

Contribution to the knowledge of the Carabid beetles of Galápagos (Ecuador).

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Abstract

In this contribution to the knowledge of the Carabid beetle fauna of the Galápagos (Ecuador) the distribution data are given on 19 species. This is based on material collected during our 1986-expedition and completed with data from previously unidentified material collected during some earlier expeditions as well as with all records mentioned in the literature.

Résumé

Dans cette contribution à la connaissance de la faune carabique des Galápagos (Ecuador), les données de distribution de 19 espèces sont énumérées. Ce travail est basé sur le matériel récolté lors de l'expédition belge effectuée en 1986 et est complété avec les données provenant de matériel non-identifié réuni lors d'expéditions antérieures ainsi que les données provenant de la littérature.

Galápagos - Carabidae - Distribution.

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Introduction

During 1986, the authors spent two months (February 13 - April 5) in the Galápagos archipelago in the scope of their Invertebrate survey of the islands, started during 1982. Several papers were already published on the araneological fauna of the archipelago by the co-authors (see BAERT & MAELFAIT, 1986 and BAERT et al. in press, for references). In this paper all known data on 19 Carabid species from the archipelago are compiled until and including those from our 1986-expedition.

In this publication we mention for each of the discussed species :

- the literature references
- the material examined : besides our material collected during 1986, the first author had the opportunity to examine the collections of (1) the Charles Darwin Research Station, (2) the Belgian entomologists N. LELEUP (1964 expedition, identified) and S. JACQUEMART (1974 expedition), and of BAERT & MAELFAIT

(1982 expedition), deposited in the K.B.I.N. at Brussels (3) the specimens collected by Heinrich and Irene SCHATZ (1985 expedition, identified) during their ecological investigation of the soil invertebrates of the Galápagos Islands ;

- in each case we mention the number of males and females (if specified in literature), together with the month (in roman numbers) and the year of capture ;
- the distribution of the species over the archipelago ; the islands marked with an asterisk were not previously mentioned for the species ;
- the habitat choice of the species if this could be deduced from our captures ;
- the zoögeographic affinities as far as these are known.

Some genera of Carabid beetles occurring in the archipelago are however still incompletely or not mentioned here because we are at the time revising these species and/or complete genera : a number of species belonging to the genera *Pterostichus*, the genera *Bradycellus*, *Selenophorus* and *Pentagonica* (a genus previously unknown to the Galápagos Islands). Separate papers will be devoted to these cases with descriptions and/or redescriptions of a number of species together with all distributional and ecological data.

Detailed descriptions of all sampling sites from our 1986 expedition are given by BAERT et al. (in press) ; all these localities are shown on a map of the archipelago (Figure 1).

Results

Agonum albemarli (VAN DYKE, 1953)

References

- VAN DYKE, 1953 : p. 27-28.
LINSLEY & USINGER, 1966 : p. 142.
FRANZ, 1985 : p. 78.

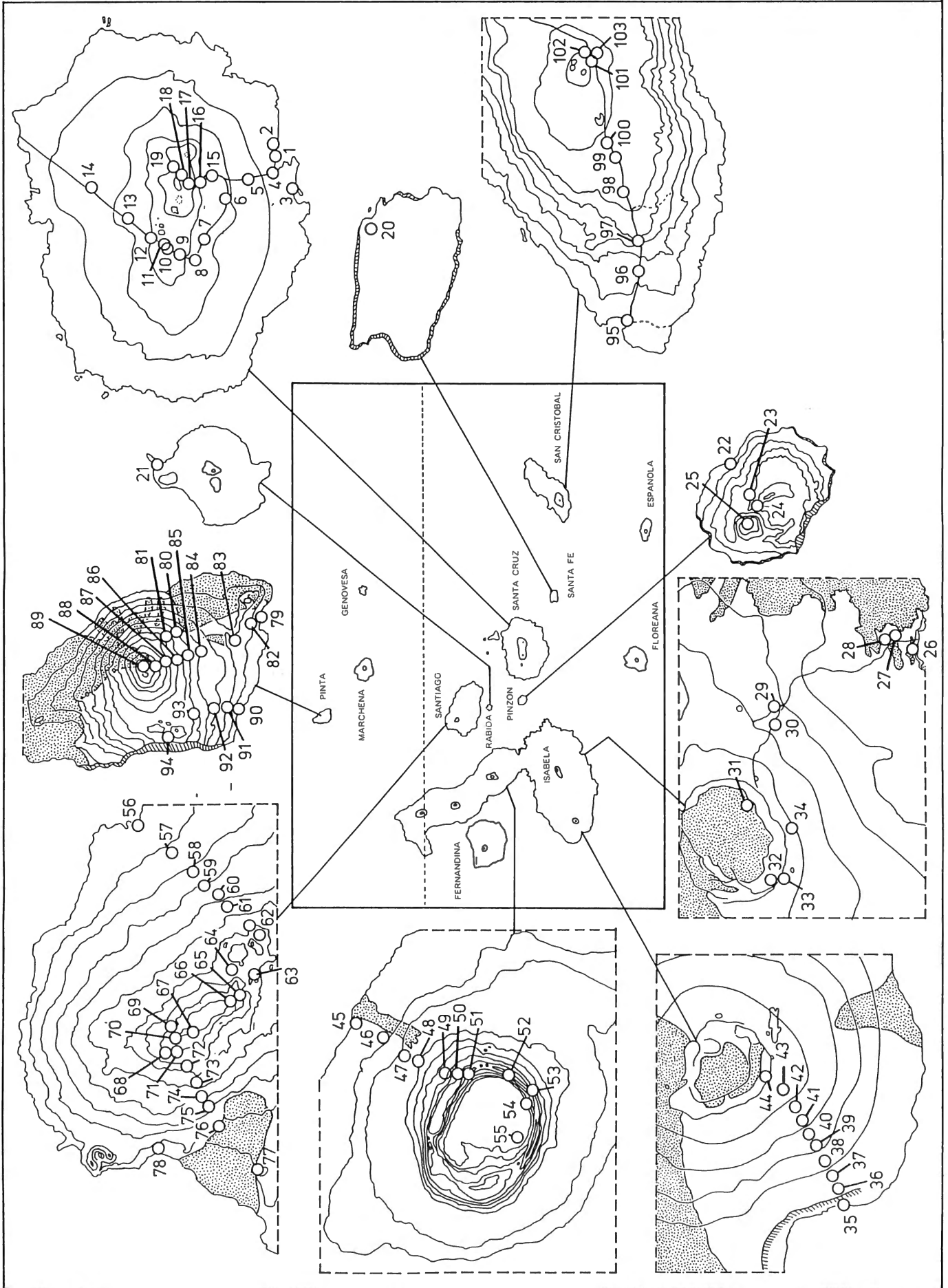


Figure 1 :
General map of the Galápagos Islands.

Material sampled in 1986

ISABELA : Volcán Sierra Negra (II) : Locality 33 (6 ♂♂, 3 ♀♀)

Records mentioned in literature

ISABELA (X,1905) : near Villamil (1 ♂, holotype) ; (V.1975) : Volcán Sierra Negra, edge of caldera near Bocanilla (5 ind.)

Distribution and habitat choice

Isabela (Volcán Sierra Negra) at different altitudes

Zoögeographic affinities

Only known from the Galápagos

Agonum chathamii VAN DYKE, 1953

References

VAN DYKE, 1953 : p. 26-27.
LINSLEY & USINGER, 1966 : p. 142.
FRANZ, 1985 : p. 78.

Material sampled in 1986

SAN CRISTOBAL (III) : Locality 102 (7 ♂♂ / 2 ♀♀), Locality 103 (1 ♂)

Other material examined

SAN CRISTOBAL : Jacquemart 1974 : (I) : surroundings of El Junco (35 ♂♂ / 42 ♀♀) ; Baert & Maelfait 1982 : (III) : El Junco (1 ♀) ; Schatz 1985 : (III) : El Junco 670 m (2 ♂♂ / 1 ♀) ; El Junco crater rim 680 m (28 ♂♂ / 30 ♀♀) ; Cerro San Joaquin 700 m (2 ♂♂ / 2 ♀♀)

Records mentioned in literature

SAN CRISTOBAL (II.1906) : near Wreck Bay (39 ind.) ; (V.1975) : El Junco crater rim (65 ind.), surroundings Cerro San Joaquin (4 ind.) and (VI.1975) same locality (15 ind.).

Distribution and habitat choice

San Cristóbal, especially abundant in the highlands

Zoögeographic affinities

Only known from the Galápagos

Agonum darwini VAN DYKE, 1953

References

VAN DYKE, 1953 : p. 25-26.
LINSLEY & USINGER, 1966 : p. 142.
FRANZ, 1985 : p. 78.

Material sampled in 1986

SAN CRISTOBAL (III) : Locality 102 (1 ♀) ; Locality 103 (1 ♂)

Other material examined

SAN CRISTOBAL : Jacquemart 1974 : (I), highlands (1 ♂ / 2 ♀♀) ; Schatz 1985 : (III) : El Junco 670 m (1 ♀), Cerro San Joaquin 700 m (2 ♀♀)

Records mentioned in literature

SAN CRISTOBAL : (I.1906) : (1 ♂ / 1 ♀) ; (VII.1906) : 2 ♀♀ ; (V.1975) : El Junco (1 ind.) ; (VI.1975) : Cerro San Joaquin (7 ind.)

Distribution and habitat choice

San Cristóbal, only in the highlands ; in different habitats

Zoögeographic affinities

Only known from the Galápagos

Bembidion equatoriale VAN DYKE, 1953

References

VAN DYKE, 1953 : p. 15.
LINSLEY & USINGER, 1966 : p. 142.
FRANZ, 1985 : p. 76.

Material sampled in 1986

ISABELA : Volcán Sierra Negra (II) : Locality 31 (1 ♂ / 1 ♀) ; Volcán Cerro Azul (II) : Locality 39 (1 ♀)

Other material examined

ESPAÑOLA : CDRS 1983 : (VI) : Punta Cevallos (1 ♀)
SAN CRISTOBAL : Jacquemart 1974 : (I) : (1 ♂) ; Schatz 1985 : (III) : El Junco 670 m (28 ♂♂ / 28 ♀♀) ; Poza Colorado 590 m (1 ♂) ; Cerro San Joaquin 740 m (1 ♀)
SANTIAGO : Jacquemart 1974 : (III) : (8 ♂♂ / 5 ♀♀)

Records mentioned in literature

SAN CRISTOBAL : (I.1906) : (6 ind.) ; (V.1975) : El Junco crater lake (5 ind.)

Distribution and habitat choice

Española*, Isabela*, San Cristóbal, Santiago* ; confined to moist, open habitats at higher altitude, except on Española

Zoögeographic affinities

Only known from the Galápagos

Bembidion galapagoensis (G.R. WATERHOUSE, 1845)**References**

Notaphus galapagoensis G.R. WATERHOUSE, 1845 : p. 23.

Notaphus galapagoensis : C. WATERHOUSE, 1877 : p. 81.

Notaphus galapagoensis : LINELL, 1898 : p. 255.

Notaphus galapagoensis : MUTCHLER, 1925 : p. 234. VAN DYKE, 1953 : p. 14-15.

LINSLEY & USINGER, 1966 : p. 142.

Bembidion (Notaphus) galapagoense : FRANZ, 1985 : p. 76.

Material sampled in 1986

ISABELA : Volcán Sierra Negra (II) : Locality 31 (112 ♂♂ / 106 ♀♀), Locality 32 (28 ♂♂ / 35 ♀♀), Locality 33 (7 ♂♂ / 5 ♀♀), Locality 34 (2 ♂♂) ; Volcán Cerro Azul (II) : Locality 39 (1 ♂ / 1 ♀) ; Volcán Alcedo (III) : Locality 51 (1 ♂ / 1 ♀), Locality 54 (2 ♀♀)

Other material examined

FERNANDINA : CDRS 1983 : (I) : Crater rim West side (2 ♀♀) ; Schatz 1985 : (III) : Crater rim West side in fumarole 1290 m (1 ♀)

PINTA : Jacquemart 1974 : (III) : above the arid zone (1 ♂)

SANTIAGO : Jacquemart 1974 : (III) : rocky summit with thigh trees (1 ♂)

Records mentioned in literature

ISABELA : (V.1975) : Volcán Sierra Negra, Pozzo del Cerro Grande (1 ind.)

SANTA CRUZ : (V.1975) : CDRS (at light) (1 ind.)

SANTIAGO : (IX.1835) (1 ind.) ; (VI.1975) : Eastern Cerro under tree ferns (43 ind.)

PINTA : (IX.1906) : just below fern belt (1 ind.) ; (VI.1975) : near top of the island and in *Scalesia* wood somewhat lower (15 ind.)

Distribution and habitat choice

Fernandina*, Isabela, Santa Cruz, Santiago, Pinta ; except for the single specimen caught at light in the dry arid zone, the species has mainly been found at higher altitude on damp, moist spots

Zoögeographic affinities

Only known from the Galápagos

Calosoma galapageium HOPE, 1838

References

HOPE, 1838 : p. 130.

VAN DYKE, 1953 : p. 11-12, pl. 1, fig. 6.

LINSLEY & USINGER, 1966 : p. 140.

Castrida galapageium : BASILEWSKY, 1968 : p. 203-204.

Castrida galapageium : LINSLEY, 1977 : p. 19.

Castrida galapageium : FRANZ, 1985 : p. 76.

Material sampled in 1986

SANTIAGO (III) : Locality 63 (5 ♂♂ / 2 ♀♀), Locality 65 (1 ♂), Locality 67 (13 ♂♂ / 6 ♀♀ and numerous dead specimens), Locality 69 (3 ♂♂ / 4 ♀♀), Locality 70 (1 ♀)

Records mentioned in literature

SANTIAGO : (IX.1835), central part of the island (1 ♂) ; (XII.1905-I.1906) : top of the island (1 ♂) ; (V.1975) : highlands near Tunel (19 ♂♂ / 10 ♀♀)

Distribution and habitat choice

Santiago, restricted to open grassy vegetation in the higher parts of the island ; especially abundant at the summit

Zoögeographic affinities

Only known from the Galápagos

Calosoma granatense GEHIN, 1885

References

GEHIN, 1885 : p. 59.

Calosoma galapagoum HOWARD, 1889 : p. 191. (non HOPE)

Calosoma howardi LINELL, 1898 : p. 251.

Calosoma galapageium ROESCHKE, 1900 : p. 59. (non HOPE)

Calosoma howardi : MUTCHLER, 1925 : p. 223.

Calosoma (Callistriga) galapageium : BREUNING, 1927 : p. 200. (non HOPE)

Calosoma howardi : BLAIR, 1933 : p. 472.

Castrida (Microcalosoma) galapageium : JEANNEL, 1940 : pp. 93, 98, fig. 2. (non HOPE)

Calosoma howardi : MUTCHLER, 1938 : p. 3.

Calosoma howardi : VAN DYKE, 1953 : p. 7, pl. 1, fig. 1.

Calosoma darwinia VAN DYKE, 1953 : p. 10, 11, pl. 1, fig. 3, 5.

Calosoma (Castrida) galapageium : GIDASPOW, 1963 : pp. 286, 289, figs. 2, 14-19, 25, 62-74. (non HOPE)

Calosoma darwinia : LINSLEY & USINGER, 1966 : p. 141.

Calosoma howardi : LINSLEY & USINGER, 1966 : p. 141.

Castrida granatense : BASILEWSKY, 1968 : pp. 189-200.

Castrida granatensis : LINSLEY, 1977 : p. 19-20.

Castrida granatense : FRANZ, 1985 : pp. 75-76.

Material sampled in 1986

ISABELA :

Volcán Sierra Negra (II) : Locality 30 (5 ♂♂ / 6 ♀♀), Locality 31 (1 ♀), Locality 32 (1 ♂), Locality 33 (7 ♂♂ / 6 ♀♀), Locality 34 (11 ♂♂ / 1 ♀) ;

Volcán Alcedo (III) : Locality 47 (17♂♂/3♀♀), Locality 48 (16♂♂/27♀♀), Locality 49 (44♂♂/19♀♀), Locality 50 (40♂♂/10♀♀), Locality 51 (23♂♂/14♀♀), Locality 52 (8♂♂/4♀♀), Locality 53 (7♂♂/8♀♀), Locality 54 (22♂♂/9♀♀), Locality 55 (17♂♂/15♀♀);

Volcán Cerro Azul (II) : Locality 35 (9♂♂/20♀♀), Locality 36 (4♂♂/4♀♀), Locality 38 (1♂/2♀♀), Locality 39 (41♂♂/20♀♀), Locality 40 (4♂♂/6♀♀), Locality 41 (1♂/8♀♀), Locality 42 (20♂♂/34♀♀), Locality 43 (19♂♂/20♀♀), Locality 44 (3♂♂/9♀♀)

PINTA (III) : Locality 80 (1♂), Locality 86 (2♂♂/1♀), Locality 87 (12♂♂/2♀♀), Locality 89 (1♀), Locality 92 (15♂♂/9♀♀), Locality 93 (2♂♂)

PINZON (III) : Locality 22 (1♂)

SAN CRISTOBAL (III) : Locality 95 (36♂♂/26♀♀), Locality 96 (3♂♂/5♀♀), Locality 97 (1♂/4♀♀)

SANTA CRUZ (III) : Locality 1 (147♂♂/71♀♀), Locality 3 (2♂♂), Locality 4 (81♂♂/64♀♀), Locality 6 (1♀), Locality 7 (4♂♂/2♀♀), Locality 8 (2♂♂), Locality 10 (1♂), Locality 11 (1♀), Locality 12 (113♂♂/32♀♀), Locality 13 (7♂♂/6♀♀), Locality 13 (49♂♂/27♀♀)

SANTA FE (III) : Locality 20 (24♂♂/18♀♀)

SANTIAGO (III) : Locality 56 (1♀), Locality 58 (11♂♂/3♀♀), Locality 59 (38♂♂/31♀♀), Locality 60 (49♂♂/53♀♀), Locality 61 (8♂♂/6♀♀), Locality 63 (5♂♂/1♀♀), Locality 65 (3♀♀), Locality 68 (2♂♂/8♀♀), Locality 69 (2♂♂/4♀♀), Locality 70 (1♂/1♀), Locality 73 (1♀), Locality 76 (1♂/1♀), Locality 77 (9♂♂/12♀♀), Locality 78 (1♀)

Other material examined

ISABELA : Volcán Alcedo : Jacquemart 1974 : (III) : inner crater (1♂); Baert & Maelfait 1982 : (IV) : 800 m (2♂♂/1♀), 900 m (3♀♀);

Volcán Sierra Negra : Baert & Maelfait 1982 : (III) : 1040 m (1♂/1♀)

PINTA : Jacquemart 1974 : (II) : (1♀)

PITT (near SAN CRISTOBAL) : CDRS 1980 : (III) : fragments in owl pellets

SANTA CRUZ : Baert & Maelfait 1982 : (III) : CDRS (5♀♀)

SANTIAGO : Jacquemart 1974 : (III) : (7♂♂/2♀♀); CDRS 1983 : (II) : Los Guayabillos 230 m (1♂)

Records mentioned in literature

BALTRA : (IV.1923) : (2 ind.)

DARWIN : (IX.1905) : (1 elytron)

EDEN (near Santa Cruz) : (II.1925) : (3 ind.)

ESPAÑOLA : (V.1899) : (2 ind.); (IV.1925) : (7 ind.);

FLOREANA : (IV.1881) : (9 ind.); (X.1905) : (1 ind.); (II.1906) : (21 ind.); (III.1925) : (3 ind.); (IV-V.1932) :

(4 ind.); (II.1964) : (3 ind.); Black Beach (4 ind.); II.1965) : Black Beach at light (83 ind.); (V.1975) : Post Office Bay (2♂♂/1♀), Punta Cormoran (1♀), Chacra (2♂♂/3♀♀)

GENOVESA : (I.1941) : (8 ind.); Darwin Bay (1 ind.)

ISABELA : (II.1899) : (9 ind.); (1925) : (2 ind.);

Volcán Alcedo (V.1965) : 640 m (16 ind.);

Volcán Cerro Azul (V.1975) : Caleta Iguana (2♂♂); Cerro Azul (2♂♂/3♀♀)

Volcán Darwin (IV.1906) : Tagus cove until 500 m (19 ind.); (IV.1923) : Tagus cove (2 ind.);

Volcán Wolf (IV.1906) : Banks Bay at low altitude (10 ind.);

Volcán Sierra Negra (IX.1906) : near Villamil 400 m (72 ind.); (V.1975) : Cerro de la Orquilla, W. of Villamil (1♀); Bosque de Jaboncillo (1♂/1♀); between Santo Tomás and crater rim (12 ind.); Pozo del Cerro Grande 900 m (3♂♂)

PINTA : (IV.1964) : 320 m (4 elytra); (VI.1975) : Beach (2♀♀), woodland (2♂♂/2♀♀)

PINZON : (1888) : 2 ind.); (II.1964) : summit and upper caldera areas (4 ind.)

SAN CRISTOBAL : (III.1899) : (7 ind.); (II.1906) : March Bay (18 ind.); (X.1905) : (13 ind.); (I.1906) : (21 ind.); IV.1906) : (1 ind.); (IV.1932) : (5 ind.); (V.1975) : Puerto Baquerizo (2♂♂/5♀♀); road from Puerto Baquerizo to El Progreso (1♂/1♀); (VI.1975) : Puerto Grande (1♀)

SANTA CRUZ : (XI.1905) : (1 elytron); (V.1932) : (4 ind.); (III.1935) : Conway Bay (3 ind.), Academy Bay (5 ind.); (I.1939) : (1 ind.); (1941) : Conway Bay (2 ind.); (II.1964) : Academy Bay CDRS (578 ind.), transition zone 140 m (5 ind.), moist forest zone 240 m (1 ind.); (III.1964) : Hornemann Farm 220 m (7 ind.); (IV.1964) : Eastern slope 160 m (1 ind.); (XI.1964) : Hornemann Farm (1 ind.); (II.1965) : Academy Bay, at light (1758 ind.); (V.1975) : CDRS (5♂♂/13♀♀); Santa Rosa (1♀)

SANTA FE : (X.1905) : (2 elytra)

SANTIAGO : (IV.1923) : (6 ind.); (II.1925) : (6 ind.); (V.1975) : top near el Tunel (1♀); (VI.1975) : James Bay (elytra)

SOUTH AMERICAN MAINLAND : COLOMBIA : (1885?) (1 ind.?)

PERU : (?) : Callao ('some ind.?)

Distribution and habitat choice

Baltra, Darwin, Eden, Española, Floreana, Genovesa, Isabela, Pinta, Pinzón, Pitt*, San Cristóbal, Santa Cruz, Sante Fé, Santiago; occurs in many habitat types, but especially abundant in the dry arid zone and transition zone at lower altitudes; on Isabela also occurring at higher altitudes in pampa-habitats.

Zoogeographic affinities

Occurring in the entire Galápagos archipelago and probably originating from the South American main-

land, although there are no recent records there and there is some doubt on the older records.

Calosoma leleuporum (BASILEWSKY, 1968)

References

Castrida leleuporum BASILEWSKY, 1968 : p. 200-203, figs. 2, 3.

Castrida leleuporum : LINSLEY, 1977 : p. 20.

Castrida leleuporum : FRANZ, 1985 : p. 76.

Material sampled in 1986

SANTA CRUZ (III) : Locality 9 (1 ♀), Locality 16 (1 ♂), Locality 17 (1 ♂, 1 ♀), Locality 19 (4 ♂ ♂)

Other material examined

SANTA CRUZ : Baert & Maelfait 1982 : (III) : Media Luna 640 m (8 ♂ ♂ / 2 ♀ ♀), Los Gemelos 580 m (1 ♀)

Records mentioned in literature

SANTA CRUZ : (IV.1964) : under *Miconia* (?) 750 m (6 ♂ ♂ / 8 ♀ ♀) ; (XII.1964) : between Cerro Biento and Puntudo 500 m (1 ♂ / 1 ♀) ; (II.1965) : craters of the summit (4 ♂ ♂ / 1 ♀) ; (V.1975) : side top of Cerro Crocker (1 ♂ / 4 ♀ ♀)

Distribution and habitat choice

Santa Cruz, only in the highlands ; especially numerous in bogs and humid grasslands

Zoögeographic affinities

Only known from the Galápagos

Calosoma linelli MUTCHLER, 1925

References

Calosoma galapageium LINELL, 1898 : p. 250 (non HOPE).

MUTCHLER, 1925 : p. 222-223.

Calosoma (Microcalosoma) linelli : BREUNING, 1927 : p. 123.

Calosoma (Microcalosoma) linelli : JEANNEL, 1940 : p. 99.

VAN DYKE, 1953 : p. 12-13, pl. 1, fig. 7.

Calosoma (Microcalosoma) linelli : GIDASPOW, 1963 : p. 284-285, figs. 8, 12, 33, 36, 57, 58, 84.

LINSLEY & USINGER, 1966 : p. 141.

Castrida linelli : BASILEWSKY, 1968 : p. 204-206.

Castrida linelli : LINSLEY, 1977 : p. 20.

Castrida linelli : FRANZ, 1985 : p. 76.

Material sampled in 1986

SAN CRISTOBAL (III) : Locality 101 (4 ♂ ♂ and elytra)

Other material examined

SAN CRISTOBAL : Schatz 1985 : (III) : Cerro San Joaquin 700 m (1 ♀)

Records mentioned in literature

SAN CRISTOBAL : (1891) : (1 ♂) ; (I.1906) : (1 ♂) ; (II.1906) 1100 ft (1 ♂ / 1 ♀) ; (V.1975) : Cerro San Joaquin (2 ♂ ♂ / 2 ♀ ♀), El Junco (7 ♂ ♂ / 4 ♀ ♀)

Distribution and habitat choice

San Cristóbal, only in the highlands, mainly in open pampa-habitats

Zoögeographic affinities

Only known from the Galápagos

Cicindela galapagoensis HORN, 1915

References

HORN, 1915 : p. 238, 241, 251, 397, 399, 402.

HORN, 1920 : p. 17-18.

MUTCHLER, 1925 : p. 221-222.

Cicindela vonhageni MUTCHLER, 1938 : p. 2-3, fig. 1.

BLACKWELDER, 1944 : p. 18.

Cicindela vonhageni : BLACKWELDER, 1944 : p. 20.

VAN DYKE, 1953 : p. 6-7.

Cicindela vonhageni : VAN DYKE, 1953 : p. 7.

LINSLEY & USINGER, 1966 : p. 140.

Cicindela vonhageni : LINSLEY & USINGER, 1966 : p. 140.

Cicindela galapagoensis discolorata MANDL, 1967 : p. 385.

REICHARDT, 1976 : p. 189-193, figs. 1-7.

LINSLEY, 1977 : p. 19.

FRANZ, 1985 : p. 75.

Cicindela vonhageni : FRANZ, 1985 : p. 75.

Material sampled in 1986

SANTA CRUZ (III) : Locality 1, at light (2 ♂ ♂), Locality 3, at light (5 ♂ ♂ / 10 ♀ ♀)

Records mentioned in literature

FLOREANA : (II.1965) : Black Beach, at light (13 ♂ ♂ / 20 ♀ ♀) ; (V.1975) : Punta Cormoran (5 ind.)

GENOVESA : (1963) : (1 ♂)

ISABELA : (IV.1906) : Banks Bay (1 ♂ / 1 ♀ + 24 ind.)

SANTA CRUZ : (XI.1935) : Bahia Tortuga (2 ♂ ♂ /

7 ♀ ♀); (I.1965) : Bahia Tortuga (53 ♂ ♂ / 92 ♀ ♀); (II.1965) : SE slope, at low altitude, at light (3 ♂ ♂ / 4 ♀ ♀); (X.1964-I.1965) : CDRS, at light (6 ♂ ♂ / 11 ♀ ♀); (VI.1975) : CDRS, at light (1 ind.)

Distribution and habitat choice

Floreana, Genovesa, Isabela, Santa Cruz : restricted to beaches, regularly flying at light.

Zoögeographic affinities

Only known from the Galápagos.

Mystroceridius basilewsky REICHARDT, 1970

References

REICHARDT, 1970 : p. 165-169.
LINSLEY, 1977 : p. 20.
FRANZ, 1985 : p. 79.

Other material examined

SANTA CRUZ : Jacquemart 1974 : (I) : near the sea (1 ♀)

Records mentioned in literature

SANTA CRUZ : (II.1965) : near Bahia Tortuga, between detritus (4 ind.) ; (V.1975) : *Scalesia*-wood, between detritus (2 ind.)

Distribution and habitat choice

Santa Cruz, at different altitudes : between detritus in humid crevasses or under *Scalesia*

Zoögeographic affinities

Only known from the Galápagos ; this holds true for the entire genus.

Morphological remark

During our detailed microscopic study of the female which we discovered in the material collected by Jacquemart (1974), we remarked a number of character states which were not or unprecisely described by REICHARDT (1970). Apparently this author must have had only male specimens at hand (not mentioned in his publication), because we observed that the shape of the terminal antennal segment (the 'typical' character for

the genus) is normal-shaped in females and not spoon-shaped as in the male (cfr. etymology of the genus-name).

Furthermore, Reichardt did not mention that the entire antenna is covered by dense fine hairs ; finally, the original description states that the scutellum is apparently hidden under the elytra, whereas we could clearly observe it at the basis of the elytra. This is also the case in the (male) holotype, which we had the opportunity to check.

Pterostichus calathoides (G.R. WATERHOUSE, 1845)

References

Feronia calathoides G.R. WATERHOUSE, 1845 : p. 21.
Poecilus calathoides : GEMMINGER & HAROLD, 1868 : p. 300.
Feronia calathoides : C. WATERHOUSE, 1877 : p. 82.
Poecilus calathoides : HOWARD, 1889 : p. 252.
LINELL, 1898 : p. 252.
MUTCHLER, 1925 : p. 234.
Feronia calathoides : VAN DYKE, 1953 : p. 16-17, pl. 2, fig. 6.
Feronia calathoides : LINSLEY & USINGER, 1966 : p. 141.
Pterostichus (Blennidus) calathoides : FRANZ, 1985 : p. 77.

Material sampled in 1986

SAN CRISTOBAL (III) : Locality 101 (12 ♂ ♂ / 7 ♀ ♀), Locality 102 (13 ♂ ♂ / 29 ♀ ♀), Locality 103 : (84 ♂ ♂ / 81 ♀ ♀)

Other material examined

SAN CRISTOBAL : Jacquemart 1974 : (I) : El Junco (3 ♀ ♀) ; Schatz 1985 : (III) : El Junco 670 m (8 ♂ ♂ / 11 ♀ ♀), El Junco 680 m (2 ♂ ♂ / 3 ♀ ♀), Cerro San Joaquin 700 m (6 ♂ ♂ / 3 ♀ ♀), Cerro San Joaquin 740 m (3 ♂ ♂)

Records mentioned in literature

SAN CRISTOBAL : (IX?.1835) : (5 ind.) ; (I.1906) : (4 ind.) ; (V.1975) : El Junco (10 ind.) ; Cerro San Joaquin (60 ind.) ; (VI.1975) : Cerro San Joaquin (14 ind.)

Distribution and habitat choice

San Cristóbal, restricted to the highlands but there occurring in different habitats

Zoögeographic affinities

Only known from the Galápagos

Pterostichus duncani* (VAN DYKE, 1953)*References**

Feronia duncani VAN DYKE, 1953 : p. 21, pl. 2, fig. 4.
Feronia duncani : LINSLEY & USINGER, 1966 : p. 141.
Pterostichus (Blennidus) duncani : FRANZ, 1985 : p. 78.

Material sampled in 1986

PINZON (III) : Locality 24 (fragments of 4 ind.)

Records mentioned in literature

PINZON : (XII.1905) : 1280 ft (148 ind.); (VI.1975) : near top, between epiphytes (249 ind.).

Distribution and habitat choice

Pinzón, especially at higher altitude

Zoögeographic affinities

Only known from the Galápagos

Pterostichus leleuporum* REICHARDT, 1976*References**

Pterostichus (Blennidus) leleuporum REICHARDT, 1976 : p. 216-217, fig. 21, 24.
Pterostichus (Blennidus) leleuporum : FRANZ, 1985 : p. 78.

Material sampled in 1986

SANTA CRUZ (III) : Locality 19 (1 ♂)

Other material examined

SANTA CRUZ : Jacquemart 1974 : (I) : pampa (1 ♂)

Records mentioned in literature

SANTA CRUZ : (XI.1964) : between Media Luna and Cerro Puntudo (21 ind.), between Cerro Biento and Puntudo 450-500 m (6 ind.); (II.1965) : summit craters (161 ind.); (VI.1965) : Horse cave entrance 600 m (4 ind.); (V.1975) : Cerro Crocker (27 ind.), *Scalesia*-wood (1 ind.); (VI.1975) : Los Gemelos (2 ind.)

Distribution and habitat choice

Santa Cruz, restricted to the highlands, especially numerous in fern-sedge vegetation.

Zoögeographic affinities

Only known from the Galápagos

Pterostichus williamsi* (VAN DYKE, 1953)*References**

Feronia williamsi VAN DYKE, 1953 : p. 21-22.
Feronia williamsi : LINSLEY & USINGER, 1966 : p. 142.
Pterostichus (Blennidus) williamsi : REICHARDT, 1976 : p. 214, 216, fig. 23.

Material sampled in 1986

SANTA CRUZ (III) : Locality 2 (fragments of at least 6 ind.), Locality 13 (31 ♂ ♂ / 23 ♀ ♀), Locality 14 (31 ♂ ♂ / 25 ♀ ♀)

Records mentioned in literature

SANTA CRUZ : (X.1905) : (1 ♂) ; (I.1906) : (1 ♀) ; (V.1932) : (2 ♂ ♂) ; (I.1964) : CDRS (1 ♂) ; (XII.1964) : deep crevasses with underground water (1 ♀) ; (II.1965) : Southeastern slope 50 m, in deep crevasse (1 ♂) ; Southeastern slope, low altitude, at light (?) (1 ♂)

Distribution and habitat choice

Santa Cruz, restricted to lower altitude (dry arid zone)

Zoögeographic affinities

Only known from the Galápagos

Scarites galapagoensis* LINELL, 1898*References**

LINELL, 1898 : p. 253-254.
 MUTCHLER, 1925 : p. 234.
 VAN DYKE, 1953 : p. 13, pl. 2, fig. 1.
 LINSLEY & USINGER, 1966 : p. 141.

Other material examined

SAN CRISTOBAL : Schatz 1985 : (III) : Cerro San Joaquin 700 m (1 ♂, incomplete)

Records mentioned in literature

SAN CRISTOBAL : (? .1891) : (1 ind.) ; (I.1906) : (remains of 1 ind.) ; (VII.1906) : (7 ind.)

Distribution and habitat choice

San Cristóbal, probably restricted to higher altitudes

Zoögeographic affinities

Only known from the Galápagos

Scarites williamsi VAN DYKE, 1953

References

VAN DYKE, 1953 : p. 13-14, pl. 2, fig. 3.
LINSLEY & USINGER, 1966 : p. 141.
Scarites (Baenningeria) williamsi : REICHARDT, 1976 : p. 195, 197, figs. 8-10.
FRANZ, 1985 : p. 76.

Material sampled in 1986

ISABELA : Volcán Cerro Azul (II) : Locality 40 (3 ♂ / 2 ♀ ♀)

Records mentioned in literature

ISABELA : Volcán Cerro Azul : (VI.1975) : (5 ind.)
Volcán Sierra Negra : (VIII-IX.1906) : near Villamil, 100-1400 ft (21 ind.) ; (XI.1964) : South, 3.6 km from the coast (2 ind.) ; (V.1975) : La Torre near Santo Tomás, remains of a *Scalesia*-wood (1 ind.), Bosque de Jaboncillo (2 ind.), Eastern slope (1 ind.)

Distribution and habitat choice

Isabela (Volcán Cerro Azul and Volcán Sierra Negra) ; probably preferring grasslands with stones at medium altitudes

Zoögeographic affinities

Only know from the Galápagos

Tachys erwini REICHARDT, 1976

References

REICHARDT, 1976 : p. 199-202, fig. 11.
DESENDER et al., 1988 : p. 21-22, 24-25.

Material sampled in 1986

PINTA (III) : Locality 79, at light (1 ♀)

Other material examined

ISABELA : Baert & Maelfait 1982 : (II) : Beagle Crater (1 ♂)

Records mentioned in literature

DARWIN : (I.1964) : (4 ind.)
FERNANDINA : (II.1964) : Punta Espinosa (1 ind.)
SANTA CRUZ : (XII.1964-I.1965) : Southeastern slope, low altitude, at light (2 ind.)

Distribution and habitat choice

Darwin, Fernandina, Isabela*, Pinta*, Santa Cruz ; especially occurring in saltmarshes ; taken during flight at light

Zoögeographic affinities

Only known from the Galápagos

Tachys vittiger LECONTE, 1851

References

LECONTE, 1851 : p. 193.
Tachys marginellus LECONTE, 1851 : p. 193.
Tachys picturatus PUTZEYS, 1874 : p. 119.
Tachys beebei MUTCHLER, 1925 : p. 223-224, fig. 42.
Tachys beebei : CSIKI, 1928 : p. 169.
Tachys ensenade MUTCHLER, 1934 : p. 3.
Tachys beebei : BLACKWELDER, 1944 : p. 30.
Tachys beebei : VAN DYKE, 1953 : p. 16.
LINDROTH, 1966 : p. 428, fig. 218.
Tachys beebei : LINSLEY & USINGER, 1966 : p. 141.
ERWIN, 1973 : p. 125.
ERWIN, 1974 : p. 150.
REICHARDT, 1976 : p. 198-199.
FRANZ, 1985 : p. 76-77.

Material sampled in 1986

ISABELA (II) : Locality 26 (29 ♂ / 30 ♀ ♀), Locality 27 (4 ♂ / 4 ♀ ♀) ; Volcán Cerro Azul : Locality 39 (1 ♀)

RABIDA (III) : Locality 21 (1 ♂ / 2 ♀ ♀)
SANTA CRUZ (II) : Locality 1, at light (43 ♂ / 56 ♀ ♀) ; Locality 3 (14 ♂ / 20 ♀ ♀) and Locality 3, at light (18 ♂ / 27 ♀ ♀)
SANTIAGO (III) : Locality 77 (25 ♂ / 35 ♀ ♀), Locality 78 (18 ♂ / 16 ♀ ♀)

Other material examined

ISABELA : Baert & Maelfait 1982 : (II) : Beagle Crater (7♂♂/3♀♀)

SANTA CRUZ : Jacquemart 1974 : (I) : *Miconia*-zone (1♀); (II) : zone of transition (1♀), Northern slope (2♀♀), top of the island (1♂); Schatz 1985 : (II) : Puerto Ayora (1♂)

Records mentioned in literature

BALTRA : (IV.1923) : under stones in damp mud around pools (8 ind.)

ISABELA : Volcán Sierra Negra : (XI.1964) : at 4 km of the coast (1 ind.)

SANTA CRUZ : (I-II.1964) : CDRS, at light (32 ind.) ; (X.1964) : idem (1 ind.) ; (IX.1964-II.1965) : South-eastern slope, low altitude, at light (198 ind.) ; (IV-V-1975) : CDRS, at light (12 ind.) ; (V.1975) : Cerro Colorado at Northeastern coast (14 ind.), *Scalesia*-wood near road to Baltra (1 ind.), Santa Rosa on trail to the Caseta (1 ind.) ; (VI.1975) : CDRS, at light (1 ind.)

AMERICAN MAINLAND : CALIFORNIA : San Diego (1♀); HAYWARD : Colorado-river; ANTIGUA (WEST INDIES), PUERTO RICO (Ensenada) ; ECUADOR : (IV.1975) : Playa Tanga

Distribution and habitat choice

Baltra, Isabela, Rábida*, Santa Cruz, Santiago* ; this halophilous species is largely confined to the banks of brackish or saline water pools ; small numbers are sometimes found in other habitats at higher altitude and probably a byproduct of flight activity.

Zoögeographic affinities

Southern parts of North America, Central America, Northern parts of South America.

Bibliography

BAERT, L., MAELFAIT, J.-P. & DESENDER, K. - in press - Results of the Belgian 1986-expedition : Araneae and provisional checklist of the spiders of the Galápagos archipelago. *Bulletin de l'Institut royal des Sciences Naturelles de Belgique*.

BAERT, L. & MAELFAIT, J.-P. - 1986 - A contribution to the knowledge of the spider fauna of Galápagos (Ecuador). *Bulletin de l'Institut royal des Sciences Naturelles de Belgique : Entomologie*, 56 : 93-123.

BASILEWSKY, P. - 1968 - Les Calosomes des îles Galápagos (Coleoptera : Carabidae). *Mission zoologique belge aux îles Galápagos et en Ecuador*, 1 : 179-200.

General Discussion

Although only 19 species (or about 50%) of the Galápagos Carabid fauna are treated in this paper, it is interesting to note that from these species no less than 17 (or nearly 90%) are endemic to the archipelago. Indeed only two species are also known from the continent, moreover found on different islands of the Galápagos archipelago, and known as both regularly and easily dispersing by flight. From the 17 endemic species, 4 only are known from more than one island and are able to fly, no less than 13 (or nearly 70%) are restricted to one island or even one volcano of the archipelago. These species, without exception, have undergone a partly or even nearly complete reduction in their flight wing development (and thus in their dispersal power). Moreover, they seem highly specialized in their habitat choice. As compared to other biotic taxocoenoses, these levels of endemism are very high indeed and show the high degree of speciation which has occurred in Carabid beetles.

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BLACKWELDER, R.E. - 1944 - Checklist of the coleopterous insects of Mexico, Central America, the West Indies and South America. *Bulletin of the United States National Museum*, 185(1) : 1-188.

BLAIR, K.G. - 1933 - Further Coleoptera from the Galápagos archipelago. *The Annals and Magazine of Natural History*, ser. 10, 11 : 471-487.

BREUNING, S. - 1927 - Monografie der Gattung *Calosoma* Web. I. Teil. *Koleopterologische Rundschau*, 13 : 129-232.

CSIKI, E. - 1928 - Coleopterorum catalogus, pars 97, Carabidae : Mormolycinae, Harpalinae I. *W. Junk, Berlin* : 1-226.

DESENDER, K., BAERT, L. & MAELFAIT, J.-P. - 1988 - Distribution and flight activity of carabid beetles genus *Tachys* in the Galápagos archipelago. *Noticias de Galapagos*, 46 : 20-25.

- ERWIN, T.L. - 1973 - Nomenclatural notes on the Tachyini (Coleoptera : Carabidae). *Proceedings of the Entomological Society of Washington*, 75 (1) : 125.
- ERWIN, T.L. - 1974 - Studies of the subtribe Tachyina (Coleoptera : Carabidae : Bembidiini). Supplement A : Lectotype designations for new world species, two new genera, and notes on generic concepts. *Proceedings of the Entomological Society of Washington*, 76 (2) : 123-155.
- FRANZ, H. - 1985 - Beitrag zur Kenntnis der Koleopterenfauna der Galápagos-Inseln. *Tagungsberichte der Österreichischen Akademie für Wissenschaften, Mathematisch-naturwissenschaftliche Klasse, Abteilung 1*, 194 : 73-124.
- GEHIN, J. - 1885 - Catalogus synonymique et systématique des Coléoptères de la Tribu des Carabides, Paris.
- GEMMINGER, M. & HAROLD, E. - 1868 - Catalogus Coleopterorum, Cicindelidae - Carabidae, 1 : 1-424.
- GIDASPOW, T. - 1963 - The Genus *Calosoma* in Central America, the Antilles, and South America. *Bulletin of the American Museum of Natural History*, 124 : 275-314.
- HOPE, F.W. - 1838 - Descriptions of some species of Carabidae collected by Charles Darwin, Esq., in his late voyage. *Transactions of the Entomological Society of London*, 2 : 128-131.
- HORN, W. - 1915 - Coleoptera Adephaga, Fam. Carabidae, Subfam. Cicindelinae. *Genera Insectorum*, 82c : 209-486.
- HORN, W. - 1920 - Cicindelinen - Studien aus dem Schwedischen Reichsmuseum nebst einigen Bemerkungen neuer Arten. *Arkiv für Zoologie*, 12(11) : 1-21.
- HOWARD, L.O. - 1889 - Scientific results of explorations by steamer Albatross, no. 5. Annotated catalogue of the insects collected in 1887-88. *Proceedings of the United States National Museum*, 12 (771) : 185-216.
- JEANNEL, R. - 1940 - Les Calosomes. *Mémoires du Muséum d'Histoire naturelles de Paris*, 13 : 1-240.
- LECONTE, J.L. - 1851 - Descriptions of new species of Coleoptera, from California. *Annals of the Lyceum of Natural History of New York*, 5 : 125-184.
- LINDROTH, C.H. - 1966 - The Ground-Beetles (Carabidae excl. Cicindelinae) of Canada and Alaska. Part 4. *Opusculae Entomologicae Supplement 29* : 409-648.
- LINELL, M.L. - 1898 - On the coleopterous insects of Galápagos Islands. *Proceedings of the United States National Museum*, no. 1143 : 249-269.
- LINSLEY, E.G. - 1977 - Insects of Galápagos (Supplement). *Occasional Papers of the California Academy of Sciences*, 125 : 1-50.
- LINSLEY, E.G. & USINGER, R.L. - 1966 - Insects of the Galápagos Islands. *Proceedings of the California Academy of Sciences*, 33 : 113-196.
- MANDL, K. - 1967 - Neue Cicindeliden-Formen in der Sammlung des Museums G. Frey, Tutzing (Col.). *Entomologische Arbeiten Museum Frey*, 18 : 384-387.
- MUTCHLER, A.J. - 1925 - Coleoptera of the Williams Galápagos Expedition. *Zoologica* 5 (20) : 219-240.
- MUTCHLER, A.J. - 1934 - New species of Carabidae from Puerto Rico. *American Museum Novitates*, no. 686 : 1-5.
- MUTCHLER, A.J. - 1938 - Coleoptera of the Galápagos Islands. *American Museum Novitates*, no. 981 : 1-19.
- PUTZEYS, J.A.A.H. - 1874 - Notice sur les cicindèles et carabiques recueillis dans l'Île Antigoa par M. Purves. *Annales du Société Entomologique de Belgique*, 17 : 117-119.
- REICHARDT, H. - 1970 - Un nouveau coléoptère carabique humicole et aveugle des îles Galápagos. *Mission zoologique belge aux îles Galápagos et en Ecuador*, 2 : 165-169.
- REICHARDT, H. - 1976 - A contribution to the knowledge of the Carabidae of the Galápagos Islands (Coleoptera). *Mission zoologique belge aux îles Galapagos et en Ecuador*, 3 : 179-222.
- ROESCHKE, H. - 1900 - Carabologische Notizen. V. *Entomologische Nachrichten*, 26 : 57-63.
- VAN DYKE, E.C. - 1953 - The Coleoptera of the Galápagos Islands. *Occasional Papers of the California Academy of Sciences*, 22 : 1-181.
- WATERHOUSE, C. - 1877 - Coleoptera. VII *Proceedings of the Zoological Society of London*, no. 5 : 77-82.
- WATERHOUSE, G.R. - 1845 - Descriptions of coleopterous insects collected by Charles Darwin, Esq., in the Galápagos Islands. *Annals of Natural History* 16 (1) : 19-41.

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