

Kleptoparasitic theridiids spiders of the granitic Seychelles (Araneae, Theridiidae)

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Abstract: Seven kleptoparasitic theridiid spiders from the genus *Argyrodes* Simon, 1864 are recorded from the granitic Seychelles islands. The male of *Argyrodes recurvatus* Saaristo, 1978 and the female of *Argyrodes pusilla* Saaristo, 1978 are described for the first time.

Key words: Kleptoparasite, *Argyrodes*, Theridiidae, Seychelles

Introduction

Members of the genus *Argyrodes* Simon, 1864 are kleptoparasites living on the webs of other spiders. They are especially common on the large orbwebs and on Seychelles they are mainly found on webs of *Nephila inaurata* (Walckenaer, 1841), *Nephilengys cruentata* (Fabricius, 1775), *Cyrtophora citricola* (Forskål, 1775), and different *Tetragnatha* species. Relationships between kleptoparasite and host vary according to the species. Some of them are harmless guests feeding on very small prey from the host's web while others steal prey from the host. Some species catch their own prey by cutting a small section out of the host's web, replacing it by their own threads. Finally some are araneophagous and prey on their hosts.

Argyrodes is a large genus comprizing over 120 species found in warm and tropical parts of the world. Although *Argyrodes* indisputably is a monophyletic taxon the general apperance of its members is by no means uniform and its is not possible to give an unambiguous description for the genus. For example the shape of the abdomen varies from more or less globular (Fig. 9) to worm-like (Fig. 8). Also colouration of the abdomen is highly variable. Usually it consists of dark (rusty brown - black) and light (dirty white - yellowish) areas, with silvery shining corpuscles on light areas; these corpuscles may be fused to cover the light areas entirely so that abdomen looks like a small silver piece. The colouration is also highly variable within the species. Thus even on the same host's web there may be very dark, blackish or rusty brown specimens or light ones with large silver patches. Most, but not all, males have their cephalic region modified to lobes or horn-like projections bearing specially modified hairs. However, there are certain pronounced differences in the general lay-out of these projections and without doubt these structures are not all homologous. In some species the AMEs and PMEs are situated on a dorsal lobe and below it there is a frontally directed, eyless horn-like projection (Figs. 3A-5A). But in some species there is a single horn standing between the AMEs and PMEs (Figs. 6A-7A) or a horn-like swelling below the AMEs (Fig. 9A). Finally, in some species the eye region is only moderately elevated (Fig. 8A). The legs are often long or very long; e.g. in the Seychellian species carapace/tibia I varies between 0.86 and 0.26. All species have a stridulatory organ; on the posterior end of the carapace there is of a pair of oval shaped areas with transverse ridges and on the anterior part of the

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abdomen there is a half circle consisting of stiff hairs with elevated bases (Fig. 7C).

The general lay-out of the bulbus of the male palp is very typical (terminology used here is from Saaristo 1978 and refers to the left palp). Arising from the right half of the tegulum the locking arm A (laA) winds clock-wise behind the other bulbal structures, ending close to the apex of the cymbium at its right side. On this site, inside the cymbium there is a small hook-like extension (ch) which fits into a small pit in the apex of the locking arm. Inside the circle of the locking arm stands an arm-like terminal apophysis (ta). The apex of the terminal apophysis is usually dilated, bearing often denticles arranged in various kinds of rows. On the right side of the terminal apophysis lies the embolic complex (ec) which has a bulbous basal part bearing the embolus proper and one or two spike- or arm-like extensions. Close to the embolic complex, behind it or on its right side stands a more or less translucent conductor A (cA). The apex of the conductor is wrapped around the embolus proper. Structurally the male palps can be divided into five main types which can be shortly described according to the shape of the terminal apophysis: (A) terminal apophysis fairly long with triangular apex (Fig. 1A-C), (B) ta relatively short, flat and broad with rows of denticles at its apex (Fig. 1D), (C) ta long and narrow, blunt tipped with scattered denticles at its apex (Fig. 1E), (D) ta fairly short, flat and strongly dilated apically (Fig. 1F), and (E) ta very weakly developed, transparent (Fig. 1G). The corresponding structural groups can also be found in epigynes: (A) openings of the entrance ducts (oeds) within shallow spiral-like depressions connected to others by a narrow posterior ridge (Fig. 2A-C), (B) oeds inside a small, oval-shaped depression at the anterior end of a trunk-like median elevation of the epigyneal area (Fig. 2D), (C), oeds inside an oval-shaped depression close to the epigastric fold (Fig. 2E), oeds on each side of a broad, ridge-like elevation at the posterior end of a median oval-shaped depression (Fig. 2F), and oeds on each side of a nose-like elevation at the center of the epigyneal area. The epigyne of mated females are regularly plugged with reddish brown excrescence which may sometimes be quite massive (Fig. 6C).

The above presented groups of the secondary genital organs have strong correlations with certain somatic or non-genital characters like modifications of the cephalic region of male carapaces, shape of the abdomen, relatively length of the legs etc. Accordingly the genus can easily be divided into several natural groups which might deserve generic rank. However, though several available names already exists for these groups, since the study of Exline & Levi (1962) they all have been placed into a single genus, viz. *Argyrodes*. It is also beyond the scope of this paper to go deeper in this issue.

Abbreviations:

CL = length of carapace

LI = length of carapace/ length of Ti I

laA = locking arm A (male palp)

ch = cymbial hook

ta = terminal apophysis

ec = embolic complex

cA = conductor A

oed = opening of entrance duct

All measurements in millimeters.

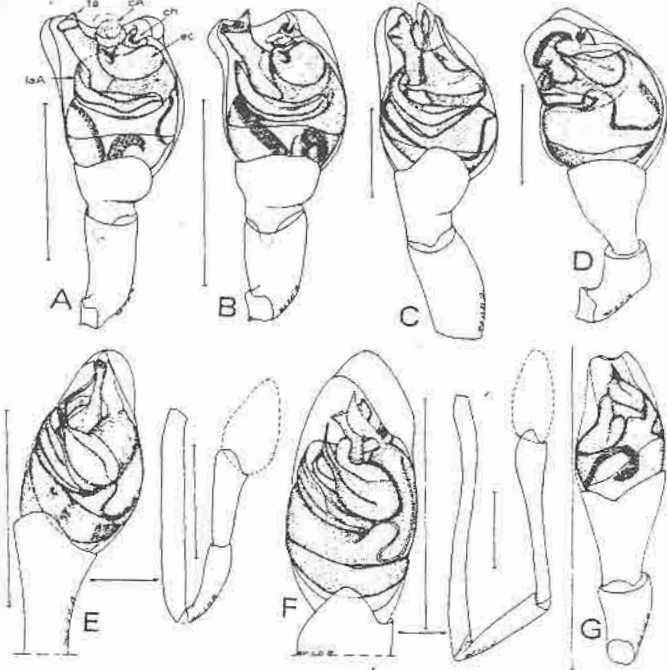


Fig. 1. Left male palps ventrally. Original figure. Scale bars = 0.5mm.

A: *Argyroides argyroides*. - B: *A. rostratus*. - C: *A. fissifrontella*. - D: *A. cognatus*. - E: *A. barycephalus*. - F: *A. recurvatus* Saaristo, 1978. - G: *A. pusillus*

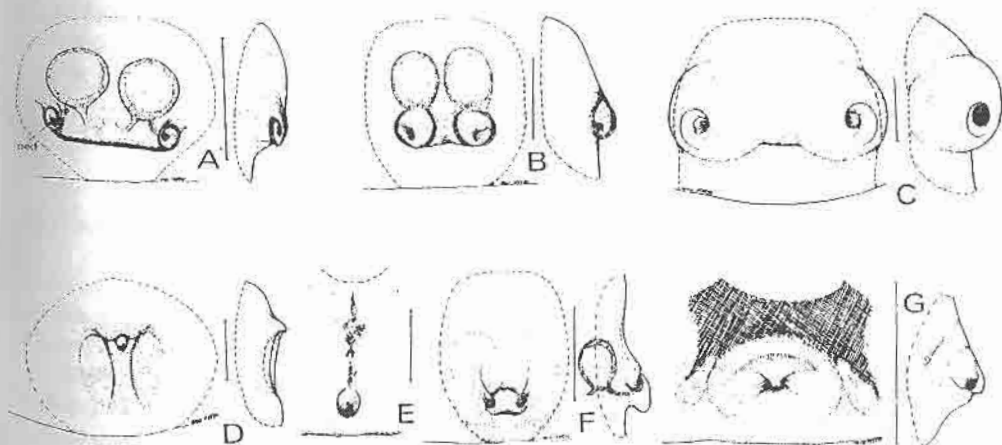


Fig. 2. Epigynes ventrally and dextrally. Original figure except A according to Roberts (1983). Scale bars 0.25mm. A: *Argyroides argyroides*. B: *A. rostratus*. C: *A. fissifrontella*. D: *A. cognatus*. E: *A. barycephalus*. F: *A. recurvatus*. G: *A. pusillus*.

Argyrodus argyrodus (Walckenaer, 1841) (Figs. 1A, 2A, 3A-C)

Linyphia argyrodus Walckenaer, 1841: 282 (male).

Argyrodus argyrodus, Simon 1864: 253 (n. comb.).

—, Saaristo, 1978: 133, f. 118-130 (male, female).

Material examined: **Mahé:** Montagne Posée Road, 2 males, 1 female, 30.10.1975, golf green of the Reef Hotel, male, female, 24.10.1975, and road side near Reef Hotel, 4 males, 5 females, 03.01.1999, all M. Saaristo leg. (MZT AA 0.022, 0.023 and 0.782).

Diagnosis: A medium sized (CL = 1.3-1.7), fairly dark coloured species with legs of normal length (LI = 0.69-0.79). Male carapace with ocular area raised into a lobe including AMEs and PMEs and below it stands a forward directed clypeal process carrying numerous, unmodified backwards pointing hairs.

According to the morphology of the secondary genital organs *argyrodus* belongs together with *rostratus* and *fissifrontella* to the group A. Its male palp differs, among other things, from that of *rostratus* and *fissifrontella* by having rounded corners on the triangular apex of the terminal apophysis; *rostratus* has angular corners while *fissifrontella* has two narrow, ridged patches on the apex of the terminal apophysis. In the epigyne of *argyrodus* the diameter of the more or less circular depressions housing the openings of the entrance ducts is relatively small and they are some four times their diameter apart; *rostratus* has larger depressions which are situated only about their diameter apart while *fissifrontella* has more clearly spiral-like depressions situated far apart on prominent bulges.

Description: Well described by Saaristo (1978).

Distribution: This is a Mediterranean-African species found only on **Mahé** Saaristo (1978, 1999). It seems to be an introduced species which have been able to establish populations only on the lowlands of Mahé.

Argyrodus rostratus Blackwall, 1877. (Figs. 1B, 2B, 4A-C)

Argyrodus rostratus Blackwall, 1877: 14 (males).

A. nephilae rostratus, Saaristo, 1978: 113, f. 131-140 (male, female, n. stat.).

A. rostratus, Roberts 1978: 923, f. 44-50 (male, female).

Material examined: **Aride:** 2 males, 2 females, 1j., 10.-17.03.1978, John Rowley leg. and 5 males, 1j., 16.-17.07.1975, M. Mühlenberg leg. (MZT AA 0.191-193 and 0.310-0.312) and 1 male, 27.02.1999, J. Cadbury & E. Andrews leg. (MZT AA 1.268), **Cousin:** on *Nephila* web (9.), 16 males, 15 female, 1j., March-April 1978, Hugh Watkins leg. (MZT AA 0.188-0.190), **Mahé:** Various places, Oct. 1975, M. Saaristo leg. (MZT AA 0.024-AA 0.027), and **Silhouette:** outside *Pisonia* forest, 4 males, 6 females, 1990, J. Gerlach leg., Chemin Montagne Posée, 1 male, 1 female, 1j., 12.01.1999, M. Saaristo & J. Gerlach leg., and La Passe, 1 male, 3 females, 11.01.1999, M. Saaristo leg. (MZT AA 0.187, AA 0.806, and AA 0.807).

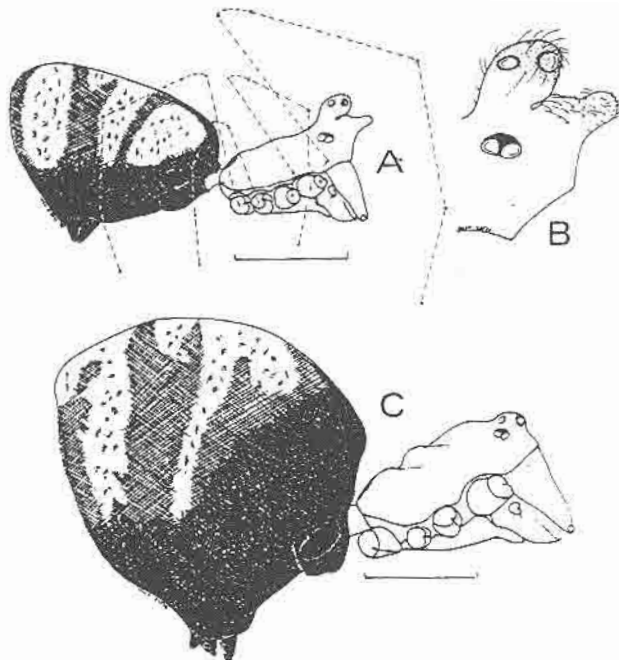


Fig. 3. *Argyrodes argyroides* (Walckenaer, 1837. Original figure. Scale bars = 1.0mm. - **A:** Male dextrolaterally. - **B:** Cephalic region of male dextrolaterally. - **C:** Female dextrolaterally.

Diagnosis: A medium sized (CL = 1.0-1.4), fairly dark coloured species with somewhat elongated legs (LI = 0.84-0.86). Male carapace with ocular area risen into a beaked lobe including AMEs and PMEs and below it stands a forward directed, apically dilated clypeal process carrying numerous dark, backwards pointing lancet-like hairs. The abdomen of female usually high conical and the silvery shining corpuscles frequently fused to cover the light areas entirely so that abdomen looks like a small silver piece.

For the structure of the secondary genital organs see above *argyroides*.

Description: Well described by Saaristo (1978) and Roberts (1978).

Distribution: This endemic species has been found on **Aride:** (Bowler *et al.* 1999), **Cousin:** (new record), **Curieuse:** (Roberts 1978), **La Digue:** (Roberts 1978), **Mahé:** (Saaristo 1978; Roberts 1978), and **Silhouette:** (Roberts 1978; Saaristo 1999).

Discussion: Earlier I (Saaristo 1978) considered this species as a subspecies of *A. nephilae* Taczanowski, 1872. At the present I prefer to follow Roberts (1978) in considering it as a full species. *A. nephilae* is a predominantly New World species but is very closely related to an Old World species, viz. *A. argentatus* O. Pickard-Cambridge, 1880. Resolving the relationships between these three taxa requires careful comparative studies of extensive series of the whole *nephilae*-*argentatus*-*rostratus*-complex, such a revision is badly needed.

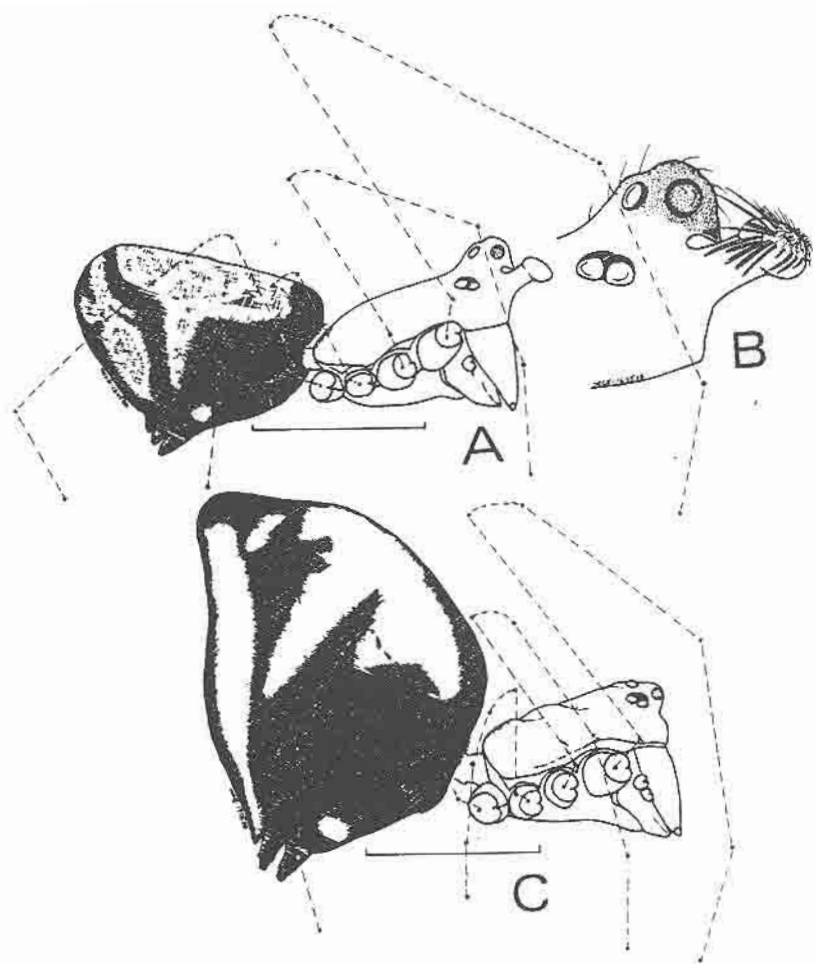


Fig. 4. *Argyrodes rostratus* Blackwall, 1877. Original figure. Scale bars = 1.0mm. - **A:** Male dextrolaterally. - **B:** Cephalic region of male dextrolaterally. - **C:** Female dextrolaterally.

Argyrodus fissifrontella Saaristo, 1978 (Figs. 1C, 2C, 5A-C)

Argyrodus fissifrontella Saaristo, 1978: 114, f. 141-148 (mae, female).

Material examined: **Mahé:** Montagne Posée Road, holotype male, allotype female, 1 male, 2 female paratypes, 30.10.1975, M. Saaristo leg. (MZT AA 0.029-AA 0.031), and path between Le Niol and Mare aux Cochons, 2 males, 2 females, 02. & 17.01.1999, M. Saaristo, Pat Matyot and Maureen Kirkpatrick leg. (MZT AA 0.784, 0.786, and 0.787), and **Silhouette:** 3 males, 1990, Justin Gerlach leg., Ch. Mon. Pos., 1 male, 1 female, 1j., 09.01.1999 and La Passe, 2 males, 1 male j., 2 females, 19.01.1999, both M. Saaristo leg. (MZT AA 0.197, AA 0.783, and AA 0.785).

Diagnosis: Large (CL = 1.5-2.0), handsome, relatively bright coloured species with transverse yellow, silvery and black stripes on abdomen. Legs conspicuously long (LI = 0.52-0.63). Male carapace with ocular area risen into a lobe including AMs and PMs and below it stands an obliquely upward directed clypeal process carrying numerous short hairs; shape of the clypeal process variable

For the structure of the secondary genital organs see above *argyrodus*.

Description: Well described by Saaristo (1978).

Description: Total length mm; length of carapace 1.5-2.0 mm, males larger.. Colour pattern of abdomen dirty white, black and silver.

Distribution: This endemic species has been found on **Mahé** (Saaristo 1978, 1999) and **Silhouette** (Saaristo 1999).

Argyrodus cognatus (Blackwall, 1877) (Figs. 1D, 2D, 6A-D)

Epeira cognatus Blackwall, 1877: 17 (male, female).

Argyrodus cognatus, Simon 1898: 376 (n. comb.).

—, Saaristo 1978: 15: 116, f. 149-156 (male, female).

—, Roberts 1978: 926, f. 51-56 (male, female).

Material examined: **Mahé:** Montagne Posée Road, 2 male, 3 female, 27.10.1975, M. Saaristo leg. and various places, 21 males, 28 females, 7j. 01.-03.01.1999, M. Saaristo, Pat Matyot and Maureen Kirkpatrick leg. (MZT AA 0.028, AA 0.795-0.798, and 0.800-0.803), and **Silhouette:** Silhouette, outside *Pisonia* forest, male, 2 females, 2j., 1990, Justin Gerlach leg. and various places, 24 males, 17 females, 31j., 09.-19.01.1999, M. Saaristo and J. Gerlach leg. (MZT AA 0.194-0.196, 0.788-0.794, and 0.804-0.805).

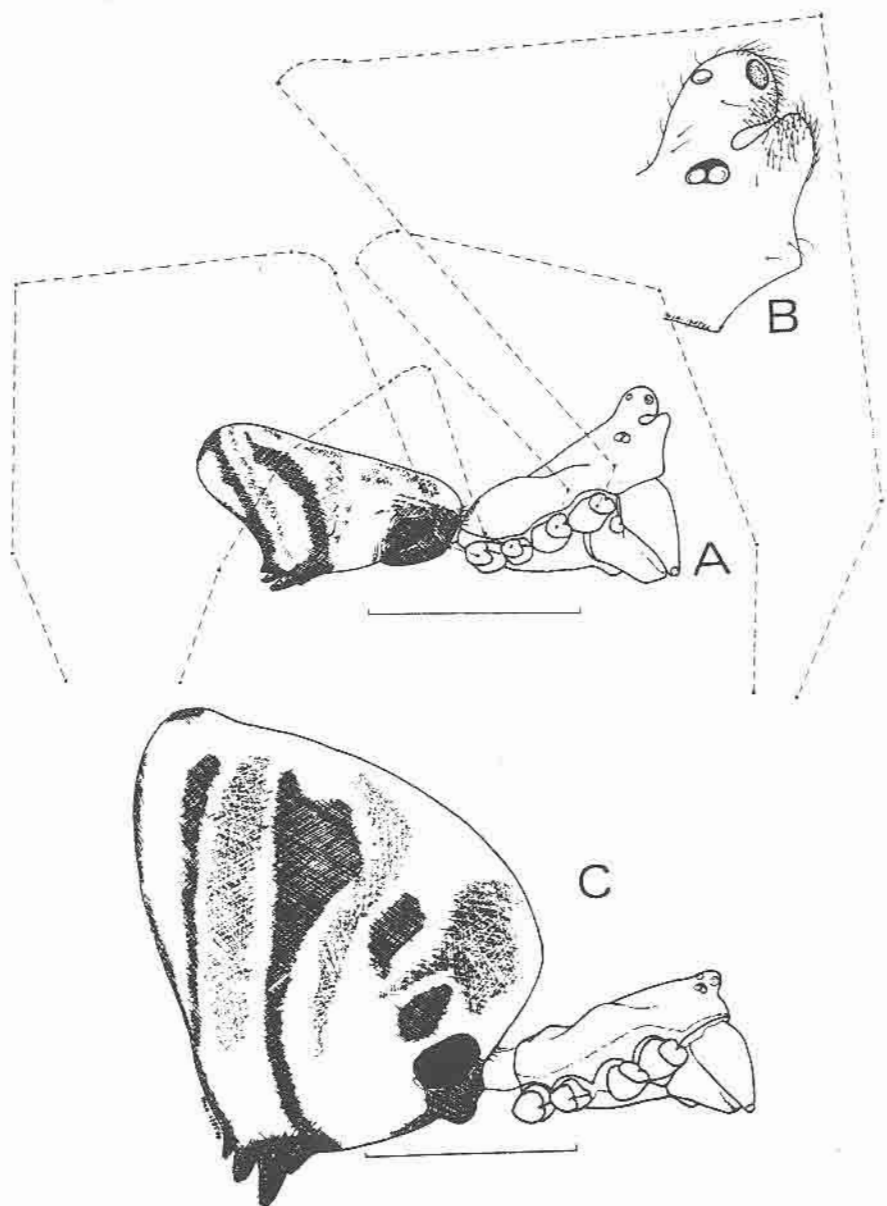


Fig. 5. *Argyrodes fissifrontella* Saaristo, 1978. Original figure. Scale bars = 2.0mm. - A: Male dextralaterally. - B: Cephalic region of male dextralaterally. - C: Female dextralaterally.

Diagnosis: Large (CL = 1.6-1.9), reddish brown or blackish species with long legs (LI = 0.52-0.56). Male carapace with a horn-like, obliquely forward directed elevation devoid of eyes arising from the center of the ocular area. Horn and upper edge of clypeus clothed with long, somewhat curved forward pointing hairs. Posterior end of the abdomen of both sexes drawn into a pair of tubercles of variable size.

Bulb of male palp characterized by a relatively short, flat and broad terminal apophysis with rows of denticles at its apex. Epigyne with a trunk-like median elevation which has at its anterior part a small, oval-shaped depression containing the openings for the entrance ducts

Description: Well described by Saaristo (1978) and Roberts (1978).

Distribution: This is again an endemic species and found on **Mahé** (Saaristo 1978, 1999), **Praslin** (Roberts 1978), and **Silhouette** (Roberts 1978; Saaristo 1999).

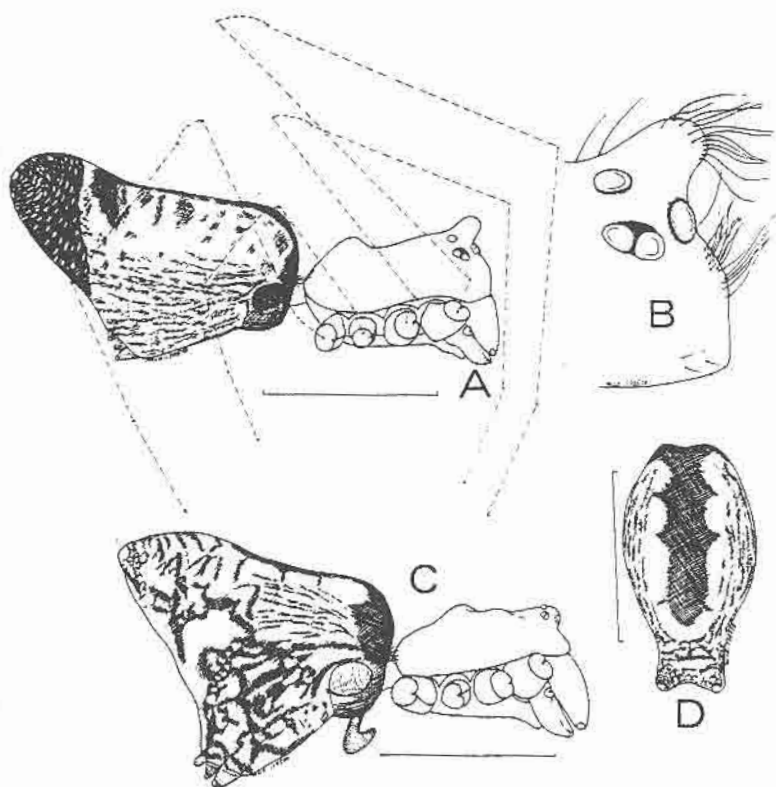


Fig. 6. *Argyrodes cognatus* (Blackwall, 1877). Original figure. Scale bars = 2.0mm. - **A:** Male dextrolaterally. - **B:** Cephalic region of male dextrolaterally. - **C:** Female dextrolaterally. - **D:** Abdomen of female dorsally.

Argyrodus barycephalus Roberts, 1983 (Figs. 1E, 2E, 7A-C)

Argyrodus barycephalus Roberts, 1983: 45, f. 99-102 (male, female).

Material examined: **Silhouette:** Pisonia forest, 1 subad. female, 1990, Justin Gerlach leg. (AA 0.199), Jardin Marron, 1 male, 13.01.1999, M. Saaristo leg. (MZT AA 0.781), and Chemin Montagne Posée, 1 subad. female, 09.01.1999, M. Saaristo leg. (MZT AA 0.780).

Diagnosis: Medium-sized ($CL = 1.1-1.4$), rather gracile species with conspicuously long and slender legs ($LI = 0.22-0.28$). Colouration relatively pale, light brown with darker sooty markings especially on caudal projection of the abdomen. Male carapace with a large, club-like, forward directed elevation devoid of eyes arising from the center of the ocular area. Abdomen much elongated posteriorly.

Segments of the male palp much elongated. Embolus long, whip-like and terminal apophysis also long with slightly dilated apex bearing numerous scattered denticles. Epigyne with an oval-shaped depression containing the openings for the entrance ducts and lying close to the epigastric furrow.

Description: Well described by Roberts (1983).

Distribution: The species was original described from Aldabra atoll (Roberts 1983). In addition known only from **Silhouette** (Saaristo 1999)

Argyrodus recurvatus Saaristo, 1978 (Figs. 1F, 2F, 8A-C)

Argyrodus recurvatus Saaristo, 1978: 11, f. 157-169 (female).

—, Roberts 1978: 928, f. 57-59 (female).

Material examined: **Mahé:** Montagne Posée Road, holotype female, 27.10.1975, M. Saaristo leg. (MZT AA 0.033) and **Silhouette:** 1 male, 1 female, 1 subad. female, 1990 and 1993, J. Gerlach leg. (MZT AA 0.198, 0.199, and 0.922).

Diagnosis: Medium-sized ($CL = 1.1-1.2$), gracile species with very long, worm-like abdomen and conspicuously long and slender legs ($LI = 0.20-0.26$). Colouration pale, light brown with some darker sooty markings on the abdomen. No special modifications on male carapace. The eye region only moderately elevated in both sexes. with a large, club-like, forward directed elevation devoid of eyes arising from the center of the ocular area. Abdomen much elongated posteriorly.

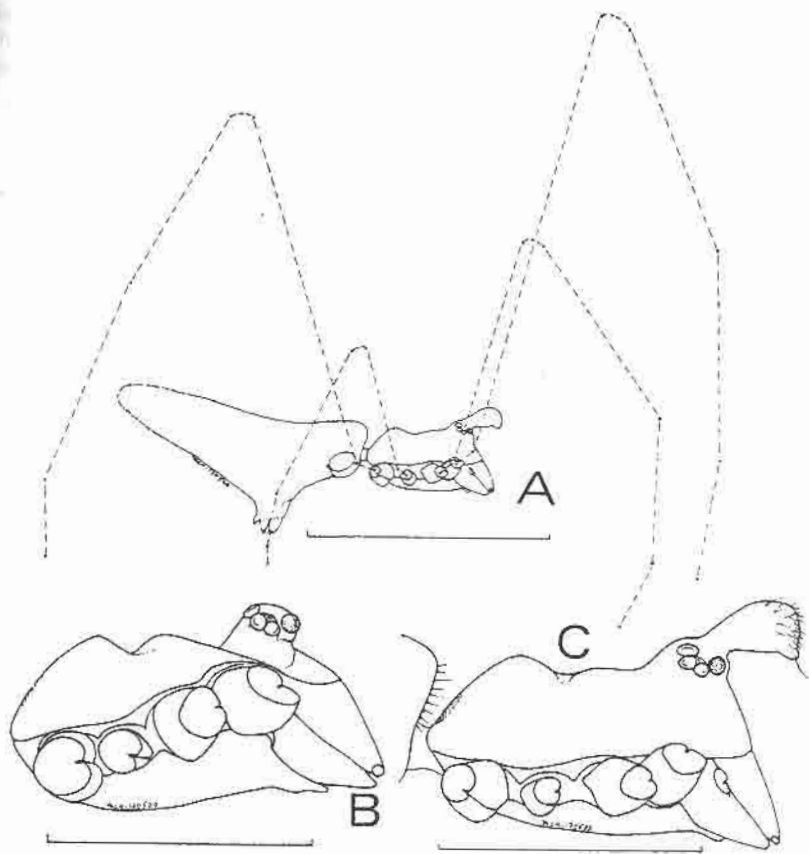


Fig. 7. *Argyrodes barycephalus* Roberts, 1983. Original figure. Scale bars: A = 2.5mm, B-C = 1.0mm. - A: Male dextrolaterally. - B: Cephalothorax of female dextrolaterally. - C: Cephalothorax of male dextrolaterally.

Segments of the male palp very much elongated. Embolus rather long with thin apical part. Terminal apophysis rather long, flat and conspicuously widening towards its apex. Epigyne with a shallow, median oval-shaped depression with a short and broad transverse ridge-like elevation at its posterior end. Openings on either sides of the ridge-like elevation.

Description: Female well described by Saaristo (1978) and Roberts (1978). Male (first description) much like female but slightly smaller and legs somewhat longer as usual in *Argyrodes*. Segments of the male palp conspicuously elongated. Embolus relatively long ending into a thin needle-like apical part which is ca. 1/3 total length of the embolus. Terminal apophysis flat, strongly widening apically and bearing a couple of small dents at its lateral edge.

Conductor A transparent, flap-like.

Distribution: This endemic species has been found on **Mahé** (Saaristo 1978; Roberts 1978) and **Silhouette** (Roberts 1978; Saaristo 1999).

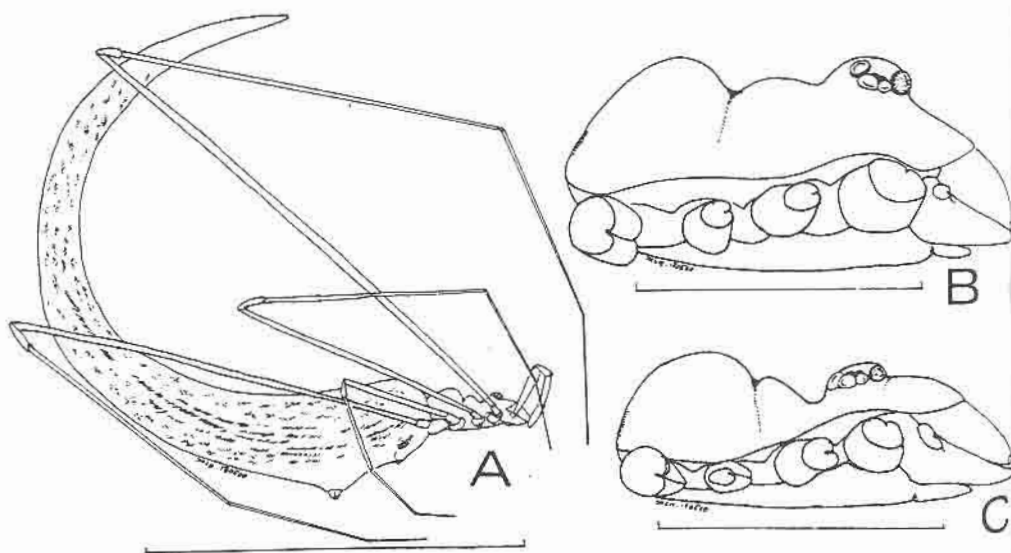


Fig. 8. *Argyrodes recurvatus* Saaristo, 1978. Original figure. Scale bars: A = 5.0mm, B-C = 1.0mm. - A: Female dextrolaterally. - B: Cephalothorax of female dextrolaterally. - C: Cephalothorax of male dextrolaterally.

Argyroides pusillus (Saaristo, 1978) (Figs. 1G, 2G, 9)

Argyroides pusillus Saaristo, 1978: 116, f. 164-169 (female)

—, Roberts 1978: 929, f. 60-64 (female).

Material examined: **Mahé:** Montagne Posée Road, holotype female, 30.10.1975, M. Saaristo leg. (MZT AA 0.032) and various places, 1 male, 4 females 01.-02.01.1999, M. Saaristo, Pat Matyot and Maureen Kirkpatrick leg. (MZT AA 0.776-0.779) and **Silhouette:** several places, 8 males, 4 females, 09.-19.01.1999, M. Saaristo and J. Gerlach leg. (MZT AA 0.767-0.775).

Diagnosis: Small (CL = 0.8-1.0), dark species with legs of normal length (LI = 0.68-0.76). Volume of the male abdomen (small specimen) about that of male palpal bulbus of *A. fissifrontella*. Abdomen more or less globular with characteristic pattern of silvery patches (Fig. 9B) and small conical elevations posterodorsally. Male with a frontally projecting clypeal outgrowth bearing a few short hairs.

Sclerites of male palpal bulbus much reduced compared to other *Argyroides* species and e.g. terminal apophysis very weakly sclerotized, transparent and almost inconspicuous. Epigyne with a median, nose-like elevation.

Description: Male well described by Saaristo (1978) and Roberts (1978). Female (first description) essentially like male but larger.

Epigyne with a median, nose-like elevation anteriorly far away from the epigastric sulcus. On its either sides shallow, transverse oval-shaped depressions. Openings of the entrance ducts at the median end of these depressions.

Distribution: This small endemic species has been found on **Mahé** (Saaristo 1978, 1999; Roberts 1978) and **Silhouette** (Saaristo 1999)

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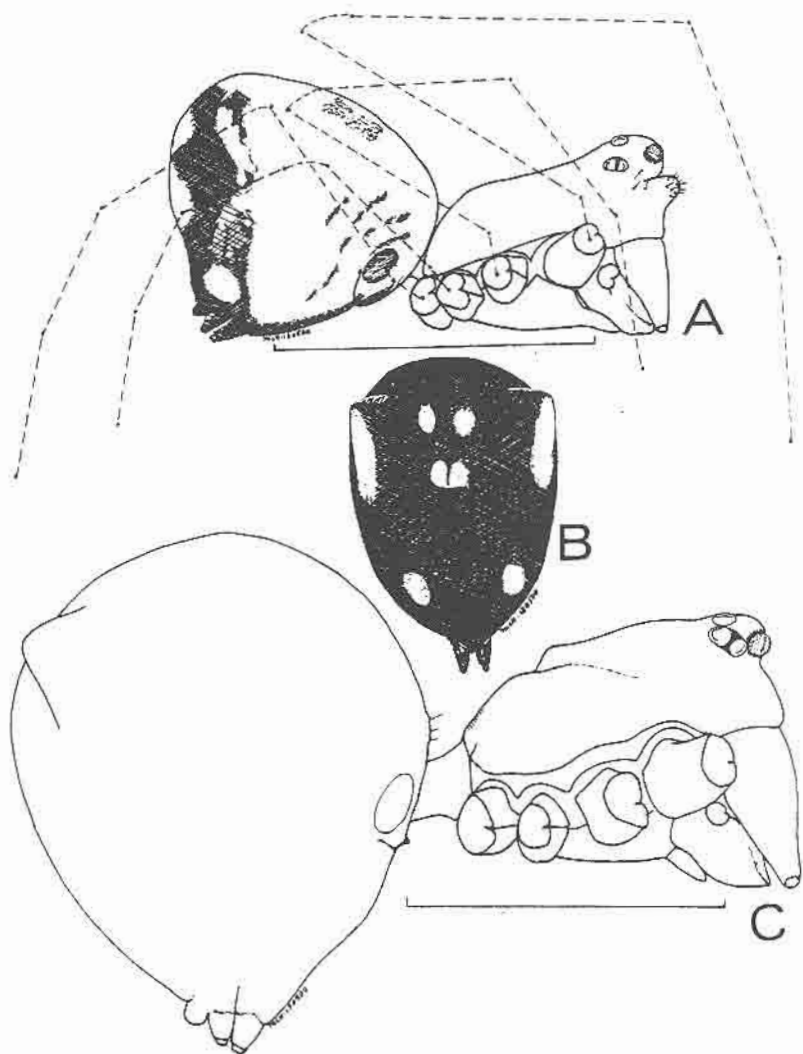


Fig. 9. *Argyrodes pusillus* Saaristo, 1978. Original figure. Scale bars = 1.0mm. - A: Male dextrolaterally. - B: Abdomen of male from behind. - C: Female dextrolaterally.

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