# First record of a "whitish yellow" terrestrial *Chersodromia* in the Afrotropical region (D. R. of the Congo) (Diptera : Hybotidae)

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**Abstract**

*Chersodromia afrosylvatica* sp. nov., a "whitish yellow" *Chersodromia* belonging to the Oriental *flavicaput* group *sensu* Grootaert & Shamshev, 2012 is described from mixed primary forest in D. R. of Congo. The new species represents the first record of a "whitish yellow" *Chersodromia* from the Afrotropical region. It has close affinities to the Oriental species of this group as is shown by the very similar male genitalia especially the left surstylus bearing a thickened apical bristle and a number of black spine-like bristles on the side.

**Keywords**: Afrotropical region, Diptera, *Chersodromia*, new species.

**Résumé**

*Chersodromia afrosylvatica* sp. nov., un *Chersodromia* « jaune blanchâtre » appartenant au groupe Oriental *flavicaput sensu* Grootaert & Shamshev, 2012 est décrit de la forêt primaire mixte de la R.D. du Congo. Cette nouvelle espèce est la pemière donnée d'un *Chersodromia* « jaune blanchâtre » de la région afrotropicale. Elle a des caractères proches des espèces orientales de ce groupe comme le montrent les genitalia mâles et plus particulièrement le surstylus gauche portant une soie apicale épaissie et un certain nombre de soies épineuses noires sur le côté.

## Introduction

The genus *Chersodromia* belongs to the unique complex of the empidoids inhabiting the narrow intertidal and supralittoral zones of the sea shores (GROOTAERT 1992, 1994; SHAMSHEV & GROOTAERT 2004, 2005). The representatives of this ecological group usually occupy very specialised microhabitats and niches, e.g. reef-flats, sandy beaches, crab holes, wet rocks, the mangrove directly exposed to the sea, etc., and only rarely penetrate inland (GROOTAERT *et al.*, 2007; GROOTAERT & SHAMSHEV, 2012). Currently, about 65 species of *Chersodromia* are known worldwide. In the Afrotropical region no species are known yet from continental Africa, but a single species is known from the Seychelles islands (RAFFONE, 1987).

GROOTAERT *et al*. (2007) described the first two "whitish-yellow" terrestrial *Chersodromia* from tropical forest in Papua New Guinea and Thailand. Later, another two species were described from terrestrial forest and even from a mangrove habitat in Singapore (GROOTAERT & SHAMSHEV, 2012). These four "whitish-yellow" species were provisionally classified in the *C. flavicaput*-group sharing apomorphic modification of the left surstylus setation (spine-like bristles). The species are almost completely white or have yellowish to brown markings on the body. Only the eyes are contrastingly black.

*Chersodromia rattii* Raffone, 1987 the only Afrotropical *Chersodromia* known hitherto was described from the sea shore (Seychelles) (RAFFONE, 1987). It has a yellow body colour, but does not belong at all to the *C. flavicaput*-group. Veins $R_1$ and $R_{2+3}$ are not shortened, the postpedicel is larger and the general structure of the genitalia is different. RAFFONE (1987) placed it in the *C. speculifera*

group. Here we describe for the first time a "whitish-yellow" terrestrial *Chersodromia* from the Afrotropical region. It was found in Yangambi (Oriental province, D. R. Congo) far inland Africa. Moreover, the new species was not associated with any water bodies like streams or lakes, but it was found in mixed primary forest at an altitude of approximately 450 m.

The present study is in the scope of the PODO project COBIMFO (Congo basin integrated monitoring for forest carbon mitigation and biodiversity) in which a relation is sought between carbon fixation and biodiversity. The aim of this project is to get baseline reference data on the Carbon balance and biodiversity in pristine and intervened dense tropical forests of the Congo Basin and to increase our understanding in the relationship between both variables as a function of forest management.

## Taxonomic account

### *Chersodromia afrosylvatica* sp. nov.

(Figs 1-2, 3-5)

MATERIAL EXAMINED. Holotype male: D. R. Congo, Yangambi, 3.III.2013, mixed primary forest (plot MIX4 (0°47'11.82"N, 24°31'24.55"E), sweep netting (reg. 33035; leg. P. Grootaert) in alcohol in coll. RBINS, Brussels.

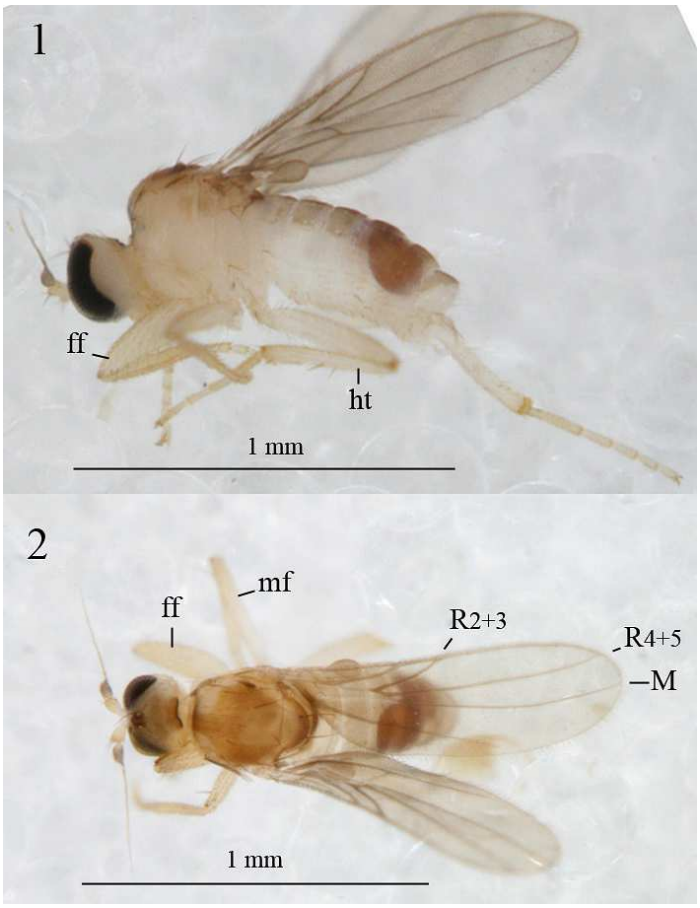
DIAGNOSIS. Occiput largely pale yellowish, brownish to brownish yellow above neck. Two short vertical bristles. Three pairs of acrostichals arranged in two distinct rows. Hind tibia with 1 short dorsal closer to middle, 1 longer anterodorsal just beyond middle and 1 short anterodorsal subapical bristles.

DESCRIPTION. Male (Figs 1-2). Body length 1.3 mm, wing length 1.1 mm. Head whitish in ground-colour; only eyes contrastingly black, occiput brownish to brownish yellow above neck and ocellar triangle brown. Frons parallel-sided just above antennae but otherwise broadly triangular widening towards ocellar triangle. Eyes touching on face, with ommatidia enlarged on lower half of eye. Two pairs of subequally long brown ocellars. Two short vertical bristles. Gena rather narrow. Occiput somewhat concave above neck. Antenna with scape and pedicel pale yellow, postpedicel brownish yellow; pedicel ventrally with 1 long brown bristle; postpedicel somewhat attenuated apically; stylus long, 2.5 times as long as postpedicel. Proboscis yellowish. Palpus small, pale yellow, with 1 brown terminal bristle and some concolorous hairs.

Thorax whitish yellow in ground-colour, especially pleura pale; with dark brown bristles and hairs; scutum (except for white anterior corners) (Fig. 2), scutellum, postnotum posteriorly yellowish brown. Postpronotal lobe with 1 long inclinate bristle. Mesonotum with 1 moderately long presutural supra-alar, 2 notopleurals, 1 postsutural supra-alar, 1 postalar and 2 long inclinate scutellars; acrostichals arranged in two distinct rows, very short; dorsocentrals 1–2 serial, barely separated from acrostichals anteriorly, 2 prescutellars long.

Wing (Fig. 2) normally developed, uniformly faintly greyish tinged, with pale brown veins. Costal bristle rather short, brown. Vein Rs long, nearly as long as crossvein bm-cu. Vein $R_{2+3}$ very short, meeting costa before wing midway. Costal index: 16/7/31. Veins $R_{4+5}$ and M somewhat divergent just before wing margin; the former almost straight, the latter slightly bowed. Vein Cu not reaching wing border. No anal vein. Crossvein bm-cu strongly oblique, contiguous with crossvein r-m. Calypter minute, brown, with 2 short brown cilia. Halter with darkened knob.

Legs entirely whitish-yellow. Fore femur much thickened (Fig. 1); with row of brownish posteroventral bristles and 2 long ventral bristles near base. Fore tibia lacking prominent bristles. Mid femur much slender than fore femur, with 1 strong, brown, anterior subapical bristle, rows of very short anteroventral and posteroventral bristles and 1 long ventral bristle near base. Mid tibia lacking prominent bristles. Hind femur slightly stouter than mid femur, with 1 short black anterior subapical, 1 long, thin, basal ventral bristle and some longer dorsal bristles near base. Hind tibia with 1 short dorsal bristle closer to middle, 1 longer anterodorsal just beyond middle and 1 short anterodorsal subapical bristles. Tarsi unmodified.




Figs 1-2. *Chersodromia afrosylvatica* sp. nov. holotype male habitus (terminalia removed). 1. Lateral view; 2. Dorsal view. Scale 1 mm. ff: fore femur; ht: hind tibia.

Abdomen with tergites brownish yellow, weakly sclerotised, unmodified, covered with short bristles longer on segments 7–8; sternites yellowish to pale yellow. Terminalia (Figs. 3-5) elongate, orange yellow. Cerci separated; right cercus rather digitiform, moderately long, narrow, with ordinary bristles; left cercus digitiform, somewhat broader and longer than right cercus, slightly attenuated apically, with ordinary bristles. Right epandrial lamella as in Fig. 3, rather subtriangular, with 4 brownish bristles ventrally; right surstylus not prominent. Left epandrial lamella fused with hypandrium, bearing two subapical bristles; Left surstylus consisting of two sclerites. Dorsal sclerite darkened with 1 tiny dorsal bristle. Ventral sclerite pale, with 1 long apical darkened bristle, a darkened bristle at right side and 4 dark brown spine-like bristles at left side. Two rod-shaped apodemes.

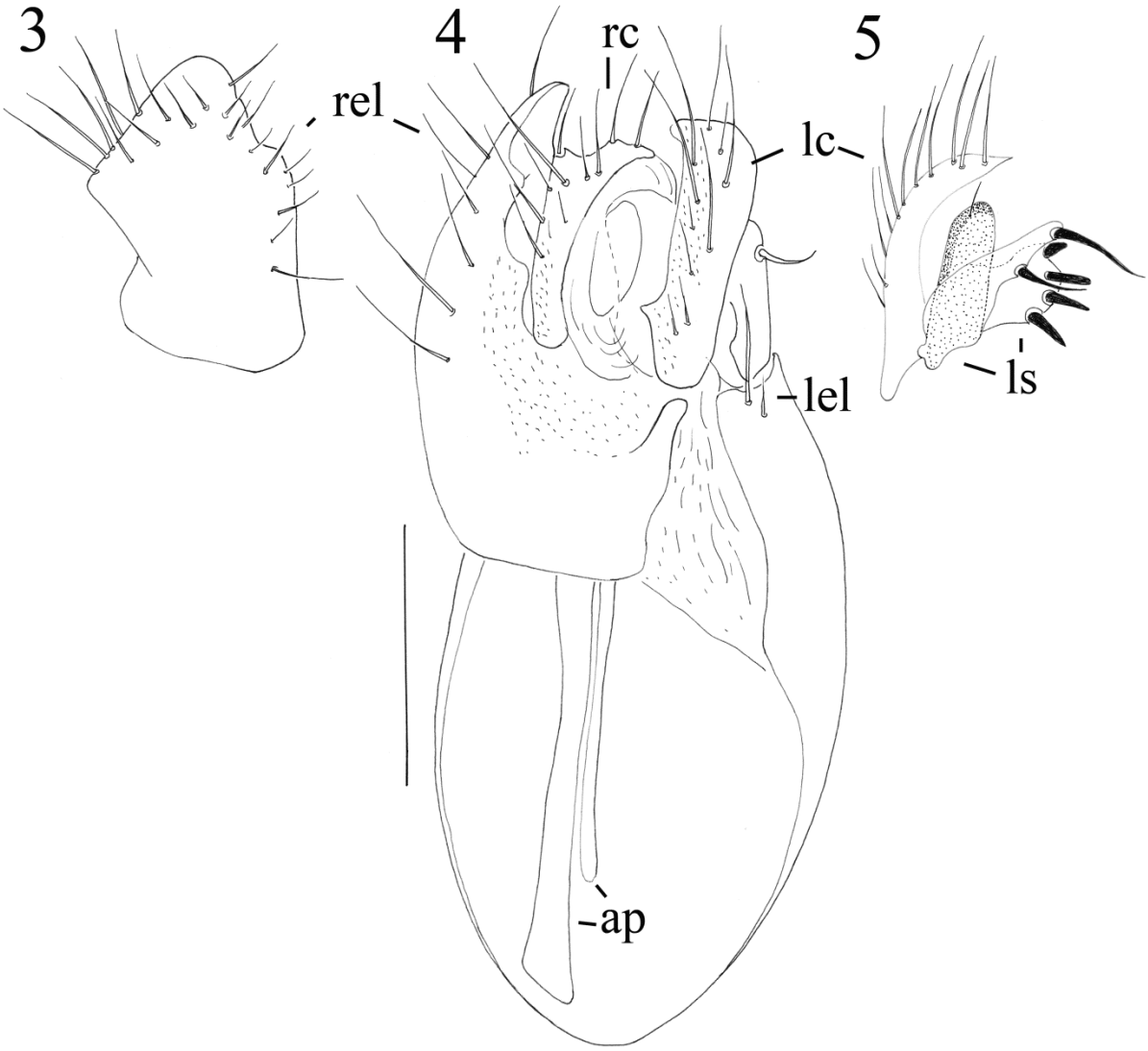
Female. Unknown.

DERIVATIO NOMINIS: The name *afrosylvatica* alludes to its presence in forest (*sylva* Lat. for forest) in Africa.

DISTRIBUTION. D. R. Congo

## Discussion

In having only three bristles on the apical half of the hind tibia the new species is quite closely related to *C. bulohensis* Grootaert et Shamshev, 2012 and *C. obscura* Grootaert, Cumming et Shamshev, 2007 that were described from mangrove in Singapore and bamboo forest in Thailand. However in *C. bulohensis* there are only three spine-like bristles on the side of the left surstylus and a much longer apical bristle. The shape of the cerci and the bristling of the right epandrial lamella are also different. The left epandrial lamella bears at least four short subapical setae while in *C. afrosylvatica* sp. nov. there are two long subapical setae. Additionally, *C. bulohensis* has no vertical




Figs 3-5. *Chersodromia afrosylvatica* sp. nov. holotype male genitalia. 3. Right epandrial lamella, lateral view; 4. Terminalia ventrally; 5. Left cercus and surstylus, lateral view. Scale 0.1 mm. ap: apodemes; lc: left cercus; lel: left epandrial lamella; ls: left surstylus; rc: right cercus; rel: right epandrial lamella.

bristles. *Chersodromia obscura* can be distinguished from the new species by uniformly dark yellowish occiput, lacking acrostichal bristles and 3 long dorsocentrals.

As to the systematic position of the "whitish yellow" terrestrial *C. flavicaput* - group we maintain our point of view (GROOTAERT & SHAMSHEV, 2012) to keep this group within the genus *Chersodromia* until we have contradicting genetic evidence.

**Acknowledgements**

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# New spider species (Araneae) from the Galápagos Islands (Ecuador)

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**Abstract**

Two new spider species are described from the Galápagos archipelago. *Theridiosoma sancristobalensis* sp. nov. (Theridiosomatidae) and *Galapa floreana* sp. nov. (Pholcidae). The unknown male of a *Zimiromus* species (Gnaphosidae) is described.

**Keywords** : Spiders, Gnaphosidae, Theridiosomatidae, Pholcidae, new species.

**Samenvatting**

Twee nieuwe spinnensoorten worden van de Galápagos eilanden beschreven : *Theridiosoma sancristobalensis* sp. nov. (Theridiosomatidae) en *Galapa floreana* sp. nov. (Pholcidae). Het onbekend mannetje van een *Zimiromus* (Gnaphosidae) soort wordt beschreven.

**Résumé**

Deux nouvelles espèces d'araignées sont décrites de l'archipel des Galápagos : *Theridiosoma sancristobalensis* sp. nov. (Theridiosomatidae) et *Galapa floreana* sp. nov. (Pholcidae). Le mâle inconnu d'une espèce de *Zimiromus* (Gnaphosidae) est décrit.

## Introduction

All important spider collections ever made on the Galápagos Archipelago have been studied by the author. A detailed overview of the sampled spider material since 1859 is given in BAERT (2013).

The author started a systematic sampling of the spider fauna of the archipelago in 1982. These samplings were carried out in collaboration with several Belgian colleagues at regular base till 2010. By the end of 2010, the author received the opportunity to study the spider collections made between 1967 and 1980 by S. Riechert (1967-1674) and Prof. W.G. Reeder (1975-1980). These collections are deposited at the Texas Memorial Museum of the University of Texas, Austin.

The entirety of the material studied comprises something more than 11.400 specimens, derived from nearly 5.200 sampling units distributed over 700 localities scattered over the whole archipelago.

The Texas Memorial Museum material contained a new Theridiosomatidae species (*Theridiosoma sancristobalensis* sp. nov.) and 2 unknown *Zimiromus* (Gnaphosidae) males which might be the males of one of the females described from the mainland.

While sampling the ants of the island of Floreana, Henri Herrera (Researcher at the Charles Darwin Research Station, Santa Cruz) caught a small pholcid spider in a pitfall trap. It appeared to belong to the genus *Galapa* Huber, 2000 and to differ consistently from the two known archipelago species (see discussion below). It is herein described.

## Material and methods

The type material of the 2 new species and the males of the *Zimiromus* species are deposited at the Royal Belgian Institute of Natural Sciences, Brussels (Belgium).

Specimens were examined and measured with a Wild M5 stereomicroscope, and illustrated using a Wild M10 stereomicroscope.
The left male palps are depicted. The female genitalia of *Theridiosoma sancristobalensis* were cleared in a methylsalycilate solution.
*The abbreviations used in the text :* AME = Anterior Median Eyes ; Fe = Femur ; HWH = Henri W. Herrera ; Mt = Metatarsus ; Pa = Patella ; PME = Posterior Median Eyes ; Ta = Tarsus ; Ti = Tibia.

## GNAPHOSIDAE

### *Zimiromus* Banks, 1914

DIAGNOSIS
Conform to the diagnosis given by PLATNICK (1976), except by small differences in eye positions : posterior eye row slightly procurved ; posterior eyes much closer to each other, median eyes nearly touching, lateral eyes separated 1/4$^{th}$ of each other.

### *Zimiromus* species
(Figs 1-5)

DIAGNOSIS
Differs from the other male *Zimiromus* species by the straight triangular conductor not folded around the embolus, the shape of the retrolateral tibial apophysis, the eye positions and the presence of a promarginal row of 11 plumose setae.

MATERIAL EXAMINED. GALÁPAGOS ARCHIPELAGO : ♂ **:** Isla Rábida, 75 m asl, under rotting *Opuntia* cactus trunk, 30/IX/1975, leg. W.G. Reeder ; ♂ **:** Isla Gardner near Isla Española, 20 m asl, litter of *Bursera* and *Croton* under large *Opuntia* cactus, 13/II/1977, leg. W.G. Reeder.

DESCRIPTION
**Male** : Total length : 3.45 mm ; carapace length : 1.24 mm, width : 0.93 mm, height : 0.39 mm.

*Carapace* : Colour (in alcohol) pale orange with black oval in eye region, especially around AME ; sparsely covered with short black setae along sides. Chelicerae, pedipalps and labium pale orange. Endites and sternum yellow with orange tinge. Sternum covered with median short setae, bordered with long setae.

*Chelicerae* : Promargin with row of 9 plumose setae ; retromargin with 2 plumose setae at fang base. Three promarginal and 1 retromarginal teeth.

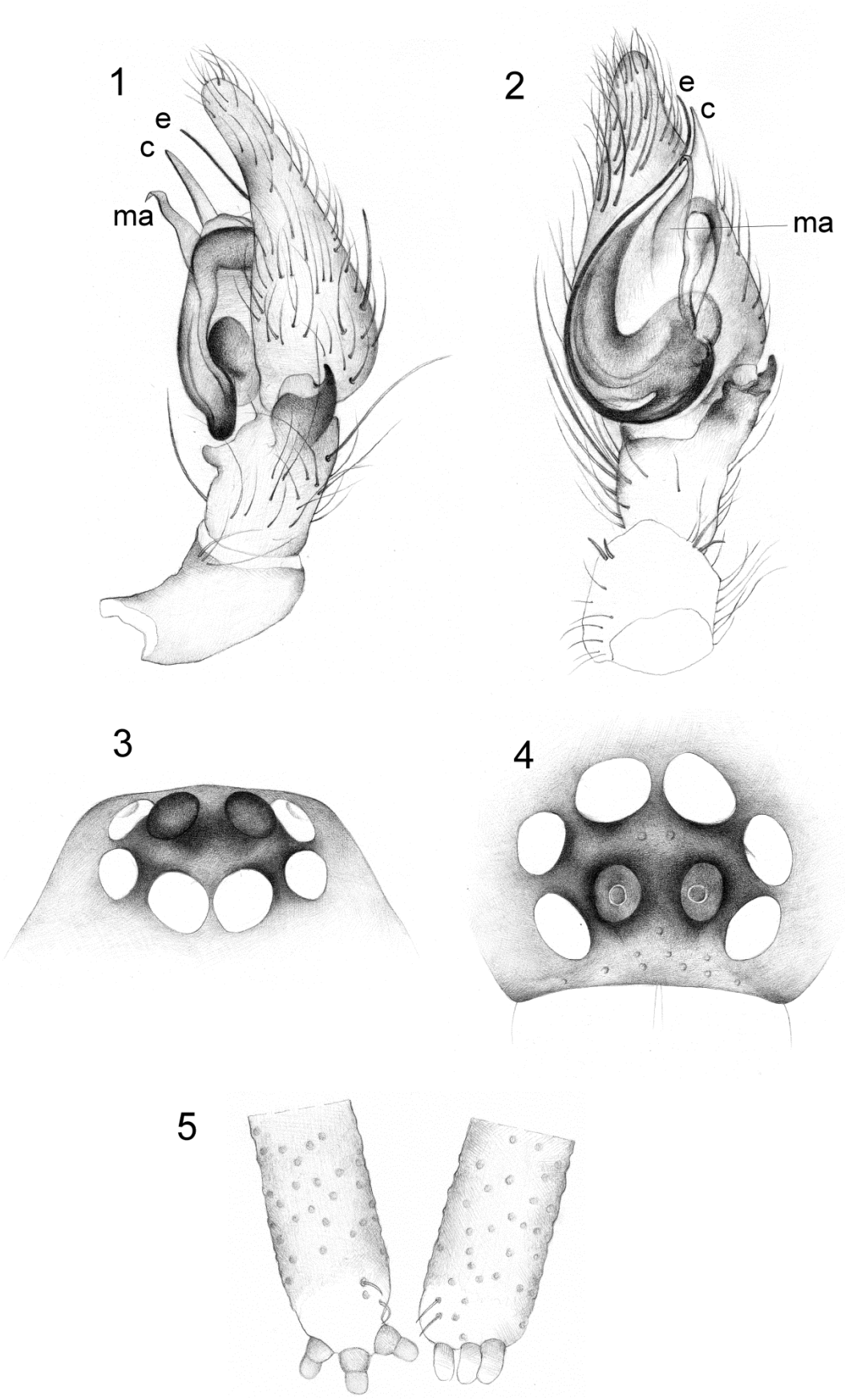
*Abdomen* : Creamy with small orange anterior scutum and four hardly visible impressed dots.

*Eyes* (Figs 3, 4) : Eyes close together ; anterior eye row slightly recurved, seen from above (Fig. 3) ; anterior median eyes separated by nearly their diameter (Fig. 4) ; anterior median eyes separated from anterior lateral eyes by 1/3$^{th}$ diameter (Fig. 4) ; posterior eye row slightly procurved ; posterior eyes much closer to each other, median eyes nearly touching, lateral eyes separated 1/4$^{th}$ of each other (Fig. 3) ; PME > AME.

*Legs* : Measurements : I (3.57 mm) : Fe 1.05 mm, Pa 0.62 mm, Ti 0.72 mm, Mt 0.68 mm, Ta 0.50 mm ; II (3.24 mm) : Fe 0.95 mm, Pa 0.56 mm, Ti 0.64 mm, Mt 0.60 mm, Ta 0.49 mm ; III (3.04 mm) : Fe 0.85 mm, Pa 0.45 mm, Ti 0.56 mm, Mt 0.68 mm, Ta 0.50 mm ; IV (4.47 mm) : Fe 1.17 mm, Pa 0.60 mm, Ti 0.87 mm, Mt 1.15 mm, Ta 0.68 mm. Spination : femora : I d3p1, II d3p1, III d3p1r1, IV d3 (proximal dorsal spine the longest, I : 0.9 femur diameter, IV : 1.1 femur diameter) ; patellae I & II none, III & IV d1p1r1 ; tibiae : I & II none, III d1p2r1v1-1-2, IV d2p2r2v1-1-2 ; metatarsi : I & II none, III d2-1p1-1r1-1v1-2, IV d2-2p1-1r1-1v1-1-1. Tarsi with 3 pairs of claw tufts.

*Spinnerets* : Anterior lateral spinnerets with 3 piriform spigots along posterior border and 2 small ampullate spigots along antero-median border (Fig. 5).

*Pedipalp* (Figs 1,2) : Cymbium length 0.41 mm. Embolus long and thin, originating retro-proximally, running prolaterally along bulbus, curved towards retrolateral side, ending in a curl adjacent to thin triangular conductor ; median apophysis hooklike. Retrolateral tibial apophysis with clawlike tip.
**Female** : unknown.




Figs 1-5. *Zimiromus* species, male. 1. Palp, lateral view (Cymbium length 0.41 mm) – 2. Palp, ventral view – 3. Eyes, dorsal view – 4. Eyes, frontal view – 5. Anterior spinnerets. (c = conductor, e = embolus, ma = median apophysis).

DISCUSSION

From the 9 known Galápagos gnaphosid species, only 2 have a cosmopolitan distribution, i.e. *Trachyzelotes kulckzynskii* (Bösenberg, 1902) and *Zelotes laetus* (O.-P. Cambridge, 1872). The 6 *Camillina* species and *Poecilochroa bifasciata* Banks, 1902 are endemic to the archipelago. Although the *Zimiromus* males described here may represent a new species, it is preferable to postpone the creation of a new species until females have been found. The males might indeed belong to one of the females described from the low altitude regions of the Latin-American mainland in Ecuador or Peru, i.e. *Z. brachet* Platnick & Shadab, 1976 from Ecuador (Guyaquil), *Z. circulus* Platnick & Shadab, 1976 from Pasco (Peru) or *Z. piura* Platnick & Shadab, 1976 from Piura (Peru).

## THERIDIOSOMATIDAE

### *Theridiosoma* O. Pickard-Cambridge, 1879

DIAGNOSIS

Conform to the diagnosis given by CODDINGTON (1986). First legs longer than fourth ; legs long and slender ; PME separation less than ½ diameter ; embolic division fragmented into bristle-like parts (hardly visible in this species) ; posterior epigynal rim blunt, not pointed.

### *Theridiosoma sancristobalensis* sp. nov.

(Figs 6-12)

ETYMOLOGY

The specific name is an adjective derived from the type locality.

DIAGNOSIS

Closely resembles *T. chiripa* Rodrigues & Ott (2005) but differs in some details : the embolic apophysis on the male palp is hooked whereas it is straight in *T. chiripa* ; the embolus is longer and median apophysis is elongate. The scapus of the epigynum is broadly rounded ; the vulva has long arched copulatory ducts whereas short in *T. chiripa*. Abdomen : with different folium design.

TYPE MATERIAL EXAMINED. GALÁPAGOS ARCHIPELAGO : **Holotype male & Allotype female** : Isla San Cristóbal, El Junco area, 540-560 m asl, sweeping dense grove of *Eugenia* leaves, 16/II/1978, leg. W.G. Reeder. **Paratype male :** Isla San Cristóbal, El Junco area, 540-560 m asl, sweeping vertical walls of encañada at head of stream, covered with ferns and *Miconia*, 16/II/1978, leg. W.G. Reeder.

OTHER MATERIAL EXAMINED**.**

One male and two females without label (leg. W.G. Reeder).

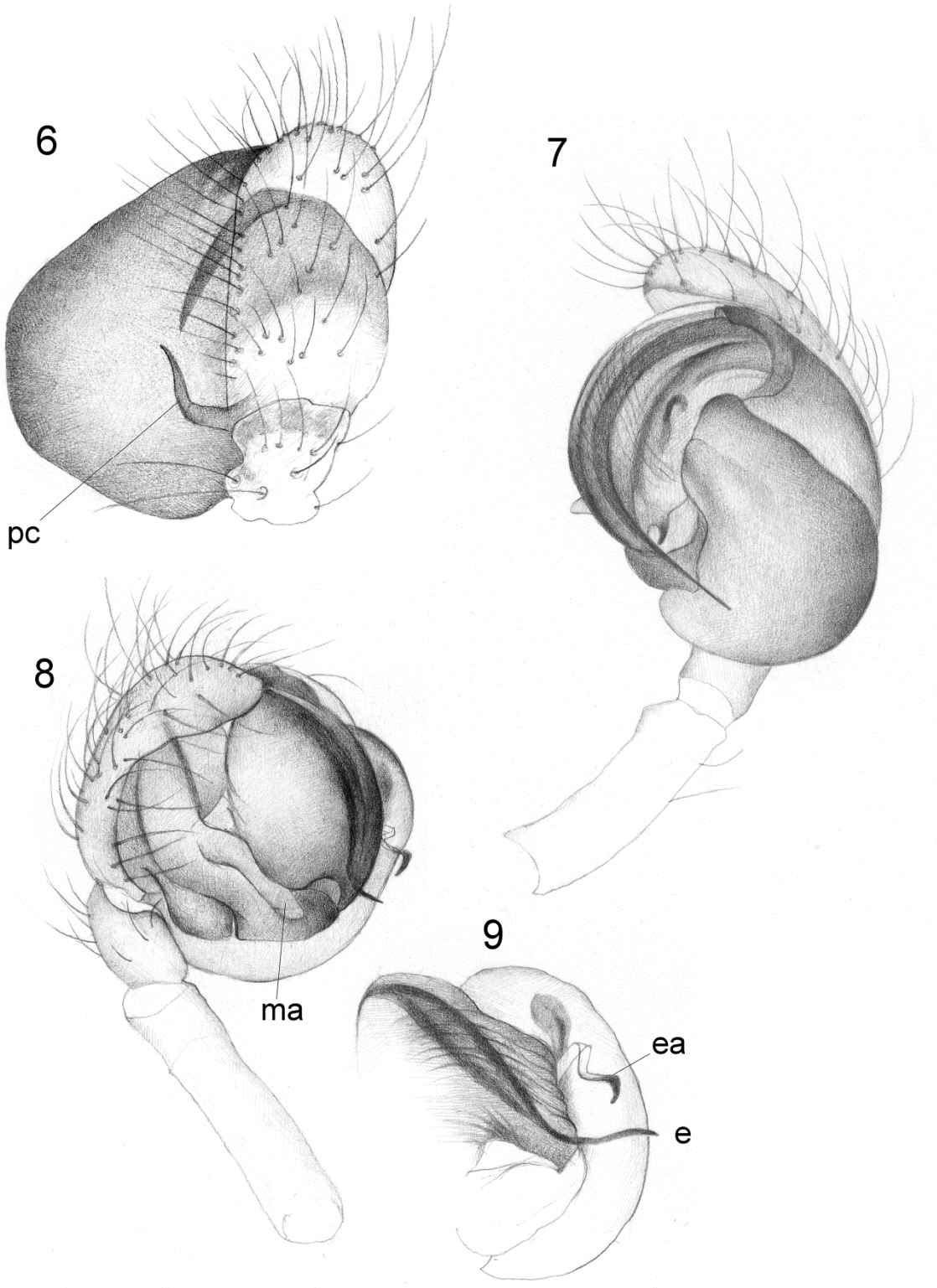
DESCRIPTION **:**

**Male Holotype** : Total length : 1.44 mm ; carapace length : 0.70 mm, width : 0.58 mm, height : 0.39 mm ; abdomen : 0.74 mm long, 1.01 mm high, 0.74 mm wide.

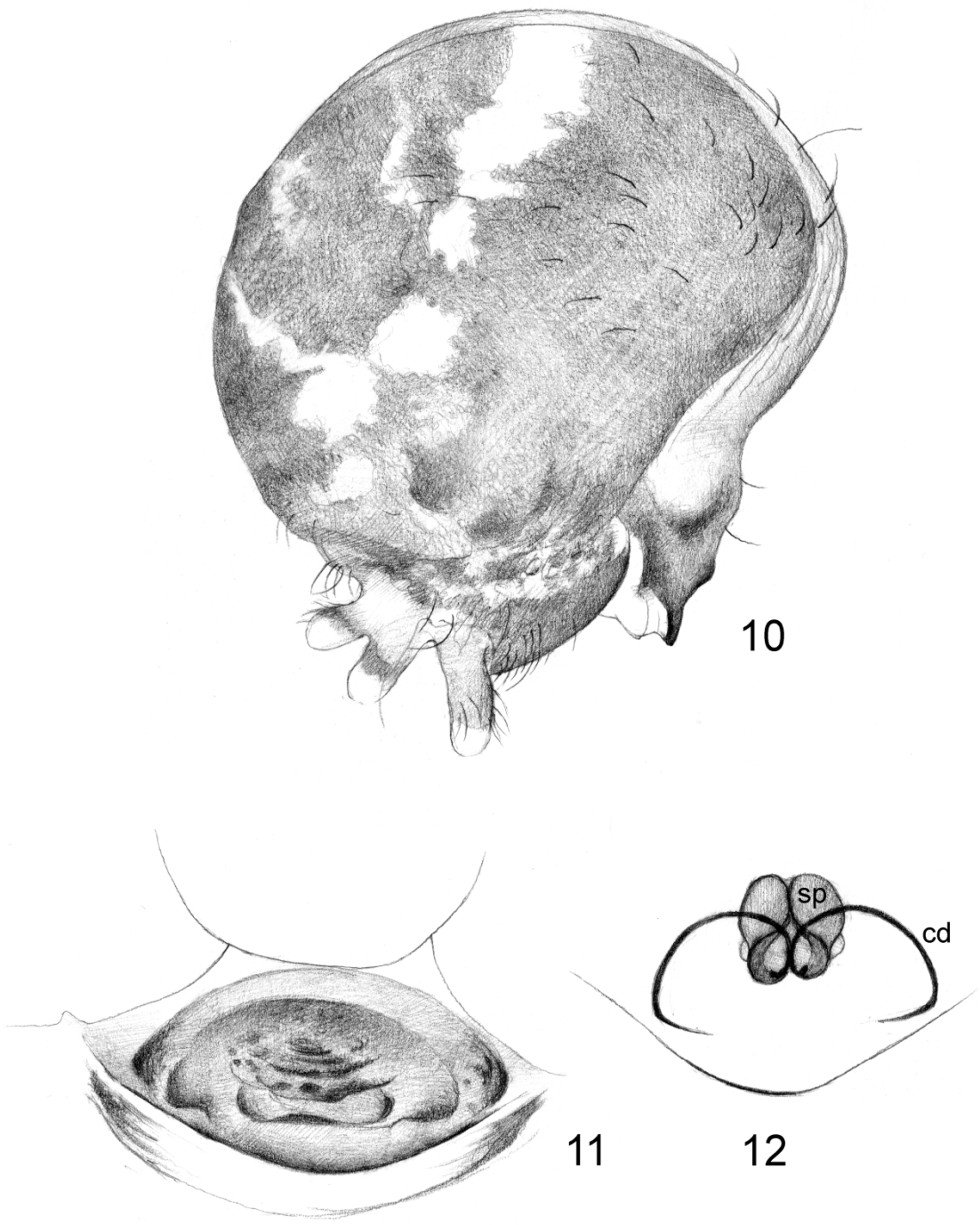
*Carapace* : Colour (in alcohol) brown, slightly suffused with black along striae ; ocular area black, especially around anterior median eyes ; slanting caudal part yellowish brown. Clypeus 3.5 times diameter of AME. Chelicerae and labium light brown. Endites whitish with blackly suffused bases. Sternum light brown with blackish border. Legs light brown hardly visibly suffused with black.

*Abdomen* : Smoothly ovoid, higher than long, with white band running across dividing dorsum in two parts : apical part dusty creamy white, posterior part blackish ; venter blackish ; sides dusty with thin broken creamy stripes. Anterior spinnerets dark ; posterior and median spinnerets pale.

*Legs* : Measurements : I (2.07 mm) : Fe 0.63 mm, Pa 0.25 mm, Ti 0.47 mm, Mt 0.43 mm, Ta 0.29 mm ; II (1.74 mm) : Fe 0.50 mm, Pa 0.23 mm, Ti 0.39 mm, Mt 0.37 mm, Ta 0.25 mm ; III (1.09 mm) : Fe 0.31 mm, Pa 0.17 mm, Ti 0.19 mm, Mt 0.23 mm, Ta 0.19 mm ; IV (1.38 mm) : Fe 0.43 mm, Pa 0.19 mm, Ti 0.29 mm, Mt 0.28 mm, Ta 0.19 mm. Ti I with proximal spine and 3 trichobothria ; Ti II with 1 proximal spine and 2 trichobothria ; Ti III with 1 proximal spine and 2 trichobothria (2.7 diameter) ; Ti IV with 1 proximal spine and 3 trichobothria (spine flanked by the proximal trichobothria). Mt III with prolateral trichobothrium.




Figs 6-9. *Theridiosoma sancristobalensis* sp. nov., male. 6. Palp, dorsal view – 7. Palp, ventral view – 8. Palp, lateral view – 9. Detail of embolus and embolic apophysis. (e = embolus, ea = embolic apophysis, ma = median apophyis, pc = paracymbium) (Cymbium length 0.35 mm).




Figs 10-12. *Theridiosoma sancristobalensis* sp. nov., female. 10. Abdomen, lateral view – 11. Epigyne, ventral view – 12. Epigyne, cleared. (cd = copulatory duct, sp = spermatheca) (Width of scapus : 0.31 mm, height of abdomen : 1.05 mm).