	Palp
Femur	12.6	10.0	10.7	12.2	7.7
Patella	5.6	3.7	4.7	5.4	3.6
Tibia	10.8	7.2	8.1	11.0	6.8
Metatarsus	9.4	7.2	10.6	14.2	–
Tarsus	6.3	5.4	5.3	6.3	2.5
Total	44.7	33.5	39.4	49.1	20.6

Table 1: *Cyrtopholis antillana* Thorell, 1894 stat. rev. non-type male (MNHN AR-17726), podomere lengths.

Females can readily be distinguished from *C. bryantae*, *C. gibbosa*, and *C. regibbosa* by absence of a foveal protuberance (present in the last three species). Females can be distinguished from those of *C. cursor*, *C. ramsi*, and *C. unispina* by absence of constriction of the receptacle necks (present in *C. cursor*, *C. ramsi*, and *C. unispina*), from *C. flavostriata* and *C. plumosa* by the absence of secondary lobes on the receptacles (present in *C. flavostriata* and *C. plumosa*), and from *C. major* by the receptacles not three times longer than wide (three times longer than wide in *C. major*). The female of *C. bartholomaei* cannot yet be compared (see above). Similarly, females of *C. bonhotei*, *C. femoralis* are totally unknown. Technically, the females of *C. culebrae*, *C. jamaicola*, and *C. portoricae* are described but their spermathecal morphology is unknown and thus an adequate comparison of these species cannot be provided at present.

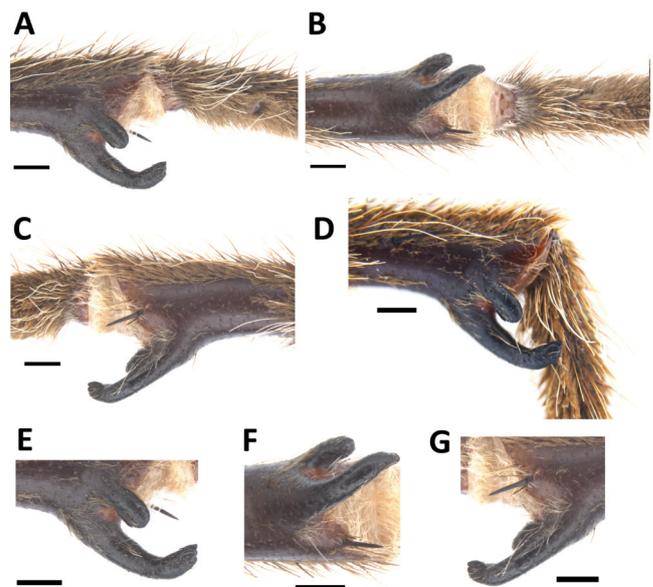


Fig. 2: *Cyrtopholis antillana* Thorell, 1894 stat. rev., non-type male (MNHN AR-17726), palpal, tibial apophysis (left-hand side). **A** prolateral view; **B** ventral view; **C** retrolateral view; **D** tibia I closed against metatarsus, prolateral view; **E** close-up of apophysis, prolateral view; **F** same, ventral view; **G** same, retrolateral view. Scale bars = 1 mm.



Fig. 3: *Cyrtopholis antillana* Thorell, 1894 stat. rev., non-type female (MNHN AR-17726), spermathecae, dorsal view. Scale bar = 1 mm.

Description of non-type male (MNHN AR-17726): Total length including chelicerae 26.6. Carapace length 12.7, width 9.7. Caput slightly raised. Ocular tubercle raised, length 1.3, width 1.8. Eyes: AME > ALE, ALE > PLE, PLE > PME, anterior eye row procurved, posterior row slightly recurved. Clypeus narrow; clypeal fringe long. Fovea deep, recurved. Chelicera length 5.1, width 2.5. Abdomen (damaged) length 8.8, width 6.7. Maxilla with 90–110 cuspules covering approximately 54% of proximal edge. Labium length 1.6, width 1.9, with 70–90 cuspules most separated by 0.5–1.0× width of a cuspule. Labio-sternal mounds joined. Sternum length 5.4, width 5.2, with three pairs of sigilla. Tarsi I–IV fully scopulate. Metatarsal scopulae: I 100%; II 66%; III 35%; IV 14%. Lengths of legs and palpal segments: see Table 1, legs 4,1,3,2. Spination: tibia I v 0–1–1, II d 0–0–1, v 0–0–2, III v 0–1–3, IV d 0–1–0, v 0–1–2, palp p 0–0–1, metatarsus II v 0–0–1 (apical), III d 1–2–2, 0–2–3 (apical), IV d 0–2–2, v 1–4–6 (4 apical). Tibia I with paired tibial apophysis, RB longer than PB each with a single megaspine on inside apex (Fig. 2A–G). Femur III incrassate. Palpal tibia unmodified. Palpal cymbium unmodified. Metatarsus I straight, unmodified, closes on outside of RB (Fig. 2D). Posterior lateral spinnerets with



Fig. 4: *Cyrtopholis antillana* Thorell, 1894 stat. rev. habitus in life, *in situ*, male (left) and female (right).



Fig. 5: *Cyrtopholis antillana* Thorell, 1894 stat. rev., lectotype male (NHRS AJLB000002210). **A** habitus, dorsal view; **B** data label; **C** palpal bulb (undissected), retrolateral view; **D** tibial apophysis, retrolateral view. Photographs by, and courtesy of, Christian Bäckstam.

three segments, basal 2.2, median 1.3, digitiform apical 2.1. Posterior medial spinnerets with one segment. Palpal bulb with weakly developed TH; embolus approximately same length as base of palpal bulb, basally broad, tapering sharply in apical quarter, embolus tip pointed downwards; PS, PI and PAc weakly developed, PC present and constricted in apical half (Fig. 1A–F). Type I urticating setae present dorsally. Stridulation organ with claviform stridulatory setae present on prolateral face of trochanter I and retrolateral face of the palpal trochanter. Colour in alcohol preserved brown.

Description of non-type female (MNHN AR-17726): Total length including chelicerae 37.4. Carapace (damaged) length 13.3, width 11.1. Caput raised. Ocular tubercle slightly raised, length 1.3, width 1.9. Eyes: AME > ALE, ALE > PLE, PLE > PME, anterior row procurved, posterior row recurved. Clypeus narrow; clypeal fringe long. Fovea deep, recurved. Chelicera length 7.3, width 2.7. Abdomen length (damaged) 16.8, width 10.4. Maxilla with 60–70 cuspules, covering approximately 39% of proximal edge. Labium length 1.7, width 2.1, with 50–60 labial cuspules, most separated by 0.5–1.0× width of a single cuspule. Labio-sternal mounds joined. Sternum length 6.1, width 5.4, with three pairs of sigilla. Tarsi I–IV fully scopulate. Metatarsal scopulae: I 100%; II 76%; III 56%; IV 16%. Lengths of leg and palpal segments: see Table 2, legs 4,1,2,3. Spination: tibia III d 0–2–0, v 0–0–2, IV v 0–0–2, tibia p 0–0–2, metatarsus I v 0–0–1 (apical), II v 0–0–3 (apical), III d 1–1–2, v 0–1–3 (apical), IV d 0–0–2, v 3–2–4 (3 apical). Posterior lateral spinnerets with three segments: (not measured due to fragility). Posterior medial spinnerets with one segment. Spermathecae with two receptacles, elongate, terminating in single lobes, indistinguishable from

	I	II	III	IV	Palp
Femur	9.7	9.2	7.9	10.1	6.0
Patella	5.6	5.6	4.4	5.2	4.5
Tibia	7.6	6.7	5.0	8.1	5.8
Metatarsus	6.1	6.2	6.0	9.9	–
Tarsus	4.1	4.5	4.6	4.9	5.0
Total	33.1	32.2	27.9	38.2	21.3

Table 2: *Cyrtopholis antillana* Thorell, 1894 stat. rev., non-type female (MNHN AR-17726), podomere lengths.

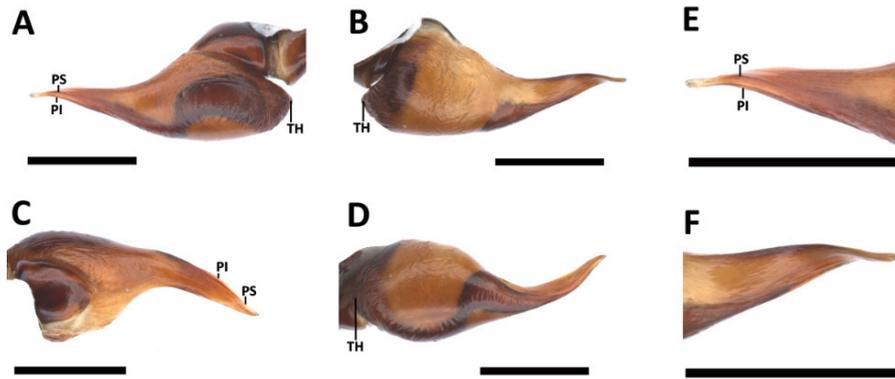


Fig. 6: *Cyrtopholis femoralis* Pocock, 1903, holotype male (BMNH 1886.113), palpal bulb (right-hand side). **A** prolateral view; **B** retrolateral view; **C** dorsal view; **D** ventral view; **E** close-up of embolus, prolateral view; **F** close-up of embolus, retrolateral view. Scale bars = 1 mm.

neck of receptacles (Fig. 3). Type I urticating setae present dorsally. Stridulation organ with claviform stridulatory setae present on prolateral face of trochanter I and retrolateral face of the palpal trochanter. Colour in alcohol preserved brown.

Other material examined: Non-types 3♂♂, 1♀, 1 imm. ♀ (MNHN AR-17726), Saint Barthélemy, coll. K. Questel.

Status: This species is still common on Saint Barthélemy (Fig. 4; KQ pers. obs.).

Distribution: Known only from Saint Barthélemy, Lesser Antilles.

Remarks: Thorell (1894) described *C. antillana*, without illustrations, from both sexes. We hereby designate the male as the lectotype as it has more informative characters than the paralectotypes, most importantly the genitalia are able to be interpreted (Fig. 5). The presence of a PAc may further differentiate this species from most other male congeners, but investigation in the genus broadly is ongoing, and closer examination of several species is needed to rule out the possibility a PAc has been overlooked in these taxa before we can state this with certainty. *Cyrtopholis antillana* was synonymised with '*Cyrtopholis venator*' by Pocock (1903) without proper justification. This latter name is nomenclaturally complex and outside the aim of this work (Sherwood *et al.* in preparation) but suffice to say that '*C. venator*' *sensu* Pocock (1903) was subsequently considered as *C.*

bartholomaei by subsequent workers (Strand 1907: 26; Chamberlin 1917: 42; Petrunkevitch 1929a: 519) and this is why *C. antillana* has been considered a junior synonym of this species until the present day (World Spider Catalog 2024). Measurements and detailed images were taken from non-type specimens as dissections and further manipulation of the types were not possible.

Our examination of the palpal bulb and tibial apophysis morphology of this species show it is distinct from material on Antigua and Saint Thomas previously assigned to *C. bartholomaei* (see World Spider Catalog 2024). Therefore, we revalidate *Cyrtopholis antillana* *stat. rev.* The taxonomic identity of *C. bartholomaei* (Latreille, 1832) *sensu stricto* has been confused by numerous previous workers which will be addressed in detail in a later work (Sherwood *et al.* in preparation). However, we must note that Pocock (1903) and Petrunkevitch (1925: 28) stated that *C. bartholomaei* was described from Saint Barthélemy but this is erroneous because Latreille (1832) actually named this species in honour of a local French politician M. Bartliélemi from Marseille and made no mention of the island of Saint Barthélemy. Indeed, Latreille (1832) only mentioned this species hails from l'Amérique méridionale (= South America).

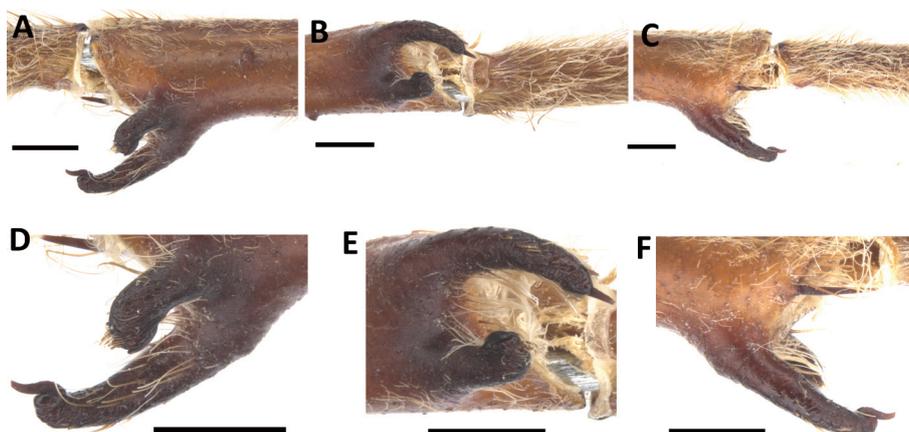


Fig. 7: *Cyrtopholis femoralis* Pocock, 1903, holotype male (BMNH 1886.113), tibial apophysis (right-hand side). **A** prolateral view; **B** ventral view; **C** retrolateral view; **D** close-up of apophysis, prolateral view; **E** same, ventral view; **F** same, retrolateral view. Scale bars = 1 mm.



Fig. 8: *Cyrtopholis femoralis* Pocock, 1903, holotype male (BMNH 1886.113), habitus of specimen and data labels, all to scale, showing minute size of holotype. Scale bar = 10 mm.

Cyrtopholis femoralis Pocock, 1903 (Figs. 6–8)

Cyrtopholis femoralis Pocock, 1903: 96.

Type material: Holotype ♂ (BMNH 1886.113), Montserrat, [coll. Sir A. Alderley, see Pocock (1903), no date given], examined.

Diagnosis: *Cyrtopholis femoralis* can readily be distinguished from *C. montserrat* sp. nov. by the smaller total body length (24.8 v. 38.5 in *C. montserrat* sp. nov.), the short embolus, curved downwards at apex in prolateral view (embolus longer (as long as base of bulb) and curved upwards at apex in prolateral view in *C. montserrat* sp. nov.), and the more elongate RB with curved megaspine situated apically (RB comparatively shorter and megaspine situated more medially at apex and not curved in *C. montserrat* sp. nov.). The male also differs from other known male congeners as follows: from *C. agilis* by absence of a crest on the prolateral keel (crest present in *C. agilis*), from *C. antillana* stat. rev., *C. bartholomaei*, and *C. ramsi* by the shorter embolus (embolus length greater than length of base of palpal bulb in *C. antillana* stat. rev., *C. bartholomaei*, and *C. ramsi*), from *C. annectans* by the thinning of the embolus in the apical quarter (thinning only near sperm pore in *C. annectans*), from *C. bonhotei* by the downwardly curved embolus and absence of a palpal tibial apophysis (embolus curved strongly upwards and apophysis present on palpal tibia in *C. bonhotei*), from *C. flavostriata* by the much wider embolus when seen from dorsal and ventral views (embolus width thin in dorsal and ventral views in *C. flavostriata*), from *C. portoricae* by the embolus not

strongly tapered in width in apical half (apical half of embolus thinning notably towards apex in *C. portoricae*), and from *C. bryantae*, *C. gibbosa*, and *C. regibbosa* by the absence of a foveal protuberance (present in *C. bryantae*, *C. gibbosa*, and *C. regibbosa*). The female of *C. femoralis* is not formally taxonomically described and therefore cannot be compared here. Nonetheless, given the distinct short-range distribution of other congeners, usually restricted to a single island, all species except *C. montserrat* sp. nov. can tentatively be differentiated from *C. femoralis* based on their different geographic distribution.

Description of holotype male: Total length including chelicerae 24.8. Carapace length 9.5, width 8.2. Caput slightly raised. Ocular tubercle raised, length 0.7, width 1.4. Eyes: ALE > AME, AME > PLE, PLE > PME, anterior eye row procurved, posterior row slightly recurved. Clypeus narrow; clypeal fringe long. Fovea deep, transverse. Chelicera length 5.1, width 1.8. Abdomen length 10.2, width 6.6. Maxilla with 70–75 cuspules covering approximately 41% of proximal edge. Labium length 1.1, width 1.8, with 35–40 cuspules most separated by 0.5–1.0× width of a cuspule. Labio-sternal mounds joined. Sternum length 4.0, width 3.5, with three pairs of sigilla. Tarsi I–III fully scopulate, tarsus IV divided by band of setae. Metatarsal scopulae: I 100%; II 65%; III 35%; IV 8%. Lengths of legs and palpal segments: see Table 3, legs 4,1,2,3. Spination: tibia I d 0–1–0, v 0–1–1, II d 1–1–0, v 0–1–2, III d 1–1–0, v 0–1–2, IV d 0–0–1, v 0–2–4, palp (RHS aspinose, LHS p 0–0–1), metatarsus I v 0–0–1 (apical), II v 0–0–3 (apical), III d 2–1–0, v 0–2–4 (apical), IV d 1–2–0, v 3–4–6 (4 apical). Tibia I with paired tibial apophysis, RB longer than PB, each with single megaspine, RB megaspine curved and situated apically (Fig. 7A–F). Femur III heavily incrassate. Palpal tibia unmodified. Palpal cymbium unmodified. Metatarsus I straight, unmodified, closes against outside of RB (not photographed due to fragility). Posterior lateral spinnerets with three segments: basal 2.1, median 0.8, digitiform apical 2.0. Posterior medial spinnerets with one segment. Palpal bulb with developed TH; embolus shorter than base of palpal bulb, basally broad, tapering sharply in apical quarter, embolus tip pointed downwards; PS and PI weakly developed, PC present and constricted in apical third (Fig. 6). Type I urticating setae present dorsally. Stridulation organ with claviform stridulatory setae present on prolateral face of trochanter I and retrolateral face of the palpal trochanter. Colour in alcohol preserved brown (Fig. 8).

Distribution: Montserrat.

Status: *Cyrtopholis femoralis* is common in the north of Montserrat including urban areas; populations in the Centre Hills have been the focus of dedicated ecological study in recent years (Garcia *et al.* 2021). Whether or not this species occurs (or occurred) in the exclusion zone in the South (enacted in response to prior volcanic eruptions) requires future investigation.

Remarks: Whilst examining this type specimen to compare to *C. antillana* we noticed that *C. femoralis* had different morphology to other Montserrat specimens examined in the Natural History Museum, London, revealing the BMNH

	I	II	III	IV	Palp
Femur	9.1	8.2	7.3	8.3	5.4
Patella	4.6	3.6	3.5	4.6	2.4
Tibia	8.2	6.0	5.5	7.7	5.1
Metatarsus	6.7	7.0	7.5	10.9	–
Tarsus	4.2	4.3	4.4	4.4	1.9
Total	32.8	29.1	28.2	35.9	14.8

Table 3: *Cyrtopholis femoralis* Pocock, 1903, holotype male (BMNH 1886.113), podomere lengths.

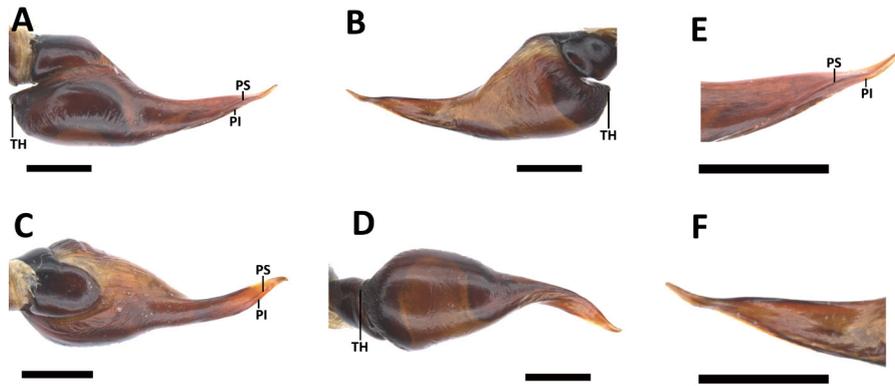


Fig. 9: *Cyrtopholis montserrat* sp. nov., holotype male (BMNH 1886.113), palpal bulb (left-hand side). **A** prolateral view; **B** retrolateral view; **C** dorsal view; **D** ventral view; **E** close-up of embolus, prolateral view; **F** close-up of embolus, retrolateral view. Scale bars = 1 mm.

specimens to be a new species, described below. Thus, it was important to redescribe here the holotype of *C. femoralis* for comparison. The holotype is a formerly pinned specimen, and the collector and date of collection are missing from the label, though this lack of information is common for theraphosids from the early to late 1800s which were previously held in the dried collection of the museum until the 1960s. The right-hand side palpal tibia is aspinose but the left-hand palpal tibia has one prolateral spine. We have not observed an aspinose palpal tibia before in a Caribbean theraphosine. The female has been depicted in habitus and with exuviae in a technical report (Garcia *et al.* 2021), which also included ecological observations on this species, but has not been formally taxonomically described.

Cyrtopholis montserrat sp. nov. (Figs. 9–13)

Type material: Holotype ♂ (BMNH 1886.113), Montserrat, [coll. Sir A. Alderley, see Pocock (1903), no date given]; paratype 1 ♂ (BMNH 1934.5.16.1), Montserrat, B.W.I., coll. HMS “Achilles”, *Cyrtopholis* sp. det. R. Gabriel 05 January 2008; paratypes 4 ♀♀ (BMNH 1934.5.16.2–5), Montserrat, coll. HMS “Achilles”; paratypes 1 imm. ♀, 2 imm. (BMNH 1931.5.11.1–3), Montserrat, B.W.I., coll. Lt. F. H. Mansell, R.N., HMS “Dorsetshire”, *Cyrtopholis* sp. det. R. Gabriel 05 August 2008.

Diagnosis: *Cyrtopholis montserrat* sp. nov. can be readily distinguished from the holotype of *C. femoralis* by its larger total body length (38.5 v. 24.8 in *C. femoralis*), the embolus longer and curved upwards at apex (embolus shorter and curved downwards at apex in *C. femoralis*), and the RB comparatively shorter with megaspine situated more medially at apex and not curved (RB comparatively longer with curved megaspine situated apically in *C. femoralis*). It differs from all other known male congeners by as follows: from *C. agilis* by absence of a crest on the prolateral keel (crest present in *C. agilis*), from *C. annectans* by the embolus thinning in apical quarter (only thinning slightly near sperm pore in *C. annectans*), from *C. bonhotei* and *C. ramsi*

by the downwardly curved embolus (embolus upwardly curved in *C. bonhotei* and *C. ramsi*), further from *C. bonhotei* by absence of a palpal tibial apophysis (present in *C. bonhotei*), from *C. flavostriata* by the wider embolus when seen from dorsal and ventral views (embolus width thin in dorsal and ventral views in *C. flavostriata*), from *C. portoricae* by the embolus not thinning consistently and abruptly in apical half (apical half of embolus thinning notably towards apex in *C. portoricae*), and from *C. bryantae*, *C. gibbosa*, and *C. regibbosa* by the absence of a foveal protuberance (present in *C. bryantae*, *C. gibbosa*, and *C. regibbosa*). Females can be distinguished from other known congeners as follows: from *C. bryantae*, *C. gibbosa*, and *C. regibbosa* by the aforementioned absence of a foveal protuberance, from *C. antillana* stat. rev. by the receptacles not much longer than wide (receptacles longer than wide in *C. antillana* stat. rev.), from *C. cursor*, *C. ramsi*, and *C. unispina* by absence of neck constriction on the receptacles (constriction present in *C. cursor*, *C. ramsi*, and *C. unispina*), from *C. flavostriata* and *C. plumosa* by the absence of secondary lobes on the receptacles (present in *C. flavostriata* and *C. plumosa*), from *C. major* by the receptacles not three times longer than wide (three times longer than wide in *C. major*). The female of *C. bartholomaei* cannot yet be compared (see above). The females of *C. bonhotei* and *C. femoralis* are undescribed; the spermathecal morphology of *C. culebrae*, *C. jamaicola*, and *C. portoricae* are unknown and thus these species also cannot be diagnosed here despite being described from females.

Etymology: The specific epithet is a noun in apposition, formed from the name of the country of origin, recognising the unique habitats and biodiversity found on Montserrat, and the efforts of local scientists and officials to conserve it.

Description of holotype male: Total length including chelicerae 38.5. Carapace length 15.8, width 13.1. Caput slightly raised. Ocular tubercle raised, length 1.5, width 2.0. Eyes: AME > ALE, ALE > PLE, PLE > PME, anterior eye row procurved, posterior row slightly recurved. Clypeus narrow; clypeal fringe medium. Fovea slightly recurved. Chelicera length 7.2, width 3.2. Abdomen length 15.5, width 18.3. Maxilla with 90–100 cuspules covering approx-

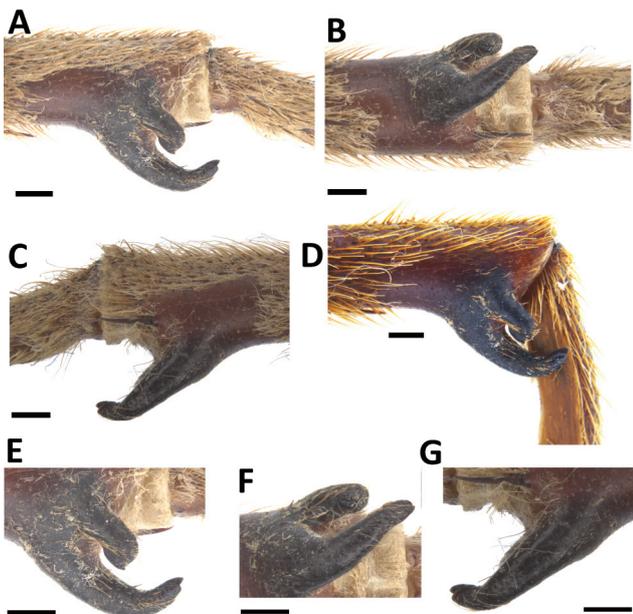


Fig. 10: *Cyrtopholis montserrat* sp. nov., holotype male (BMNH 1886.113), tibial apophysis (left-hand side). **A** prolateral view; **B** ventral view; **C** retrolateral view; **D** tibia I closed against metatarsus, prolateral view; **E** close-up of apophysis, prolateral view; **F** same, ventral view; **G** same, retrolateral view. Scale bars = 1 mm.

imately 49% of proximal edge. Labium length 1.5, width 2.0, with 45–50 cuspules, most separated by 0.5–1.0× width of a cuspule. Labio-sternal mounds joined. Sternum length 6.2, width 5.8, with three pairs of sigilla. Tarsi I–IV fully scopulate. Metatarsal scopulae: I 100%; II 100%; III 56%; IV 14%. Lengths of legs and palpal segments: see Table 4, legs 4,1,2,3. Spination: femur II d 0–0–1, tibia I v 0–1–1, II d 0–1–1, v 0–2–4, III d 1–2–2, v 0–3–3 IV d 0–2–1, v 0–3–5, palp p 0–0–2, metatarsus I v 0–0–1 (apical), II d 0–0–1, v 1–0–2 (apical), III d 1–2–1, v 1–1–4 (apical), IV d 1–2–2, v 2–4–8 (4 apical). Tibia I with paired tibial apophysis, RB longer than PB, each with single megaspine, RB megaspine situated medially at apex and not curved (Fig. 10A–G). Femur III incrassate. Palpal tibia unmodified. Palpal cymbium unmodified. Metatarsus I slightly curved, closes on outside of RB (Fig. 10D). Posterior lateral spinnerets with three segments: basal 3.1, median 1.6, digitiform apical 2.4. Lateral median spinnerets with one segment. Palpal bulb with developed TH; embolus approximately same length as base of palpal bulb, basally broad, tapering sharply in apical quarter, embolus tip pointed upwards; PS and PI weakly developed, PC present and constricted in apical half (Fig. 9A–F). Type I urticating setae present dorsally. Stridulation

	I	II	III	IV	Palp
Femur	13.5	13.0	11.6	13.3	9.0
Patella	6.6	6.5	6.1	6.5	4.8
Tibia	11.3	10.4	8.5	11.0	7.2
Metatarsus	10.5	11.3	12.5	15.5	–
Tarsus	7.1	6.5	6.7	7.9	3.0
Total	49.0	47.7	45.4	54.2	24.0

Table 4: *Cyrtopholis montserrat* sp. nov., holotype male (BMNH 1886.113), podomere lengths.



Fig. 11: *Cyrtopholis montserrat* sp. nov., holotype male (BMNH 1886.113), habitus of specimen and data labels.

organ with claviform stridulatory setae present on prolateral face of trochanter I and retrolateral face of the palpal trochanter. Colour in alcohol preserved brown (Fig. 11).

Description of paratype female (BMNH 1934.5.16.2–5): Total length including chelicerae 42.8. Carapace length 15.5, width 12.7. Caput raised. Ocular tubercle slightly raised, length 1.5, width 2.2. Eyes: ALE > AME, AME > PLE, PLE > PME, anterior row procurved, posterior row recurved. Clypeus narrow; clypeal fringe long. Fovea deep, slightly recurved. Chelicera length 7.8, width 3.7. Abdomen length 19.5, width 15.9. Maxilla with 80–90 cuspules, covering approximately 45% of proximal edge. Labium length 1.9, width 2.1, with 45–55 labial cuspules, most separated by 0.5–1.0× width of a single cuspule. Labio-sternal mounds joined. Sternum length 6.7, width 6.2, with three pairs of sigilla. Tarsi I–IV fully scopulate. Metatarsal scopulae: I 100%; II 100%; III 53%; IV 9%. Lengths of leg and

	I	II	III	IV	Palp
Femur	11.2	10.0	8.2	11.4	8.2
Patella	6.6	5.8	5.7	4.7	4.6
Tibia	8.6	7.2	6.3	9.0	6.5
Metatarsus	6.7	7.1	7.3	11.5	–
Tarsus	4.3	5.1	4.8	5.9	5.8
Total	37.4	35.2	32.3	42.5	25.1

Table 5: *Cyrtopholis montserrat* sp. nov., paratype female (BMNH 1934.5.16.2–5), podomere lengths.

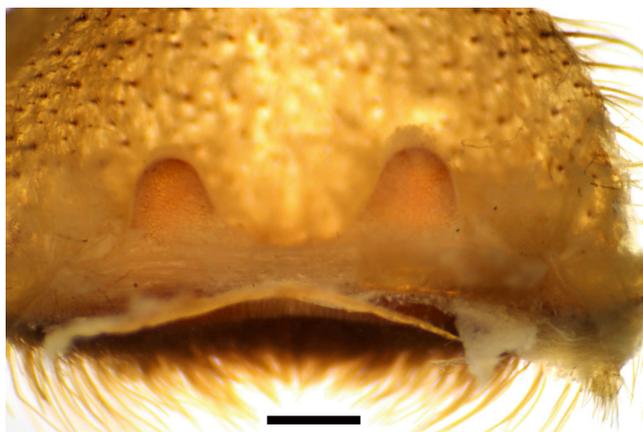


Fig. 12: *Cyrtopholis montserrat* sp. nov., paratype female (BMNH 1934.5.16.2–5), spermathecae, dorsal view. Scale bar = 1 mm.

palpal segments: see Table 5, legs 4,1,2,3. Spination: tibia II v 0–1–3, III d 0–2–0, v 0–1–3, IV d 0–1–1, v 0–2–2, palp p 0–0–1, metatarsus II v 0–0–3 (apical), III d 2–2–1, v 0–2–3 (apical), IV d 0–2–2, v 1–3–6 (3 apical). Posterior lateral spinnerets with three segments: basal 2.4, medial 1.7, digitiform apical 2.6. Posterior medial spinnerets with one segment. Spermathecae with two receptacles, short, terminating in single lobes, indistinguishable from neck of receptacles (Fig. 12). Type I urticating setae present dorsally. Stridulation organ with claviform stridulatory setae present on prolateral face of trochanter I and retrolateral face of the palpal trochanter. Colour in alcohol preserved brown (Fig. 13).

Distribution: Known only from the type locality, Montserrat.

Status: Unknown, this species has not been collected since the 1930s, when the paratypes were collected. Recent survey efforts have been focused on the Centre Hills (García *et al.* 2021) and have only yielded *C. femoralis*. Further fieldwork is needed to ascertain if this species still occurs on the island, although initial work appears to show it does not occur in the north of the island. If not extinct due to past eruptions of the Soufrière Hills stratovolcano, it is possible that it occurs much further south in the exclusion zone. During the time that known specimens were collected, the capital city Plymouth was still populated and was an onshore stopping point on voyages.

Remarks: Pocock (1903) noted material collected by Sir A. Alderley from Montserrat, which he assigned to *C. bartholomaei* (*nec* *Cyrtopholis venator*). The holotype males of both *C. femoralis* and *C. montserrat* sp. nov. share an accession number as they were accessioned at the BMNH simultaneously. Thus, it is possible that these species once lived in sympatry. However, *C. montserrat* sp. nov. has never been collected again to our knowledge since the paratypes were collected in the 1930s. The status of this species presently must be investigated through further fieldwork. We cannot say for certain whether volcanic eruptions in Montserrat may have impacted *C. montserrat* sp. nov. but equally cannot rule it out at this stage.



Fig. 13: *Cyrtopholis montserrat* sp. nov., paratype female (BMNH 1934.5.16.2–5), habitus of specimen and data labels.

Notes on other taxa

The following species need comment, but do not require comprehensive redescrptions or new type designations like some other species (i.e. *C. bartholomaei*); therefore, we take the opportunity to propose them in the present work.

Cyrtopholis innocua (Ausserer, 1871) *nomen dubium*

Crypsidromus innocuus Ausserer, 1871: 194–195.

Cyrtopholis innocuus: Simon (1903): 931.

Type material: Holotype not located in BMNH nor NHMW, considered lost.

Remarks: Ausserer (1871: 195) described *C. innocua* (as *Crypsidromus innocuus*) as originating from “Havannah” (= Havana), and stated that the species was similar to, but smaller than, *Crypsidromus isabellinus* Ausserer, 1871 (Ausserer 1871: 194). One specimen with a label stating “*Eurypelma* C. L. Koch, 1840 90.7.1.350 (= accession number BMNH 1890.7.1.350) was apparently considered by Argentinian arachnologists Rita Schiapelli and Berta Gerschman as *C. innocuus*, as noted on a typed label (in Spanish) also present in the jar (DS and RG pers. obs.). However, because the specimen does not carry the original type locality and has no historical label indicating it may be a type specimen from Ausserer’s collection, it cannot be considered the type. Most likely, Gerschman and Schiapelli considered this specimen as the type due to similar body measurements, but this is not enough to be certain it is the same specimen. Ausserer (1871) stated that *C. innocua* is smaller than *C. isabellinus* (a small adult female, holotype examined in NHMW) which may indicate it is a juvenile, but the possibility it was a very small female like *C. isabellinus* cannot be ruled out. Therefore, given the absence of type material, the possible immaturity of the holotype, and the poor original description which does not provide characters which could make this species recognisable in the future, we propose *Cyrtopholis innocua* be regarded as a *nomen dubium*.

Cyrtopholis intermedia* (Ausserer, 1875) *nomen dubium

Crypsidromus intermedius Ausserer, 1875: 180.

Cyrtopholis intermedius: Schiapelli & Gerschman (1979): 297.

Type material: Holotype ♀ not located in BMNH nor NHMW, considered lost.

Remarks: Ausserer (1875: 181) described *C. intermedia* from a single female with the type locality “Südamerika?”. The original description did not provide characters which would unequivocally identify this species from congeners. Therefore, based on the absence of the type material, the imprecise type locality which prohibits collection of topotypes, and the poor original description, we propose *C. intermedia* be regarded as a *nomen dubium*.

Cyrtopholis ischnoculiformis* (Franganillo, 1926) *nomen dubium

Cyclosternum ischnoculiforme Franganillo, 1926: 43, fig. 1.

Cyrtopholis implumis: Franganillo (1931b): 285, fig. 18. (unjustified replacement name)

Cyclosternum ischnoculiforme: Roewer (1942): 228.

Cyrtopholis ischnoculiformis: Fabiano-da-Silva *et al.* (2020): 87. (*species inquirenda*)

Type material: Holotype imm. (IES 30), Monte Cocuyo, Habana, Cuba, Franganillo colln., examined.

Remarks: As mentioned by Fabiano-da-Silva *et al.* (2020) the holotype of *C. ischnoculiformis* is an immature specimen. The type locality is identical to that of *C. unispina*, and the specimens were found in the same habitat, under stones. We considered the possibility *C. ischnoculiformis* may be a senior synonym of *C. unispina* but because the holotype is immature and *Cyrtopholis* species are indistinguishable as juveniles (pers. obs.) this cannot be confirmed beyond doubt. Therefore, given the holotype is immature and possesses no features which make this species unequivocally recognisable, we propose *C. ischnoculiformis* be regarded as a *nomen dubium*.

Cyrtopholis obsoleta* (Franganillo, 1935) *nomen dubium

Stichoplastus obsoletus Franganillo, 1935: 24.

Stichoplastus obsoletus: Franganillo (1936b): 22, fig. 5.

Cyrtopholis obsoletus: Rudloff (1997): 14.

Cyrtopholis obsoleta: Fabiano-da-Silva *et al.* (2020): 87. (*species inquirenda*)

Type material: Holotype ♀ not located in IES or MNHC, considered lost.

Remarks: As noted by Fabiano-da-Silva *et al.* (2020) the holotype female of *C. obsoleta* could not be located in either of the two Cuban museum collections where material from the Franganillo collection are known to be housed. The original description is vague and gives no characters to adequately separate this species from congeners. Furthermore, the type locality refers to the province of La Habana, a large

area where several species occur in sympatry. Therefore, given the absence of type material, the poor original description and the inability to unequivocally recognise this species, we propose *C. obsoleta* be regarded as a *nomen dubium*.

“*Cyrtopholis respinus* Franganillo, 1935” *nomen nudum*

Cyrtopholis respinus Roewer, 1942: 230. (lapsus—supposed original description by Franganillo (1935) is non-existent).

Cyrtopholis respina: Fabiano-da-Silva *et al.* (2020): 88. (lapsus, treated taxon as a *nomen dubium* when the name was in actuality never available).

Remarks: As noted by Fabiano-da-Silva *et al.* (2020) the record of Roewer (1942: 230) which listed *Cyrtopholis respinus* as a species described by Franganillo (1935) with the citation “Belen Habana Cuba 9 (51-52), p. 45 (D)” does not refer to an actual description. Thus, this *nomen* was in actuality created by lapsus of Roewer (1942). Since it lacks a formal description and designation of a name-bearing type must be considered a *nomen nudum* as it fails to meet Article 13 of the Code (ICZN, 1999). The taxonomic act of Fabiano-da-Silva *et al.* (2020) which treated this taxon as a *nomen dubium* was erroneous because the name was never available.

Discussion

Here, we take the first steps towards resolving the taxonomic chaos found in the non-Cuban species of *Cyrtopholis*. The interesting discovery of a second species on Montserrat, much larger than *C. femoralis* and which has not been seen for nearly a century is particularly notable. Examination of historical type material has also allowed for the restoration of the long-synonymized *C. antillana* stat. rev., and several enigmatic taxa have been regarded as *nomina dubia* or transferred to other related genera. Studies such as the present one demonstrate the continued value of museum collections and particularly of examining undetermined historical material. Nonetheless, as evident to the reader from the above text, many congeners on islands other than Montserrat remain poorly known, most of which do not even have the genitalia properly figured. A revision of the genus is far outside the scope of this work; however, we have been able to examine a number of types (e.g. *C. agilis*, *C. bonhotei*, *C. cursor*) which allowed us to diagnose those taxa from those within the scope of our study.

Of particular importance is the need for further fieldwork on Montserrat to assess whether *C. montserrat* sp. nov. may still occur in some areas, and to learn more about the conservation status of this species and/or *C. femoralis*. García *et al.* (2021) made important first contributions in discussing the ecology of *C. femoralis*, but long-term studies are required to say more about its status. It appears that *C. montserrat* sp. nov. does not occur in the north (see above), which may suggest that, prior to the eruption on Montserrat,

some other ecological barrier separated these species. Molecular investigation of both species would be of particular benefit.

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References

- AUSSERER, A. 1871: Beiträge zur Kenntniss der Arachniden-Familie der Territelariae Thorell (Mygalidae Autor). *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien* **21**: 117–224, pl. I.
- AUSSERER, A. 1875: Zweiter Beitrag zur Kenntniss der Arachniden-Familie der Territelariae Thorell (Mygalidae Autor). *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien* **25**: 125–206.
- BERTANI, R. 2000: Male palpal bulbs and homologous features in Theraphosinae (Araneae, Theraphosidae). *Journal of Arachnology* **28**: 29–42.
- BERTANI, R. 2001: Revision, cladistic analysis, and zoogeography of *Vitalius*, *Nhandu*, and *Proshapalopus*; with notes on other theraphosine genera (Araneae, Theraphosidae). *Arquivos de Zoologia* **36**: 265–356.
- CHAMBERLIN, R. V. 1917: New spiders of the family Aviculariidae. *Bulletin of the Museum of Comparative Zoology* **61**: 25–75.
- COOKE, J. A. L., ROTH, V. D. & MILLER, F. H. 1972: The urticating hairs of theraphosid spiders. *American Museum Novitates* **2498**: 1–43.
- FABIANO-DA-SILVA, W., GUADANUCCI, J. P. L., ALAYÓN GARCÍA, G., LUCAS, S. M. & DA SILVA, M. B. 2020: Taxonomy of the genus *Cyrtopholis* Simon, 1892 (Araneae, Mygalomorphae, Theraphosidae): Cuban species described by Pelegrín Franganillo Balboa. *Zootaxa* **4779**: 79–90.
- FRANGANILLO B., P. 1926: Arácnidos nuevos o poco conocidos de la Isla de Cuba. *Boletín de la Sociedad Entomológica de España* **9**: 42–68.
- FRANGANILLO B., P. 1931a: Excursiones arachnológicas, durante el mes de agosto de 1930. *Estudios de "Belen"* **1931**: 168–171.
- FRANGANILLO B., P. 1931b: Excursiones arachnológicas, durante el mes de agosto de 1930. *Estudios de "Belen"* **1931**: 285–288.
- FRANGANILLO B., P. 1935: Estudio de los arácnidos recogidos durante el verano de 1934. *Estudios de "Belen"* **1935**: 20–26.
- FRANGANILLO B., P. 1936a: Una nueva especie de araña peluda. *Memorias de la Sociedad Cubana de Historia Natural "Felipe Poey"* **9**: 259–262.
- FRANGANILLO B., P. 1936b: *Los arácnidos de Cuba hasta 1936*. La Habana: Cultural.
- GARCIA, G., PAPP, T., LONGHORN, S., JAMESON, T., FLEWITT, A. & PRINCE, H. 2021: *Best practice guidelines for the Montserrat tarantula* (*Cyrtopholis femoralis*). Amsterdam: European Association of Zoos and Aquaria.
- GABRIEL, R. & SHERWOOD, D. 2020: Revised taxonomic placement of *Pseudhapalopus* Strand, 1907, with notes on some related taxa (Araneae: Theraphosidae). *Arachnology* **18**: 301–316.
- LATREILLE, P. A. 1832: Vues générales sur les aranéides à 4 pneumobranches ou quadripulmonaires, suivies d'une notice de quelques especes de mygales inedites et de l'habitation de celle que l'on nomme nidulans. *Nouvelles Annales du Muséum d'Histoire Naturelle de Paris* **1**: 61–66.
- PETRUNKEVITCH, A. 1925: Arachnida from Panama. *Transactions of the Connecticut Academy of Arts and Sciences* **27**: 51–248.
- PETRUNKEVITCH, A. 1926: Spiders from the Virgin Islands. *Transactions of the Connecticut Academy of Arts and Sciences* **28**: 21–78.
- PETRUNKEVITCH, A. 1929a: Descriptions of new or inadequately known American spiders (Second paper). *Annals of the Entomological Society of America* **22**: 511–524.
- PETRUNKEVITCH, A. 1929b: The spiders of Porto Rico. Part one. *Transactions of the Connecticut Academy of Arts and Sciences* **30**: 1–158.
- PICKARD-CAMBRIDGE, F. O. 1901: On a collection of spiders from the Bahama Islands made by J. L. Bonhote, Esq., with characters of a new genus and species of Mygalomorphae. *Annals and Magazine of Natural History, decade 7* **7**: 322–332.
- POCOCK, R. I. 1903: On some genera and species of South-American Aviculariidae. *Annals and Magazine of Natural History, decade 7* **11**: 81–115.
- ROEWER, C. F. 1942: *Katalog der Araneae von 1758 bis 1940. 1. Band (Mesothelae, Orthognatha, Labidognatha: Dysderaeformia, Scytodiformia, Pholciformia, Zodariiformia, Hersiliaeformia, Argypiformia)*. Bremen: Natura.
- RUDLOFF, J.-P. 1994: Two new species of *Cyrtopholis* from Cuba (Araneida: Theraphosidae: Theraphosinae). *Garciana* **22**: 7–16.
- RUDLOFF, J.-P. 1995a: Una nueva especie de *Cyrtopholis* de San Blas (Cienfuegos) - Cuba (Theraphosidae: Mygalomorphae) incluido una comparación entre *Cyrtopholis gibbosus* Franganillo 1936 y *Cyrtopholis regibbosus* Rudloff 1994. *Garciana* **23**: 14–20.
- RUDLOFF, J.-P. 1995b: Una nueva especie de *Cyrtopholis* (Mygalomorphae: Theraphosidae) de Cuba oriental incluyendo una clave para este género. *Garciana* **24**: 17–24.
- RUDLOFF, J.-P. 1997: Revision der Gattung *Holothele* Karsch, 1879 nebst Aufstellung einer neuen Gattung *Stichoplastoris* gen. nov. (Araneae, Theraphosidae) und Wiedereinsetzung einiger weiterer Gattungen der Mygalomorphae. *Arachnologisches Magazin* **5**(2): 1–19.
- SCHIAPELLI, R. D. & GERSCHMAN DE P., B. S. 1979: Las arañas de la subfamilia Theraphosinae (Araneae, Theraphosidae). *Revista del Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (Ent.)* **5**: 287–300.
- SCHMIDT, G. 1995: Eine neue Vogelspinnenart von den Virgin Islands, *Cyrtopholis flavostriatus* sp. n. (Araneida: Theraphosidae: Theraphosinae). *Arachnologisches Magazin* **3**(10): 1–6.
- SHERWOOD, D., FABIANO-DA-SILVA, W., GABRIEL, R. & LUCAS, S. M. 2020: Redescription of *Nesipelma insulare* Schmidt & Kovařík, 1996 with a revised generic diagnosis for *Nesipelma* Schmidt & Kovařík, 1996 and a transfer from *Cyrtopholis* Simon, 1892 (Araneae: Theraphosidae). *Arachnology* **18**: 462–467.
- SIMON, E. 1892: *Histoire naturelle des araignées. Deuxième édition, tome premier*. Paris: Roret: 1–256.
- SIMON, E. 1903: *Histoire naturelle des araignées. Deuxième édition, tome second*. Paris: Roret: 669–1080.
- SMITH, A. M. 1986: *The tarantula: classification and identification guide*. London: Fitzgerald.
- SMITH, A. M. 1987: *The tarantula: classification and identification guide, second edition*. London: Fitzgerald.
- STRAND, E. 1907: Aviculariidae und Atypidae des Kgl. Naturalienkabinetts in Stuttgart. *Jahreshefte des Vereins für vaterländische Naturkunde in Württemberg* **63**: 1–100.
- STRAND, E. 1908: Diagnosen neuer aussereuropäischer Spinnen. *Zoologischer Anzeiger* **32**: 769–773.
- THORELL, T. 1894: Förteckning öfver arachnider från Java och närgränsande öar, insamlade af Carl Aurivillius; jemte beskrifningar å några sydasiatiska och sydamerikanska spindlar. *Bihang till Kungliga Svenska Vetenskaps-Akademiens Handlingar* **20**(4): 1–63.
- WORLD SPIDER CATALOG 2024: *World spider catalog, version 24.5*. Bern: Natural History Museum, online at: <http://wsc.nmbe.ch>