

## **A review of Aleocharine Rove Beetles from the Galápagos Islands, Ecuador (Coleoptera: Staphylinidae, Aleocharinae)**

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**A review of Aleocharine Rove Beetles from the Galápagos Islands, Ecuador (Coleoptera: Staphylinidae, Aleocharinae).** - The Galápagos aleocharine rove beetles are reviewed. Fifteen species (3 new), in 9 genera and 7 tribes are recognised in our collections: Athetini: *Atheta* (*Acrotona*) *pseudoclaudiensis* sp. n. (endemic), *A. (Atheta) coriaria* (Kraatz) (introduced, new record), *A. lurida* (Erichson) (native), *A. dichroa* (Gravenhorst) (native), *A. galapagoensis* Pace (endemic); Myllaenini: *Myllaena leleupi* Pace (endemic); *Rothium littoralis* sp. n. (probably endemic); Hypocyphtini (=Oligotini): *Oligota (Holobus) chrysopyga* Kraatz (introduced, new record); Homalotini (=Bolitocharini): *Diesota (Apheloglossa) franzi* (Pace) (status uncertain, possibly endemic), *D. (Apheloglossa) leleupi* Pace (probably endemic), *Phanerota tridentata* sp. n. (probably introduced), *Thecturota franzi* Pace (probably endemic); Falagriini: *Myrmecocephalus concinnus* (Erichson) (introduced, new record); Placusini: *Euvira scalesia* sp. n. (endemic, new record) and Oxypodini: *Feluva franzi* Pace (probably endemic). The tribes Falagriini, Hypocyphtini and Placusini are reported from the islands for the first time. *Diesota galapagosensis* Pace (1985a), and *Rothium ashlocki* Ahn & Ashe (1996), previously reported from Galápagos, are not confirmed in our material. All but the unconfirmed species are described/redescribed and their diagnostic features illustrated. Data on bionomics and species affiliations are briefly discussed. Keys for identification are provided. Most naturally occurring species occur in the arid vegetation zone. The 17 known species seem to represent at least 17 separate colonization events.

**Key-words:** Coleoptera - Staphylinidae - Aleocharinae - Galápagos Islands - native species - endemic species - island insects.



## INTRODUCTION

The Galápagos Islands of Ecuador (Map. 1) lie 800-1000 km west of the coast of Ecuador, and span 304 km east to west and 341 km northwest to southeast. There are 45 named islands, islets, or rocks. The total land area is approximately 7856 km<sup>2</sup>. The largest island is Isabela (4670 km<sup>2</sup>), and the second largest island is Santa Cruz (904 km<sup>2</sup>). The next five islands in order of size are Ferdinandina (635 km<sup>2</sup>), Santiago (572 km<sup>2</sup>), San Cristóbal (552 km<sup>2</sup>), Floreana (171 km<sup>2</sup>), and Marchena (130 km<sup>2</sup>). The islands are oceanic and volcanic in origin. They lie at the edge of the Central Pacific dry zone with two seasons: rainy and warm from about January to May, and dry and cool from about May to December (PECK & KUKALOVÁ-PECK 1990).

Scientific interest in the fauna and flora of the Galápagos Archipelago was first generated after Charles Darwin and H.M.S. Beagle visited the islands in 1835. The islands are now considered as a model system for estimating the dynamics of biotic dispersal to, evolutionary differentiation in, and ecological structuring of oceanic islands (PECK & KUKALOVÁ-PECK 1990). Darwin collected a total of 29 beetle species, which were described in 1845 by Waterhouse (VAN DYKE, 1953). The general beetle fauna was reviewed by PECK & KUKALOVÁ-PECK (1990), and the entire insect fauna was summarized by PECK (1996). There are now 418 known beetle species in 238 genera belonging to 59 families of Coleoptera (PECK 1996).

The vegetation and moisture conditions in the islands change seasonally and from sea level to the top of the volcanic mountains, two of which reach an elevation of about 1700 m. The following seven biotic zones are reported for the large main islands (PECK & KUKALOVÁ-PECK 1990, PECK 1991, 1996): littoral zone, arid zone, transition zone, humid forest zone, evergreen shrub zone, fern-sedge or "pampa" zone, and an agricultural zone. The littoral zone: a narrow belt of salt tolerant vegetation (mangroves, succulents) extending from the beach line to some 10 m or more inland. The arid zone: the largest zone of microphyllous and xerophytic vegetation (*Jasminocereus* and *Optuntia* cacti, seasonally deciduous trees of *Acacia*, *Bursera*, and *Prosopis*) extending up to 80-120 m altitude on the southerly face of the islands and up to 200-300 m on the leeward side of the larger islands. The transition zone: a relatively more moist zone consisting of some evergreen plants and numerous tree species, including the genera *Pisonia*, *Pisidium* and *Piscidia*. The humid forest (or *Scalesia*) zone: a mesophyllous, mainly evergreen forest often with a rich undergrowth, extending from 180 to 550 m with average rainfall 1040 mm. The forest often contains endemic trees of *Scalesia pedunculata*, other *Scalesia* species and *Zanthoxylum*. The evergreen shrub (or *Miconia*) zone: a zone above the humid forest, especially on Santa Cruz, Santiago, and San Cristóbal, extending from about 450 to 625 m (average rainfall 1694 mm), and often dominated by the endemic *Miconia robinsoniana* a mesophyllous evergreen shrub often forming a low closed canopy with a dense growth of epiphytic mosses and liverworts. A fern-sedge (or pampa) zone: a zone extending from 550 to 650 m to 1000 m or more on the mountains on higher islands, lacking native woody vegetation, sometimes with abundant *Pteridium* bracken fern. The agricultural zone: a human-influenced zone dominated by intro-



duced plants in the altered vegetation of former transition, humid forest and evergreen shrub zones.

In 1981 COIFFAIT reviewed the rove beetles from the Galápagos, with new collections from N. & L. Leleup. The latest review of the Galápagos aleocharine rove beetles was that of PACE (1985a), based on material collected by Prof. H. Franz in 1975. He recorded 9 aleocharine species, of which 6 were described as new to science, all belonging to four tribes: Bolitocharini (*sensu* Pace), Callicerini (=Athetini), Myllaenini, and Oxypodini. His studies were a well illustrated contribution but were unfortunately based on a small sample size and very restricted collecting area and time period.

The results reported here are based on very large sample sizes and extensive collecting over 5 expeditions, temporally extending from early January to July, totalling 15 months of field work. We here present new records for 15 species of aleocharines in 9 genera (*Atheta*, *Diesota*, *Euvira*, *Feluva*, *Myllaena*, *Oligota*, *Phanerota*, *Rothium*, *Thecturota*) in 7 tribes (Athetini, Falagriini, Homalotini, Hypocyphtini, Myllaenini, Oxypodini, Placusini). Six species in four genera, *Atheta*, *Euvira*, *Oligota*, *Phanerota*, and three tribes, Falagriini, Hypocyphtini, Placusini, are recorded from Galápagos for the first time (see Table 1). Knowledge of the South American aleocharines, including Colombia, Ecuador, Peru and the West Indies, despite several recent publications (AHN & ASHE 1996, PACE 1982, 1983a, b, c, 1984, 1985a, b, 1986, 1987a, b, c, 1988, 1990a, b) is still fragmentary. This is the major predicament in assessing the origin and phylogenetic affiliations of Galápagos aleocharine beetles, and Galápagos insects in general. However, our preliminary assessment indicates 11 species to be potentially endemic, 2 to be native (to South America), and 4 probably represent very recent accidental introductions by humans (*Atheta coriaria*, *Myrmeccephalus cingulatus*, *Oligota chrysopyga*, *Phanerota tridentata*) (see Table 1 for details). The species of the genera *Diesota*, *Euvira*, *Feluva*, *Myllaena*, *Phanerota*, *Rothium* and *Thecturota*, are ultimately of South American origin, while *Oligota* is cosmopolitan and the *Atheta* are either endemic (*A. galapagoensis*, *A. pseudo-claudiensis*), or cosmopolitan (*A. coriaria*), or of South American origin (*A. dichroa*, *A. lurida*). The genus *Diesota* is particularly species rich on the South American mainland where it has undergone a massive radiation (PACE 1985a, 1986). No endemism at the generic level in Aleocharinae was found, which indicates fairly recent colonizations. As indicated by KUSCHEL (1963) the arthropod fauna of the archipelago is young, but he placed its origin as far back as the Eocene or part of the Oligocene. Present geological understanding places the origin of the present islands to be about 3.5 million years at most (PECK 1996).

The Galápagos Islands are famous for Darwin's Finches, a classic group showing within-archipelagic species formation and adaptive radiation. One might expect other groups of Galápagos organisms to provide similar examples. Do we see this in the aleocharine staphylinids?

Of the 10 genera present, only three have more than one endemic species: *Rothium* (2 species), *Diesota* (3 species) and *Atheta* (2 species). In no case is it clear



that these represent sister species decendant from a single common ancestor and originating from within the Archipelago (only *D. galapagoensis* has not been seen by us, but the other two *Diesota* are more closely comparable to different continental species). Thus, the pattern seems to be that each of the 17 known species originated from at least 17 separate colonization events (in the distant past (Pleistocene) for the endemic species, in Holocene times or more recently for the native species, and in Historical times for the introduced species. This lack of within-archipelago species multiplication is similar to the pattern found by BORKENT (1991), in which the 11 known species of Galápagos ceratopogonid flies represent 10 or 11 separate colonization events, and is the norm in Galápagos insects (PECK 1996).

Table 2 shows the distribution of our samples of aleocharine species in the different vegetation zones. The highest species diversity is equivalent in the arid, transition and humid forest zones with 10 species each, and 9 species in the evergreen shrub zone. Thus, the species diversity is relatively uniform through these 4 vegetation zones. Excluding introduced species yields a diversity which decreases with increased elevation: arid (9), transition (8), humid forest (7), littoral and evergreen shrub (6), and pampa (4). Six of nine non-introduced species occurring in transition to evergreen shrub zones are able to persist after these are converted to agriculture.

## MATERIAL AND METHODS

Approximately 7321 specimens, collected by S. B. Peck and associates during 5 expeditions to the Galápagos (1985-1996) were examined in this study. The majority of specimens were collected in Flight Interception Traps (FIT), Malaise traps, carrion baited pitfall traps, by sifting litter, and by general collecting. Many specimens were dissected to confirm an identity based on genitalic structures. Genitalia and terminalia were dehydrated in absolute ethanol, washed in xylene, and embedded in Canada balsam on small microslides attached to the pins with the specimens. The habitus illustrations were made using a drawing tube attached to a WILD M3Z stereomicroscope. Genital structures were studied using an image processing system consisting of a compound microscope (JENAMED 2), digital camera (JAVELIN) and an IBM computer with an image processing programe (COMPUTER EYES/1024, Digital Vision). The images were printed in Microsoft Word and used for tracing. All drawings were inked on V-C® tracing film.

The terminology used in this paper follows that of ASHE (1984), HOEBEKE (1985), KLIMASZEWSKI (1982a, b), and SEEVERS (1978). The following main taxonomic sources were consulted in the course of this study: AHN & ASHE 1996, ASHE (1984), BERNHAUER (1907, 1908, 1941), BERNHAUER & SCHEERPELTZ (1926), COIFFAIT (1981), ERICHSON (1840), FAIRMAIRE & GERMAIN (1861), FAUVEL (1865), HOEBEKE (1985), KLIMASZEWSKI (1982a, b), KUSCHEL (1963), LOHSE *et al.* (1990), PACE (1982, 1983a, b, c, 1984, 1985a, b, 1986, 1987a, b, c, 1988, 1990a, b), SCHUBERT (1849), SOLIER (1849), and VAN DYKE (1953).



## CONVENTIONS

## 1. Localities and specimen data:

Localities are grouped under individual island names, which form the Galápagos Archipelago (see Map 1). We use the conventional Ecuadorian (not English) names for the indicated islands.

## 2. Specimen Repository abbreviations:

DEI Deutsches Entomologisches Institut, Eberswalde, Germany; (L. Zerche)

HFC H. Franz collection, Modling, Austria

HUB Museum für Naturkunde, Humboldt Universität, Berlin, Germany; (M. Uhlig)

IRSNB Institut Royal des Sciences Naturelles de Belgique, Bruxelles, Belgium; D. Drugmand

JKC J. Klimaszewski collection, BC Research Inc., Vancouver, Canada

RPC R. Pace collection, Verona, Italy

SBPC S. B. Peck collection, Carleton University, Ottawa, Canada

SEM Snow Entomological Museum, University of Kansas, Lawrence, U.S.A.

Surplus specimens from SBPC will be deposited first in the collections of the Muséum d'Histoire Naturelle, Geneva, Switzerland; and then in Canadian National Collection, Agriculture Canada, Ottawa; Charles Darwin Research Station, Santa Cruz, Galápagos; and the Catholic University, Quito, Ecuador.

## 3. Citation of information on primary type labels:

Text of each label is enclosed within double quotes (""), a forward slash (/) with a space on each side separates each line, and information enclosed by brackets ([ ]) provides further details about the specimen associated with the label.

## 4. Terms:

Frank & McCoy (1990) proposed definitions and a classification of commonly used terms such as "introduced" and "endemic" as applied to species occurring in an area under discussion. They recommend the use of "precinctive" rather than "endemic" when referring to species confined to an area, because of prior and continuing use of "endemic" in a somewhat different sense in epidemiology. However, we prefer to continue to use "endemic" in its traditional biogeographic sense. It is a well understood zoological term, is commonly used in entomological literature, and is unlikely to be confused with its use in epidemiology. We also use the term "native" for those species which have probably arrived through natural dispersal (from Mexico or Central and South America) and "introduced" for those accidentally brought in by human activity. We know of no intentional introductions of insects into the Galápagos Islands, for bio-control or other purposes. While our use of terms may not satisfy everybody, it is consistent with the established literature on Galápagos organisms and ideas of their origins and distribution.



## RESULTS

## SYSTEMATICS

## Order Coleoptera

## Family Staphylinidae

## Subfamily Aleocharinae

## KEY TO TRIBES OF ALEOCHARINAE RECORDED FROM GALÁPAGOS

1. Antenna 10-segmented with distinct 4-segmented club (Fig. 3), tarsal formula 4-4-4 . . . . . Hypocyphitini (=Oligotini) (*Oligota* p. 229)
- Antenna 11-segmented without distinct club, tarsal formula not as above . . . 2
- 2(1). Tarsal formula 4-5-5 . . . . . 3
- Tarsal formula 4-4-5 or 5-5-5 . . . . . 5
- 3(2). Antennal segments 8-11 bead-shaped, pronotum trapezoidal, widest at apex and narrowest at base (Fig. 2), wings absent, labial palpi extremely elongate (Fig. 18) . . . . . Myllaenini (*Rothium* p. 227)
- Antennal segments 8-11 never bead-shaped, pronotum differently shaped, widest at base or at middle, wings present, labial palpi moderately elongate . . . . . 4
- 4(3). Head with clearly visible slender neck, pronotum with median sulcus, body ant-like (Fig. 14), legs extremely elongate . . . . . Falagriini (*Myrmecocephalus* p. 243)
- Head without clearly visible slender neck, pronotum without median sulcus, body not ant-like (Figs 9-13), legs moderately elongate . . . . . Athetini (*Atheta* p. 236)
- 5(2). Tarsal formula 5-5-5 . . . . . Oxypodini (*Feluva* p. 244)
- Tarsal formula 4-4-5 . . . . . 6
- 6(5). Body elongate, fusiform (Fig. 1), with evenly dense, short and adhering pubescence directed posteriorly, abdomen with lateral bristles, labial palpi extremely elongate . . . . . Myllaenini (*Myllaena* p. 227)
- Body narrowly elongate but not fusiform, pubescence not as above, abdomen without or with less pronounced lateral setae, labial palpi short (exception: *Diesota*) . . . . . 7
- 7(6). Head approximately quadrate, genae angular posteriorly, neck distinct and narrow, one half as wide as head (Fig. 8) . . . . . Placusini (*Euvira* p. 235)
- Head not as above, neck not visible from above (Figs 4-7) . . . . . Homalotini (=Bolitocharini) (*Diesota*, *Phanerota*, *Thecturota* p. 230, 231, 232)

## I. TRIBE Myllaenini Ganglbauer, 1895

(for details on characteristics and phylogenies see AHN & ASHE 1996, KLIMASZEWSKI 1982a, 1992)



**D i a g n o s i s .** Tarsal formula 4-4-5 or 4-5-5; body fusiform (*Myllaena*, Fig. 1) or subparallel (*Rothium*, Fig. 2); abdomen with protruding prominent setae; labial palpi exceptionally elongate (3-segmented in *Rothium*, Fig. 18); maxillary palps 4-segmented, last segment minute; tergite 10 deeply bifid (*Myllaena*) or entire (*Rothium*). Hydrophilous species with *Rothium* confined to the seashores of the Pacific coast of Mexico, Ecuador, Peru, and the Galápagos (Ahn & Ashe 1996). Inclusion of *Rothium* in Myllaenini (Ahn & Ashe 1996) requires redefinition of the tribe.

### 1. *Myllaena leleupi* Pace, 1985a

(Figs 1, 16)

PACE 1985a: 450 (habitus and spermatheca illustrations).

**H o l o t y p e** (♀): "I. Isabela Sud., a 4 km de la côte, tamisage, XI-1964, N. Leleup leg." (IRSNB).

**D i a g n o s i s .** Body length 1.8 mm; fusiform (Fig. 1), narrow; uniformly dark brown; slightly glossy; punctation minute and dense; pubescence greyish, very short, dense, and adhering to body; antennal segments 6-10 slightly elongate; head wide at base and produced anteriorly, temples shorter than diameter of eye; pronotum transverse, straight basally and apically, arcuate at sides; elytra transverse; abdomen elongate, gradually tapering posteriorly with some protruding setae (Fig. 1); legs slim.

♂ Unknown. ♀ Spermatheca with spherical capsule and short, sinuate duct which is coiled posteriorly (Fig. 16). Tergite and sternite 8 elongate and truncate apically.

**Bionomics.** Our single new female was collected from Buttonwood mangrove (*Conocarpus*) litter soil washing in the littoral zone. Collecting period: May and November (Pace 1985a).

**D i s t r i b u t i o n .** Pace (1985a) recorded this species for the first time from Isabela. We confirm his record. Endemic.

**M a t e r i a l e x a m i n e d** (new). One female: Isabela, 2 km W Villamil (SBPC).

**Remarks.** Body form similar to *A. cuneata* Notman (SE USA), but spermatheca distinct. For details on *M. cuneata* and other Nearctic species see Klimaszewski (1982a).

### *Rothium* Moore & Legner 1977

(Fig. 2)

**Type species:** *Rothium sonorensis* Moore & Legner

We here provide characteristics for this genus because of its unsettled taxonomic position. For discussion see AHN & ASHE (1996).

**D i a g n o s i s .** Tarsal formula 4-4-5, or 4-5-5. Body linear, superficially *Leptusa*-like (Fig. 2), finely pubescent with macrosetae on pronotum, elytra and abdomen; punctation fine and dense; head with frontal suture; antenna with 3 basal segments strongly elongate, first longest, second and third slightly shorter than first and of equal length, 4-8 elongate and progressively shortening apically, 9-11 bead-shaped; maxillary palpus 4-segmented, basal and apical segments minute, second and third elongate; lacinia elongate, narrow, with teeth in apical fourth; galea narrower than



lacinia, and with surface smooth; labial palpi longer than mentum, with a few microsetae; mentum trapezoidal with anterior angles produced anteriorly; labrum transverse, narrow; mesocoxae widely separated, mesocoxal process wide, rounded apically and nearly reaching mesocoxal base; tarsal claws large, sickle-shaped; female tergite and sternite 8 elongate, truncate apically. Members of *Rothium* are known from the seashores of Mexico (Acapulco, Guerrero, Sonora, Sinaloa), Peru (Paita), and Ecuador (Galápagos Islands; continental: Punta Galera, Salinas) (AHN & ASHE 1996).

## 2. *Rothium ashlocki* Ahn & Ashe, 1996

Ahn & Ashe, 1996:247 (illustrations of habitus, mouthparts, genitalia).

**H o l o t y p e :** Galápagos, Santa Cruz Is., Academy Bay, 15.02.1964, on rocks low tide level, P.D. Ashlock (SEM).

**D i a g n o s i s** (based on original description). Body length 2.4 mm. Linear in shape, antennae, elytra and legs light brown, and head, pronotum and abdomen dark reddish-brown; head almost as long as wide; pronotum about 0.58 times as long as wide; elytral length to pronotum length ratio 1.17. For details and illustrations of genitalia see Ahn & Ashe (1996). See also further under Remarks of *R. littoralis*.

## 3. *Rothium littoralis* sp. n. (Figs 2, 17, 18)

**D i a g n o s i s .** Body length 4.5 mm. Linear in shape (Fig. 2), uniformly reddish-brown, appendages slightly lighter; pubescence short and dense; punctation dense, large and slightly coarse on abdomen; head triangular, temples rounded posteriorly, as long as diameter of eye, pubescence directed anteriorly and obliquely anterolaterally; pronotum overlapping elytra at base, trapezoidal in form, narrowest at base (Fig. 2), pubescence radiating from middle line anteriorly, laterally and posteriorly; elytra short, pubescence directed straight posteriorly; abdomen subparallel, tergites 1-5 with shallow basal impressions; legs moderately elongate with strong claws. ♂ Unknown. ♀ Spermatheca with capsule small, approximately hemispherical, and slightly broader than diameter of duct, duct sinuate and coiled posteriorly (Fig. 17). Tergite and sternite 8 elongate, truncate apically, densely pubescent, pubescence long, protruding setae in 4 rows.

**B i o n o m i c s .** The unique female was collected in March from a pitfall trap baited with sea lion dung in the littoral zone.

**D i s t r i b u t i o n .** *Rothium littoralis* is known only from Floreana Island, Galápagos. Endemic.

**M a t e r i a l e x a m i n e d .** Holotype (♀): "ECU.[ador], Galápagos / Floreana, Black Beach [from lobsteria (Sea lion colony) about 2 km S of Black Beach] / 23-27.III.89, littoral / sea lion dung tp. [=trap] / B.J. Sinclair, 89-159 " (SBPC).

**Remarks.** The genus *Rothium* was originally described by MOORE & LEGNER (1977) based on the new species *R. sonorensis* from Sonora, Mexico. They placed this species in the tribe Bolitocharini (=Homalotini). AHN & ASHE (1996) revised this genus, recognizing 5 species, 3 of which were newly described, and transferred it to



the tribe Myllaenini. They believe that *Rothium* is closely related to members of the tribes Myllaenini and Pronomaenini because they have a similar gland opening on tergite 7, antero-lateral angles of mentum produced apically, similarly formed lacinia and galea, ligula short and entire, and elongate labial palpi (for details see AHN & ASHE 1996).

*Rothium* is superficially similar to *Polypea* Fauvel (Diglottini), known only from Aru Islands, New Guinea (KLIMASZEWSKI 1982b). Both genera share the following characteristics: similar body form, similarly shaped maxillae with 4-segmented maxillary palpus, narrow lacinia and galea, elongate glossae with few microsetae, mentum with two latero-apical projections, and mesocoxae widely separated. *Rothium* is distinct, however, by having 4-5-5-segmented tarsi, labial palpi longer than mentum, mental apical margin between lateral projections straight, lacinia with apical teeth of a different shape (triangular), galea narrower and glabrous, and female tergite 8 not dentate apically.

*Rothium littorallis* is closely related to *R. ashlocki* described from Santa Cruz, Galápagos by AHN & ASHE (1996). It is readily distinguishable from *R. ashlocki* by its twice larger body size, uniform color, more slender lacinia and galea, and the spermatheca with contracted coils of posterior duct (Fig. 17). We think these differences are too great for them to be descended from a common ancestor in the Galápagos. They then represent separate colonizations from the continent.

**E t y m o l o g y.** The specific name is derived from the adjective littoral, in allusion to the habitat where this species was found and to which it may be restricted.

## II. TRIBE Hypocyphtini Laporte, 1835 (=Oligotini)

LAPORTE 1835:135; NEWTON & THAYER 1992 (nomenclature).

**D i a g n o s i s .** Tarsi 4-4-4-segmented; antenna 10-segmented with distinct club (Fig. 3); hind coxae with lamella over base of femur; body minute. Species of *Oligota* feed on mites.

### 4. *Oligota (Holobus) chrysopyga* Kraatz, 1859 (Figs 3, 19-21)

KRAATZ 1859: 25; PACE 1984: 9; FRANK (1972) (illustrations of habitus and median lobe of aedeagus in last two references)

**D i a g n o s i s .** Body length 0.8-1.0 mm; subovate (Fig. 3), widest at elytra; robust; rust-brown or dark brown with light brown / reddish tip of abdomen, legs and base of antennae; moderately glossy; punctation fine; pubescence short and dense on fore-body; scale-like microsculpture present on abdomen (Fig. 3); antenna with two basal segments enlarged, segments 3-6 slightly elongate, 7-10 transverse and forming club; head partially or completely concealed by pronotum, eyes large, pubescence directed anteriorly and obliquely antero-laterad; pronotum strongly transverse and strongly convex, hypomera not visible in lateral view, pubescence directed straight and obliquely posteriad; elytra transverse, pubescence directed straight posteriad; abdomen subparallel basally and tapering apically. ♂ Median lobe of aedeagus with small



round bulbous (Figs 20, 21) and extremely elongate tubus which is produced ventrally at apex (Fig. 20). Tergite and sternite 8 transverse and truncate apically. ♀ Spermatheca with spherical capsule and narrow, short and approximately L-shaped duct (Fig. 19). Tergite 8 strongly transverse, truncate apically, slightly pointed medially; sternite 8 transverse, and moderately strong pointed apically.

**B i o n o m i c s .** Adults have been collected widely from arid zone, thornscrub, transition forest, agricultural zone, guava thicket, *Scalesia* forest, *Miconia* forest etc. Some specimens were found in frass under bark, and on *Fomes* fungi. Collecting methods: Malaise traps, Flight interception Traps, general collecting.

Altitudes: 20-570 m above sea level. Collecting period: February to July. Species of this genus are known to feed on mites (SeEVERS 1978).

**D i s t r i b u t i o n .** A cosmopolitan species recorded from Africa, Madagascar, Canary Is., Mascarene Is., India, Jamaica, New Caledonia, Sechelles, and Sri Lanka (FRANK 1972, PACE 1984). We report this species for the first time from Galápagos: Isabela, San Cristóbal, St. Cruz. Probably a recent accidental introduction by humans.

**M a t e r i a l e x a m i n e d .** (56 specimens, 4 ♂, 7 ♀, 45 sex undetermined) (SBPC, JKC): Isabela: Tagus Cove (SBPC); 23 km NW Villamil, Jabonocillo forest (SBPC). San Cristóbal: 1 km E Progreso (SBPC). St. Cruz: Academy Bay (SBPC); Charles Darwin Research Station (SBPC); Los Gemelos (SBPC, JKC); 2, 4, 21 km N Bellavista (SBPC, JKC); 1 km N Puntudo (SBPC); 7.2 km N St. Rosa (SBPC); Tortoise Reserve (SBPC).

### III. TRIBE Homalotini Heer, 1839 (=Bolitocharini, Gyrophaenini)

HEER 1839: 305; ASHE 1984a, 1991, 1992 (phylogenetic relationships); NEWTON & THAYER 1992 (nomenclature).

**D i a g n o s i s .** Tarsal formula 4-4-5; body elongate, subparallel, or short and compact (morphologically diversified, Figs 4-7); ligula elongate, entire, bifid apically or divided. ASHE (1992) defined this tribe by the following features: presence of more or less developed denticles in the molar region of the ventral (condylar) side of the mandible; narrowing of the distance between the medial setae of the prementum so that the setal insertions are close or contiguous; and narrowing of the medial pseudopores. For details and subtribal classification of Homalotini see ASHE (1992).

#### KEY TO GALÁPAGOS SPECIES

1. Body minute, length 1.0-1.3 mm ..... 2
- Body moderately large, length 1.8-2.5 mm ..... 3
- 2(1). Body short and wide, oval in outline, strongly glossy (Fig. 4)  
..... *Phanerota tridentata* sp. n.
- Body linear, narrow, moderately glossy (Fig. 5) ..... *Thecturota franzi* Pace
- 3(1). Antennal segments 5-10 at most twice as wide as long; pubescence short; body length 1.8-2.0 mm (Fig. 6) ..... *Diesota franziana* (Pace)
- Antennal segments 5-10 approximately three times as wide as long; pubescence long; body length 2.1-2.5 mm (Fig. 7) ..... *Diesota leleupi* (Pace)



## Subtribe Gyrophaenina

5. *Phanerota tridentata* sp. n.

(Fig. 4, 22)

**D i a g n o s i s .** Body length 1.3 mm; shortly-oval, compact and strongly glossy; forebody uniformly dark-brown with abdomen slightly lighter, legs yellowish, antenna brownish apically and yellowish basally; antenna with basal 3 segments elongate, 4<sup>th</sup> as wide as long, 5-10 transverse, nearly twice as wide as long; punctation and setation throughout body very sparse; head with large eyes, some 12 moderately large and scattered setigerous punctures in each half, frons flattened; pronotum narrowly oval, strongly transverse, setigerous punctures large and scattered, distributed in 4 rows and on disc margin; elytra transverse, with scattered setigerous pores, pores slightly elevated; abdomen sparsely pubescent, basal 3 terga impressed at base, integument with transversely meshed microsculpture. ♂ Median lobe of aedeagus with tubus strongly produced ventrally (Fig. 22). Tergite 8 conically produced medially and with two narrow lateral projections. Sternite 8 slightly transverse and rounded apically. ♀ Unknown.

**B i o n o m i c s .** Collected in May from guava thicket in agricultural zone using Flight Interception Trap. Altitude: 360 m above sea level. For life history and habits of some species see ASHE (1981, 1982).

**D i s t r i b u t i o n .** Known only from St. Cruz. Probably introduced, because it is known only from the disturbed agricultural area.

**M a t e r i a l e x a m i n e d .** Holotype (♂): "ECU.[ador], St. Cruz / 2 km N Bellavista / 14, V.85, 85- / 159, 360 m" "S. & J. Peck, guava /thicket, FIT, Agric. / area" (SBPC).

**Remarks.** For details on the genus see ASHE (1984b, 1986). *Ph. tridentata* may be readily separated by the distinctive shape of male tergite 8 with three apical projections. No close relative was established. *Ph. brunnessa* Ashe from Florida also bears three (but smaller) projections on male tergite 8 (see ASHE 1986). PACE (1987a, b, 1990a) reviewed and illustrated some Latin American Gyrophaenina. We think the species belongs to *Phanerota*, and not *Gyrophaena*, because the latter does not have a strongly bent median lobe of the aedeagus in such a manner, and male sternite 8 has 3 strong projections, which are not typical in *Gyrophaena* (see ASHE 1986).

**E t y m o l o g y .** The specific name *tridentata*, having three teeth, relates to the three dentate (toothed) apex of male tergite 8 of this species.

## Subtribe Homalotina

6. *Thecturota franzi* Pace, 1985a

(Figs 5, 23-25)

PACE 1985a: 450 (habitus, spermatheca and median lobe of aedeagus illustrations). Holotype (♂): "Santiago Gebirge [mountains], V-VI. 1975, H. Franz leg. "(HFC).

**D i a g n o s i s .** Body length 1.0-1.3 mm; narrowly subparallel (Fig. 5); uniformly rust-brown, dark-brown or nearly black, occasionally with paler legs and basal antennal segments; moderately glossy; punctation fine, slightly asperate particularly on pronotum, dense on forebody and sparse on abdomen; antennal segments 4-10



strongly transverse, up to 3 times as wide as long (Fig. 5); head slightly wider than pronotum, with gena long (longer than diameter of eye), subparallel and rounded posteriorly, dorsum flattened, pubescence directed laterad from midline of disc (Fig. 5); pronotum narrowly trapezoidal dorsally, pubescence directed horizontally laterad from median line (Fig. 5); elytra elongate with pubescence directed obliquely latero-posteriad (Fig. 5); abdomen widening apically at 5/6 of its length and narrowed at apex, 4 basal tergites impressed basally (Fig. 5); legs short. ♂ Median lobe of aedeagus with moderately large ovoid bulbous and narrowly elongate tubus which has sinuate venter in lateral view (Figs 23, 24). Tergite 8 transverse, truncate apically; sternite 8 transverse, rounded apically and slightly pointing. ♀ Spermatheca with capsule narrowly spherical, duct short and curved posteriorly (Fig. 25). Tergite 8 transverse, truncate apically; sternite 8 transverse, broadly rounded apically.

**B i o n o m i c s .** Adults have been collected from: arid zone, *Bursera* forest, transition zone forest (of *Bursera*, *Trema*, *Zanthoxylon*), agriculture zone, rose-apple thicket, in forest litter (*Tournefortia* litter), guave/fern litter, litter in grietas (lava cracks), epiphyte and rotten wood litter, frass under bark, cow, horse and tortoise dung, *Scalesia* and *Miconia* forest, and pampas. Altitudes: 10-700 m. Collecting methods: sifting litter and dung, carrion traps, Flight Interception Traps, and UV light traps.

**D i s t r i b u t i o n .** PACE (1985a) recorded this species from Santiago, and St. Cruz. Both records are confirmed here. New island records: Fernandina, Floreana, Isabela, Marchena, Pinta, Pinzón, and San Cristóbal.

**M a t e r i a l e x a m i n e d .** (282 specimens, ♂, ♀, sex undetermined) (SBPC, JKC): Fernandina: 5, 10 km NE Cabo Hammond (SBPC, JKC). Floreana: 6 km E Black Beach (SBPC); Cerro Pajas (SBPC). Isabela: Alcedo (east crater) (SBPC); Cerro Azul (SBPC, JKC); Sierra Negra (SBPC, JKC); 2 km NE Tagus Cove (SBPC, JKC); 13 km NW Villamil, Jabonicillo forest (SBPC). Marchena: Pta. Espejo (SBPC); SW Playa (SBPC). Pinta: trans. zone forest (SBPC, JKC). Pinzón: SE slope (SBPC). San Cristóbal: El Junco (base & rim) (SBPC); 1 km E Progreso (SBPC, JKC); 3-5 km E Wreck Bay (SBPC). Santiago: Aguacate Camp and vicinity (SBPC, JKC); Santiago Camp (SBPC); 8 km SE Playa Espumilla (SBPC). St. Cruz: 2 km N Bellavista (SBPC); El Granillo (SBPC); 1 km NE Media Luna (SBPC, JKC); Puntudo (SBPC, JKC); 7 km N Puerto Ayora (SBPC, JKC); 7, 7.2, 13 km N St. Rosa (SBPC, JKC); Tortoise Reserve (SBPC).

## Subtribe Silusina

### 7. *Diesota* (*Apheloglossa*) *franziana* (Pace, 1985a) (Figs 6, 27-30)

*Parasilusa franzi* PACE 1985a: 451 (illustrations of habitus and median lobe of aedeagus).

*Diesota* (*Apheloglossa*) *franziana* (PACE 1986: 422). Holotype (♂): "S. ta [=Sta.] Cruz, Wald uber [forest above] S. ta [=Sta.] Rosa, V-VI.1975, H. Franz "(HFC).

**D i a g n o s i s .** Body length 1.8-2.0 mm; narrowly subparallel; flattened (Fig. 6); color variable, either approximately uniformly dark brown to black, sometimes with reddish-brown legs and abdomen, or reddish brown with dark brown head, or reddish-brown with dark brown head, pronotum, elytra, and posterior abdomen; antenna uniformly rust-brown, black, or rust-brown basally and black apically; moderately



glossy, less so on forebody; punctation fine, dense and asperate on forebody; microsculpture present; pubescence short; antennal segments 5-10 transverse, at most about twice as wide as long (Fig. 6); head as wide as long, approximately subequal in width to pronotum, abruptly produced in front of eyes, rounded posteriorly, temples shorter than diameter of eye, pubescence directed anteriorly medially and laterad on either side from midline (Fig. 6); pronotum transverse, rectangular in shape, and with small mediobasal impression, pubescence directed laterad and obliquely laterolaterad (Fig. 6); elytra as long as wide or slightly transverse, insignificantly wider than pronotum and abdomen, pubescence directed approximately straight posteriorly (Fig. 6); abdomen subparallel, 4 basal tergites shallowly impressed basally, pubescence directed straight posteriorly (Fig. 6). ♂ Median lobe of aedeagus with ovoid bulbous and moderately narrow, tapering apically tubus (Fig. 30), venter of tubus approximately straight laterally (Fig. 29), internal sac with inconspicuous structures. Tergite 8 transverse with 6 apical teeth, 2 lateral ones being longer (Fig. 28). Sternite 8 transverse and truncate apically with numerous apical bristles. ♀ (new record). Spermatheca with long (variable in length) frequently and regularly coiled duct and narrow, elongate capsule (Fig. 27). Tergite and sternite 8 transverse, and truncate apically.

**Bio n o m i c s .** Adults have been collected from: arid zone, thornscrub, *Opuntia* forest, transition zone, agricultural zone, avocado grove, pastures, *Bursera*, *Scalesia*, *Miconia* forest, in leaf litter, fruit litter, soil and rotten cactus, and in carrion. Collecting methods: sifting, Malaise traps, Flight Interception Traps (FIT), carrion and banana baited traps. Altitudes: 10-620 m above sea level. Collecting period: February to August.

**D i s t r i b u t i o n .** PACE (1985a) recorded this species from St. Cruz (Sta Rosa), and we confirm his record here. New island records: Floreana, Isabela, Marchena, Pinzón, Santiago, San Cristóbal. Status uncertain (possibly endemic).

**M a t e r i a l e x a m i n e d .** (153 specimens, 18 ♂, 18 ♀, 117 sex undetermined) (SBPC, JKC): Floreana: 6 km E Black Beach (SBPC). Isabela: Sto. Tomas; 1/2 and 3 km W Sto. Tomas; Corazon Verde; 13 km NW Villamil (SBPC, JKC). Marchena: SW Playa (SBPC). Pinzón: SE slope (SBPC). Santiago: Aguacate Camp (SBPC, JKC). San Cristóbal: 5 km E Wreck Bay (SBPC). St. Cruz: Academy Bay (SBPC); Bellavista and vicinity (SBPC, JKC); Charles Darwin Research Station (SBPC); Horneman Farm (SBPC, JKC); Los Gemelos; 7.2, 15 and 31 km N Sta Rosa (SBPC); Media Luna (SBPC); Puerto Ayora and vicinity (SBPC).

**Remarks.** PACE (1985a) affiliated *D. franzi* with three Latin American species described by ERICHSON (1840): *D. laesicollis* (Er.), from Brazil; *D. flavipennis* (Er.), from the Antilles; and *D. melanura* (Er.), from Puerto Rico. We have examined the original type material of the latter three species and found consistent differences in body size, color, proportion of pronotum and genitalia between *D. franzi* and *D. flavipennis* and *D. melanura*. However, we were not able to find important differences in external morphology, color and the shape of spermathecae between *D. franzi* (reddish-brown form) and *D. laesicollis*. Should further studies including comparison of males of the two species (*D. laesicollis* male unknown) prove that there are no substantial differences, the status of *D. franzi* should be reconsidered. Dark brown



or black specimens in our material with slightly narrower pronota than those of the reddish-brown form are considered to be color variations of *D. franzi* because they retain the same genitalic structures. However, they may represent sibling species which can not be discriminated using morphological methods.

#### 8. *Diesota* (*Apheloglossa*) *leleupi* (Pace)

(Figs 7, 31-34)

*Parasilusa leleupi* PACE 1985a, PACE 1986 (as *Diesota* subg. *Apheloglossa*).

Holotype (♀): I. Isabela Sud, à 4 km de la côte, tamisage, XI-1964, récolté en forêt humide, N. Leleup leg. (IRSNB).

**D i a g n o s i s .** Readily distinguishable from *D. franzi* and the mainland *Diesota* species by the extremely transverse antennal segments 7-10 (approximately 3 times as wide as long, Fig. 7). Body length 2.1-2.5 mm; narrowly oval, abdomen subparallel (Fig. 7); uniformly reddish-brown (all but one) or dark brown (one specimen), with darker, brown to greybrown, apical portions of antennae (segments 5-11); strongly glossy; punctuation fine and sparse on forebody and large and coarse on abdomen, especially in tergal impressions; pubescence moderately long to long on abdomen; microsculpture not apparent; head nearly as wide as pronotum, abruptly produced in front of eyes, widely rounded behind, temples shorter than diameter of eye, pubescence directed inward medially and lateroanteriorly elsewhere (Fig. 7); pronotum strongly transverse, slightly narrower than elytra, approximately rectangular in shape, with U-shaped basal impression, pubescence directed anteriorly on middle line of disc and laterally on sides (Fig. 7); elytra slightly transverse, pubescence directed straight- and slightly obliquely posteriorly (Fig. 7); abdomen with 4 basal tergites impressed basally, impressions with large and coarse punctures, punctures outside impressions asperate (Fig. 7). ♂ (new record). Median lobe of aedeagus with bulbous oval in outline and tubus wide at base and gradually narrowed apically (Fig. 33), laterally tubus slightly sinuate subapically and produced ventrally (Fig. 32). Tergite 8 transverse, with 6 apical narrowly elongate teeth of approximately equal length. Sternite 8 transverse, and widely rounded apically. ♀ Spermatheca with extremely long regularly and irregularly twisted duct, capsule narrow and elongate (Fig. 31). Tergite 8 strongly transverse, truncate apically. Sternite 8 slightly transverse, widely rounded apically with slightly emarginate apex.

**B i o n o m i c s .** Adults have been collected from: littoral zone, under *Sesuvium* and *Heliotropium* debris on upper beach, cormorant nest debris, and from moist litter in rock crevices. Altitudes: 1-2 m above sea level. Collecting methods: sifting debris, yellow pan trap, Flight Interception Trap (FIT). Apparently mostly a littoral zone species. Although the Leleup holotype record is reported to be from "humid forest", the actual locality is in the arid zone in a low spot where groundwater, under tidal influence, presents a local zone of moisture.

**D i s t r i b u t i o n .** Recorded by PACE (1985a) from Isabela I. New island record: St. Cruz. Endemic.

**M a t e r i a l e x a m i n e d .** (23 specimens, 5 ♂, 5 ♀, 13 sex undetermined) (SBPC, JKC). St. Cruz: Charles Darwin Research Station, 29.I.89, 89-3, S. Peck (SBPC, JKC); Charles



Darwin Research Station, littoral zone, 19.I-9.II.89, yellow pan trap; B. J. Sinclair (SBPC); Tortuga Bay, 18.V.85, 85-167, S. & J. Peck (SBPC), labelled as previous one except: 23.V.85, back beach *Heliotropium curassavicum* lit. [ter]" (SBPC). Isabela: Bahia Urvina, 23.V.92, S. Peck 92-200 (SBPC, JKC); Villamil 1 km W, 2-15.III.89, 89-88, Peck & Sinclair (SBPC).

*Remarks.* This species resemblances *D. patagonica* (Scheerpeltz) but has more strongly transverse antennal segments 7-10, and has a differently shaped spermatheca. It is readily distinguishable from all South American species known to us by having antennal segments 7-10 extremely transverse, approximately three times wider than long. For illustrations of some South American *Diesota* see PACE (1985b, 1986, 1987a, b, 1990a).

#### 9. *Diesota galapagosensis* (Pace), 1985a

*Parasilusa galapagosensis* PACE 1985a: 452; PACE 1986: 422 (as *Diesota*).

Holotype (♂): Isla Marchena, S. Seite, 5/6. 1975, H. Franz leg. (HFC).

*D i a g n o s i s* (based on the original description). Body length 2 mm, narrowly oval, abdomen subparallel; head brown, pronotum and abdomen reddish except for brown abdominal segments 4 and 5, antennae with two basal segments reddish and remainder brown. Habitus and male genitalia illustrated by PACE (1985a).

*Remarks.* Unfortunately we were not able to borrow the holotype specimen for study.

#### IV. TRIBE Placusini Mulsant & Rey, 1871

MULSANT & REY 1871: 102; ASHE 1989, 1991, 1992 (definition, phylogenetic relationships); NEWTON & THEAEYER 1992 (nomenclature)

*D i a g n o s i s*. Tarsal formula 4-4-5; head with strongly angular posterior genae and with distinct narrow neck (*Euira* only, Fig. 8); labium rounded medially with small a-sensillum, epipharynx with longitudinal medial field of small pores flanked on either side with row of large scales, mandibles with dorsal 'velvety patch' modified to transverse rows of large teeth, labium with short and widely rounded ligula (ASHE 1991). For larval characteristics see ASHE (1991).

#### 10. *Euira scalesiai* sp. n. (Figs 8, 26)

*D i a g n o s i s*. Body length 1.7-1.9 mm; uniformly dark-brown with reddish-brown antennae (except apex), maxillary palpi and legs; glossy; punctuation sparse and coarse; integument with reticulate microsculpture present; pubescence sparse, moderately long; antennal segments 5-10 strongly transverse, at least twice as wide as long (Fig. 8); head with long subparallel temples, angular posteriorly, with distinct neck approximately half as wide as base of head, pubescence directed medially (Fig. 8); pronotum transverse, about 1.4 times as wide as long, sides widely rounded, base sinuate laterally, posterior angles distinct and slightly pointed posteriad, pubescence directed approximately straight posteriorly (Fig. 8); elytra elongate, pubescence directed straight posteriorly (Fig. 8); abdomen subparallel, widely rounded apically, 4 basal tergites deeply impressed basally (Fig. 8). ♂ Unknown. ♀ Spermatheca with



capsule elongate and globular, as in Fig. 26. Tergite 8 strongly transverse, truncate apically; sternite 8 approximately as wide as long, apical margin arcuate.

**B i o n o m i c s .** Adults (all females) have been collected only from forests of *Scalesia pedunculata*. Collecting methods: vegetation sweeping and Malaise traps. Altitudes: 550-620 m above sea level. Collecting period: April, May. Most specimens were taken by sweeping low grass-herbaceous vegetation in the humid forest highland zone. Ashe & Kistner (1989), recorded larvae and adults of *Euvira diazbatresae* Ashe from the nests of communal pierid butterfly *Eucheria socialis* in Mexico. It remains to be seen if other species of the genus exhibit similar behaviour.

**D i s t r i b u t i o n .** Known only from St. Cruz Island, Galápagos. Endemic.

**M a t e r i a l e x a m i n e d .** (12 ♀) (SBPC, JKC): Holotype (♀): "Galap.[agos], Santa Cruz / Los Gemelos, 620 m / 17.V.91, J. Heraty / *Scalesia* zone H91/38" (SBPC); Paratypes (9 ♀): 3 labelled as holotype (SBPC); "Galap. [agos], Santa Cruz / 3 km N Santa Rosa, 600 m / *Scalesia* H91/011" (SBPC) 1; "Galap., Santa Cruz, Los Gemelos, 620 m / 1.V.91, J. Heraty / *Scalesia* H91/012" (SBPC, JKC) 4; "Galap. St. Cruz / 1.7 km N Sta. Rosa, 1-30.VI.91, 550 m / *Scalesia* forest malaise / S. Peck, 91-233" (SBPC) 2; St. Cruz, 7.2 km N Sta. Rosa (SBPC) 1.

**E t y m o l o g y .** Name of this species derived from the generic name *Scalesia pedunculata*, a tree common to the humid forest zone of some islands of the Galápagos.

**R e m a r k s .** We were able to examine the type series (7 specimens, HUB) of *Euvira fervidula* Erichson from Columbia. The specimens are generally similar to our specimens of *E. scalesia* in body form and size but have the forebody orange instead of uniformly brown and have a slightly differently shaped spermatheca.

#### V. TRIBE Athetini Casey, 1910 (=Callicerini)

**D i a g n o s i s .** Tarsi 4-5-5-segmented, mesocoxae usually narrowly separated, intercoxal process highly variable, male tergite eight usually modified and bearing teeth (Figs 51, 53, 54), median lobe of aedeagus with an oval compressor plate and in front with a transverse sclerotised strip called the 'athetine bridge' (SEEVERS 1978). Maxillary palpi 4-segmented, labial palpi usually 3-segmented.

#### KEY TO SPECIES

1. Body fusiform (Figs 9, 12), length 1.0-3.0 mm (average 2.0 mm); pronotum slightly transverse, approximately trapezoidal in outline with lateral margins strongly converging apically; convex; pubescence directed straight or antero-laterad, laterad or obliquely posteriad, forming straight lines radiating from midline of disc (Figs 9, 12) ..... 2
- Body linear (Figs 10, 11, 13), length 2.1-3.1 mm (average 2.6 mm); pronotum strongly transverse, approximately rectangular in outline with lateral margins slightly converging apically; flattened; pubescence directed anteriad, laterad or lateroposteriad, forming arched lines from midline of disc (Figs 10, 11, 13) ..... 3



- 2(1). Body length 1.3-2.0 mm; moderately glossy; pronotal punctation asperate; pronotal pubescence directed anterolaterad, laterad and posteriad from midline of disc (Fig. 12); antennal segments 8-10 approximately twice as wide as long (Fig. 12); median lobe of aedeagus and spermatheca as in Figs 41, 42, 44. . . *Atheta (Acrotona) pseudoclaudiensis* sp. n.
- Body length 1.8-3.0 mm; strongly glossy; pronotal punctation not asperate; pronotal pubescence directed straight and obliquely posteriad (Fig. 9); antennal segments 8-10 at most 1.5 times as wide as long (Fig. 9); median lobe of aedeagus and spermatheca as in Figs 35, 36, 43  
 ..... *Atheta galapagoensis* Pace
- 3(1). Antennal segments 7-10 strongly transverse, about twice as wide as long (Fig. 11); body strongly glossy; pronotum strongly transverse, nearly twice as wide as long (Fig. 11); median lobe of aedeagus and spermatheca as in Figs 47-49 ..... *Atheta (s. str.) coriaria* (Kraatz)
- Antennal segments 7-10 moderately transverse (Figs 10, 13), about 1.5 times as wide as long; body moderately glossy; pronotum moderately transverse, at most 1.4 as wide as long; genitalia different ..... 4
- 4(3). Eyes large, diameter much longer than temples (Fig. 13); temples short and abruptly converging posteriorly (Fig. 13); median lobe of aedeagus and spermatheca distinct (Figs 39, 40, 45) . . . . . *Atheta dichroa* (Gravenhorst)
- Eyes moderate in size, diameter shorter or at most as long as temples (Fig. 10); temples long, subparallel anteriorly (near eyes), and gradually converging posteriorly (Fig. 10); median lobe of aedeagus and spermatheca as in Figs 37, 38, 46 ..... *Atheta lurida* (Erichson)

# 11. *Atheta galapagoensis* Pace, 1985a

(Figs 9, 35, 36, 43, 52)

PACE 1985a: 452 (habitus, aedeagus and spermatheca illustrations).

Holotype (♂): "Isabela I., Cerro Azul 5/6-1975, H. Franz leg." (HFC).

**D i a g n o s i s .** Body length 1.8-3.0 mm; narrowly oval (Fig. 9), from uniformly dark brown or nearly black to light brown with paler pronotum, elytra, abdominal apex and appendages; strongly glossy; punctation moderately dense on pronotum and elytra and sparser elsewhere; pubescence short, moderately dense on forebody, and sparse on abdomen; meshed microsculpture present on forebody; antennal segments 5-10 slightly transverse, each segment at most 1.5 wider than long (Fig. 9); head approximately quadrate, temples widely round, eyes large, longer than temples (Fig. 9); pronotum much wider than head, transverse, strongly convex, pubescence straight and directed slightly obliquely posteriad (Fig. 9); elytra transverse with pubescence directed posteriad (Fig. 9); abdomen widely arcuate laterally and gradually narrowing apically, four basal tergites with deep basal impressions (Fig. 9). ♂ Median lobe of aedeagus with moderately large, ovoid bulbous and narrowly elongate tubus (Figs 35, 36), internal sac with two subapical structures (Fig. 36). Tergite 8 truncate apically with arcuate apex, apical margin entire (Fig. 52), sternite 8 truncate and slightly



pointed apically. ♀ Spermatheca with enlarged, elongate capsule, and sinuate posterior duct (Fig. 43). Tergite 8 truncate apically, sternite 8 strongly pointed medially.

**B i o n o m i c s .** Adults have been collected from littoral zone, arid zone, transition zone and pampa zone, leaf litter, deep soil litter, soil washing under *Croton* and *Sesuvium* (littoral zone), shrub litter, lava flow edge. *Cryptocarpus* and *Manchineel* litter, cow and horse dung, sea lion dung, epiphytes, dead wood (e.g., rotted avocado), frass under bark, under bark of dead *Manchineel*, rotted logs, guava/mosse litter, lake edge litter, mangrove litter, *Trema/Zanthoxylum* litter, *Zanthoxylum*/lichen litter, moss forest litter, fern/moss and fern/sedge litter, treefern litter, rotting *Opuntia* trunks, cave litter, in moss forest, *Miconia* and *Scalesia* forests, grass and *Bursera* forest, *Pisonia* forest, *Zanthoxylum/Pisonia* forest, coffee plantation. Collecting methods: Malaise traps, Flight Interception Traps (FIT), general sweeping, sifting leaf litter, dung baited traps, deep soil traps, soil washing, and UV traps. Altitudes: from 1 m to 1700 m above sea level. Collecting period: January to July.

**D i s t r i b u t i o n .** Originally recorded by Pace (1985) from Isabela, Pinta, Pinzón, Santiago, San Cristóbal, and St. Cruz Islands. Our data confirm all of Pace's records. New island records: Bartolomé, Española, Fernandina, Floreana, Marchena, Plaza Sur, Rábida, and St. Fé.

**M a t e r i a l e x a m i n e d .** (3523 specimens: 14 ♂, 3 ♀, 3506 sex undetermined) (SBPC, JKC). Bartolomé: (SBPC). Española: Bahia Manzanillo (SBPC). Gardner at Española: arid zone (SBPC). Fernandina: Crater Rim (SBPC); 8, 10, 11 km NE Cabo Hammond (SBPC, JKC). Floreana: 3, 5, 6, 8 km E Black Beach (SBPC); Pta. Cormorant (SBPC); Cerro Pajas (SBPC); Finca Cruz (SBPC). Isabela: 7-10 km NE P. Bravo (SBPC); Cerro Azul and vicinity, 7 km NE caleta Iguana (SBPC); 11 km SW Playa (SBPC); Sierra Negra (SBPC, JKC); 4, 8 km NW Sto. Tomas (SBPC, JKC); Tagus Cove and vicinity (SBPC, JKC); 4, 12 and 2 km NW Villamil (SBPC); Volcan Alcedo and vicinity (SBPC, JKC). Marchena: Pta. Espejo (SBPC); SW Playa (SBPC); Pinta: Playa Ibbetson (SBPC, JKC); transition zone forest (SBPC); *Zanthoxylum*-lichen forest (SPPC). Pinzón: SE slope (SBPC). Plaza Sur: S Plazas (SBPC). Rábida: Red Beach (SBPC). Santiago: Central Camp (SBPC); Aguacate Camp and vicinity (SBPC); 9 km SE Playa Espumilla (SBPC); Playa Espumilla (SBPC); 1 km E Progreso (SBPC). San Cristóbal: Baquerizo and vicinity (SBPC); El Junco and vicinity (SBPC); Poza Colorada (SBPC); 2-12 km SE Wreck Bay (SBPC). St. Fé: littoral zone (SBPC, JKC). St. Cruz: 2, 3 km W Bellavista (SBPC); Cerro Crocker and vicinity (SBPC); 2 km E Charles Darwin Research Station (SBPC, JKC); Cueva Tres Entradas (SBPC); Los Gemelos and vicinity (SBPC, JKC); Media Luna and vicinity (SBPC); Pta. Roca fuerte (SBPC); Pto. Ayora and vicinity, Tortuga Bay (SBPC); Puntudo (SBPC, JKC); 1.7, 3, 7.2, 10, 13, 15 km N Sta. Rosa (SBPC, JKC).

**Remarks.** According to PACE (1985a) *A. galapagoensis* belongs to the species group of *A. propinqua* (Erichson, 1840) which is a distinct species and should not be considered as a synonym of *A. dichroa* (Gravenhorst, 1802). *A. propinqua* is known from the Antilles (BERNHauer & SCHEERPELTZ, 1926).

## 12. *Atheta lurida* Erichson

(Figs 10, 37, 38, 46, 53)

*Atheta lurida* Erichson, 1840, PACE 1985a. Type: see "material examined".

**D i a g n o s i s .** Body length 2.2-2.8 mm; narrowly subparallel (Fig. 10), dark brown to black with rust-brown elytra, apex of abdomen, legs and 2-3 basal antennal



segments, antennal segments 4-11 mat black; moderately glossy; punctation fine and moderately dense, slightly asperate on forebody; meshed microsculpture clearly visible on forebody; pubescence moderately dense on pronotum and abdomen and sparse elsewhere; body sides with strong bristles; antennal segments 5-10 slightly transverse, at most 1.5 times wider than long (Fig. 10); head slightly elongate with pubescence directed medially and anteriad, temples as long as eye diameter, arcuate and narrowed posteriorly (Fig. 10); pronotum transverse, subequal in width to elytra, pubescence at midline of disc directed anteriad and laterally on the sides (Fig. 10); elytra transverse with pubescence directed straight posteriad or obliquely posterolaterad (Fig. 10); abdomen sparsely pubescent with 3 basal terga bearing basal impressions (Fig. 10). ♂ Median lobe of aedeagus with moderately large bulbous, tubus wide basally and tapering apically, internal sac with two subapical and median structures (Figs 37, 38); tergite 8 bearing two wide median and two narrow lateral teeth apically (Fig. 53); sternite 8 widely arcuate apically. ♀ Spermatheca with elongate capsule and slightly posteriorly arched duct (Fig. 46); tergite 8 slightly emarginate apically; sternite 8 rounded posteriorly.

**B i o n o m i c s .** Adults were collected from carrion in a shady ravine. Collecting methods: carrion baited traps. Altitudes: 400 m above sea level. Collecting period: May.

**D i s t r i b u t i o n .** *Atheta lurida* was originally described from Brazil (ERICHSON 1840). PACE (1985a) recorded this species from Galápagos: Santiago Gebirge, St. Cruz. We record it here for the first time from Fernandina. Because of its remote collecting site on pristine Fernandina Island, we interpret this as a natural dispersal, and the species to be native. It is interesting that we had no other collections of this species.

**M a t e r i a l e x a m i n e d .** (4 specimens, 2 ♂, 3 ♀) (SBPC, HUB, JKC). Type: "lurida Er.[ichson] / Brasil Reich", "6994", "Type", "Zool. Mus. Berlin" (HUB) 1 ♀, studied. Non type material: Fernandina: 10 km NE, Cabo Hammond, 400 m, 6-10.V.91, S. & J. Peck (SBPC, JKC).

### 13. *Atheta (Atheta) coriaria* (Kraatz, 1856) (Figs 11, 47-49, 51)

*Homalota coriaria* KRAATZ 1856, FRANK 1980, MUONA 1984. Aedeagus and spermatheca illustrated by HANSEN (1954), and LOHSE (1974). Syntypes: "Germany: Berlin (DEI) 6, sex undetermined, Leipzig "(DEI) 1 sex undetermined (Geadike 1981).

**D i a g n o s i s .** Body length 2.1-2.8 mm; narrowly subparallel (Fig. 11), dark brown to rust brown, usually with lighter pronotum, elytra, base and apex of abdomen, legs and base of antenna (segments 1-4); strongly glossy; punctation fine, slightly asperate, and dense on forebody; fine, meshed microsculpture clearly visible on head and pronotum; pubescence short and moderately dense except on abdomen; body sides with some bristles; antennal segments 5-10 transverse, at most almost twice as wide as long (Fig. 11); head approximately as long as wide, with temples arcuate and narrowing posteriorly, shorter than diameter of eye, pubescence directed anteriad (Fig. 11); pronotum transverse, pubescence directed anteriad along midline, and



lateroposteriad on sides of disc (Fig. 11); elytra slightly transverse, pubescence directed straight posteriad (Fig. 11); abdomen sparsely pubescent, strongly glossy and with 3 basal tergites strongly impressed basally (Fig. 11). ♂ Median lobe of aedeagus with large bulbous, and narrow and short triangularly dorsally shaped tubus (Fig. 48), internal sac with complex and strongly sclerotised structures (Figs 47, 48); tergite 8 slightly emarginate apically with two large lateral teeth and several medial teeth (Fig. 51); sternite 8 rounded apically. ♀ Spermatheca with horizontally subdivided capsule, and narrow and short posterior duct (Fig. 49); tergite 8 broadly arcuate apically; sternite 8 truncate apically.

**Bionomics.** Adults have been collected from transition forest, *Scalesia* forest, in *Miconia* forest, pampa zone, agricultural zone, litter under coffee, forest litter, rotting oranges, cow dung, tortoise dung and guava thicket. Collecting methods: sifting organic litter, Flight Interception Traps (FIT). Altitudes: 200 to 1000 m above sea level. Collecting period: February to May. In Europe *A. coriaria* is often found on mushrooms (Polyporaceae), and in compost (HANSEN 1954, LOHSE 1974). Larva described by Ashe (1984).

**Distribution.** Europe, North America (California, Florida) (Frank 1980, Lohse 1974, Muona 1984). New island records: Floreana, Isabela, San Cristóbal, and St. Cruz.

**Material examined.** (82 specimens, 10 ♂, 3 ♀, 69 sex undetermined) (SBPC, JKC). Floreana: 5, 6 km E Blackbeach (SBPC, JKC). Isabela: Sierra Negra (SBPC; JKC). San Cristóbal: 1 km W Progreso (SBPC, JKC). St. Cruz: Bellavista (SBPC); Cueva Tres Entradas (SBPC); Los Gemelos (SBPC); Sta. Rosa (SBPC).

**Remarks.** An introduced European species recorded for the first time from the Galápagos Islands. Well established. Superficially similar to smaller *A. clientula* Erichson from South America but has differently formed genitalia.

#### 14. *Atheta (Acrotona) pseudoclaudiensis* sp. n.

(Figs 12, 41, 42, 44, 50)

**Diagnosis.** Body length 1.3-2.0 mm; fusiform (Fig. 12), uniformly dark brown to black, often with legs slightly paler; moderately glossy; punctation dense and asperate on forebody and sparse on abdomen; microsculpture scarcely visible; pubescence short and dense except for abdomen; sides, especially on abdomen, with bristles; antennal segments 4-10 transverse and 7-10 approximately twice as wide as long (Fig. 12); head with temples about as long as diameter of eye, arcuate and gradually narrowing posteriorly, pubescence directed anteriad and anterolaterad (Fig. 12); pronotum transverse, pubescence directed laterad and posterolaterad from midline of disc (Fig. 12); abdomen strongly narrowing apically and pointed (Fig. 12), three basal tergites with basal impressions. Meso- and metatibia with strong bristle in basal half. ♂ Median lobe of aedeagus with narrowly elongate bulbous and narrow subparallel apically truncate tubus (Fig. 42); internal sac with fine structures (Figs 41, 42). Tergite 8 truncate apically and with slightly emarginate base (Fig. 50). Sternite 8 widely arcuate apically and with straight base. ♀ Spermatheca with small spherical



capsule and sinuate coiled posteriorly duct (Fig. 44). tergite and sternite 8 similar to those of male.

**B i o n o m i c s .** Adults have been collected predominantly from tortoise dung, some from horse and cow dung, carrion, cormorant nest debris, in arid zone shrub and succulent litter, lagoon edge, tidal meadow, arid zone beach forest, *Bursera* forest, and *Pisonia* forest, transition forest, shrub forest, guava thicket, pampas. Collecting methods: shifting litter and dung, in dung and beer baited pitfall traps, Flight Interception Traps (FIT). Altitudes: 2 m to 1100 m above sea level. Collecting period: February to July.

**D i s t r i b u t i o n .** New island records: Fernandina, Floreana, Isabela, Marchena, Pinta, San Cristóbal, and St. Cruz. It is probably an endemic species.

**M a t e r i a l e x a m i n e d .** 1234 specimens, 5 ♂, 11 ♀ (SBPC, JKC).

Holotype (♀): "Ecu.[ador], Galap.[agos], St. Cruz/Sta. Rosa 180 m/7.02.89, 89-34", "S. Peck, Tortoise/Res.[erve], trans.[ition] for.[est]/tortoise dung" (SBPC). All remaining specimens listed below are considered paratypes. Fernandina: 5-10 km NE Cabo Hammond (JKC, SBPC). Floreana: 3-8 km E Black Beach, Cerro Pajas, Finca Cruz (SBPC). Isabela: Alcedo (Volcan), E crater, NE slope, 14 km NE Playa (JKC, SBPC); Bahia Urvina (SBPC); Bellavista, 21 km N (SBPC); Cerro Azul and vicinity (SBPC); Los Gemelos, 31 km N Sta. Rosa (JKC, SBPC); Sierra Negra (SBPC); St. Rosa, 15 km N (KJKC, SBPC); Tagus Cove, 2-10 km NE (JKC, SbPC); 13 km NW Villamil, Jabonocillo forest (SBPC). Marchena: Pta. Espejo (SBPC); SW Playa (SBPC). Pinta: Playa Ibbetson (SBPC). Plaza Sur: (SbPC). San Cristóbal: El Junco (SBPC). St. Cruz: Bella Vista (SBPC); Charles Darwin Research Station (SBPC); Puntudo (SBPC); Sta. Rosa, 3 km N St. Cruz (SBPC); Tortoise Reserve (SBPC).

**Remarks.** This species is externally similar to *A. (A.) neolutea* Pace from Brazil (PACE 1990a), *A. (A.) praemeditata* Pace from Argentina, *A. (A.) hoyoana* Scheerpeltz from Argentina and Chile (SCHEERPELTZ 1972, PACE 1987a, b), and *A. (A.) magellanica* Pace from Chile (PACE 1987b). It is distinct, however, in the shape of the spermatheca which bears a small spherical capsule with a characteristic invagination (Fig. 44), and two posterior coils and the shape and structures of the median lobe of the edeagus. This species has a strong affiliation with the mainland South American fauna of the genus. For illustrations of genitalia of the mainland species see PACE (1987a, b, 1990a). The genitalia of *A. pseudoclaudiensis* superficially resemble those of the European *A. alterrima* (Grav.), and *A. pusilla* Brundin, however *A. alterrima* is on average twice larger and *A. pusilla* has differently shaped antennae (segments elongate) and median lobe of the aedeagus. For illustrations and description of European species see BRUNDIN (1952). *Atheta pseudoclaudiensis* has a spermatheca very similar to that of *A. claudiensis* Pace (1990a) described from a unique female specimen collected in Brazil (Espírito Santo, Laranja de Terra, HUB). *A. claudiensis* however is smaller and lighter in color and the male of the species remains unknown.

#### 15. *Atheta dichroa* (Gravenhorst)

(Figs 13, 39, 40, 45, 54)

*Aleochara dichroa* Gravenhorst, 1802; BLACKWELDER 1943; MOORE & LEGNER 1975 (as *Brundinia*), PACE 1985a (as *Atheta*). Type material listed under 'material examined'.

**D i a g n o s i s .** This species has two distinct color forms; dark and light, with the light being predominant. Specimens of the two forms are sympatric in distribution.



Dark form: uniformly brownish-black to blackish, or with elytra, tip of abdomen and 3 basal antennal segments, and tarsi or entire legs, usually paler and brownish; moderately glossy. Light form: dark-brown with light-brown elytra, tip of abdomen, legs and 2-3 basal antennal segments, head usually the darkest; moderately to strongly glossy. Body length 2.1-3.1 mm; subparallel (Fig. 13), punctation fine and moderately dense on forebody, slightly asperate especially on elytra; pubescence moderately dense on forebody and sparse on abdomen; body sides with bristles; meshed microsculpture clearly visible on forebody; antenna with segments 2-3 glossy and 4-11 mat, segments 6-10 slightly transverse, less than 1.5 as wide as long (Fig. 13); head approximately round dorsally, flattened medially, with temples shorter than diameter of eye, and strongly narrowing posteriorly, pubescence directed medially and anteriorly (Fig. 13); pronotum nearly as wide as elytra at base, pubescence directed anteriorly on midline of disc and lateroposteriad laterally (Fig. 13); elytra transverse, pubescence directed posteriad (Fig. 13); abdomen subparallel and pointed apically (Fig. 13). ♂ Aedeagus with moderately large, approximately oval bulbous (Fig. 40); tubus elongate, subparallel medially, and sharply pointed apically (Figs 39, 40); in lateral view venter of tubus straight, narrow apically and pointed ventrally (Fig. 39); internal sac with two well defined dark structures in bulbous and two pairs of inconspicuous structures in tubus (Fig. 40); tergite 8 with apical margin bearing two lateral sharp and two median rounded teeth (Fig. 54); sternite 8 rounded apically. ♀ Spermatheca with arched capsule bearing small conical projection posteriorly, and spherical ending of duct (Fig. 45); tergite 8 truncate apically; sternite 8 arcuate apically.

**B i o n o m i c s .** Adults have been collected predominantly from carrion (e.g., dead tortoise), tortoise-, horse-, and cow dung, rotting *Opuntia*, forest litter, roseapple litter, cormorant nest debris, in littoral zone (e.g., lagoon edge), arid zone, agricultural zone, *Bursera* forest, *Scalesia* forest, *Zonothoxylon*-lichen humid forest, *Miconia* forest, mixed forest, shrub forest, open forest, guava thicket, *Inga* pods, pampas etc. Collecting methods: carrion traps, dung traps, light traps, Flight Interception Traps (FIT), Malaise traps, bottle traps, and general collecting techniques. Altitudes: 2 m to 1100 m above sea level. Collecting period: February to July. This is the most common aleocharine species on the Galápagos Islands.

**D i s t r i b u t i o n .** The original series of this species consists of 6 specimens from South America and West Indies, St. Thomas (HUB), and subsequent records are from Grenada, St. John, St. Thomas, St. Vincent, Tortola; Bolivia and Galápagos (St. Cruz) (BLACKWELDER 1943, PACE 1985a). We judge it to be native. *Atheta dichroa* is also known to occur in North America (BLACKWELDER 1943, MOORE & LEGNER 1975). New island records: Baltra, Fernandina, Floreana, Isabela, Marchena, Pinta, Santiago, San Cristóbal.

**M a t e r i a l e x a m i n e d .** (1906 specimens, 41 ♂, 18 ♀, 1847 sex undetermined) (SBPC, JKC). Syntypes: "dichroa / Gr.[avenhorst] / Am.[erica] spt [=septemptrionalis], Zimm.[ermann]", "5423", "Typus" (HUB) 1 ♂; "Americ.[a] sept.[emptrionalis] / Zimmermann / Nr. 5423", "Typus" (HUB) 2 ♂, 1 ♀; "6994", "Type" (HUB) 1 ♀; "St. Thomas / Moritz / 5424" (HUB) 1 ♀. Non type material: Baltra: Arid zone (SBPC). Fernandina: 5-10 km NE Cabo



Hammond (SBPC); near summitt (SBPC). Floreana: 3-8 km E Black Beach (SBPC); Cerro Pajas (SBPC). Isabela: Alcedo (E crater rim, NE slope) (SBPC); Bahia Urvina (JKC, SBPC); Cerro Azul, 2-9 km NE (SBPC); Finca Cruz (SBPC); Sierra Negra (JKC, SBPC); Sto. Thomas and vicinity (SBPC); Tagus Cove, 2-9 km NE (JKC, SBPC); Villamil and 12 km NW Villamil (SBPC). Marchena: Pta. Espejo (SBPC); SW Playa (SBPC). Pinta: littoral zone, Playa Ibbetson (SBPC), Zanthoxylon-lichen forest (SBPC). Santiago: Aguacate Camp (SBPC); Central Camp (SBPC). San Cristóbal: 2 km NE and 3 km E Baquerizo; 5 km E Wreck Bay (SBPC); Casetta (SBPC); El Junco and vicinity (JKC, SBPC); Progreso, 1-5 km E (SBPC). St. Cruz: Academy Bay (SBPC); Bellavista (SBPC); 3 km W, 2-4 km N Bellavista (JKC, SBPC); Devine Farm (SBPC); Charles Darwin Research Station; Pto. Ayora (SBPC); Horneman Farm (SBPC); Media Luna and vicinity (SBPC); Los Gemelos; 31 km N Sta. Rosa (JKC, SBPC); 7.2-10 km N Sta. Rosa; Tortoise Reserve (JKC, SBPC).

*Remarks.* We consider the two color forms as belonging to the same species because they occur sympatrically, do not differ in external morphology, and have a similar shape of the median lobe of aedeagus and spermatheca. *Atheta dichroa* is externally very similar to *A. propinqua* (Er.) which is known from Brazil, but has a differently shaped spermatheca and should be considered as a different species. The female type of the latter species was examined and is deposited in HUM.

#### VI. TRIBE Falagriini Mulsant & Rey, 1873

(First record of this tribe from Galápagos)

*D i a g n o s i s .* Tarsi 4-5-5-segmented, body ant-like (Fig. 14); head with distinctly constricted neck which is no more than one-third as wide as head (Fig. 14); pronotum narrow at base, no more than three-fourths maximum width, usually with median sulcus (Fig. 14); mesothoracic peritremes enlarged and sclerotised and almost always present behind procoxae; mesocoxal cavities moderately separated; maxillary palpus 4-segmented, labial palpus 3-segmented; legs long and slender.

#### 16. *Myrmecocephalus concinnus* (Erichson)

(Figs 14, 55-57)

ERICHSON (1840) (*Falagria*). HOEBEKE 1985 (illustrations); PACE (1990a).

Lectotype: "Brasil, Germ.[any], Hist. Coll. Nr. 5288 / Typus, Zool. Mus. Berlin" (HUB).

*D i a g n o s i s .* Body length 2.2-2.6 mm; ant-like (Fig. 14), with long and slender legs; brown to rust-brown, with rufous basal and apical portions of antennae, tibiae, tarsi, base and tip of abdomen and elytra, sometimes elytra appears rufous, mottled with dark brown; glossy; punctation fine and moderately dense on forebody; pubescence short, except slightly longer on abdomen; antennal segments 1-7 elongate and 8-10 as wide as long or slightly transverse (Fig. 14); head arcuately truncate at base, slightly wider than thorax (Fig. 14); pronotum elongate, convex, strongly converging at base, hind margin reflexed, deeply sulcate along median line (Fig. 14); scutellum partially carinate at base; elytra much wider than prothorax, with pronounced shoulders; abdomen narrowed at base and apex, 3 basal terga deeply impressed basally, first impression with some punctures. ♂ Median lobe of aedeagus with large, widely oval bulbous, and short and apically truncate tubus (Figs 56, 57; internal sac with two sclerites in bulbous (Fig. 57). Tergite 8 truncate and without



comb of denticles on apical margin; sternite 8 rounded apically. ♀ Spermatheca S-shaped (Fig. 55). Tergite and sternite 8 truncate apically.

**B i o n o m i c s .** Adults have been collected from *Miconia* and *Scalesia* forest, and a guava filled ravine. Collecting methods: Flight Interception Traps (FIT). Altitudes: 370-550 m above sea level. Collecting period: February and March.

**D i s t r i b u t i o n .** A cosmopolitan species originally described from Brazil (ERICHSON 1840), and recorded from Bolivia (PACE 1990b), and across the United States (HOEBEKE 1985). We report this species for the first time from Galápagos: San Cristóbal, St. Cruz. We judge it to be introduced.

**M a t e r i a l e x a m i n e d .** (19 specimens, 4 ♂, 2 ♀, 13 unsexed (SBPC, JKC): San Cristóbal: 1 km E Progreso (SBPC) 1 sex undetermined. St. Cruz: Media Luna (SBPC, JKC); Los Gemelos (SBPC); Puntudo (SBPC).

## VII. TRIBE Oxypodini Thomson, 1859

**D i a g n o s i s .** Tarsi 5-5-5-segmented, mesocoxae narrowly to moderately widely separated and set in margined acetabula, intercoxal process slender, median lobe of aedeagus with elongate compressor plate and without a transverse strip called the 'athetine bridge'. Maxillary palpi 3 or 4-segmented, labial palpi 3-segmented.

### Genus **Feluva** Blackwelder, 1952

Type species: *Feluva varicolor* (Fauvel) (*Brachyglossa*)

#### 17. **Feluva franzi** Pace, 1985a

(Figs 15, 58-60)

PACE 1985a: 454. Habitus and spermatheca illustrated by PACE (1985a).

Holotype (♀): Isabela I., Cerro Azul, 5/5-1975, H. Franz leg. (RPC)

**D i a g n o s i s .** Body length 1.9-2.1 mm; narrowly subparallel (Fig. 15), dark brown or nearly black to pale brown with rust tinge, usually with darker antennal segments 5-11, head, pronotum and abdomen except for the apex; moderately glossy; punctuation dense especially on head and pronotum; forebody with granulate surface; antennal segments 5-10 strongly transverse, each at least twice wider than long (Fig. 15); head with long (approximately as long as diameter of eye) subparallel temples, abruptly constricted posteriorly into narrow neck (Fig. 15); pronotum equal in width to head, slightly narrowed posteriorly, with pubescence directed horizontally from the median line of disc (Fig. 15); abdomen slightly widening posteriorly, three basal tergites with deep basal impressions (Fig. 15). ♂ Median lobe of aedeagus with enlarged oval bulbous, and short triangular tubus in dorsal view, internal sac structures inconspicuous (Figs 58, 59). Tergite 8 transverse, truncate apically, with several protruding setae, sternite 8 transverse, broadly rounded apically with several protruding setae. ♀ Spermatheca with slightly elongate spherical capsule and approximately two posterior coils (Fig. 60), tergite and sternite 8 elongate, truncate posteriorly, with protruding long setae.



**B i o n o m i c s .** Adults have been collected from beach zone forests, arid zone, agriculture zone, transition zone, and *Scalesia* and *Miconia* forests. Collecting methods: Malaise traps, Flight Interception Traps (FIT), carrion trap, and beating forest branches. Altitudes: 10 to 650 m above sea level. Collecting period: January to May.

**D i s t r i b u t i o n .** First recorded from Galápagos (Isabela, Marchena) by Pace (1985). Isabela and Marchena records are here confirmed. New island records: Floreana, Pinta, Rábida, St. Cruz. An endemic species.

**M a t e r i a l e x a m i n e d .** (26 specimens: ♂, ♀, sex undetermined) (SBPC, JKC): Floreana: 3 and 8 km E Black Beach (SBPC). Isabela: 4 km NW Villamil (SBPC); Cerro Azul, 2 km E Caleta Iguana (SBPC); Marchena: Pta. Espejo (SBPC); SW Playa (SBPC). Pinta: Playa Ibbetson (SBPC). Rábida: NE Coast, Palo Santo forest (SBPC). St. Cruz: Bellavista (SBPC, JKC); Charles Darwin Research Station, arid zone (SBPC); Los Gemelos (SBPC, JKC); Puntudo (SBPC, JKC); agricultural zone (SBPC); 1-7.2 km N. St. Rosa (SBPC).

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TABLE 1  
Checklist of species

Taxon	Original	Distribution	Status
	Description	(New Galápagos records with asterisk)	
Myllaenini	Ganglbauer, 1885		confirmed
1. <i>Myllaena leleupi</i>	Pace, 1985	Isabela	confirmed probably endemic
2. <i>Rothium ashlocki</i>	Ahn & Ashe, 1996	Sta. Cruz	unconfirmed probably endemic
3. <i>Rothium littoralis</i>	sp. n.	Floreana	probably endemic
Hypocyphtini	Laporte, 1835		new record
4. <i>Oligota (Holobus) chrysopyga</i>	Kraatz, 1859	Africa, Madagascar, Mascarene Is., India, New Caledonia, Sechelles, Sri Lanka; Isabela*, San Cristóbal*, Sta. Cruz*	cosmopolitan, introduced
Homalotini	Heer, 1839		confirmed
5. <i>Phanerota tridentata</i>	sp. n.	Sta. Cruz*	probably introduced
6. <i>Thecturota franzi</i>	Pace, 1985a	Fernandina*, Floreana*, Isabela*, Marchena*, Pinta*, Pinzón*, San Cristóbal*, Santiago, Sta. Cruz	well established, probably endemic
7. <i>Diesota (Aphelogglossa) franziana</i>	Pace, 1985a	Floreana*, Isabela*, Marchena*, Pinzón*, Santiago*, San Cristóbal*, Sta. Cruz	well established, status uncertain, possibly endemic
8. <i>Diesota (Aphelogglossa) leleupi</i>	Pace, 1985a	Isabela, Sta. Cruz*	well established, probably endemic
9. <i>Diesota (Aphelogglossa) galapagosensis</i>	Pace, 1985a	Marchena	unconfirmed, possibly endemic
Placusini	Mulsant & Rey, 1871		new record



10. <i>Euvira scalesia</i>	sp. n.	Sta. Cruz*	probably endemic
Athetini	Casey, 1910		confirmed and new records
11. <i>Atheta galapagoensis</i>	Pace, 1985a	Bartolomé*, Española*, Fernandina*, Floreana*, Isabela, Marchena*, Pinta, Pinzón, Plaza Sur*, Rábida*, Santiago, San Cristóbal, Sta. Cruz, St. Fé*	well established, probably endemic
12. <i>Atheta lurida</i>	Erichson, 1840	Brazil; Santiago, Fernandina*	established, native
13. <i>Atheta</i> (s. str.) <i>coriaria</i>	Kraatz, 1856	Europe, North America; Floreana*, Isabela*, San Cristóbal, Sta. Cruz*	cosmopolitan, established, introduced
14. <i>Atheta</i> ( <i>Acrotona</i> ) <i>pseudoclaudiensis</i>	sp. n.	Fernandina*, Floreana*, Isabela*, Marchena*, Pinta*, Plaza Sur*, San Cristóbal*, Sta. Cruz*	well established, endemic
15. <i>Atheta dichroa</i>	Gravenhorst, 1802	North America, South America (Bolivia), West Indies (St. Thomas); Baltra*?, Fernandina*, Floreana*, Isabela*, Marchena*, Pinta*, Santiago*, San Cristóbal*, Sta. Cruz	established, native
Falagriini	Mulsant & Rey, 1873		new record
16. <i>Myrmecocephalus concinnus</i>	Erichson, 1840	North America, Bolivia, Brasil; San Cristóbal, Sta. Cruz*	established, introduced
Oxypodini	Thomson, 1859		confirmed
17. <i>Feluva franzi</i>	Pace, 1985a	Floreana*, Isabela, Marchena, Pinta*, Rábida*, Sta. Cruz*	well established, probably endemic



TABLE 2

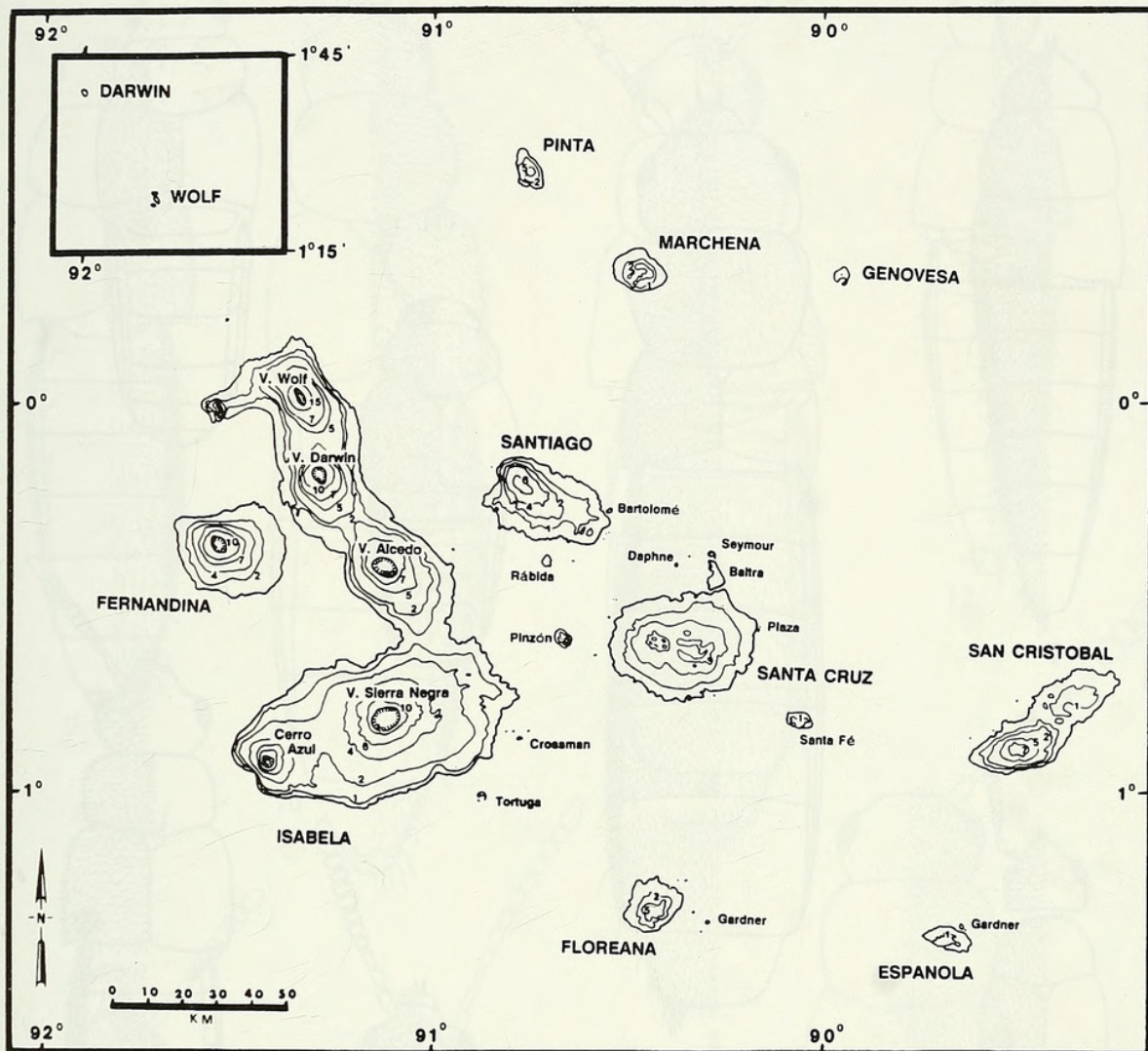
Aleocharine species distribution (including earlier literature records) in biotic zones on the Galápagos Islands and a total species diversity per zone as depicted in Table 1. (X) indicates presence; column one indicates species name, and its probable status. Columns 2-8 biotic zones. Last row contains information on species diversity per biotic zone (Litt.=littoral zone; Ar.=arid zone; Tr.=transition zone; HF.=humid forest; Es.=evergreen shrub; Pa.=pampa zone; Agr.=agricultural zone).

Species and its probable status	Litt.	Ar.	Tr.	HF.	ES.	Pa.	Agr.
<i>Myllaena leleupi</i> (endemic)	X						
<i>Rothium ashlocki</i> (endemic)	X						
<i>Rothium littoralis</i> (endemic)	X						
<i>Oligota chrysopyga</i> (introduced)		X	X	X	X		X
<i>Phanerota tridentata</i> (introduced)							X
<i>Thecturota franzi</i> (endemic)		X	X	X	X	X	X
<i>Diesota franziana</i> (probably endemic)		X	X	X	X		X
<i>Diesota leleupi</i> (endemic)	X	X					
<i>Diesota galapagosensis</i> (endemic)		X					
<i>Euvira scalesia</i> (endemic)			X	X			
<i>Atheta galapagoensis</i> (endemic)	X	X	X	X	X	X	X
<i>Atheta lurida</i> (native)		X	X				
<i>Atheta coriaria</i> (introduced)			X	X	X	X	X
<i>Atheta pseudoclaudiensis</i> (endemic)	X	X	X	X	X	X	X
<i>Atheta dichroa</i> (native)	X	X	X	X	X	X	X
<i>Myrmecocephalus concinnus</i> (introduced)				X	X		
<i>Feluva franzi</i> (endemic)		X	X	X	X		X
Total Species diversity in different zones	6	10	10	10	9	5	9
Endemic and native species diversity in different zones	6	9	8	7	6	4	6

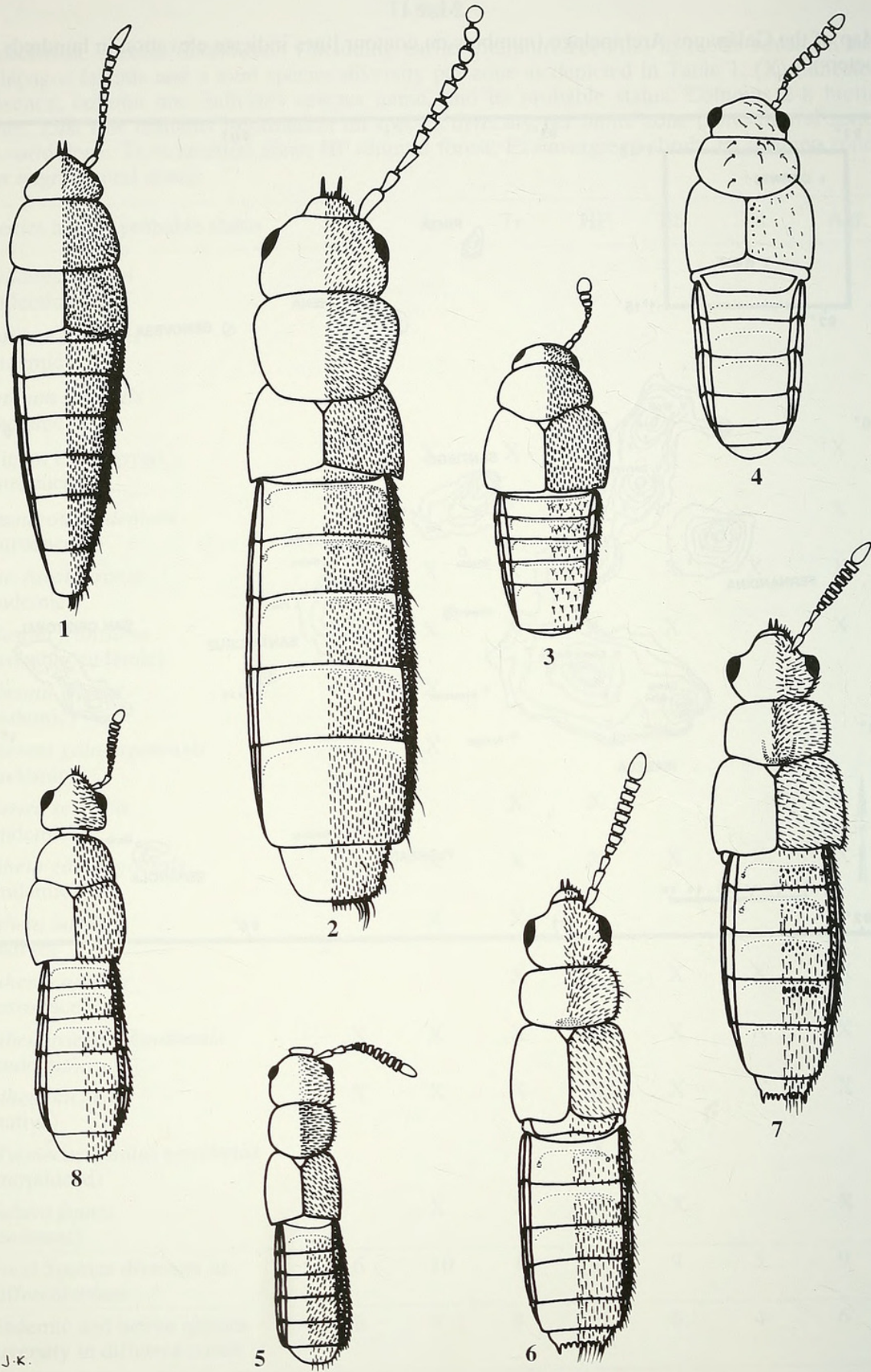


MAP 1

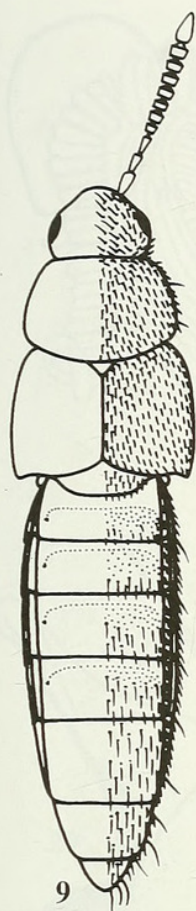
Map of the Galápagos Archipelago (numbers on contour lines indicate elevation in hundreds of meters).



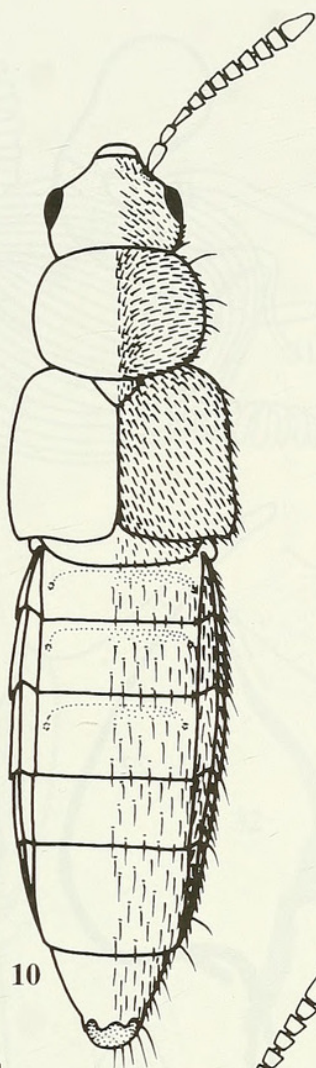




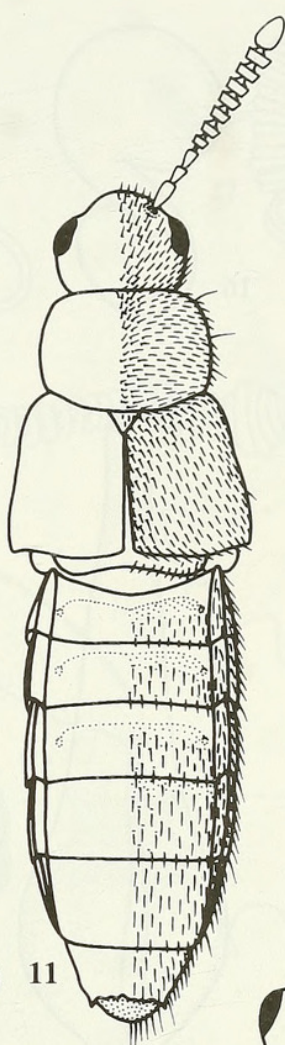




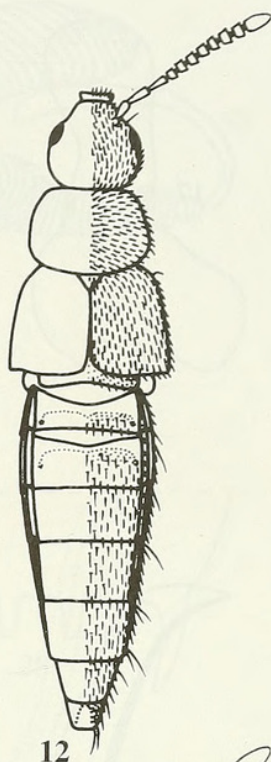
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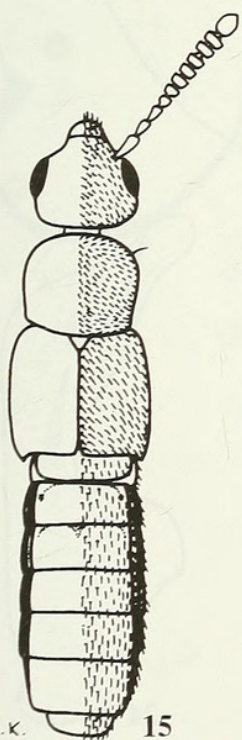
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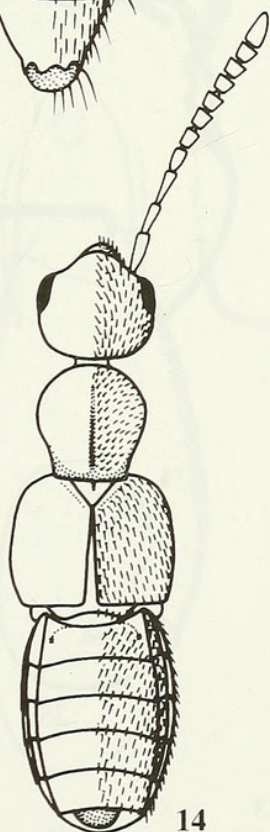
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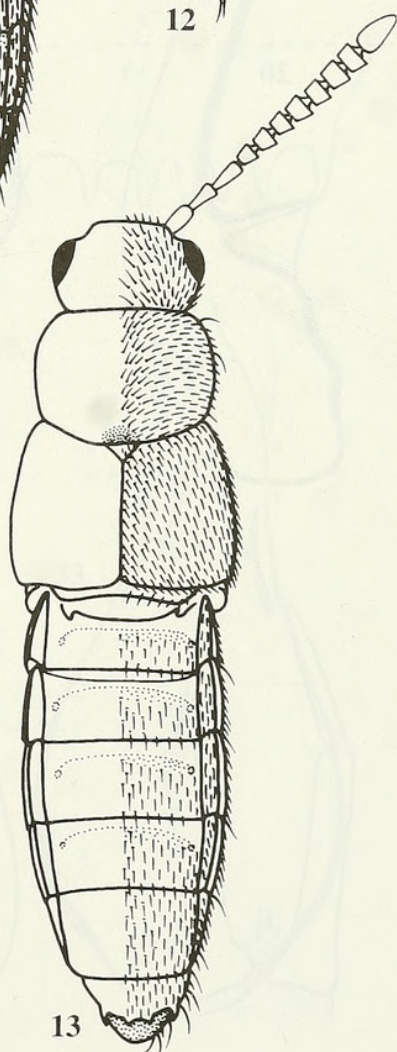
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15



14

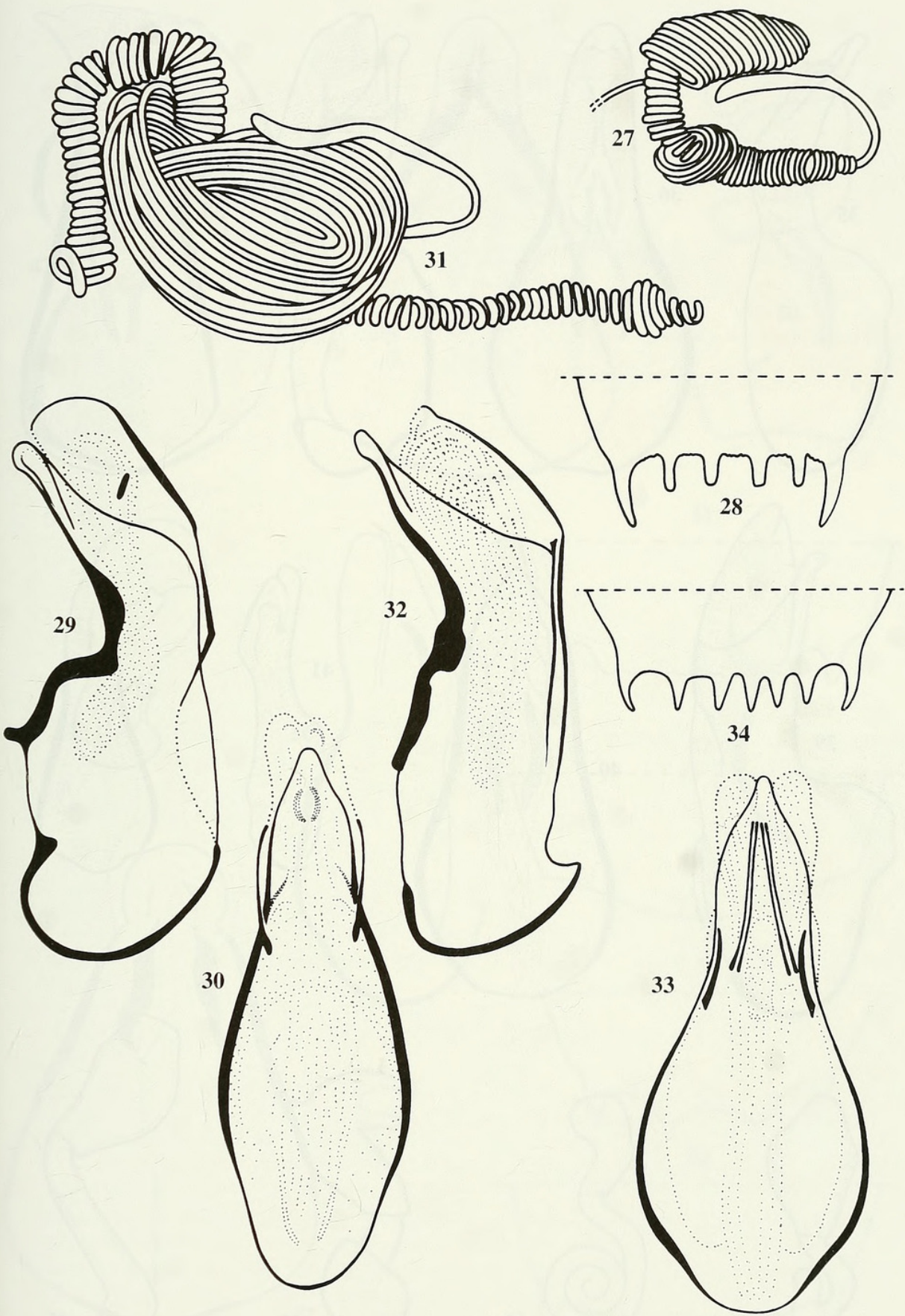


13





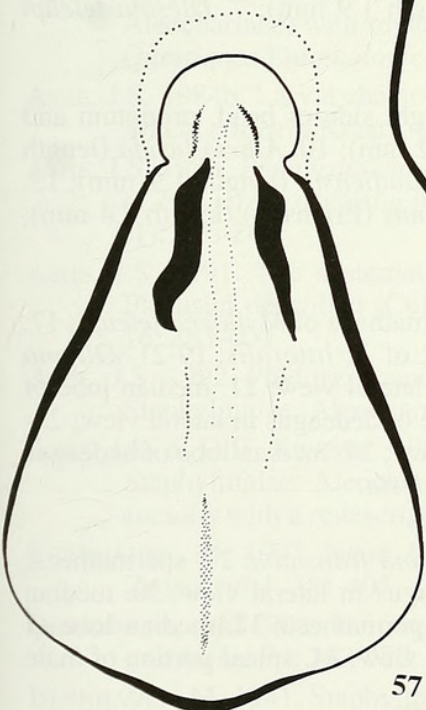
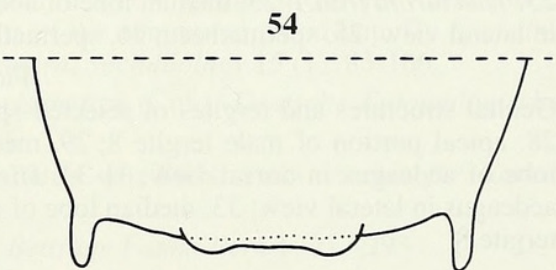
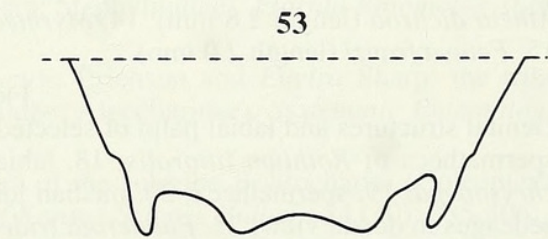
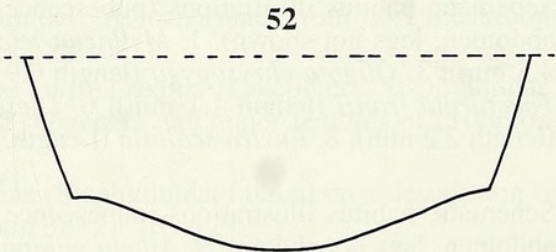
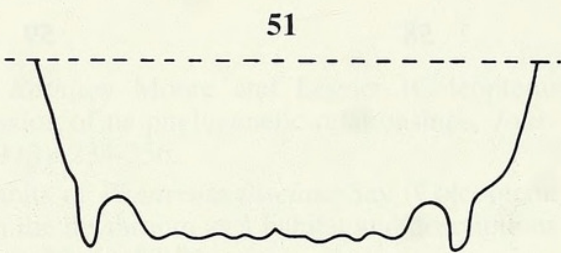
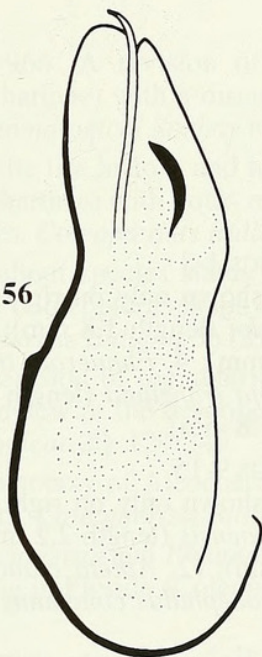
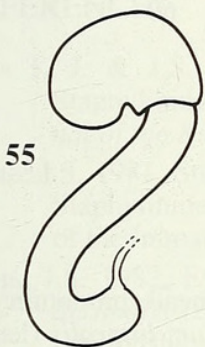
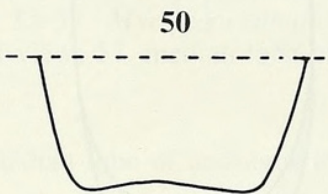
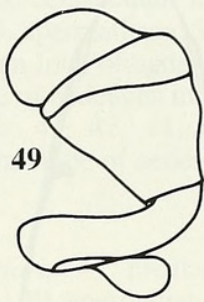
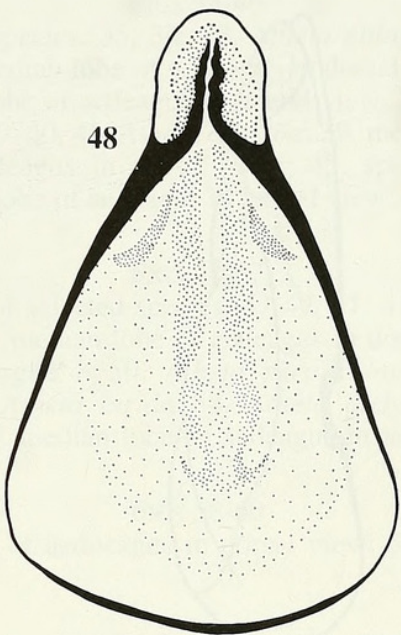
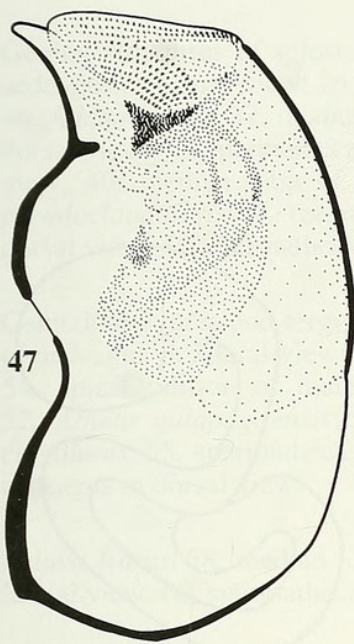




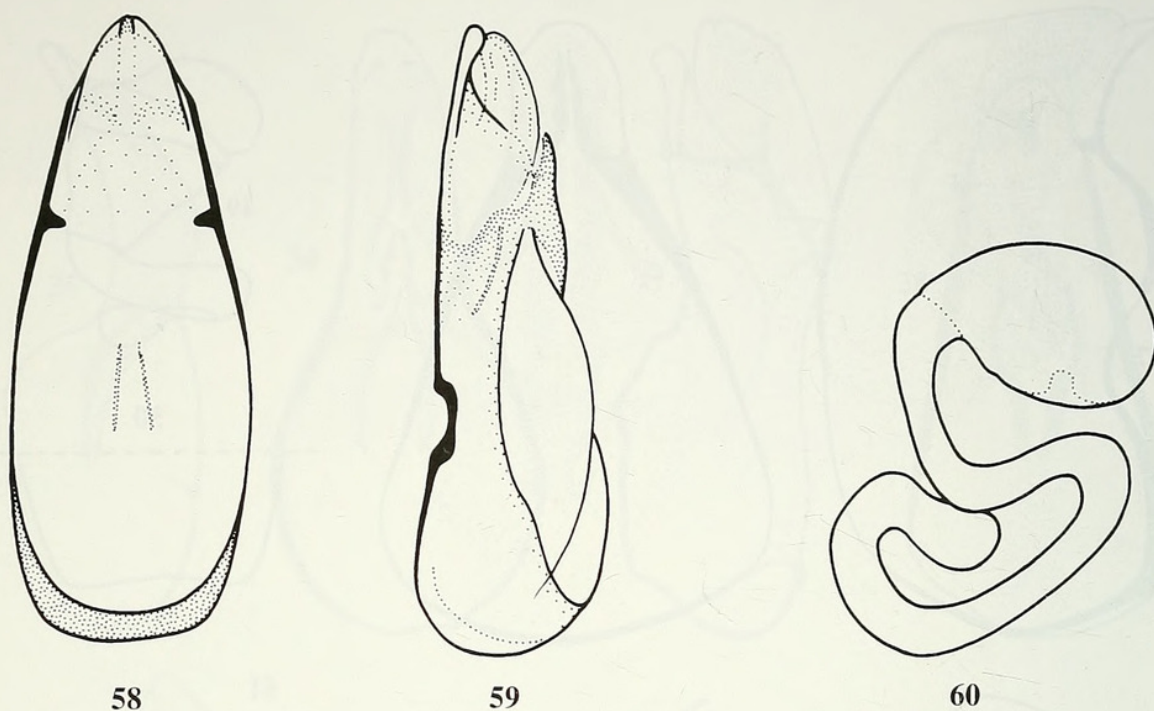












FIGS 1-8

Schematic habitus illustrations (pubescence shown only on right side of head, pronotum and abdomen; legs not shown). 1. *Myllaena leleupi* (length 1.8 mm); 2. *Rothium littoralis* (length 4.5 mm); 3. *Oligota chrysopyga* (length 0.9 mm); 4. *Phanerota tridentata* (length 1.3 mm); 5. *Thecturota franzi* (length 1.1 mm); 6. *Diesota franziana* (length 1.9 mm); 7. *Diesota leleupi* (length 2.2 mm); 8. *Euvira scalesia* (Length 1.8 mm).

FIGS 9-15

Schematic habitus illustrations (pubescence shown only on right side of head, pronotum and abdomen; legs not shown). 9. *Atheta galapagoensis* (length 2.2 mm); 10. *Atheta lurida* (length 2.8 mm); 11. *Atheta coriaria* (length 2.7 mm); 12. *Atheta claudiensis* (length 1.9 mm); 13. *Atheta dichroa* (length 2.8 mm); 14. *Myrmecocephalus concinnus* (Erichson) (length 2.4 mm); 15. *Feluva franzi* (length 2.0 mm).

FIGS 16-26

Genital structures and labial palpi of selected species. 16. Spermatheca of *Myllaena leleupi*; 17. spermatheca of *Rothium littoralis*; 18. labial palpi or glossae of *R. littoralis*; 19-21. *Oligota chrysopyga*: 19. spermatheca; 20. median lobe of aedeagus in lateral view; 21. median lobe of aedeagus in dorsal view; 22. *Phanerota tridentata*, median lobe of aedeagus in lateral view; 23-25. *Thecturota franzi*: 23. median lobe of aedeagus in dorsal view; 24. median lobe of aedeagus in lateral view; 25. spermatheca; 26. spermatheca of *Euvira scalesia*.

FIGS 27-34

Genital structures and tergites of selected species. 27-30. *Diesota franziana*: 27. spermatheca; 28. apical portion of male tergite 8; 29. median lobe of aedeagus in lateral view; 30. median lobe of aedeagus in dorsal view; 31-34. *Diesota leleupi*: 31. spermatheca; 32. median lobe of aedeagus in lateral view; 33. median lobe of aedeagus in dorsal view; 34. apical portion of male tergite 8.



## FIGS 35-46

Genital structures of selected species. 35, 36, 43, *Atheta galapagoensis*: 35. median lobe of aedeagus in lateral view; 36. median lobe of aedeagus in dorsal view; 43. spermatheca; 37, 38, 46. *Atheta lurida*: 37. median lobe of aedeagus in lateral view; 38. median lobe of aedeagus in dorsal view; 46. spermatheca. 39, 40, 45. *Atheta dichroa*: 39. median lobe of aedeagus in lateral view; 40. median lobe of aedeagus in dorsal view; 45. spermatheca; 41, 42, 44. *Atheta pseudoclaudiensis*: 41. median lobe of aedeagus in lateral view; 42. median lobe of aedeagus in dorsal view; 44. spermatheca.

## FIGS 47-57

Genital structures and tergites of selected species. 47-49, 51. *Atheta coriaria*: 47. median lobe of aedeagus in lateral view; 48. median lobe of aedeagus in dorsal view; 49. spermatheca. 51-54. apical portion of male tergite 8: 50. *Atheta pseudoclaudiensis*; 51. *Atheta coriaria*; 52. *Atheta galapagoensis*; 53. *Atheta lurida*; 54. *Atheta dichroa*. 55-57. *Myrmecocephalus cingulatus*: 55. spermatheca; 56. median lobe of aedeagus in lateral view; 57. median lobe of aedeagus in dorsal view.

## FIGS 58-60

*Feluva franzi*: 58. median lobe of aedeagus in dorsal view; 59. median lobe of aedeagus in lateral view; 60. spermatheca.

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