

ARTICULO:

A nature's treasury: Pseudoscorpion diversity of the Canary Islands, with the description of nine new species (Pseudoscorpiones, Chthoniidae, Cheiridiidae) and new records

Volker Mahnert

Muséum d'histoire naturelle
case postale 6434 CH-1211
Genève 6, Suisse.
C-elect.: volker.mahnert@wanadoo.fr

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Sociedad Entomológica Aragonesa
(SEA)

Avda. Radio Juventud, 37

50012 Zaragoza (ESPAÑA)

Tef. 976 324415

Fax. 976 535697

C-elect.: amelic@telefonica.net

Director: Carles Ribera

C-elect.: cribera@ub.edu

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ARTICULO:

A nature's treasury: Pseudoscorpion diversity of the Canary Islands, with the description of nine new species (Pseudoscorpiones, Chthoniidae, Cheiridiidae) and new records

Volker Mahnert

Abstract:

Three new species of the subgenus *Chthonius* (*Ephippiochthonius*) from Tenerife and Gran Canaria and five new species of the genus *Lagynochthonius* (Chthoniidae) are described from the mesovoid shallow substratum (MSS) of Gran Canaria. The presence of four lanceolate setae on the movable chelal finger of *Lagynochthonius* species is a previously unrecorded morphological character in this genus. *Paraliochthonius curvidigitatus* (Mahnert) is replaced in its original genus *Lagynochthonius*. *Apocheiridium lienhardi* sp. nov. (Cheiridiidae) is described from the island of El Hierro, the species is characterized by the presence of only 6 trichobothria on the fixed chelal finger. The subgenus *Apocheiridium* (*Chiliocheiridium*) Vitali-di Castri is sunk in the synonymy of *Apocheiridium* J. C. Chamberlin, it was only known from three species from Chile. *Chthonius* (*Ephippiochthonius*) *canariensis* stat. nov. is elevated from subspecies rank; *Geogarypus mirei* Heurtault (Geogarypidae) and *Garypus* s. *saxicola* Waterhouse (Garypidae) are recorded for the first time from the Canarian Archipelago, several other species are added to the fauna of different islands. Identification keys are provided to the species of the genera *Chthonius* (*Ephippiochthonius*) and *Lagynochthonius* from the Canary Islands.

Key words: Pseudoscorpions, new taxa, Chthoniidae, Cheiridiidae, Spain, Canary Islands, Faunistics, Taxonomy, subterranean fauna.

Taxonomy: *Chthonius* (*Ephippiochthonius*) *lopezi* sp. nov., *Chthonius* (*E.*) *tamaran* sp. nov., *Chthonius* (*E.*) *tenerifae* sp. nov.; *Lagynochthonius lopezi* sp. nov., *Lagynochthonius microdentatus* sp. nov., *Lagynochthonius oromii* sp. nov., *Lagynochthonius subterraneus* sp. nov., *Lagynochthonius tenuimanus* sp. nov.; *Apocheiridium lienhardi* sp. nov.

Un tesoro de la naturaleza: La diversidad de Pseudoscorpiones de las islas Canarias, con la descripción de nueve especies nuevas (Pseudoscorpiones, Chthoniidae, Cheiridiidae) y de nuevas citas.

Resumen:

Se describen cinco nuevas especies del género *Chthonius* (*Ephippiochthonius*) procedentes de Tenerife y Gran Canaria y cinco nuevas especies del género *Lagynochthonius* (Chthoniidae) del Medio Subterráneo Superficial (MSS) de Gran Canaria. La presencia de cuatro sedas lanceoladas en el dedo móvil de las especies de *Lagynochthonius* representa un nuevo carácter morfológico para este género. Se transfiere *Paraliochthonius curvidigitatus* (Mahnert) a su género original *Lagynochthonius*. Se describe *Apocheiridium lienhardi* sp. nov. (Cheiridiidae) de la isla de El Hierro, la especie se caracteriza por la presencia de solo 6 tricobotrios situados en el dedo fijo de la pinza del pedipalpo. Se propone que el subgénero *Apocheiridium* (*Chiliocheiridium*) Vitali-di Castri es una nueva sinonimia de *Apocheiridium* J. C. Chamberlin, conocido únicamente por tres especies de Chile. *Chthonius* (*Ephippiochthonius*) *canariensis* stat. nov. es elevado a la categoría de especie. Se señalan por primera vez en el archipiélago canario *Geogarypus mirei* Heurtault (Geogarypidae) y *Garypus* s. *saxicola* Waterhouse (Garypidae). Se añaden también otras especies para diferentes islas del archipiélago. Finalmente se presentan claves de identificación para las especies canarias pertenecientes a los géneros *Chthonius* (*Ephippiochthonius*) y *Lagynochthonius*.

Palabras clave: Araneae, Pseudoscorpions, nuevas especies, Chthoniidae, Cheiridiidae, España, Islas Canarias, Faunística, Taxonomía, fauna subterránea.

Taxonomía: *Chthonius* (*Ephippiochthonius*) *lopezi* sp. nov., *Chthonius* (*E.*) *tamaran* sp. nov., *Chthonius* (*E.*) *tenerifae* sp. nov.; *Lagynochthonius lopezi* sp. nov., *Lagynochthonius microdentatus* sp. nov., *Lagynochthonius oromii* sp. nov., *Lagynochthonius subterraneus* sp. nov., *Lagynochthonius tenuimanus* sp. nov.; *Apocheiridium lienhardi* sp. nov.

Introduction

The archipelago of the Canary Islands consists of 7 main islands of volcanic origin dispersed in the Atlantic Ocean between 27°38' and 29°35'N and between 13°20' and 18°14'W, belonging politically to Spain. It is located about 100 to 500 km off the north-west of the African continent. Tenerife is the most extensive island (surface 2034 km²), followed by Fuerteventura (1659 km²) and Gran Canaria (1560 km²), Tenerife has with the Teide the highest mountain of the archipelago (3718 m). Geological age of the islands lessens from east to west, Fuerteventura and Lanzarote being apparently the oldest ones, all islands emerged during the Miocene. Up to 1965 only two species of pseudoscorpions had been recorded from the archipelago, but due to several collections (done mainly by H. Franz, Vienna) diversity of this group got better known, and Beier (1975) recorded already 29 species and subspecies. Thanks to intensive biological surveys and development of new sampling techniques, carried out by Prof. Pedro Oromí and his team at the University of La Laguna (Tenerife), Mahnert *et al.* (2004) could record 45 species and subspecies, 24 species/subspecies being endemic for the archipelago. The most diversified families are Cheliferidae (9 species) and Chthoniidae (14 species). A new step has been taken since 2000 with the development of a new simple and highly efficient MSS pitfall trap (López & Oromí, 2009), which has revealed eight new species of Chthoniidae, that are distinctly adapted to this mesovoid shallow substratum (MSS). With only a few localities mainly on Gran Canaria having been sampled with this method, one can suppose the existence of numerous undiscovered pseudoscorpion species on this and other islands of the Canarian archipelago. 15 traps at six different locations on Gran Canaria have produced 19 troglobiont species of arthropods, 18 of which were previously unknown (López & Oromí, 2009)!

In this paper nine species new to science and two species new to the archipelago are added to the faunal list, bringing up to 56 the total number of recorded species and subspecies.

The species *Chthonius (Ephippiochthonius) canariensis* Beier, 1965 and *Microcreagrina hispanica* (Ellingsen, 1910), as well as *Calocheirus canariensis* (Beier, 1970) and *Withius piger* (Simon, 1878) were regularly collected in the traps, reflecting their frequency in this habitat and their biological activity. The presence of different species emphasizes a trapping efficiency along the whole 75 cm of trap length. A trap in Brezal del Palmital (Gran Canaria) produced, for example, specimens of *Microcreagrina hispanica*, *Chthonius (E.) canariensis*, *Chthonius (Ephippiochthonius) gracilimanus* Mahnert, 1997 and *Lagynochthonius oromii* sp. nov. The first two species live in the uppermost layers, *C. (E.) gracilimanus* probably in an intermediary depth, while *Lagynochthonius oromii* can be considered as a hypogean species occurring in the deep layers.

The new cheiridiid species was collected by my colleague Dr Charles Lienhard (Geneva) during a survey of Psocoptera in the Canarian archipelago.

Terminology

Several hypotheses have been formulated concerning homology of certain trichobothria in different families of pseudoscorpions and their appearance during the different post-embryological stages (e.g. Helversen, 1966; Mahnert, 1982; Vachon, 1974). However, the supposed homologies have yet not been proved by histological results. For this reason I follow the nomenclature of trichobothria proposed by Chamberlin (1931).

Abbreviations

T tritonymph; D deutonymph; P protonymph. **DZUL** Departamento de Zoología, Universidad La Laguna, Tenerife. **GBIF** Global Biodiversity Information Facility. **GIET** Grupo de Investigaciones Espeleológicas de Tenerife. **MCNT** Museo de Ciencias Naturales de Tenerife (actually Museo de la Naturaleza y el Hombre). **MHNG** Muséum d'histoire naturelle Genève, Switzerland. **MSS** mesovoid shallow substratum. **RGB** Rafael Garcia Becerra collection, Santa Cruz de La Palma (Museo La Cosmológica). **UTM** Universal Transverse Mercator System.

Taxonomy

Chthoniidae

Chthonius (Ephippiochthonius) lopezi sp. nov.

(Figs 1-4)

Type material. Holotype ♂. Tenerife, Monte del Agua, Barranco de los Cochinos, MSS (UTM 28R 3213/31343), 14.XII.2003, leg. H.López (1680c) (DZUL). Paratypes. Same data, 1 ♀ (MHNG); same locality, 2 ♂ 2 ♀, 30.XI.2006, leg. P.Oromí & H.López (3132b) (1 ♂ DZUL, 1 ♂ 1 ♀ MHNG, 1 ♀ MCNT). Tenerife, Degollada de Bicora, MSS (UTM 28R 3806/31579), 1 ♂, 8.XII.2002, leg. H. Contreras (396a) (DZUL).

Diagnosis. Member of the species group with trichobothria *eb-esb-ist* placed in a straight line (or nearly so), *ist* slightly distal to *esb* and indistinctly basal to *st* of movable finger; posterior margin of cephalothorax with 4 setae (the lateral ones short), eyes or eyespots absent; pedipalps short and moderately stout, length of chela 0.58-0.69 mm, 5.0-5.5 times longer than deep. Comparison with the other species is presented in the identification key.

Description. Yellowish brown, chelicerae darker. Cephalothorax (Fig. 1) 1.0-1.1 times longer than broad, basally constricted, no eyes or eyespots, middle part of anterior margin dentate and rounded, chaetotaxy: 4 (plus 1-2 preocular setae)-6-4-2-4 (lateral setae short); tergites I-IV 4 setae, V-IX 6, X 4, XI 6 (2 tactile setae); manducatory process acute, 2 setae, pedipalpal coxa 3 setae (2 marginal ones, 1 submarginal one), coxa I 3+3 marginal microsetae, II 4+5-7 bipinnate coxal setae, III 5+3-5 bipinnate coxal setae, IV 6, intercoxal tubercle bisetose; anterior genital operculum 10 setae (6 marginal ones), genital opening of male cordiform, with 3-4 internal

glandular setae (2♂ 3/3, 1♂ 4/4), 5-6 marginal and 1-2 discal setae on each side; sternite III 8-10 + 2x2-3 suprastigmal setae, IV 7-8 + 2x2 suprastigmal setae, V-X 6-8/6-7/6/6/6/7 (2 tactile setae). Anal cone 0+2. Pleural membrane papillostriae.

Chelicera (Fig. 2) with 6 setae and 1-2 accessory setae on hand, fixed finger with 8-10 distally bigger teeth, movable finger with 5-9 small teeth and one isolated subdistal tooth, spinneret in female present as small hump, lacking in male, serrula exterior 14-15 lamellae, rallum 11 setae. Pedipalps (Figs 3-4): femur smooth, 4.9-5.5 times longer than broad and 2.2-2.3 times longer than patella, chaetotaxy 3-6-3-5, patella 2.0-2.1 times longer than broad, hand with distinct hump distal to *ib/isb*, 2.0-2.25 times, chela 5.0-5.5 times longer than deep, finger 1.45-1.6 times longer than hand; fixed finger with a distal lateral tooth, 15 acute teeth and basally some granular teeth, movable finger with well developed apodeme, with 9-11 acute teeth (with tooth canals), followed by 8-9 rounded rudiments without canals. Trichobothria: *ist* slightly distal to *esb*, *sb* distinctly nearer *b* than *st*, one sensillum at tooth lamella proximal of *sb*. Leg I: femur 4.1-4.6 times longer than deep and 2.0-2.1 times longer than patella, patella 2.5-2.8 times, tibia 3.5-3.8 times, tarsus 8.3-9.2 times longer than deep; leg IV: femur+patella 2.2-2.3 times, tibia 3.6-4.1 times, basitarsus 2.5-2.7 times longer than deep, a tactile seta in proximal half (TS=0.36-0.39), telotarsus 8.9-9.9 times longer than deep and 1.9-2.1 times longer than basitarsus, tactile seta in basal third (TS=0.25-0.30); arolia simple and shorter than smooth claws.

Measurements (in mm: ♂ followed by ♀ in parentheses): body length 0.82-1.10; cephalothorax 0.32-0.35/0.30-0.33 (0.40/0.37); pedipalps: femur 0.41-0.42/0.08 (0.48-0.50/0.10-0.11), patella 0.18-0.19/0.09 (0.21-0.22/0.10-0.11), hand 0.24-0.25/0.11-0.12 (0.28/0.13-0.14), length of finger 0.34-0.37 (0.41-0.42), of chela 0.58-0.61 (0.69); leg I: femur 0.21-0.23/0.05 (0.25-0.27/0.06), patella 0.11/0.04 (0.12-0.13/0.05), tibia 0.12/0.03-0.04 (0.14-0.15/0.04), tarsus 0.24-0.26/0.03 (0.29-0.30/0.03); leg IV: femur+patella 0.33-0.37/0.15-0.17 (0.40/0.17-0.18), tibia 0.23-0.24/0.0-0.07 (0.26-0.28/0.07), basitarsus 0.12-0.13/0.05 (0.14-0.15/0.05-0.06), telotarsus 0.24-0.26/0.03 (0.28-0.29/0.03).

Etymology. Named in honour of Dr Heriberto López (University of La Laguna), who developed the particular traps used to sample the mesovoid shallow substratum (MSS) on the Canary Islands.

***Chthonius (Ephippiochthonius) tamaran* sp. nov.**
(Figs 5-9)

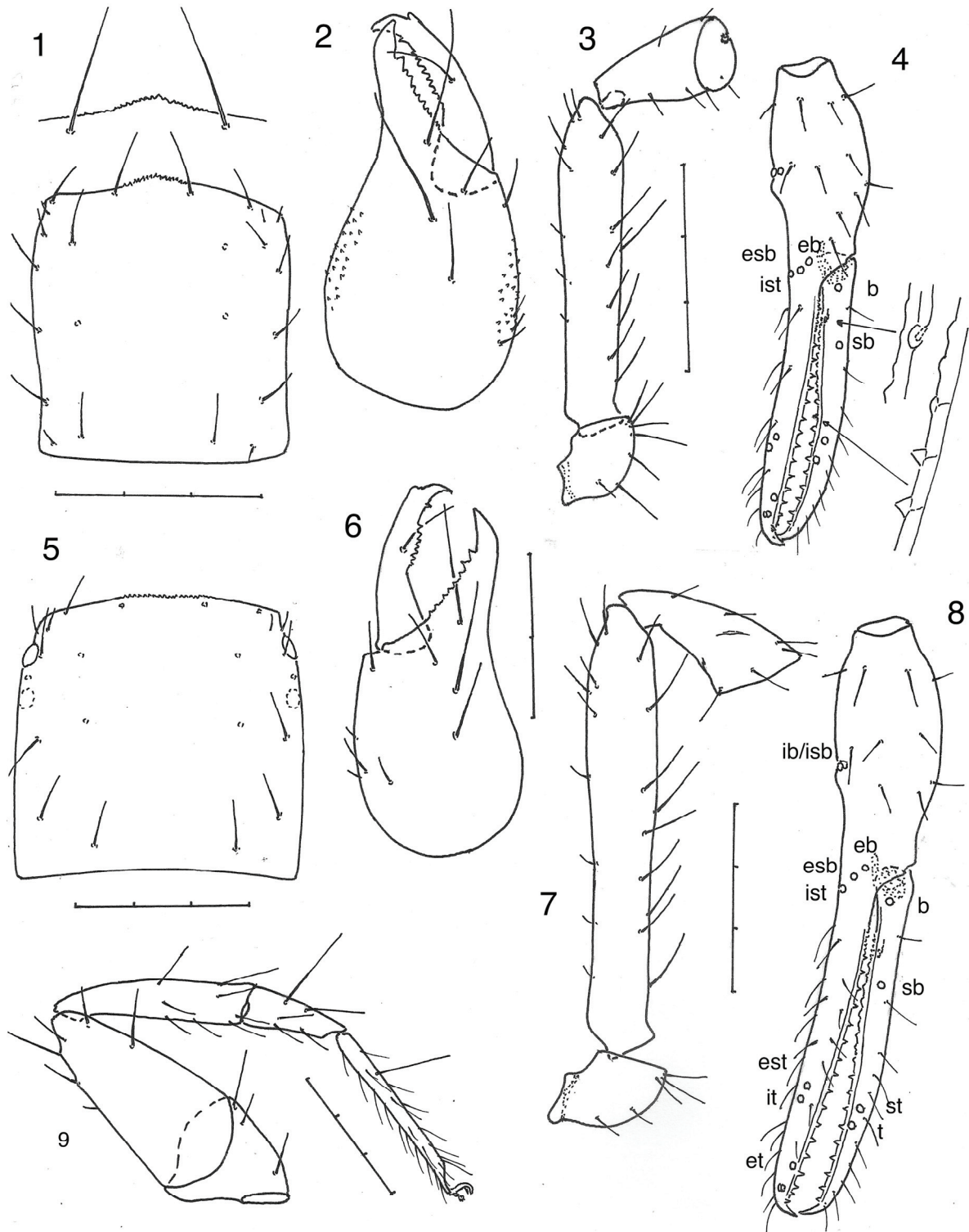
Type material. Holotype ♀. Gran Canaria, Cueva de Los Arrepentidos (UTM 28R 4482/30878), 7.IV.2002, leg. GIET (PS-1A) (DZUL). Paratypes. Same locality, leg. GIET: 1♂ 2 ♀, 17.XI.2003 (1572) (DZUL); 1♂, 17.XI.2003 (1590) (MHNG); 2♀, 8.VII.2007 (3922) (1♀ DZUL, 1♀ MCNT). Gran Canaria, Cueva de La Luna (28R 4478/30873), leg. GIET: 1♂ 2♀,

23.XII.2006 (3046) (1♀ DZUL, 1♂ 1♀ MHNG); 1♂ 4♀, 8.VII.2007 (3914) (1♂ 2♀ DZUL, 2♀ MHNG). Gran Canaria, Barranco del Draguillo, MSS (UTM 28R 4561/30913), leg. H. López: 6♂ 7♀, 26.XII.2006 (GBIF4877-4) (2♂ 3♀ DZUL, 2♂ 2♀ MHNG, 2♂ 2♀ MCNT); 1♂ 12♀, 16.VIII.2007 (GBIF 4878-4) (1♂ 8♀ DZUL, 4♀ MHNG); 1♀, 28.XII.2008 (GBIF4881-2) (DZUL).

Diagnosis. Member of the species group with trichobothria *eb-esb-ist* in a straight line, *ist* distinctly distal to *esb*; posterior margin of cephalothorax with 2 setae, 2 pairs of eyes present (anterior ones with flat lenses, the posterior ones as indistinct spots), epistome reduced, the anterior margin in middle nearly straight and dentate. Pedipalps moderately long and slender, femur 6.8-7.2 (♂)/6.0-6.9 (♀) times longer than broad (length 0.62-0.73 mm), chela 5.9-6.5 (♂)/ 5.5-6.2 (♀) times longer than deep. Comparison with the other species is given in the key.

Description. Yellowish brown, chelicerae brown; cephalothorax (Fig. 10) 0.97-1.03 times longer than broad, anterior margin nearly straight, dentate in middle, 2 pairs of eyes, anterior eyes with flat lenses, half of diameter from anterior margin, posterior eyes indistinct spots; 18 setae (4+2x2-3 preocular setae-6-4-2-2), length of median anterior setae 0.12 mm; tergites I-IV 4, V-IX 6, X 4, XI 6 (2 sublateral tactile setae); manducatory process acute, 2 setae, pedipalpal coxa 3, coxa I 3+3 marginal microsetae, II 4+7-10 bipinnate coxal setae, III 5+3-5 bipinnate coxal setae, IV 6, intercoxal tubercle bisetose; anterior genital operculum 10 setae (6 marginal ones), male genital opening cordiform, 5 marginal setae on each side, sternite III 6-8+2x3 suprastigmal setae, IV 6-8+2x2 suprastigmal setae, V 6-8, VI-IX 6, X 7 (2 submedial tactile setae). Anal cone 0+2. Pleural membrane papillostriae.

Chelicera (Fig. 6): Hand with 6 long and 2-4 accessory setae, fixed finger with 8-11 distally larger teeth, movable finger with 4-8 small teeth and one isolated subdistal tooth, subgaleal seta not reaching finger tip, spinneret hump-like, small (in both sexes), serrula exterior 14-15 lamellae, rallum 11 setae. Pedipalps (Figs 7-8): trochanter 1.6-1.8 times, femur ♀ 6.0-6.9 (♂ 6.8-7.2) times longer than broad and 2.3-2.5 (♂ 2.5-2.6) times longer than patella, patella 2.1-2.5 (♂ 2.0-2.1) times longer than broad, hand 2.2-2.5 (♂ 2.4-2.6) times, chela 5.5-6.2 (♂ 5.9-6.5) times longer than deep, hand with distinct hump distal to *ib/isb*, finger 1.5-1.6 times longer than hand; fixed finger with a distal lateral tooth, 17-19 acute teeth (2 distal ones small) and some basal granula, movable finger with distinct apodeme, 9-10 acute teeth (1-2 distal ones small) and 9-12 rounded rudiments (without canals). Trichobothria: *ist* distal to *esb*, *eb-esb-ist* in straight line, *sb* nearer to *b* than to *st*, one sensillum between *b* and *sb*. Leg I: femur 4.9-5.8 times longer than deep and 2.0-2.2 times longer than patella, patella 2.7-3.3 times, tibia 4.2-4.9 times, tarsus 9.7-11.3 (8.6 in 1♀) times longer than deep; leg IV (Fig. 9): femur+patella



Figures 1-4: *Chthonius (Ephippiochthonius) lopezi* sp. nov.: 1. Cephalothorax, with details of epistome. 2. Chelicera. 3-4: Pedipalp, with details of dentition and sensillum of movable finger, vestitural setae of finger partly omitted. scale units 0.1 mm.
Figures 5-9: *Chthonius (Ephippiochthonius) tamaran* sp. nov.: 5. Cephalothorax. 6. Chelicera. 7-8: Pedipalp. 9: Leg IV. scale units 0.1 mm.

2.4-2.8 times, tibia 4.5-5.0 times, basitarsus 2.9-3.4 times longer than deep, tactile seta in basal half (TS=0.38-0.45), telotarsus 10.7-12.6 times longer than deep and 1.9-2.2 times longer than basitarsus, tactile seta in basal half (TS=0.28-0.39); arolia simple, shorter than smooth claws.

Measurements (3♂ 7♀) in mm: body length 1.3-1.7; cephalothorax 0.44-0.48/0.44-0.49 (♂ 0.39-0.43/0.38-0.42); pedipalps: trochanter 0.18-0.20/0.10-0.12 (♂ 0.16/0.10), femur 0.63-0.72/0.10-0.11 (♂ 0.62-0.65/0.09-0.10), patella 0.26-0.30/0.12-0.14 (♂ 0.24-0.25/0.11-0.12), hand 0.33-0.38/0.15-0.16 (♂ 0.32-0.34/0.13-0.14), length of finger 0.51-0.58 (♂ 0.50-0.54), of chela 0.84-0.95 (♂ 0.79-0.88); leg I: femur 0.34-0.39/0.06-0.07, patella 0.16-0.19/0.05-0.06, tibia 0.19-0.22/0.04-0.05, tarsus 0.36-0.42/0.03-0.04; leg IV: femur+patella 0.56-0.61/0.21-0.23, tibia 0.38-0.42/0.08, basitarsus 0.19-0.21/0.06-0.07, telotarsus 0.38-0.44/0.03-0.04.

Etymology. Tamarán is the aboriginal name for the island Gran Canaria.

Chthonius (Ehippichthonius) tenerifae sp. nov.
(Figs 10-12)

Type material. Holotype ♀. Tenerife, Monte del Agua, Barranco de Los Cochinos, MSS, 21.I.2003, leg. H. Contreras (2690) (DZUL).

Diagnosis. Member of the group with trichobothria *eb-esb-ist* in a straight line, *ist* distinctly distal to *esb*; posterior margin of cephalothorax with 4 setae (lateral ones short), anterior margin in middle slightly curved and dentate, without eyes or eyespots. Pedipalps long and moderately slender, femur 5.7 times longer than broad (length 0.73 mm), chela 6.1 times longer than deep, length 1.08 mm. Comparison with the other species is given in the key.

Description. Yellowish brown, chelicerae brown; cephalothorax (Fig. 10) basally not constricted, 1.1 times longer than broad, without eyes or eyespots (rudiments of anterior eyes' tapetum perhaps present), chaetotaxy: 4+2 preocular setae on each side-6-4-3 (one supernumerary seta on right side)-4 (lateral setae short), length of medial anterior setae 0.13 mm; tergites: I-IV 4, V-IX 6, X 4, XI 6 (2 tactile setae); manducatory process acute, 2 setae, pedipalpal coxa 3, coxa I 3+3 minute marginal setae, II 3+4-5 bipinnate coxal setae, III 6+6 bipinnate coxal setae, IV 6, intercoxal tubercle bisetose; anterior genital operculum 10 setae (6 marginal ones), sternite III 8+2x2 suprastigmal setae each, IV 6+2x2 suprastigmal setae each, V-IX 6, X 7 (2 tactile setae). Anal cone 0+2. Pleural membrane papillostriae.

Chelicera with 6 long and 4/2 accessory setae, fixed finger with 14 distally bigger teeth, movable finger with 8 distally larger teeth and one isolated subdistal tooth, subgaleal seta long; spinneret hump-like, serrula exterior 18 lamellae, rallum 11 setae. Pedipalps (Figs 11-12):

trochanter 1.9 times longer than broad, femur smooth, 5.7 times longer than broad, chaetotaxy: 3-6-3-6, patella 2.3 times longer than broad, hand 2.3 times, chela 6.1 times longer than deep, finger 1.6 times longer than hand; a distinct hump distal to *ib/isb*; fixed finger with a distal lateral tooth, 21 acute teeth and some basal granules, base of movable finger with well developed apodeme, 2 small distal and 13 acute large teeth, in basal third 10 rounded rudimentary teeth (without canals). Trichobothria: *ist* distinctly distal to *esb*, *eb-esb-ist* in a straight line, *sb* distinctly nearer *b* than *st*, one sensillum distal to *b*. Leg I: femur 5.2 times, patella 2.8 times, tibia 4.2 times, tarsus 10.4 times longer than deep; leg IV: femur+patella 2.5 times, tibia 4.3 times, basitarsus 2.9 times longer than deep, a tactile seta in proximal half (TS=0.41), telotarsus 9.7 times longer than deep and 1.9 times longer than basitarsus, tactile seta in basal third (TS=0.30); simple arolia shorter than smooth claws.

Measurements (in mm): body length 1.64; cephalothorax 0.56/0.50; pedipalps: trochanter 0.22/0.11, femur 0.73/0.14, patella 0.31/0.14, hand 0.41/0.18, length of finger 0.67, of chela 1.08; leg I: femur 0.40/0.08, patella 0.19/0.07, tibia 0.23/0.04, tarsus 0.44/0.04; leg IV: femur+patella 0.60/0.24, tibia 0.40/0.09, basitarsus 0.22/0.07, telotarsus 0.41/0.04.

Etymology. a Latin noun, deriving from the name of the Canarian island Tenerife.

Discussion. All endemic species on the Canary Islands of the genus *Chthonius* belong to the subgenus *Ehippichthonius*, and form a well-defined species group (*machadoi*-group) characterised by the presence of an isolated subdistal tooth on movable cheliceral finger, the presence of a distinct hump on hand dorsum distal to *ib/isb* and the dentition of the movable chelal finger (a series of acute teeth in distal half, a series of rounded rudiments in basal half on raised basal lamella). Two groups may be distinguished by the position of trichobothrium *ist*:

- *ist* on level with *esb*, line *eb-esb-ist* broken, forming distinct angle: *C. (E.) canariensis*, *Chthonius (E.) setosus* Mahnert, 1993 and *C. (E.) gracilimanus*; all these species have only 2 setae on the posterior margin of cephalothorax. Within this *canariensis*-group no variation was observed in the number of setae on posterior margin of the cephalothorax and only minimal variation of the position of trichobothrium *ist*. In a few specimens (mainly males) out of the populations of *canariensis* from El Sao and Barranco del Draguillo *ist* was placed indistinctly distal to *esb* on one chela, but on level with *esb* on the other chela. One specimen identified as *gracilimanus* (Barranco Oscuro) had a tiny lateral seta in addition to the 2 long ones on the posterior margin of cephalothorax.

- *ist* distal to *esb*, line *eb-esb-ist* straight or nearly so; two subgroups can be distinguished, one with 2 setae on the posterior margin of cephalothorax: *Chthonius (E.) dubius* Mahnert, 1993 and *C. (E.) tamaran*; and one with 4 setae: *Chthonius (E.) rimicola* Mahnert, 1993, *C. (E.)*

lopezi, and *C. (E.) tenerifae*. In a few specimens of a *dubius* population collected at Los Marteles, the trichobothrium *ist* was placed more basally, the line *eb-esb-ist* therefore being slightly broken. The number of setae on the posterior margin of the cephalothorax showed slight variation: only 3 (one short lateral seta lacking) in 2♂ of *C. (E.) rimicola* from Barranco Oscuro (Gran Canaria) and a few specimens of *C. (E.) rimicola* from Temisa (Lanzarote), one specimen from Roque de

los Pasos (Tenerife) even had 5 setae (2 long and 3 tiny lateral ones).

The taxonomic validity of the presence/absence of microsetae in the subgenus *Ephippiochthonius* is under discussion, since some minor variation is observable in some populations (see *Chthonius (Ephippiochthonius) beieri* Lazzeroni, 1966 and *Chthonius (E.) kewi* Gabbutt, 1966 within the *tetrachelatus*- group).

Identification key to the species of *Chthonius (Ephippiochthonius)* recorded from the Canary Islands (adapted from Mahnert, 1997)

- 1 Movable cheliceral finger without isolated subdistal tooth; chelal hand without distinct hump distal to trichobothria *ib/isb* *C. (E.) tetrachelatus* (Preysslerr)
- 1* Movable cheliceral finger with isolated subdistal tooth; chelal hand with distinct hump distal to trichobothria *ib/isb* 2
- 2 Trichobothria *eb-esb-ist* placed in a (nearly) straight line, *ist* distal to *esb* 3
- 2* Trichobothria *eb-esb-ist* not in a straight line, *ist* on level with *esb* or proximal to *it* 7
- 3 Posterior margin of cephalothorax with 2 (exceptionally 3) setae; posterior eyes reduced to indistinct spots 4
- 3* Posterior margin of cephalothorax with 4 (very exceptionally 3 or 5) setae, the lateral ones short; posterior eyes present or absent 5
- 4 Epistome prominent, rounded and dentate; setae of cephalothorax shortened (length of setae on posterior margin about 0.056mm); 4 eyes, posterior ones reduced to indistinct spots; spinneret on movable cheliceral finger absent in male; pedipalps stout, femur 6.2 (♂) or 5.1-6.1 times (♀) longer than broad (length 0.49-0.56 mm), hand 2.4 (♂) or 1.9-2.2 times (♀) longer than deep, chela 6.1 (♂) or 5.1-5.6 times (♀) longer than deep (length 0.69-0.76 mm) *C. (E.) dubius* Mahnert
- 4* Epistome reduced, anterior margin in middle nearly straight, dentate; setae on cephalothorax not shortened (length of setae on posterior margin about 0.10 mm); 4 eyes, posterior ones reduced to indistinct spots; spinneret on movable cheliceral finger present in male; pedipalps slender, femur 6.8-7.2 (♂) or 6.0-6.9 times (♂) longer than broad (length 0.62-0.73mm), hand 2.4-2.6 (♂) or 2.2-2.5 times (♀) longer than deep, chela 5.9-6.5 (♂) or 5.5-6.2 (♀) times longer than deep (length 0.79-0.95 mm) *C. (E.) tamaran* sp. nov.
- 5 Cephalothorax without eyes or eyespots 6
- 5* Cephalothorax with 4 well developed eyes; trichobothrium *ist* distinctly distal to *esb*, slightly distal to *st* of movable finger; length of chela 0.65-0.77 mm *C. (E.) rimicola* Mahnert
- 6 Chela length 0.58-0.69 mm, 5.0-5.5 times longer than deep; trichobothrium *isb* slightly distal to *esb*, indistinctly basal to *st* of movable finger *C. (E.) lopezi* sp. nov.
- 6* Chelal length 1.08 mm, 6.1 times longer than deep; trichobothrium *ist* distinctly distal to *esb* *C. (E.) tenerifae* sp. nov.
- 7 Anterior eyes well developed, distinctly corneate; pedipalps stout, hand 2.0 times and chela 5.0 (♀)-5.6 (♂) times longer than deep (length 0.52-0.75mm); 9-10 pointed teeth on movable finger up to level or slightly proximal to *sb* *C. (E.) canariensis* Beier
- 7* Anterior eyes with or without cornea, pedipalps slender, hand at least 2.2 times and chela at least 5.7 (♀) times longer than deep (length at least 0.79 mm); 12 or more pointed teeth reaching well beyond *sb* (nearly halfway between *b* and *sb*) 8
- 8 Cephalothorax with a total of 4-7 preocular and ocular microsetae 9
- 8* Cephalothorax with a total of 15 microsetae (preocular ones and ocular row), chela 6.0 times longer than deep, length of chela (♀) 1.08 mm *C. (E.) setosus* Mahnert
- 9 Anterior eyes reduced to indistinct spots, pedipalpal femur 6.6-7.1 times longer than broad, chela 7.0-7.2 times (♂) or 6.4-6.8 times (♀) longer than deep, length 0.77-0.81 mm (♂) or 0.82-0.85 mm (♀) *C. (E.) gracilimanus* Mahnert (La Palma)
- 9* Anterior eyes weakly corneate, pedipalpal femur 5.5-6.0 times longer than broad, chela 5.7-6.2 (♂♀) longer than deep, length 0.79-0.87 mm *C. (E.) gracilimanus* Mahnert (Gran Canaria)

***Lagynochthonius lopezi* sp. nov.**

(Figs 13-16)

Type material. Holotype ♀. Gran Canaria, El Sao, MSS (UTM 28R 4354/31049), 2.I.2009, leg. H. López (GBIF4873-4) (DZUL). Paratypes. Same locality, leg. H. López: 1♀, 8.IV.2004 (1881c) (DZUL); 2♂ 2♀, 28.XII.2006 (GBIF4896-4) (1♂ 1♀ DZUL; 1♂ 1♀ MHNG, 1♀ MCNT); 1♂, II.VIII.2007 (GBIF4897-5) (MHNG); MSS 1, 2♂ 2♀ 1T, 3.I.2010 (GBIF 9010) (DZUL).

Diagnosis. Medium-sized feebly sclerotized species, cephalothorax without eyes or eyespots, epistome normally small, acute (1-2 points); movable finger of chelicerae without spinneret; pedipalps with granulate femur, relatively stout, chelal hand 2.2-2.5 times longer than deep, chela 6.0-6.3 times longer than deep, finger 1.5-1.7 times longer than hand; movable chelal finger with 8-10 small separate teeth in basal third; trichobothrium *ist* proximal to *esb*. Differences to the other described species are given in the key.

Description. Cephalothorax and pedipalps yellowish brown, chelicerae brown, tergites I-III whitish, the other ones yellowish brown. Cephalothorax (Fig. 13) 1.0-1.1 times as long as broad, normally with a small, acute (with 1-2 points) epistome (rounded in one ♀), with one long seta on each side near its base (as in all species here discussed), eyes or eyespots absent, 16 setae (4-4-4-2-2) (1♀ with 3! setae on posterior margin) plus 1 preocular seta on each side, latero-basally reticulate. Tergites I-III 4 setae (1♂ III with 5), IV-IX normally 6, but holotype VII 7, VIII 5, IX 5, X 4, XI 6 (2 tactile setae) and 1♂ IV 4; manducatory process acute, 2 setae, pedipalpal coxa 3 (1 discal seta), coxa I 3, lateral corner finger-like, II 3 + 5-6 serrate coxal spines, III/IV 5, intercoxal tubercle absent; anterior genital operculum with 10 (holotype 11) setae, (4 (5) marginal ones), sternite III 6+2x2-3 suprastigmal setae, IV 6-8+2x2-3 suprastigmal setae, IV-X 9-10/9/9-10/9/9/7 (2 tactile setae). Anal cone 0+2 setae. Pleural membrane papillostriate.

Chelicera (Fig. 14) with 5 setae on hand, fixed finger 7-10 distally larger teeth, movable finger with 8-10 small uniform teeth (partly worn down to basic lamella), spinneret absent, subgaleal seta in middle of finger, not reaching finger tip; serrula exterior 18-22 lamellae, rallum 7 setae.

Pedipalps (Figs 15-16): Femur medially finely granulate, with 5-6-2-5 setae and a slit-shaped lyrifissure between 4th and 5th medio-dorsal seta [as in all other species of *Lagynochthonius* described here, but also in the species of the subgenus *Chthonius* (*Ephippiochthonius*)], 5.0-5.6 times longer than broad and 2.3-2.6 times longer than patella, patella 1.9-2.1 times longer than broad, hand bottle-like shape, without longer or stronger seta distally on paraxial face, with 4 chemosensory setae on dorsum (between *ib* and *ist*) (Judson, 2007), with "area porosa" [small area with numerous tiny pores(?)] near *eb/esb*, 2.2-2.5 times, chela 6.0-6.3 times longer than deep, fin-

ger 1.5-1.7 times longer than hand; fixed finger with 27-29 teeth, 3 distal and about 11 basal ones small, those in middle heterodontate, near finger tip a transparent lateral tooth is present; movable finger with strong basal apodeme, 26 teeth (3 small distal ones, 8-10 small basal ones, in middle heterodontate), 4 lanceolate setae near *st/t*. Trichobothria: *esb* slightly distal to *eb*, *ist* distinctly proximal to *eb*; *sb* on movable finger nearer to *b* than to *st*, 2 sensilla present (between *sb/b* and *sb/st*).

Leg I: femur 5.2-5.7 times longer than deep and 1.8-1.9 times longer than patella, patella 3.2-3.7 times, tibia 3.9-4.5 times, tarsus 8.5-9.6 times longer than deep; leg IV: femur+patella 2.5-2.8 times, tibia 4.7-5.2 times, basitarsus 2.8-3.2 times longer than deep, with tactile seta near basal third (TS=0.31-0.36), telotarsus 8.8-10.3 times longer than deep and 2.1-2.4 times longer than basitarsus, with tactile seta near middle of segment (TS=0.40-0.49); arolia simple, shorter than smooth claws.

Measurements (3♂ 5♀) (in mm): body length 1.0-1.2; cephalothorax 0.36-0.43/0.32-0.38; pedipalps: femur 0.47-0.61/0.09-0.11, patella 0.21-0.24/0.10-0.11, hand 0.28-0.34/0.13-0.15, length of finger 0.47-0.56, of chela 0.74-0.93. Leg I: femur 0.25-0.29/0.05-0.06, patella 0.14-0.17/0.04-0.05, tibia 0.14-0.16/0.04, tarsus 0.29-0.31/0.03; leg IV: femur+patella 0.40-0.44/0.16-0.17, tibia 0.31-0.34/0.06-0.07, basitarsus 0.12-0.15/0.04-0.05, telotarsus 0.29-0.32/0.03. (University of La Laguna), who developed the particular traps used to sample the mesovoid shallow substratum (MSS) on the Canary Islands.

Remarks. The presence of a slit-shaped lyrifissure in the pedipalpal femur is emphasized here, since it was rarely notified, but it is present in several other chthoniid genera. It is probably without taxonomic interest on species level, but might be of interest in higher systematic level.

***Lagynochthonius microdentatus* sp. nov.**

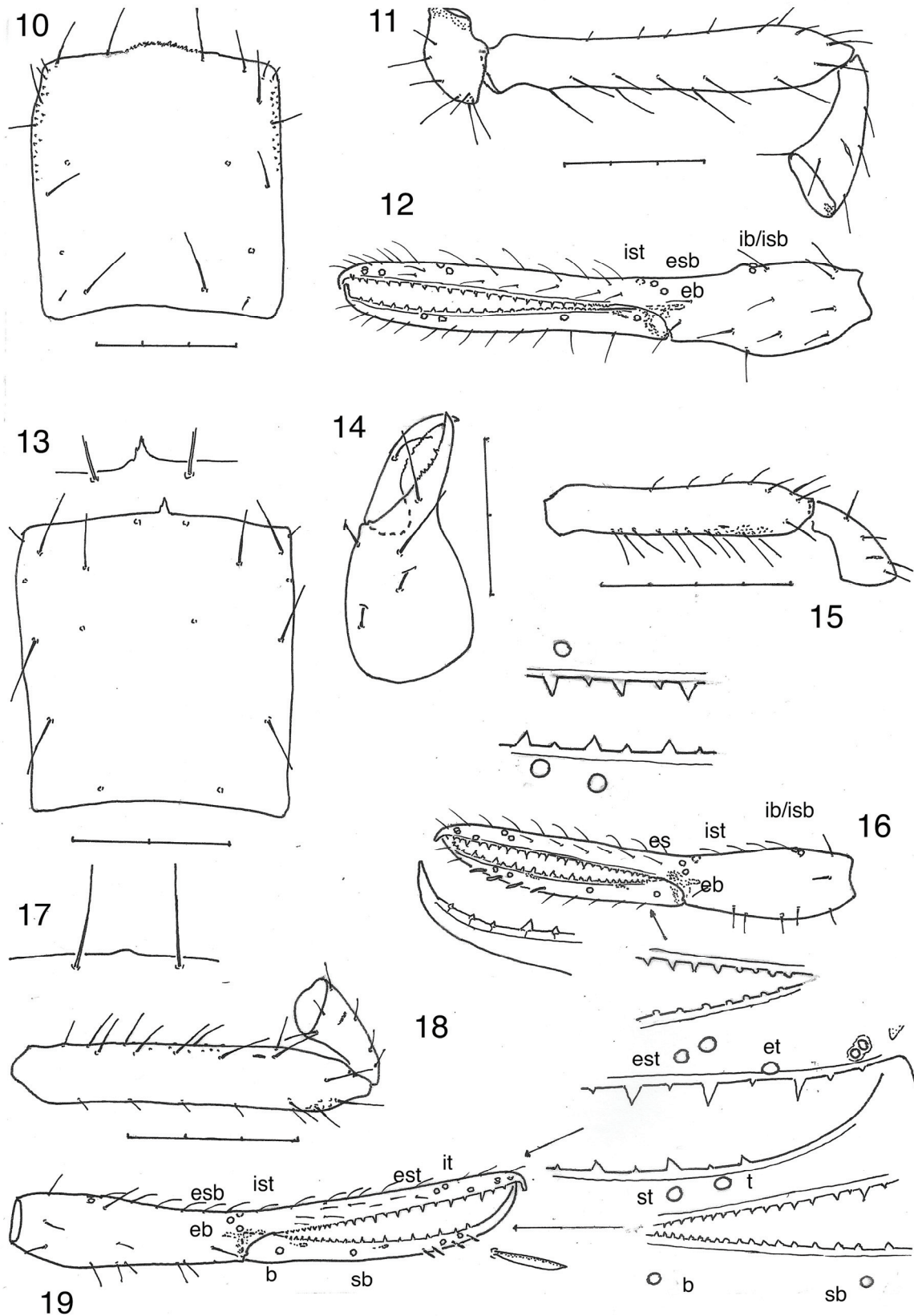
(Figs 17-19)

Type material. Holotype ♀. Gran Canaria, El Sao, MSS, 8.IV.2004, leg. H. López (1881d) (DZUL).

Diagnosis. Medium-sized weakly sclerotized species; cephalothorax without eyes or eyespots, epistome low and rounded; pedipalps with granulate femur, slender, hand 3.2 times, chela 7.35 times longer than deep, finger 1.2 times longer than hand; trichobothrium *ist* distal to *esb*; chelal fingers with 16-18 small, in basal third densely set teeth. Movable cheliceral finger without spinneret (♀). Differences to the other described species are emphasized in the key.

Etymology. Named in honour of Dr Heriberto López

Description. Yellowish coloured; cephalothorax 1.2 times longer than broad, basally slightly constricted, an indistinct rounded epistome present, no eyes or eyespots, 16 setae (4-4-4-2-2), 1 preocular seta on each side; ter-



Figures 10-12: *Chthonius (Ephippiochthonius) tenerifae* sp. nov. 10: Cephalothorax. 11-12: Pedipalp; scale units 0.1 mm.
Figures 13-16: *Lagynochthonius lopezi* sp. nov. 13: Cephalothorax, with detail of epistome. 14: Chelicera. 15-16: Pedipalp, with details of dentition. scale units 0.1 mm.
Figures 17-19: *Lagynochthonius microdentatus* sp. nov. 17: Epistom. 18-19: Pedipalp, with details of dentition and lanceolate setae. scale units 0.1 mm.

gites I-III 4 setae, IV-IX 6, X 4, XI 6 (2 tactile setae); manducatory process 2 setae, pedipalpal coxa 3 (1 discal one), coxa I 3, lateral corner long finger-like, II 3+6 serrate coxal spines (one row), III/IV 5, intercoxal tubercle absent; anterior genital operculum 10 setae (3/3 marginal ones), III 6(?) + 2x3 suprastigmal setae on each side, IV 6(?) + 2x2 suprastigmal setae on each side, chaetotaxy of following ones as in the other described species. Pleural membrane papillostriae.

Chelicera with 5 setae on hand, fixed finger with 9 teeth (distal ones larger), movable finger with 8 distally inclined small teeth, subgaleal seta placed in middle of finger, reaching finger tip, spinneret absent; serrula exterior 18 lamellae, rallum apparently with 7 setae.

Pedipalps (Figs 18-19): femur medially and laterodistally finely granulate, chaetotaxy: 5-6-3-5, 6.3 times longer than broad and 3.0 times longer than patella, patella 2.0 times longer than broad, hand 3.2 times, chela 7.35 times longer than deep, finger 1.2 times longer than hand; hand slender bottle-like, no enlarged seta on chelal palm, with 6 chemosensory setae on dorsum, fixed finger with "area porosa" near *eb/esb*, 13 teeth of alternating length + 16 small, acute teeth in basal third, a transparent distal lateral tooth present; movable finger with strong basal apodeme, 10 teeth (reaching *sb*) of alternating length, and 18 small, acute teeth in basal part, 4 lanceolate setae near trichobothria *st/t*. Trichobothria: *esb* proximal to *eb*, *ist* on level with *eb*; *sb* on movable finger nearer to *b* than to *st*, *st/t* opposite *it/est*. Leg I: femur 6.4 times longer than deep and 1.85 times longer than patella, patella 3.9 times, tibia 4.9 times, tarsus 11.2 times longer than deep; leg IV: femur+patella 2.85 times, tibia 5.9 times, basitarsus 3.2 times longer than deep, with a tactile seta in basal third (TS=0.27), telotarsus 12.1 times longer than deep and 2.5 times longer than basitarsus, with tactile seta proximal to middle (TS=0.37).

Measurements (in mm): body length 1.0; cephalothorax 0.34/0.29; pedipalps: femur 0.61/0.10, patella 0.20/0.10, hand 0.39/0.12, length of finger 0.48, of chela 0.86; leg I: femur 0.31/0.05, patella 0.17/0.04, tibia 0.17/0.03, tarsus 0.35/0.03; leg IV: femur+patella 0.45/0.16, tibia 0.34/0.06, basitarsus 0.14/0.04, telotarsus 0.36/0.03.

Etymology. The species epithet is a Latin adjective, meaning "with small teeth", with reference to the dentition of chelal fingers.

***Lagynochthonius oromii* sp. nov.**

(Figs 20-24)

Type material. Holotype ♂. Gran Canaria, Barranco Oscuro, MSS (UTM 28R 4421/31047), 28.VIII.2003, leg. H.López (1461) (DZUL). Paratypes. Same locality, leg. H.López: 2♂ 19♀ 1T, 14.XI.2003 (1649) (1♂ 12♀ 1T DZUL; 1♂ 7♀ MHNG); 1♂ 1♀, 13.IV.2004 (1878b) (DZUL); 3♂, 4.I.2006 (2647d) (1♂ DZUL; 2♂ MHNG); 1♂, 14.VIII.2006 (GBIF4888-3) (DZUL); 2♀, 2.I.2007 (GBIF4889-3) (MHNG); 1♂ 3♀, 18.VIII.2007 (GBIF4890-3) (DZUL); 1♂ 21♀ 3T, 3.I.2009

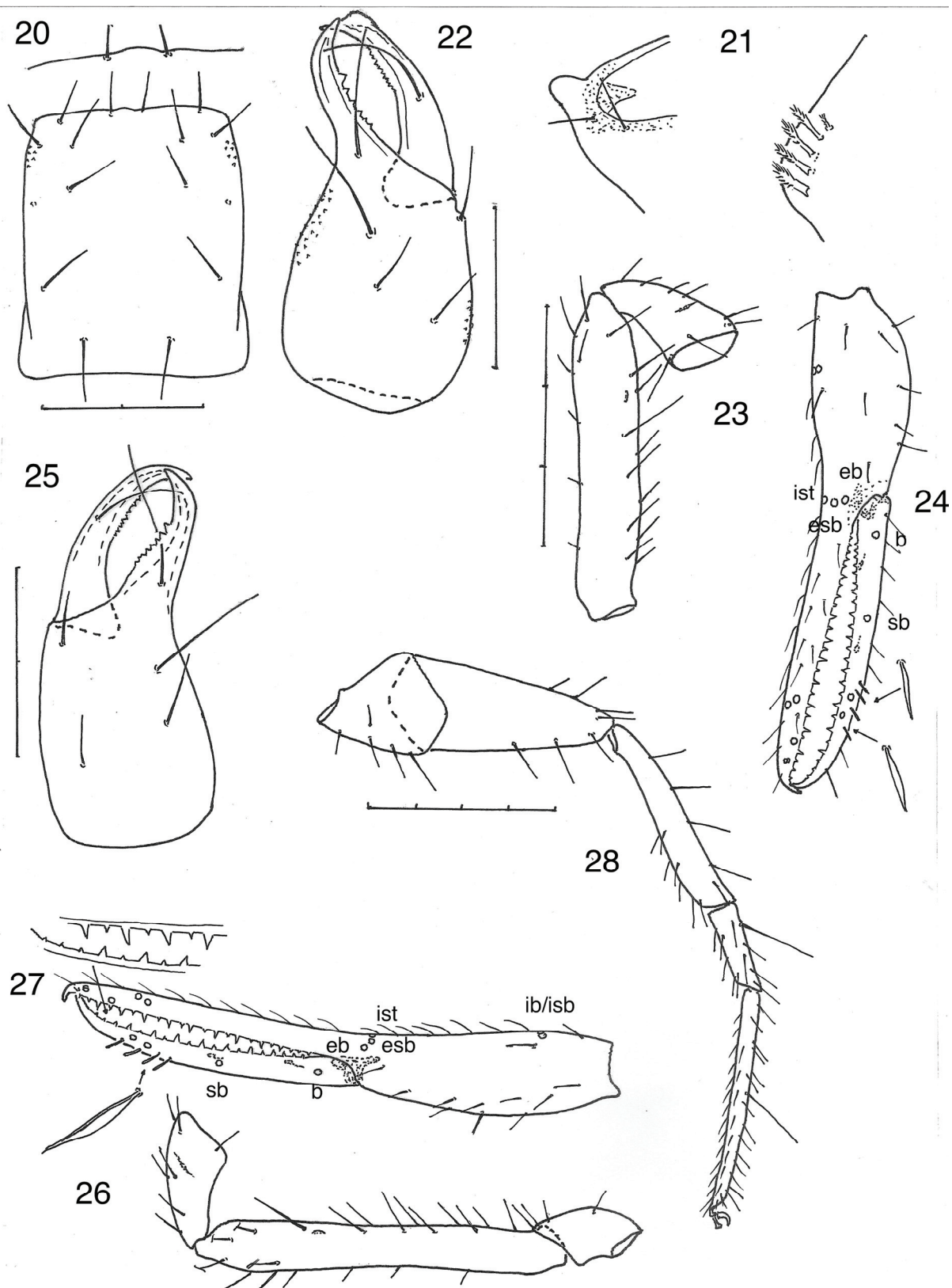
(GBIF4891-4) (1♂ 11♀ 2T DZUL, 8♀ 1T MHNG, 2♀ MCNT). Gran Canaria, Brezal del Palmital, MSS (UTM 28R 4409/31095), leg. H.López: 56 ex., 4.I.2006 (2650c) (40 ex. DZUL; 5♂ 5♀ MHNG, 8 ex. MCNT); 1♂ 2♀, 14.IV.2004 (2671) (2♀ DZUL, 1♂ MHNG); 1♂ 5♀, 3.I.2009 (GBIF4875-3) (MHNG); 3♂ 4♀ 1T, 14.VIII.2006 (GBIF4884-1) (2♂ 2♀ DZUL, 1♂ 2♀ MCNT); 2♀ 2T 1D, 2.I.2007 (GBIF4885-2) (DZUL); 1♂ 2♀, 17.VIII.2007 (GBIF4886-2) (DZUL).

Other material. Gran Canaria, Brezal del Palmital, MSS, leg. H.López: 1♀ 1T, 3.I.2009 (GBIF4874-2); 1♂ 2♀, 3.I.2009 (GBIF4876-2).

Diagnosis. Small, weakly sclerotized species, cephalothorax without eyes or eyespots, epistome tiny button-like; pedipalps relatively stout, femur smooth, 4.4-4.9 times longer than broad, chelal hand 1.8-2.1 times, chela 4.6-5.3 times longer than deep, chelal length 0.58-0.64 mm; trichobothrium *ist* on level with *eb/esb*; movable cheliceral finger in both sexes with spinneret. Differences to the other described species are emphasized in the key.

Description. Yellowish brown, chelicerae darker. Cephalothorax (Fig. 20) 1.1-1.2 times longer than broad, basally not constricted, without eyes or eyespots; a tiny button-like epistome (Fig. 20) present, with 16 setae and 1-2 preocular setae on each side; tergites I-III 4 (holotype III 5), IV-IX mostly 6 (sometimes 7), X 4, XI 6 (2 tactile setae); manducatory process pointed, 2 setae, pedipalpal coxa 3 (1 discal seta), coxa I 3, finger-like lateral process (Fig. 21), II 3 + 5-6 serrate coxal spines (Fig. 21), III/IV 5, intercoxal tubercle absent; anterior genital operculum mostly with 10 setae (6 marginal ones) (♂♀), genital opening of ♂ in basal part slit-like, 4-5 marginal and 2-3 discal setae on each side, sternite III 6 (♀ 6-8) + 2x3 suprastigmal setae, IV 6-8 (♀ 8-10) + 2x2-3 suprastigmal setae, V-X 10-12/10-12/9-10/8-9/8-9/7-9 (2 tactile setae). Anal cone 0+2 setae. Pleural membrane papillostriae.

Chelicera (Fig. 22) with 5 (1♂ with 6 on right hand) setae, fixed finger with 5-9 distally larger teeth, movable finger with 7-9 uniform teeth, subgaleal seta long, spinneret flat and rounded, but distinct in both sexes, serrula exterior 17-18 lamellae, rallum 7 setae. Pedipalps (Figs 23-24) rather stout, femur smooth, chaetotaxy 5-6-2-5, 4.4-4.9 times, patella 1.8-2.0 times longer than broad, hand without stronger seta, with 3-4 chemosensory setae on dorsum, 2.0-2.1 (♀ 1.85-2.1) times, chela 5.1-5.3 (♀ 4.6-5.3) times longer than deep, finger in dorsal view slightly curved, fixed finger 25-28 teeth (in distal two-thirds heterodentate, basally 8-12 small uniform teeth), a flat transparent lateral tubercle near finger tip (absent or indistinct in females); movable finger with strong apodeme, 25-27 teeth (of alternating length up to *sb*, in basal third 7-11 small ones), four lanceolate setae near *st/t*. Trichobothria: *esb* distal to *eb*, *ist* on level with *esb*, *st* halfway between *b* and *st*, with two sensilla (between *b/sb* and *sb/st*). Leg I: femur 4.7-5.3 times longer than



Figures 20-24: *Lagynchthonius oromii* sp. nov. **20:** Cephalothorax, with detail of epistome (higher magnification). **21:** Coxa I and coxal spines on coxa II. **22:** Chelicera; **23-24:** Pedipalp, with details of lanceolate setae. scale units 0.1 mm.

Figures 25-28: *Lagynochthonius subterraneus* sp. nov.. **25:** Chelicera; **26-27:** Pedipalp (vestitural setae on finger partially omitted), with details of dentition and lanceolate seta. **28:** Leg IV. scale units 0.1 mm.

deep and 1.6-1.8 times longer than patella, patella 2.7-3.5 times, tibia 3.6-4.0 times, tarsus 8.8-9.2 (♀ 8.0-8.7) times longer than deep; leg IV: femur+patella 2.3-2.9 times, tibia 4.8-5.5 times, basitarsus 2.7-3.0 times longer than deep, with tactile seta in basal fourth (TS=0.23-0.27), telotarsus 8.5-10.0 times longer than deep and 2.1-2.3 times longer than basitarsus, tactile seta in basal third (TS=0.28-0.32), arolia simple and shorter smooth claws.

Measurements (5♂ 5♀) (in mm): body length 0.82-1.07; cephalothorax 0.31-0.33/0.25-0.29; pedipalps: femur 0.37-0.41/0.08-0.09, patella 0.16-0.18/0.08-0.09, hand 0.22-0.24/0.11-0.13, length of finger 0.35-0.40, of chela 0.58-0.64. Leg I: femur 0.21-0.23/0.04-0.05, patella 0.12-0.14/0.04-0.05, tibia 0.11-0.13/0.03, tarsus 0.23-0.27/0.03; leg IV: femur+patella 0.31-0.35/0.12-0.13, tibia 0.23-0.26/0.05, basitarsus 0.11/0.04, telotarsus 0.22-0.26/0.03.

Etymology. named in honour of Dr Pedro Oromí, University of La Laguna, who consecrates his research to the biodiversity of the Canary Islands in general and to that of mesovoid shallow substratum (MSS) and of caves in particular.

Lagynochthonius subterraneus sp. nov.
(Figs 25-28)

Type material. Holotype ♂. Gran Canaria, Valsequillo, Mina de Los Llanetes (UTM 28R 4527/30959), 29.I.2006, leg. R. García Becerra (DZUL). Paratype: same data, 1 ♀ (MHNG).

Diagnosis. Bigger-sized species; cephalothorax with tiny rounded epistome; with elongate pedipalps, pedipalpal femur smooth, 7.3-3.5 times longer than broad, chelal hand 3.0 times, chela 6.7-6.8 times longer than deep, chelal length 1.13-1.20 mm; movable cheliceral finger without spinneret in both sexes. Differences to the other described species are emphasized in the key.

Description. Specimens in relatively bad conditions; yellowish coloured; cephalothorax 1.0-1.1 times longer than broad, basally feebly constricted, anterior-laterally spinous, epistome tiny and rounded, 16 setae (4-4-4-2-2), plus 1 preocular microseta on each side; tergite I-III 4 setae, IV-IX 6, X 4, XI 6 (2 tactile setae); manducatory process 2 setae, pedipalpal coxa 3 (1 discal seta), coxa I 3, lateral corner short finger-like, II 3 + 6-7 serrate coxal spines (one row), III/IV 5, intercoxal tubercle absent; anterior genital operculum 10 setae (6 marginal ones), male genital chamber with 3(?) internal setae, basal part of opening slit-like, 5 marginal and 2 discal setae on each side, sternite III 6 (♀ 8)+2x3-4 supra-stigmal setae on each side, IV 6 (♀ 8)+2x 2-3 supra-stigmal setae, V-X 10-9-9-9-7-7 (♂) (♀ 8 setae), XI no setae. Anal cone 0+2. Pleural membrane papillostriae. Chelicera (Fig.25) with 5 setae on hand, fixed finger 8-10 distally slightly larger teeth, movable finger with 6-9 small teeth of equal length, subgaleal seta placed in

middle of finger, reaching finger tip; spinneret absent in both sexes; serrula exterior 21 lamellae, rallum 7 setae. Pedipalps (Figs 26-27): femur smooth, 7.3-7.45 times longer than broad and 2.8-2.9 longer than patella, chaetotaxy: 5-7-3(?)5(?)6 (observation difficult, since several setae are lacking), patella 2.1-2.3 times longer than broad, hand 3.0 times, chela 6.7-6.8 times longer than deep, finger 1.22-1.25 times longer than hand; hand slender bottle-like, with about 9 chemosensory setae on dorsum, fixed finger with 26 teeth of alternating length, transparent lateral distal tooth present; movable finger with strong basal apodeme, 24 teeth of alternating length (the distal 4 and several basal ones small). Trichobothria *esb/ist* slightly proximal to *eb*, on movable finger *sb* nearer to *b* than to *st*, sensilla present near *sb* and distal to *b*. Leg I (holotype): femur 6.9 times longer than deep and 1.8 times longer than patella, patella 4.5 times, tibia 5.2 times, tarsus 13.6 times longer than deep; leg IV (Fig. 28): femur+patella 2.8-2.9 times, tibia 5.9 times, basitarsus 3.3-3.5 times longer than deep, with tactile seta in basal fourth (TS=0.23-0.25), telotarsus 11.8-12.3 times longer than deep and 2.3-2.4 times longer than basitarsus, with tactile seta proximal of middle (TS=0.38-0.46).

Measurements of ♂ (followed by those of ♀ in parenthesis)(in mm): body length 1.3-1.5; cephalothorax 0.45/0.44 (0.47/0.42); pedipalps: femur 0.75/0.10 (0.79/0.11), patella 0.26/0.12 (0.27/0.13), hand 0.51/0.17 (0.53/0.18), length of fixed finger 0.62 (0.67), of movable finger 0.59 (0.63), of chela 1.13 (1.20); leg I (♂): femur 0.41/0.06, patella 0.23/0.05, tibia 0.23/0.05, tarsus 0.45/0.03; leg IV: femur+patella 0.60/0.21 (0.64/0.23), tibia 0.44/0.07 (0.47/0.08), basitarsus 0.19/0.06 (0.21/0.06), telotarsus 0.46/0.04 (0.48/0.04).

Etymology. The species epithet is a Latin adjective, meaning "living under the earth".

Lagynochthonius tenuimanus sp. nov.
(Figs 29-31)

Type material. Holotype ♂. Gran Canaria, Valsequillo, Mina de Los Llanetes (UTM 28R 4527/30959), 29.I.2006, leg. R. García Becerra (DZUL). Paratypes. Same data, 2 ♀ (1 ♀ RGB, 1 ♀ MHNG).

Diagnosis. Small, weakly sclerotized species, cephalothorax eyeless, without epistome; pedipalpal femur granulate on medial face, chelal hand 2.4-2.5 times, chela 5.8 times longer than deep, chela length 0.56-0.58 mm; trichobothrium *ist* proximal to *eb/esb*; movable cheliceral finger without spinneret in both sexes. Differences to the other described species are given in the key.

Description. Small and feebly sclerotized species, cephalothorax, pedipalps and tergites yellowish; cephalothorax 1.1 longer than broad, basally weakly constricted, without eyes or eyespots, anterior-laterally spinous, anterior margin straight, without epistome, 16 setae: 4-4-4-2-2, plus 1 preocular microseta on each side; tergal

chaetotaxy: I-III 4, IV-IX 6, X 4, XI 6 (2 lateral tactile setae); manducatory process pointed, 2 setae; pedipalpal coxa 3 setae (1 discal one), coxa I 3, lateral corner short finger-like, II 3 + 7-8 serrate coxal spines (one row), III/IV 5 setae, intercoxal tubercle absent. Anterior genital operculum with 10 setae (3/3 marginal ones), sternite III 8+2x3 suprastigmal setae, IV 6+2x2 suprastigmal setae, V-X 8, XI without setae. Anal cone 0+2 setae. Pleural membrane papillostriae.

Chelicera (Fig. 29): 5 setae on hand, fixed finger with 7-9 distally slightly larger teeth, movable finger with 7-8 equal teeth; subgaleal seta long, inserted near middle of finger, spinneret absent, serrula exterior 18 lamellae, rallum 10 setae. Pedipalps (Figs 30-31): femur on medial face distinctly granulate, chaetotaxy: 5-6-2-5, 4.6-5.1 times longer than broad and 2.5-2.6 times longer than patella, patella 2.0 times, hand 2.4-2.5 times longer, chela 5.6-5.8 times longer than deep, finger 1.3-1.4 times longer than hand; hand short bottle-like, with 5-6 chemosensory setae on dorsum between *ib* and *esb*, "area porosa" at base of fixed finger distal to *eb/esb*, trichobothrium *ist* distinctly basal to *eb/esb*; movable finger with sclerotized internal apodeme; fixed finger with 23-25 teeth of alternating length and 6-8 smaller teeth basally, a distal transparent lateral tooth absent, movable finger with 22 teeth of alternating length, 7-8 basal ones smaller, two sensilla (between *b/sb* and *sb/st*), 4 lanceolate setae near *st* and *t*. Leg IV (holotype): femur+patella 2.7 times longer than deep, tibia 4.8 times, basitarsus 3.1 times, with a tactile seta in the basal fourth (TS=0.25), telotarsus 8.0 times longer than deep and 2.0 times longer than basitarsus, a tactile seta near

basal third (TS=0.35).

Measurements (in mm): body length 0.9; cephalothorax 0.29/0.25; pedipalps: femur 0.36-0.39/0.07-0.08, patella 0.14-0.15/0.07, hand 0.24-0.26/0.09-0.10, length of finger 0.32-0.33, of chela 0.56-0.58; leg IV (holotype): femur+patella 0.31/0.11, tibia 0.22/0.05, basitarsus 0.10/0.03, telotarsus 0.21/0.03.

Etymology. The species epithet is a Latin adjective, meaning "slender hand".

Discussion. The diversity of *Lagynochthonius* species on the Canary Islands is amazing, with five new species from a few localities sampled on Gran Canaria island alone. Furthermore, these species probably belong to at least two species-groups. The sole cave-dwelling species *Lagynochthonius curvidigitatus* Mahnert, 1997 (comb. rev.) from Tenerife has a homodontate dentition on both chelal fingers, and possesses nine lanceolate setae on the movable chelal finger (situated between trichobothria *sb* and *t*); the five new species on Gran Canaria possess distinctly size-alternating dentition (acute teeth with small intercalary teeth) on at least the fixed chelal finger, and possess only four lanceolate setae near trichobothria *st* and *t*. *Lagynochthonius curvidigitatus* was transferred to the genus *Paraliochthonius* by Judson (2007), presuming a slight variability in absence or presence of spiniform setae on the chelal palm might exist in *Paraliochthonius*. Furthermore, the internal strengthened apodeme at the base of the movable chelal finger seems to have, due to this author, developed several times in different not related groups.

Identification key to the *Lagynochthonius* species from Canary Islands

- 1 Chelal finger distinctly curved in dorsal view, chelal finger with about 30-35 teeth of more or less equal length; trichobothrium *ist* distinctly distal to *esb*; 9 lanceolate setae between trichobothria *sb* and *t*; pedipalpal femur 5.5 times longer than broad (length 0.65 mm), chela 6.7 times longer than deep (length 0.95 mm) (Tenerife, Cueva Felipe Reventón) ***L. curvidigitatus* Mahnert**
- 1* Chelal finger straight or nearly so in dorsal view; teeth in distal half of fixed chelal finger of alternating length; trichobothrium *ist* proximal to *eb/esb* or at same level of *eb* or *es*; 4 lanceolate setae near trichobothria *st* and *t* **2**
- 2 Pedipalpal femur smooth **3**
- 2* Pedipalpal femur granulate on medial face **4**
- 3 Spinneret present in both sexes; pedipalpal femur 4.4-4.9 times longer than broad, chelal hand 1.8-2.1 times, chela 4.6-5.3 times longer than deep, length 0.58-0.64 mm; trichobothrium *ist* on level with *eb/esb* (Gran Canaria: Barranco Oscuro, Brezal del Palmital) ***L. oromii* sp. nov.**
- 3* Spinneret absent (♂♀); pedipalpal femur 7.3-7.5 times longer than broad, chelal hand 3.0 times, chela 6.7-6.8 times longer than deep, length 1.13-1.20 mm (Gran Canaria: Valsequillo, Mina del Agua) ***L. subterraneus* sp. nov.**
- 4 Length of chela at least 0.74 mm **5**
- 4* Length of chela 0.56-0.58 mm; chelal hand 2.4-2.5 times, chela 5.8 times longer than deep, trichobothrium *ist* proximal to *eb/esb*; spinneret absent (♂♀) (Gran Canaria: Valsequillo, Mina del Agua) ***L. tenuimanus* sp. nov.**
- 5 Epistome low and rounded; chelal fingers with 16-18 small, densely set teeth in basal third; chelal hand 3.2 times, chela 7.35 times longer than deep, length 0.86 mm; finger 1.2 times longer than hand; trichobothrium *ist* distal to *esb* (Gran Canaria: El Sao) ***L. microdentatus* sp. nov. (♀)**
- 5* Epistome acute (two-pointed) and triangular; chelal fingers with 8-10 small separate teeth in basal third; chelal hand 2.2-2.5 times, chela 6.0-6.3 times longer than deep, length 0.74-0.93 mm; finger 1.5-1.7 times longer than hand; trichobothrium *ist* proximal to *esb* (Gran Canaria: El Sao) ***L. lopezi* sp. nov. (♂♀)**

The several new *Lagynochthonius*-species from Gran Canaria possess the lagyniform facies: a distinctly modified and strengthened apodeme at the base of the movable chelal finger (but perhaps not as strongly modified as in some edaphous species), a displaced distal transparent tooth on fixed chelal finger is lacking or present, a spiniform seta on chelal palm is lacking in all species from Canary Islands. *Lagynochthonius curvidigitatus* (which lacks a transparent distal tooth on the fixed chelal finger) shares these characters with the newly described species from Gran Canaria which form a homogeneous group corresponding much more to the generic definition of *Lagynochthonius* than to that of *Paraliochthonius*. *L. curvidigitatus* is therefore replaced in its original genus, its strongly curved and homodentate chelal fingers and the high number of lanceolate setae on the movable chelal finger might place it in a different species group within the genus *Lagynochthonius*. Within the species with the heterodentate dentition, there are two groups, one with a smooth pedipalpal femur, the second one with a granulate pedipalpal femur. The five species from Gran Canaria are adapted to subterranean environments, having desclerotized teguments and not possessing neither eyes nor eyespots, but only two species might be considered as troglomorphic, having slender elongate appendages: *L. subterraneus* sp. nov. and *L. microdentatus* sp. nov.

The genus *Lagynochthonius* includes 42 species described world-wide, including five from Jamaica, three from South America, six from Africa and Socotra Is. (Yemen), and the others from Asia and Australia. A few are recorded from caves and several species are eyeless, *Lagynochthonius typhlus* (Muchmore, 1991: Jamaica, Maldon School Cave), *Lagynochthonius asema*, *Lagynochthonius leemouldi*, and *Lagynochthonius polydentatus* (Edward & Harvey, 2008: Australia: subterranean environments). None of all these species is recorded to possess lanceolate setae near trichobothria *st/t* on the movable chelal finger, in contrast to the species recorded here from Gran Canaria and Tenerife, but this character might also have been overlooked. A re-examination of some paratypes of *Lagynochthonius kenyensis* (Mahnert, 1986) and *Lagynochthonius guasirih* (Mahnert, 1988) confirmed the absence of such setae in *L. kenyensis*, but revealed the presence of 4 lanceolate setae near trichobothria *st* and *t* in *L. guasirih*! *Lagynochthonius kenyensis* has four normal setae at the position of the lanceolate setae. These lanceolate setae were not mentioned, too, in the description of *L. curvidigitatus*.

Cheiridiidae

Apocheiridium lienhardi sp. nov.

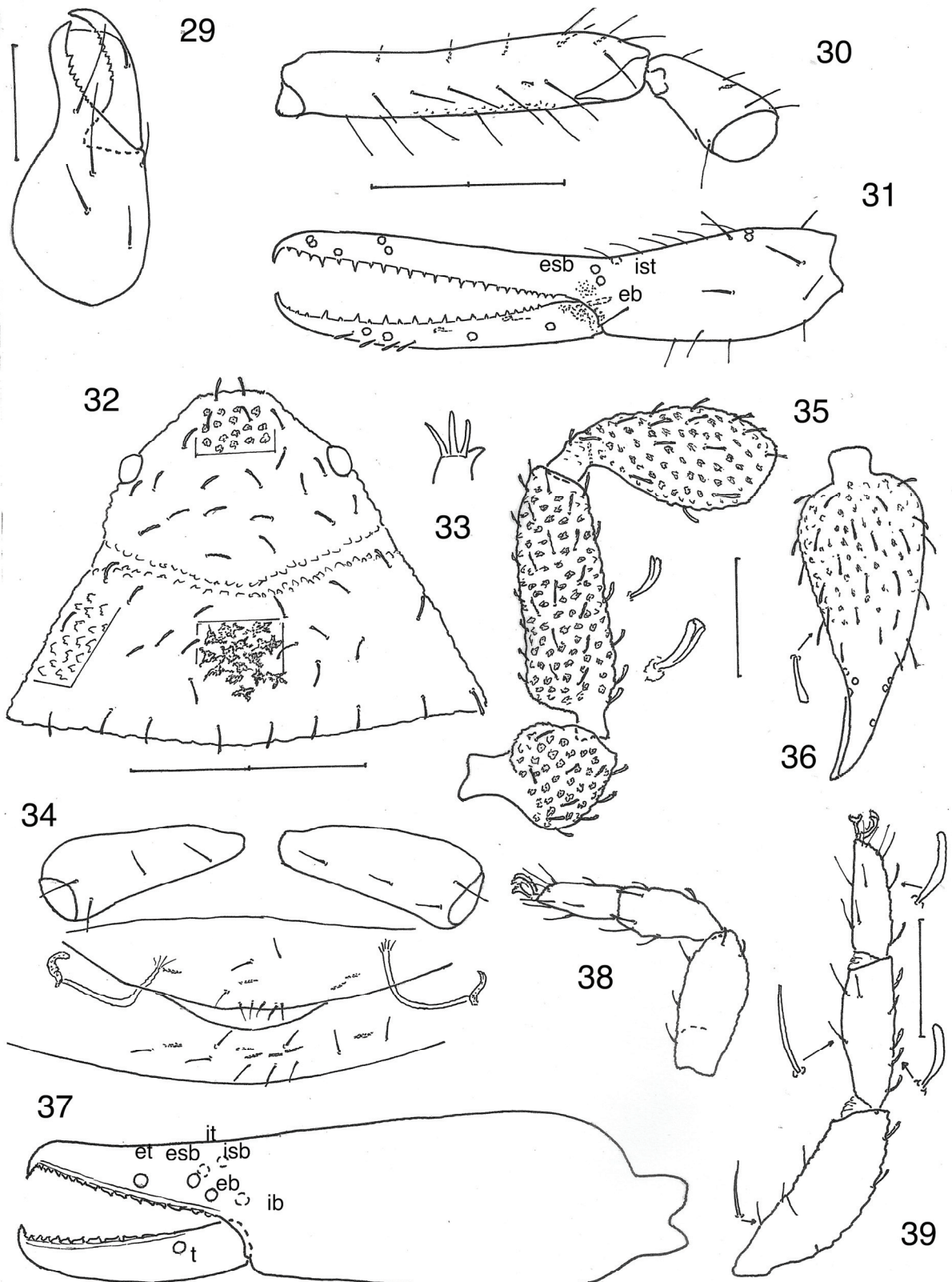
(Figs 32-39)

Type material. Holotype ♂. Hierro, above Punta del Verodal, 250 m a.s.l., under bark of dead *Juniperus turbinata canariensis*, 31.V.2000, leg. Ch. Lienhard (MHNG). Paratypes. Same data, 1♂ 3♀ (MHNG).

Diagnosis. The new species is characterized by the

presence of only 6 trichobothria on fixed chelal finger and resembles in this character the species of the subgenus *Apocheiridium* (*Chiliocheiridium*) Vitali-di Castri, 1969. It differs from these species by much shorter chelal fingers (hand with pedicel 1.7 (♂)/2.1 (♀) times longer than finger) and its trichobothrial pattern.

Description. Cephalothorax (Fig. 32) with 2 eyes (high rounded lenses), one medial deep transverse furrow (laterally wider), median depression in metazone absent; coarsely granulate, granules on cucullus with pore on apex, granules on basal half star-like, setae (like those of pedipalps, tergites and legs) stout and curved, smooth, some covered by fine "exocuticula" (apparently easily falling off), posterior margin of cephalothorax and tergites straight, without clearly protruding granules; tergites without lateral modifications, I-IX thinly divided, X/XI undivided, all eleven visible in dorsal view, surface sculpture as on cephalothorax. Cephalothorax 0.71-0.74 times longer than broad, 2 setae on anterior and 10-12 on posterior margin. Chaetotaxy of half-tergites I-IX: 5-7/5-7/4-6/6/6-7/5-6/6-7/5-6/5; VI-IX with a lateral anterior seta; X 10+lateral setae, XI 8-9. Manducatory process with 3 setae (suboral seta tiny), pedipalpal coxa in distal part scaly, 4 setae, coxa I 2-3, II 2, III 3-4, IV 4; anterior genital operculum with 5-6 discal and 2-3 marginal setae (Fig. 34), ♀ genital organ with medial oval cribrate plate, lateral plates small, circular; sternites undivided, smooth, posterior sternites laterally scaly sculptured, setae long and acute, posterior sternites with 1-2 lateral setae stout, curved and with tiny tooth on lateral face, chaetotaxy: 6-7 (+ 2 discal setae in male)/3-5/7/8/7-8/8-9+1 lateral seta/7-8+1/7-8+1/6. Anal cone 2+2. Chelicera with 4 setae on hand, fixed finger with 2 teeth and one granule, movable finger with cone-like subapical lobe, galea of ♂ short, cone-like, that of ♀ composed of 3 spines; serrula exterior 9-10 lamellae; rallum 3 setae, distal one sail-like and dentate. Pedipalps (Figs 35-36): trochanter with broad dorsal hump, 1.6 times longer than broad, femur with indistinct lateral thickening near base, 3.2-3.3 times longer than broad (breadth excluding granules), patella 2.3-2.4 times, club 1.9 times longer than broad and 4.2 (♂)/4.9 (♀) times longer than pedicel, hand with pedicel 1.8-2.0 times longer than broad and 1.7 (♂)/2.1 (♀) times longer than finger, chela with pedicel 2.6-2.7 times, without pedicel 2.4-2.6 times longer than broad, chela length/patella breadth ratio 3.5 (Benedict, 1978); fixed finger with 12 teeth, basal ones broad and flattened, movable finger with 9-10 basally broad and flattened teeth. Trichobothria (Fig. 37): 6 (3 antiaxial and 3 paraxial ones), *et* in middle of finger, *esb* halfway between *ib* and *et*, movable finger with 1 trichobothrium (*t*). Leg I (Fig. 38): femur and patella without suture, 2.4-2.5 times longer than deep, tibia 2.2 times, tarsus 2.7 times longer than deep; leg IV (Fig. 39): femur+patella 3.2 (♂) or 3.8 (♀) times, tibia 3.1 (♂) or 3.6 (♀) times, tarsus 3.2 times longer than deep. Arolia simple, shorter than smooth claws.



Figures 29-31: *Lagynochthonius tenuimanus* sp. nov. 29: Chelicera; 30-31: Pedipalp, vestitural setae on finger omitted. scale units 0.1 mm.

Figures 32-39 *Apocheiridium lienhardi* sp. nov. 32: Cephalothorax. 33: Galea ♀. 34: Coxae IV, anterior genital operculum and sternite III of ♂. 35-36: Pedipalp, with details of setae. 37: Trichobothrial pattern. 38: Left leg I; 39: Left leg IV. scale units 0.1 mm.

Measurements (in mm): body length 1.1-1.2; cephalothorax 0.29/0.39-0.42; pedipalps: trochanter 0.13/0.07-0.08, femur 0.23-0.24/0.07, patella 0.19/0.08, hand with pedicel 0.18-0.20/0.10, length of finger 0.09-0.10, of chela with pedicel 0.26-0.27, without pedicel 0.24-0.26. Leg I: femur+patella 0.12-0.13/0.05, tibia 0.09/0.04, tarsus 0.07/0.03; leg IV: femur+patella 0.18-0.20/0.05-0.06, tibia 0.13-0.14/0.04, tarsus 0.10/0.03.

Etymology. The species is named in honour of Dr Charles Lienhard (Muséum d'histoire naturelle, Genève), specialist of Psocoptera, who collected the specimens.

Discussion. This new species shows the main characters of the genus *Apocheiridium*: cephalothorax without medial depression in basal zone, rallum with 3 setae, form of galea, 11 tergites visible in dorsal view. By virtue of the presence of only 6 trichobothria on fixed chelal finger, it can be placed in the subgenus *Apocheiridium* (*Chiliocheiridium*), known from three species in Chile (Vitali-di Castri, 1969). It differs from *Apocheiridium* (*Chiliocheiridium*) *leopoldi* Vitali-di Castri, 1962, *Apocheiridium* (*C.*) *chilense* Vitali-di Castri, 1962 and *Apocheiridium* (*C.*) *serenense* Vitali-di Castri, 1969 by the much shorter chelal finger and the trichobothrial pattern: *et* in more basal position, placed in middle of finger, all other trichobothria grouped near base of finger, *it* opposite *est* (or *esb*?) and very close to *isb/eb*.

The value of reduced number of trichobothria as generic (or subgeneric) character has already been criticized and minimized in recent publications, e.g. in the garypid genus *Synsphyronus* Chamberlin (Chamberlin, 1943; Harvey, 1987) or in the chernetid genus *Americhernes* Muchmore (Mahnert, 1979). The subgenus *Apocheiridium* (*Chiliocheiridium*) was established by Vitali-di Castri (1969) solely because of the presence of 6 trichobothria on the fixed chelal finger, instead of 7, the number present in all the other 24 species of *Apocheiridium*.

The finding of a new species sharing this reduced number of trichobothria but differing clearly in other characters, inducing also an incoherent geographical distribution, underlines the small interest of maintaining the status of a certainly paraphyletic taxonomic subgenus. I consider therefore *Chiliocheiridium* Vitali-di Castri (type species *Apocheiridium leopoldi* Vitali-di Castri) as a subjective junior synonym of *Apocheiridium* J. C. Chamberlin. A further problem concerns the South African species *Apocheiridium chamberlini* Godfrey, 1927 and *Apocheiridium asperum* Beier, 1964 which are recorded as possessing two trichobothria on the movable chelal finger. The type specimens should be examined to check, if this statement is correct, the figures 26 and 27 given by Beier (1964) are not unequivocal.

New Records

Chthoniidae

Chthonius (*E.*) *canariensis* Beier, 1965, **nov. stat.**

The species was described by Beier (1965) as a subspe-

cies of *C. (E.) machadoi* Vachon. The differences between these taxa, as pointed out by Beier (*loc. cit.*), have been verified on a large number of specimens from the Canary Islands and do not seem to vary. I therefore consider *canariensis* as a distinct species which is widely spread on the Canary islands. Beier (1970) mentioned *C. (E.) machadoi* Vachon from La Gomera (El Cedro), Hierro, and Gran Canaria. The occurrence of the latter species on those islands seems improbable to me and may represent a misidentification of *C. (E.) rimicola* Mahnert, which is superficially similar to *C. (E.) machadoi*, especially in the size and shape of the pedipalpal chela. *Chthonius* (*E.*) *machadoi* Vachon and *C. (E.) canariensis* Beier can be distinguished by following characteristics:

C. (E.) canariensis Beier (Beier, 1965, and further specimens): Ventral face of hand of chela slightly convex, 2.0-2.3 (♂♀) times longer than deep, chela 5.2-5.7 (♂) or 4.9-5.2 (♂) times longer than deep, finger 1.5-1.7 (♂) – 1.4-1.6 (♀) times longer than hand, fixed finger with 14-21 acute teeth, movable finger with 8-11 acute teeth reaching to trichobothrium *st*, trichobothrium *ist* on level of *esb*; length of femur 0.39-0.52 mm (♂) (♀ 0.45-0.56 mm), hand 0.24-0.28 mm (♂) (♀ 0.25-0.31 mm), length of finger 0.37-0.42 mm (♂) (♀ 0.39-0.43 mm), length of chela 0.59-0.70 mm (♂) (♀ 0.63-0.75 mm).

C. (E.) machadoi Vachon (Vachon, 1940): Ventral face of hand strongly convex, 2.0 (♂) or 1.7 (♀) times longer than deep, chela 4.5 (♂) or 3.8-4.0 (♀) times longer than deep, finger 1.3 times longer than hand; fixed finger with 13-16 acute teeth, movable finger 6-8 acute teeth, nearly reaching to trichobothrium *st*, trichobothrium *ist* proximal to *esb*; length of pedipalpal femur 0.46mm (♀ 0.61mm), length of hand 0.27 mm (♂) (♀ 0.37 mm), length of finger 0.35 mm (♂) (♀ 0.50 mm), length of chela 0.63 mm (♂) (♀ 0.85 mm).

Chthonius (*Ephippiochthonius*) *dubius*

Mahnert, 1993

Gran Canaria. El Sao, MSS, leg. H. López, 2♀, 8.IV.2004 (1881b) (1♀ MHNG); 4♂ 14♀, 15.V.2005 (GBIF4895-2) (2♂ 4♀ MHNG); 2♂ 8♀ 2T 3D, 11.VIII.2007 (GBIF4897-4). Caldera de Los Marteles, MSS (UTM 28R 4481/30920), leg. H. López, 1♂ 6♀, 19.VIII.2006 (GBIF4898); 4♀, 26.XII.2006 (GBIF4899-2); 3♂ 17♀ 1T, 16.VIII.2007 (GBIF4900) (MHNG); 1♂ 4♀, 27.XII.2008 (GBIF4901-1); 5♂ 17♀ 1T, 27.XII.2008 (GBIF4902) (2♂ 4♀ 1T MHNG). Los Majales, MSS (UTM 28R 4508/30906), leg. H. López, 1♂, 3.V.2006 (GBIF4903) (MHNG); 4♂ 8♀ 5T 2D, 16.VIII.2007 (GBIF4904).

This species was previously known only from the female holotype, which was collected from the Cueva de San Marcos, Tenerife (Mahnert, 1993). The specimens from two localities on Gran Canaria can be briefly character-

ized as follows: cephalothorax with a broadly rounded and dentate epistome, chaetotaxy: 4+2x1-2/6/4/2/2, length of medial anterior setae 0.11mm; anterior eyes with flat lenses, posterior eyes present as indistinct spots. Chelicerae: spinneret on movable finger absent in male, well developed in female. Pedipalps: femur 6.2x (♀ 5.0-6.1x) times longer than broad and 2.4-2.5 times longer than patella, chaetotaxy: 3/6/2-3/5, patella 2.1-2.3 times longer than broad, hand 2.4x (♀ 2.1-2.2x) times, chela 6.1x (♀ 5.2-5.6x) times longer than deep, finger 1.5-1.8 times longer than hand; fixed finger with 16-18 acute teeth (2 small distal ones) + some granules basally, movable finger with 9-12 acute teeth (1-2 small distal ones), 8-11 rounded rudiments and a few indistinct granules. Trichobothrial pattern typical (*ist* distinctly distal to *esb*), but in few specimens from Caldera de Los Marteles (4900) *ist* is closer to *esb* and nearly on same level (in some specimens only on one chela).

Measurements in mm (1♂ 4♀): cephalothorax 0.39-0.41/0.37-0.39; pedipalps: femur 0.52-0.56/0.09-0.11, patella 0.21-0.23/0.10-0.11, hand 0.25-0.30/0.12-0.15, length of finger 0.44-0.47, of chela 0.68-0.76.

As usual in this genus, the male pedipalps are more slender than those of the female. The observed variation in female proportions and measurements lies within that expected within a species.

Chthonius (Ephippiochthonius) gracilimanus

Mahnert, 1997

Gran Canaria. Barranco Oscuro, MSS, leg. H.López, 1♀, 20.VIII.2003 (1459); 1♀, 20.VIII.2003 (1460); 1♀, 14.XI.2003 (1648) (MHNG); 2♂ 2♀, 4.I.2006 (2647c) (1♂ 1♀ MHNG); 2♀ 1D, 3.V.2006 (GBIF4887) (MHNG); 2♀, 14.VIII.2006 (GBIF4888-2); 1♀ 1T, 2.I.2007 (GBIF4889-2); 5♂ 8♀, 18.VIII.2007 (GBIF4890-4) (MHNG); 4♂ 7♀ 1T, 3.I.2009 (GBIF4891-3). Cueva del Montañón Negro (UTM 28R 4404/31011), leg. GIET: 1♀, 7.VII.2007 (3941) (MHNG). Brezal del Palmital, MSS, leg. H.López, 1♀, 4.I.2006 (2650b) (MHNG). **La Palma.** Cueva del Ratón (UTM 28R 2212/31517), 1♀, 2.VII.2004, leg. GIET (2658b). Cueva de La Fajanita (UTM 28R 2176/31936), 1♀, 22.II.2005, leg. GIET (2686) (MHNG). Cueva de Los Palmeros (UTM 28R 2204/31567), 1♀, 14.XI.2005, leg. P.Oromí (2687b) (MHNG); 2♀ 12♂ 3T, leg. GIET (2661c).

Chthonius (E.) gracilimanus was described from the island of La Palma (Mahnert, 1997). The specimens from Gran Canaria are intermediate between *C. canariensis* and *C. gracilimanus* (from La Palma) concerning pedipalpal proportions and measurements (*canariensis*: 2♂: femur 5.2-6.0 times, length 0.43-0.52 mm, hand 2.0-2.3 times, length 0.24-0.28 mm, chela 5.2-5.7 times, length 0.63-0.70 mm; 4♀: femur 5.0-5.8 times, length 0.45-0.56 mm, hand 2.0-2.2 times, length 0.25-0.31 mm, chela 4.9-5.2 times, length 0.63-0.75 mm; *gracilimanus*: 4♂: femur 6.8-7.1 times longer than broad, length 0.57-

0.58 mm, hand 2.6-2.9 times, length 0.31-0.32 mm, chela 7.0-7.2 times, length 0.77-0.81 mm; 4♀: femur 6.6-6.9 times, length 0.61-0.65 mm, hand 2.5-2.6 times, length 0.32-0.35 mm, chela 6.4-6.8 times, length 0.82-0.85mm). They furthermore differ from *canariensis* by the presence of a small spinneret in the male (absent in *canariensis*), from *gracilimanus* by the presence of indistinctly corneate anterior eyes. The variation of length of the setae on the cephalothorax is noteworthy. At least for the moment I consider them conspecific with the La Palma populations: it remains to see whether these divergences are due to instabilities of some characters within this population or else hint at a taxonomic difference perhaps at the subspecific level.

Short description of specimens (1♂ 4♀) from Gran Canaria: cephalothorax with broadly rounded dentate epistome, anterior eyes indistinctly corneate, posterior eyes indistinct spots, length of medial anterior setae (0.08)0.12-0.13 (0.15) mm, up to 7 microsetae (1♀) (preocular and along anterior margin), 2 setae on posterior margin (1 ex. out of 38 with 3: 2 long and 1 tiny lateral seta). Chelicerae: spinneret on movable finger distinct, small (in both sexes), movable finger with isolated subdistal tooth. Pedipalps: femur 5.9 (♂) times (♀ 5.5-6.0) times longer than broad and 2.4-2.5 times longer than patella, patella 2.1-2.2 times longer than broad, hand with distinct hump distal to *ib/isb* 2.2-2.4 times, chela 5.7-6.2 times longer than deep, finger 1.6-1.7 times longer than hand; fixed finger with 19-22 acute teeth (2 small distal ones) and some tiny rudiments (granules) basally, movable finger 11-12 acute teeth (2 small distal ones) and about 10-12 flat rudiments. Trichobothria: *ist* on level with or indistinctly proximal to *esb*, *sb* clearly nearer to *b* than to *st*, one sensillum halfway between *sb* and *b*.

Measurements (in mm): cephalothorax 0.44-0.47/0.43-0.48; pedipalps: femur 0.57-0.64/0.10-0.11, patella 0.23-0.27/0.11-0.12, hand 0.29-0.33/0.13-0.15, length of finger 0.49-0.54, of chela 0.79-0.87.

Chthonius (Ephippiochthonius) rimicola

Mahnert, 1993

Gran Canaria. Barranco Oscuro, MSS, leg. H. López, 1♂, 4.I.2006 (2647b); 1♀, 14.VIII.2006 (GBIF4888-1); 2♂ 1♀, 2.I.2007 (GBIF4889-1); 3♂, 18.VIII.2007 (GBIF4890-1) (MHNG); 1♂ 1♀, 3.I.2009 (GBIF4891-1) (MHNG); 5♂ 13♀ 5T 1D, 3.I.2009 (GBIF4892); 1♂ 3♀ 3T 2D, 3.I.2009 (GBIF4893). **Lanzarote.** Temisa, MSS (UTM 28R 6450/32236), 4♂ 11♀ 4T 1D, 13.I.2007, leg. H. López (GBIF4906-2); Haría, MSS (UTM 28R 6442/32233), 1♀, 10.VII.2009, leg. H. López (GBIF4907-2) (MHNG).

Out of all the specimens examined about 5 specimens (from Barranco Oscuro and Temisa) possessed only 3 setae on posterior margin of the cephalothorax (one short lateral seta lacking), 1♂ from Tenerife (Roque de los Pasos; MSS-pitfall) possessed 5 setae (1/2 tiny lateral setae).

Paraliochthonius canariensis Vachon, 1961

Tenerife. Playa de San Roque, Garachico (UTM 28R 3280/31396), 5♂ 2♀, 10.XI.2007, leg. H. López (GBIF4905) (2♂ 1♀ MHNG).

This species was described from Lanzarote (Vachon, 1961), and the specimens reported here represent the first record for Tenerife.

Garypidae*Garypus beauvoisi* (Audouin, 1826)

Gran Canaria. Mouth of Barranco de Guayadeque (UTM 28R 4617/30864), 1♀ 1T 1D, 7.IV.2004, leg. H. López (2666) (MHNG).

A halophilic species, previously recorded already from Tenerife, Fuerteventura and Lanzarote (Mahnert *et al.*, 2004).

Garypus saxicola saxicola Waterhouse, 1878

Tenerife. Malpaís de la Rasca, pitfall trap, 2♀, 12.X.2007, leg. GIET (4588a) (MHNG).

A halophilic species, hitherto recorded from mainland Spain and Portugal. The subspecies *saxicola salvagensis* Helversen, 1965, was described from the Ilhas Selvagens (Ilheu de Fora, Pitão).

The two females from Tenerife fit quite well to the description of the nominate subspecies (Beier, 1963) and have the following proportions and measurements: pedipalps: femur 4.4-4.6 times longer than broad (2.22-2.31 mm/0.50 mm), patella 3.6-3.8 times (1.80-1.88/0.50), hand with pedicel 1.8-1.9 times longer than broad (1.69-1.85/0.95-1.00), finger 1.3-1.5 times longer than hand with pedicel, chela 4.1-4.2 times longer than broad, length of finger 2.40-2.50, length of chela 4.00-4.08. Leg I: basitarsus 3.75 times longer than deep (0.47 mm/0.13 mm) and 1.23 longer than telotarsus, telotarsus 3.3 times longer than deep (0.39/0.12), suture between basi- and telotarsus strongly oblique.

Geogarypidae*Geogarypus mirei* Heurtault, 1970

Gran Canaria. Dunas de Maspalomas, in dry stalks, 1♂ 1♀, 9.12.2002, leg. Ch. Muster (MHNG).

The species was originally described from North Africa (Chad) and has certainly been introduced by human activity to this Canarian locality. A centre providing dromedary rides to tourists is located at Dunas de Maspalomas, which may represent the source of the Canarian population.

Olpidae*Calocheirus tenerifae* Mahnert, 2002

Lanzarote. P.N. Timanfaya, estación Chinero, 1♀, 6.VI.1988, leg. J. L. Martín (2681) (MHNG). **Gran Canaria.** Barranco del Draguillo, MSS, leg. H. López, 4♂, 26.XII.2006 (GBIF4877-2) (2♀ MHNG); 1♂ 1♀, 16.VIII.2007 (GBIF4878-1) (1♀ MHNG); 1♀, 23.XII.2007 (GBIF4879-1); 2♂ 2D 1P, 28.XII.2008 (GBIF4880) (MHNG).

The female holotype was described from the Cueva Honda de Güimar, Tenerife (Mahnert, 2002), and the species was subsequently found on Tenerife [Malpaís de la Rasca, leg. D. Hernández, 12.X.2007, 1♂ 2 D (4588)].

These supplementary specimens have the following characteristics: cephalothorax with 4-5 (1♂ 7!) setae on posterior margin; chaetotaxy of anterior tergites differing from that of the holotype: 4-4-4-4-6 (♂); 4-6-5-6-6 (♂); 4-5-5-6-6 (♂); 5-5-6-6-6 (2♂); 6-6-6-6-6 (1♂ 1♀); pedipalps: femur 5.3-5.9 (♀ 4.8-5.3) times, patella 4.7-5.4 (♀ 4.0) times, hand with pedicel 1.4-1.6 (♀ 1.3) times, chela with pedicel 4.0-4.6 (♀ 3.7-3.8) times longer than broad, finger 1.8-2.2 times longer than hand with pedicel; fixed finger 39-42 teeth, movable finger with 18-27 teeth (4-7 distal ones acute, others flattened and partly indistinct). Leg I: femur 4.4-5.2 (♂ from Malpaís de la Rasca 5.5) times, patella 2.2-2.6 (3.7) times, tibia 5.9-6.4 (9.0) times, basitarsus 4.4-5.1 (6.8) times, telotarsus 5.5-6.0 (6.5) times; leg IV: femur+patella 2.5-2.9 (♂ from Malpaís de la Rasca 3.4) times, tibia 5.2-5.9 (7.3) times, basitarsus 4.4-4.9 (5.9) times, telotarsus 5.3-6.3 (7.4) times longer than deep. Measurements of ♂ (followed by those of ♀ in parenthesis) (in mm): body length 2.5-2.9; cephalothorax 0.72-0.75/0.43-0.51 (0.75/0.43); pedipalps: femur 0.89-0.97/0.16-0.17 (0.96-1.00/0.19-0.20), patella 0.75-0.86/0.16-0.17 (0.73-0.80/0.19-0.20), hand with pedicel 0.44-0.50/0.30-0.32 (0.51-0.52/0.40-0.41), length of finger 0.82-0.98 (1.00-1.01), of chela 1.20-1.44 (1.49-1.53); leg I: femur 0.42-0.46/0.08-0.10, patella 0.20-0.21/0.08-0.10, tibia 0.32-0.37/0.05-0.06, basitarsus 0.21-0.24/0.04-0.06, telotarsus 0.19-0.20/0.03-0.04; leg IV: femur+patella 0.70-0.78/0.27-0.29, tibia 0.53-0.57/0.10, basitarsus 0.28-0.31/0.06-0.07, telotarsus 0.22-0.25/0.04.

Halominniza oromii Mahnert, 1997

Lanzarote. Timanfaya-Costa Cochino, 1♂ 2♀, 5.IV.1988, leg. J.L. Martín (2694 (L-T-307) (MHNG).

Only the female holotype was previously known from the island of Alegranza (north of Lanzarote) (Mahnert, 1997).

Short description of the male (in parenthesis those of one female): cephalothorax 1.7 times longer than broad, setae on posterior margin, tergite I 2 setae, II 4, III 4, IV 6; pedipalps: trochanter without dorsal hump, 2.0 times longer than broad (0.41 mm/0.20 mm), femur 5.3 times (0.95/0.18) (♀ 5.0 times, 1.07/0.21), patella 3.8 times (0.81/0.22) (♀ 3.6 times, 0.95/0.27), hand with pedicel

2.2 times (0.75/0.34) (♀ 2.0 times, 0.85/0.43), chela with pedicel 4.1 times (length 1.41) (3.8 times, 1.62/0.43) longer than broad, without pedicel 3.8 times (length 1.31) longer than broad, finger nearly as long as hand with pedicel (length 0.74); fixed finger with 60 acute teeth, movable finger with 23 acute and 16 rounded teeth. Leg I: femur 3.8 times longer than deep (0.38/0.10) and 1.6 times longer than patella, patella 2.3 times (0.24/0.10), tibia 5.5 times (0.40/0.07), basitarsus 4.4 times (0.23/0.05), telotarsus 4.0 times (0.20/0.05) longer than deep; leg IV: femur+patella 3.9 times (0.78/0.20), tibia 6.6 times (0.63/0.10), basitarsus 4.0 times (0.30/0.07), telotarsus 4.0 times (0.24/0.06) longer than deep.

Olpium canariense Beier, 1965

Gomera. Puntallana (UTM 28R 2932/31131), leg. GIET: 5♂ 2♀, 27.X.2002 (81, 101, 107, 118) (MHNG 2♂ 2♀).

The species was previously recorded from Tenerife, Gran Canaria, Fuerteventura, and Lanzarote (Beier, 1965; Mahnert et al., 2004).

Syarinidae

Microcreagrina cavicola Mahnert, 1993

Lanzarote. P.N. Timanfaya, estación Chinero, 2♀, 6.VI.1988, leg. J.L. Martín (2677a). **Gran Canaria.** Mina de Los Llanetes, Valsequillo, 1♀, 10.II.2007, leg. GIET (3828).

This species has been previously recorded only from La Palma (Mahnert, 1993).

Microcreagrina subterranea Mahnert, 1993

Gran Canaria. Los Majaletes, MSS, 1♀, 7.IV.2004, leg. H. López (1877). **La Palma.** Cueva de Los Palmeros, leg. GIET: 1♂ 1T, 12.VII.2004 (2661a) (MHNG); 1♂, 2.IV.2004 (2668).

Microcreagrina subterranea was known from La Gomera and Tenerife (Mahnert et al., 2004). These new specimens from different islands testify to the partial overlapping of character ranges of *M. subterranea* and *M. cavicola* [e.g. number of teeth on fixed chelal finger and length of pedipalpal segments, e.g. length of palpal femur 0.56-0.75 mm, length of chela 0.94-1.18 mm, 52-66 teeth on fixed chelal finger in *M. subterranea*, femur length 0.72-0.85 mm, length of chela 1.15-1.24 mm, 67-81 teeth on fixed chelal finger in *M. cavicola* (see Mahnert, 1993)].

Withiidae

Withius piger (Simon, 1878)

Gomera. Topo del Negrillo, on *Euphorbia mellifera*, 1♂, 30.VI.2008, leg. H. Lopez

This cosmopolitan species (Harvey, 2009) has been recorded from the Canary Islands, from Gran Canaria, Hierro, La Palma, and Tenerife (Mahnert et al., 2004). Adults and all nymphal stages were collected several times in MSS-traps on Gran Canaria, indicating that reproduction and development occur in the upper (?) soil layer.

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