Pier Mauro Giachino

New Anillini from South Africa
(Coleoptera Carabidae Trechinae)

Riassunto: *Nuovi Anillini del Sud Africa (Coleoptera Carabidae Trechinae).*

L'autore descrive le seguenti nuove specie: *Microdipnus papafrancisci* n. sp. di Pirie State Forest (Eastern Cape, RSA), *Caeconannus silvanae* n. sp. di Garden Route N.P. (Western Cape, RSA), *C. confusus* n. sp. di Riversonderend Mts., Olifantsbos Forest (Western Cape, RSA), *C. giovanniboanoi* n. sp. di Langeberge Mts., Garcia N.R. (Western Cape, RSA), *C. brunobasoloi* n. sp. di Riviersonderend, Oudebos Forest (Western Cape, RSA), *C. mariozuninoi* n. sp. di Kogelberg NR, Oudebos Forest (Western Cape, RSA), *C. montaguensis* n. sp. di Montagu pass Forest (Western Cape, RSA) e *C. gigas* n. sp. di Cata Forest (Eastern Cape, RSA). Vengono forniti dati aggiuntivi sulla distribuzione delle specie di *Caeconannus* già conosciute. Il genere *Caeconannus* si conferma, al momento, endemico del Sud Africa.

Abstract: The author describes the following new species: *Microdipnus papafrancisci* n. sp. from Pirie State Forest (Eastern Cape, RSA), *Caeconannus silvanae* n. sp. from Garden Route N.P. (Western Cape, RSA), *C. confusus* n. sp. from Riversonderend Mts., Olifantsbos Forest (Western Cape, RSA), *C. giovanniboanoi* n. sp. from Langeberge Mts., Garcia N.R. (Western Cape, RSA), *C. brunobasoloi* n. sp. from Riviersonderend, Oudebos Forest (Western Cape, RSA), *C. mariozuninoi* n. sp. from Kogelberg NR, Oudebos Forest (Western Cape, RSA), *C. montaguensis* n. sp. from Montagu pass Forest (Western Cape, RSA) and *C. gigas* n. sp. from Cata Forest (Eastern Cape, RSA). Additional data on the distribution of already known *Caeconannus* species are provided. The genus *Caeconannus* is currently confirmed to be endemic to South Africa.

Key words: Coleoptera, Carabidae, Anillini, South Africa, new species, soil fauna, endogean beetles.

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Introduction

Until about ten years ago, knowledge about South Africa's Anillini was relatively scarce. Jeannel himself (1963), in one of his major contributions to the knowledge of this interesting tribe, listed only a few species from South Africa: *Anillopsis capensis* (Peringuey, 1896), *Hypodipnites kocki* Jeannel, 1963, *Microdipnus latus* Jeannel, 1963 and *Caeconannus rotundicollis* Jeannel, 1963. It would then be 40 years before the description of *C. marlothi* Schüle, 2004. Finally, Giachino (2015) gave new impetus to the knowledge of this group with the description of *C. bulirschi* Giachino, 2015, *C. orientalis* Giachino, 2015, *C. occidentalis* Giachino, 2015, *Afranillus schuelei* Giachino, 2015 and *Afrodipnus transvaalianus* Giachino, 2015. The availability, courtesy of our friend Petr Bulirsch, of the material of his latest collections in SA allows us to add another piece to our knowledge of the fauna of this interesting region.

Materials and Methods

Before drawing their habitus and male genitalia, the specimens were included in Canada balsam. The drawings were made with a camera lucida connected to a Leitz Dialux Biological Microscope. Specimens' total length was always measured from the anterior margin of the labrum to the apex of the elytra.

The following acronyms have been used for museums or private collections:

DMNHP: Ditsong National Museum of Natural History, Pretoria, South Africa.
NMP: Národni Muzeum Praha, Czech Republic.
CBu: Petr Bulirsh Collection, Praha, Czech Republic.
CKm: Rudolf Kmeco Collection, Litovel, Czech Republic.
CGi: Pier Mauro Giachino Collection, San Martino Canavese (TO), Italy.

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The following acronyms have been used for type material:
HT: holotype;
PT, PTT: paratype(s).

TAXONOMY

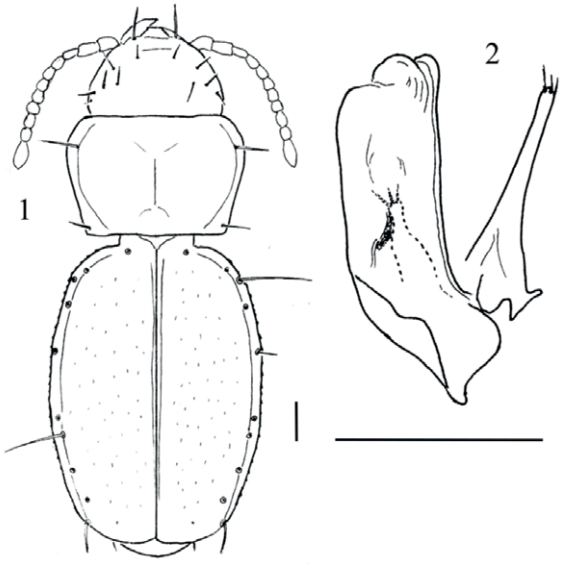
Genus *Microdipnus* Jeannel, 1937
***Microdipnus papafrancisci* n. sp.** (Figs. 1-2)
lsid:zoobank.org:act:
ECB35958-27FF-4B5C-A07B-17061C4A7DC2

Locus typicus: South Africa, Eastern Cape, Pirie State Forest, 32°43'7"S 27°17'4"E

Type material: HT ♂ South Africa, Eastern Cape, Pirie State Forest, 32°43'7"S 27°17'4"E, 20.I.2016, P. Bulirsch lgt. (DMNHP).
PTT: 4 ♀♀ 1 ♂ (remains), South Africa, Eastern Cape, Pirie State Forest, 32°43'7"S 27°17'4"E, 20.I.2016, P. Bulirsch lgt. (CBu, CGi).

Diagnosis. *Microdipnus papafrancisci* n. sp. appears to be related to *M. latus* Jeannel, 1963, a geographically neighboring species, the male of which is unknown, by the elytral chaetotaxis with a type B umbilicate series (*sensu* Jeannel, 1963), by the absence of discal setae and by the base of the pronotum not very narrow and straight, with large and protruding basal angles. It differs from *M. latus* in its smaller size, its stockier and broader body, the shorter antennae and the reciprocal position of pores 7th, 8th, and 9th of the umbilicate series.

Description. Total length (from the anterior margin of the labrum to apex of elytra) 1.4-1.5 mm. Body stocky, broad, depigmented, testaceous with legs, antennae, and palpi slightly lighter; integuments shiny, with light microsculpture, with very short and sparse pubescence.
Head big, stout, only slightly narrower than base of pronotum. Labium tooth absent. Antennae delicate, moniliform, very short, reaching half of pronotum when stretched backwards. Clypeo-frontal groove distinct; anterior margin of epistome subrectilinear.
Pronotum very transverse (max width/max length ratio=1.50), maximum width at about base of anterior fourth, slightly narrowed basally, here slightly wider than anterior edge; sides anteriorly regularly arcuate, sub-rectilinear and slightly sinuate posteriorly before base. Anterior angles broadly obtuse and rounded, not prominent; posterior ones obtuse and not rounded, evident. Base rectilinear. Disc slightly convex, without pubescence; median groove very shallow, faintly marked. Marginal groove wide and flattened, enlarged near base; anterior marginal setae inserted inside marginal groove, almost at anterior fourth; basal setae placed at posterior angles.
Legs robust, with protarsi pentamerous, two protarsomeres slightly dilated in male.
Elytra oval, short (max length/max width ratio=1.41), with maximum width near middle, not emarginated in pre-apical area. Disc convex; integuments shiny, with light microsculpture, with very sparse and short pubescence. Humeri totally blunted, posthumeral margin denticulate; elytral apices separately and broadly rounded. Marginal groove wide and distinct up to 9th pore of umbilicate series.
Chaetotaxy: basal umbilicate pore big, foveate. Umbilicate series of type B (*sensu* Jeannel, 1963), with first three pores of humeral group not equidistant (1st and 2nd closer each other), 4th pore decidedly farther and inserted after base of anterior third of elytron; 5th pore placed before base of posterior third of elytron; 6th, 7th and 8th almost equidistant, with 8th displaced onto disc. Discal setae absent.
Aedeagus (Fig. 2) small, with basal bulb small. Median



Figs. 1-2. *Microdipnus papafrancisci* n. sp., holotype ♂. 1) Habitus; 2) Aedeagus in lateral view. Scale bar: 0.1 mm.

lobe, in lateral view, long but stout, with rounded apex; ventral margin sub-rectilinear; apical blade short, stout and not curved downward. Endophallus with one median, sinuate, slightly sclerified phanera not prolonged in a flagellum. Parameres very different in length; left one longer and slender than right one, each bearing three short, apical and divergent setae.

Etymology. This new species is dedicated to His Holiness Pope Francis, as a sign of gratitude for his constant action in defense of the diversity of life.

Distribution and ecology. *Microdipnus papafrancisci* n. sp. is presently known only from the type locality of Pirie Forest in Eastern Cape Province (South Africa). The altitude of this site is about 720 m above sea level (a.s.l.); all specimens were collected by sifting litter in forest patches.

Genus *Caeconannus* Jeannel, 1963
***Caeconannus silvanae* n. sp.** (Figs. 3, 7)
lsid:zoobank.org:act:
B93B1554-6BAF-4BD3-9F7F-C0A19AA71E56

Locus typicus: South Africa, Western Cape, Garden Route N.P., Woodville Ind. Forest, 33°56'0"S 22°38'7"E.

Type material: HT ♂, South Africa, Western Cape, Garden Route N.P., Woodville Ind. Forest, 33°56'0"S 22°38'7"E, 15.I.2015, P. Bulirsch lgt. (DMNHP)
PTT: 8 ♂♂ 3 ♀♀, South Africa, Western Cape, Garden Route N.P., Woodville Ind. Forest, 33°56'0"S 22°38'7"E, 15.I.2015, P. Bulirsch lgt. (CBu, CGi).

Diagnosis. *Caeconannus silvanae* n. sp. is closely related to *C. rotundicollis* Jeannel, 1963 and *C. bulirschi* Giachino, 2015 by the absence of microserrulation in the basal part of the elytral margin. *C. silvanae* n. sp. differs from these species in the different shape of the median lobe of the aedeagus, which is slenderer than in *C. rotundicollis* and without a beak-shaped apex like in *C. bulirschi*. It differs from *C. bulirschi* also in the presence of a posterior discal seta.

Description. Total length (from the anterior margin of labrum to apex of elytra) 1.1-1.2 mm. Body poorly elongated, stumpy, depigmented, yellow-testaceous with legs, antennae, and palpi slightly lighter; integuments shiny, with light microsculpture, without pubescence.
Head big, stout, slightly narrower than pronotum. Labium tooth absent. Antennae delicate, moniliform, very short, hardly reaching half length of pronotum when stretched backwards. Clypeo-frontal groove distinct; anterior margin of epistome sub-rectilinear.
Pronotum transverse (max width/max length ratio=1.31), with maximum width at about base of anterior fourth, basally narrowed, here as wide as anterior edge; sides anteriorly regularly arcuate, sub-rectilinear and not sinuate posteriorly before base. Anterior angles broadly obtuse and rounded, not prominent; posterior ones broadly obtuse and slightly rounded. Base slightly arcuate. Disc scarcely convex, with very sparse and short pubescence; median groove very shallow, scarcely marked. Marginal groove wide and flattened, enlarged near base; anterior marginal setae inserted inside marginal groove, almost at anterior fourth; basal setae placed before posterior angles.
Legs robust, with protarsi pentamerous, two protarsomeres slightly dilated in male.
Elytra egg-shaped, short (max length/max width ratio=1.29), with maximum width near base of posterior third, not emarginated in pre-apical area. Disc moderately convex; integuments shiny, with light microsculpture and with very sparse and short pubescence. Humeri totally blunted, posthumeral margin not denticulate; elytral apices separately and broadly rounded. Marginal groove wide and obvious up to 9th pore of umbilicate series.
Chaetotaxy: basal umbilicate pore big, foveate. Umbilicate series of type B (*sensu* Jeannel, 1963), with first three pores of humeral group almost equidistant, 4th pore decidedly farther and inserted after base of anterior third of elytron; 5th pore placed near the base of posterior third of elytron; 5th, 6th, 7th and 8th ones displaced onto disc; the 7th, 8th and 9th ones not equidistant, with 7th and 8th closer. Posterior discal seta inserted just before 8th umbilicate pore.
Aedeagus (Fig. 7) small, with basal bulb small. Median lobe, in lateral view, long but stout, showing rounded apex; ventral margin sub-rectilinear; apical blade short, stout and not curved downward. Endophallus with one median, sinuate, scarcely sclerified phanera prolonged in long and thin flagellum. Parameres different in length, relatively long and slender, reaching apical fourth of median lobe; bearing two long and apical setae.

Etymology. This new interesting species is dedicated to my mother Silvana in gratitude for her moral teachings.

Distribution and ecology. *Caeconannus silvanae* n. sp. is presently known only from the type locality, the Woodville Forest, in the Garden Route N.P., Western Cape Province (South Africa). The altitude of this site is about 470 m a.s.l.; all specimens were collected by sifting litter in forest.

***Caeconannus confusus* n. sp.** (Figs. 4, 8)
lsid:zoobank.org:act:
529298F8-983E-4AA0-B597-40E530BEF435

Locus typicus: South Africa, W. Cape, m 550, Riversonderend Mts., Olifantsbos Forest, sifting, 34°5'5"S 19°53'5"E.

Type material: HT ♂, South Africa, W. Cape, m 550, Riversonderend Mts., Olifantsbos forest, sifting, 34°5'5"S 19°53'5"E, 11.X.2017, P. Bulirsch lgt (DMNHP).
PTT: 1 ♀ + 1 spec., South Africa, W. Cape, m 550, Riversonderend Mts., Olifantsbos forest, sifting, 34°5'5"S 19°53'5"E, 11.X.2017, P. Bulirsch lgt (CBu, CGi); 15 ♂♂ 18 ♀♀, South Africa, W. Cape, NW of Riviersonderend, Ou(de)bos Ind. For., 34°3.95'S 19°49.35'E, 29.XI.2022, P. Bulisch lgt. (CBu, CGi).

Diagnosis. *Caeconanus confusus* n. sp. is closely related to *C. occidentalis* Giachino, 2015 by the presence of microserrulation in the basal part of the elytral margin, but differs from this species in the different shape of the median lobe of the aedeagus, which is stouter, without a beak-shaped apex.

Description. Total length (from anterior margin of labrum to apex of elytra) 1.2-1.3 mm. Body scarcely elongated, stumpy, depigmented, yellow-testaceous with legs, antennae, and palpi slightly lighter; integuments shiny, with light microsculpture, with sparse and medium length pubescence.
Head relatively small, stout, narrower than pronotum. Labium tooth absent. Antennae delicate, moniliform, short, reaching half length of pronotum when stretched backward. Clypeo-frontal groove distinct; anterior margin of epistome sub-rectilinear. Pronotum transverse (max width/max length ratio=1.20), with maximum width at about the base of anterior third, basally narrowed, where it is narrower than anterior edge; sides anteriorly regularly arcuate, sub-rectilinear or slightly curved, and not sinuate posteriorly before base. Anterior angles broadly obtuse and rounded, not prominent; posterior ones broadly obtuse and slightly rounded. Base subrectilinear. Disc scarcely convex, with sparse and medium length pubescence; median groove very shallow, scarcely marked. Marginal groove narrow and flattened, enlarged near base; anterior marginal setae inserted inside the marginal groove, almost at anterior fifth; basal setae placed well before posterior angles. Legs robust, with protarsi pentamerous, two protarsomeres slightly dilated in male.
Elytra oval, short (max length/max width ratio=1.55), with maximum width near middle, not emarginated in pre-apical area. Disc moderately convex; integuments shiny, with light microsculpture, with sparse and medium length pubescence. Humeri totally blunted, posthumeral margin denticulate; elytral apices separately and broadly rounded. Marginal groove wide and distinct up to 9th pore of umbilicate series.
Chaetotaxy: basal umbilicate pore big, foveate. Umbilicate series of type B (*sensu* Jeannel, 1963), with first three pores of humeral group almost equidistant, 4th pore decidedly farther and inserted after base of anterior third of elytron; 5th pore placed near base of posterior third of elytron; 5th, 6th, 7th, 8th and 9th ones almost equidistant; 5th, 7th and 8th ones displaced onto the disc. Posterior discal seta inserted near 8th umbilicate pore.
Aedeagus (Fig. 8) small, with basal bulb small. Median lobe, in lateral view, long but stout, showing broadly rounded apex; ventral margin sub-rectilinear; apical blade short, stout and not curved downward. Endophallus unarmed. Parameres different in length, relatively long and slender, reaching the apical third of median lobe; bearing two long apical setae.

Etymology. Confused, *confusus* in Latin. The name indicates that this taxon was originally confused with *C. brunobasoloi* n. sp.

Distribution and ecology. *Caeconannus confusus* n. sp. is presently known only from two different locali-

ties of the Western Cape Province (South Africa): the first one is Olifantsbos Forest, Riversonderend Mts.; the second one is Oudebos Forest, NW of Riviersonderend. The altitude of these sites is 550-570 m a.s.l.; all specimens were collected by sifting litter in forest.

***Caeconannus giovanniboanoi* n. sp.** (Figs. 5, 9)
lsid:zoobank.org:act:
D848457C-DE2C-4232-914A-742D5294A270

Locus typicus: South Africa, W. Cape, Langeberge Mts, Garcia NR, m 570, 33°57'9"S 21°12'4"E.

Type material: HT ♂, South Africa, W. Cape, Langeberge Mts, Garcia NR, m 570, 33°57'9"S 21°12'4"E, 16.X.2017, P. Bulirsch lgt (DMNHP).
PTT: 1 ♀, South Africa, W. Cape, Langeberge Mts, Garcia NR, m 570, 33°57'9"S 21°12'4"E, 16.X.2017, P. Bulirsch lgt, (CBu); 1 ♂ 1 ♀, South Africa, W. Cape, Langeberge Mts, Tradouvpass env., 33°57'9"S 20°42'3"E, 16.X.2017, P. Bulirsch lgt. (CBu, CGi).

Diagnosis. *Caeconannus giovanniboanoi* n. sp. is closely related to *C. rotundicollis* Jeannel, 1963 and *C. bulirschi* Giachino, 2015 by the absence of microserrulation in the basal part of the elytral margin. It differs from these species in the different shape of the median lobe of the aedeagus, which is less slender, without a beak-shaped apex if compared with *C. bulirschi* and slenderer if compared with *C. rotundicollis*.

Description. Total length (from anterior margin of labrum to apex of elytra) 1.1 mm. Body scarcely elongated, stumpy, depigmented, yellow-testaceous with legs, antennae, and palpi slightly lighter; integuments shiny, with light microsculpture, with sparse and very short pubescence.
Head large, stout, slightly narrower than pronotum. Labium tooth absent. Antennae delicate, moniliform, short, reaching half length of pronotum when stretched backward. Clypeo-frontal groove distinct; anterior margin of epistome sub-rectilinear.
Pronotum transverse (max width/max length ratio=1.15), with maximum width at about base of anterior fourth, basally narrowed, where it is narrower than anterior edge; sides anteriorly regularly arcuate, subrectilinear, or slightly curved, and not sinuate posteriorly before base. Anterior angles broadly obtuse and rounded, not prominent; posterior ones broadly obtuse and slightly rounded. Base slightly curved. Disc scarcely convex, with sparse and very short pubescence; median groove very shallow, scarcely marked. Marginal groove narrow and flattened, enlarged near base; anterior marginal setae inserted inside the marginal groove, almost at anterior fifth; basal setae placed before posterior angles.
Legs robust, with protarsi pentamerous, two protarsomeres slightly dilated in male.
Elytra oval, short (max length/max width ratio=1.51), with maximum width near middle, not emarginated in pre-apical area. Disc moderately convex; integuments shiny, with light microsculpture, with sparse and very short pubescence. Humeri totally blunted, posthumeral margin very slightly denticulate; elytral apices separately and broadly rounded. Marginal groove wide and distinct up to 9th pore of umbilicate series.
Chaetotaxy: basal umbilicate pore big, foveate. Umbilicate series of type B (*sensu* Jeannel, 1963), with first three pores of the humeral group almost equidistant, 4th pore decidedly farther and inserted after base of anterior third of elytron; 5th pore placed after base of posterior third of elytron; 5th and 6th ones very close to each other, 7th, 8th and 9th ones not equidistant; 7th and 8th displaced onto disc. Posterior discal seta inserted before 7th umbilicate pore.
Aedeagus (Fig. 9) small, with basal bulb small. Median lobe, in lateral view, short, curved, showing subacute apex; ventral margin bisinuate; apical blade short, stout and slightly curved downward. Endophallus showing two spiniform clusters, one in preapical and one in median positions. Parameres different in length, relatively long and slender, reaching apical third of median lobe; bearing two long apical setae.

Etymology. This interesting new species is named after my friend Giovanni Boano, ornithologist, in appreciation for his contribution to Italian ornithology.

Distribution and ecology. *Caeconanus giovanniboanoi* n. sp. is presently only known from two sites in the Langeberge Mts. in the Western Cape Province (South Africa): Garcia Nature Reserve and Tradouvpass env. The altitude of these sites is 290–570 m a.s.l.; all specimens were collected by sifting litter in forest patches.

***Caeconannus brunobasoloi* n. sp.** (Figs. 6, 10)
lsid:zoobank.org:act:
6737D275-5969-4A89-B08A-96C6B3EEF886

Locus typicus: South Africa, W. Cape, NW of Riviersonderend, Ou(de)bos Ind. For., 34°3.95'S 19°49.35'E.

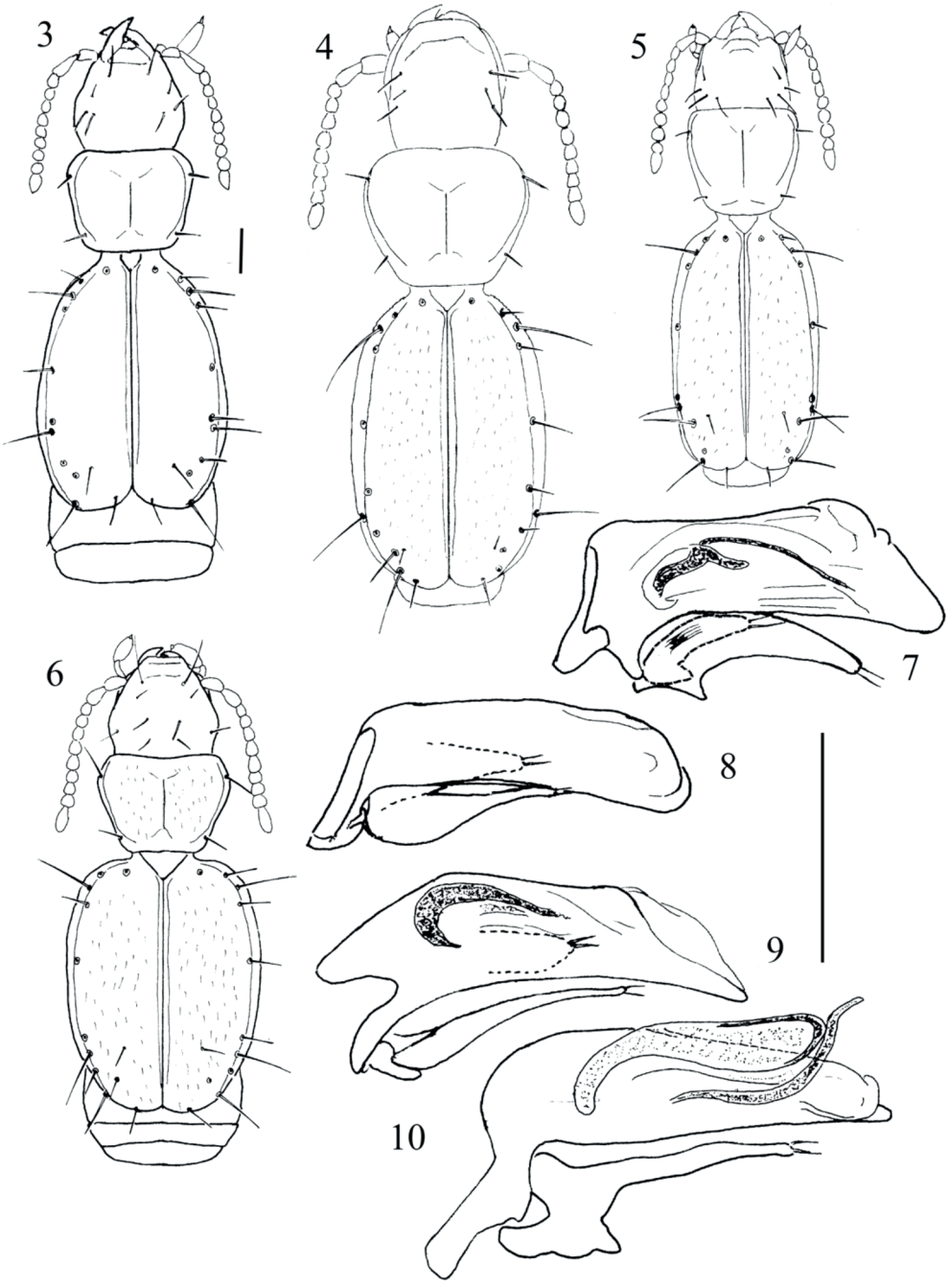
Type material: HT ♂, South Africa, W. Cape, NW of Riviersonderend, Ou(de)bos Ind. For., 34°3.95'S 19°49.35'E, 29.XI.2022, P. Bulisch lgt. (DMNHP).
PTT: 7 ♂♂ 13 ♀♀, South Africa, W. Cape, NW of Riviersonderend, Ou(de)bos Ind. For., 34°3.95'S 19°49.35'E, 29.XI.2022, P. Bulisch lgt. (CBu, CGi); 1 ♂ South Africa, W. Cape, ca 400 m, Rivieresonderend Mts., Olifantsbos forest, 34°5'0"S 19°53'6"E, 11.X.2017, J. Janák lgt. (CBu).

Diagnosis. *Caeconannus brunobasoloi* n. sp. is closely related to *C. rotundicollis* Jeannel, 1963, *C. bulirschi* Giachino, 2015 and *C. giovanniboanoi* n. sp. by the absence of microserrulation in the basal part of the elytral margin. It differs from these species in the different shape of the median lobe of the aedeagus, which is slenderer, without a beak-shaped apex if compared with *C. bulirschi* and slenderer if compared with *C. rotundicollis* and *C. giovanniboanoi* n. sp.

Description. Total length (from anterior margin of labrum to apex of elytra) 1.0-1.1 mm. Body short, stumpy, depigmented, yellow-testaceous with legs, antennae and palpi slightly lighter; integuments shiny, with light microsculpture, with sparse and medium length pubescence.
Head large, stout, narrower than pronotum. Labium tooth absent. Antennae delicate, moniliform, short, just overcoming half length of pronotum when stretched backward. Clypeo-frontal groove distinct; anterior margin of epistome sub-rectilinear.
Pronotum transverse (max width/max length ratio=1.42) with maximum width at about base of anterior third, basally narrowed, where it is narrower than anterior edge; sides irregularly arcuate anteriorly, sub-rectilinear, or slightly sinuate posteriorly. Anterior angles broadly obtuse and rounded, not prominent; posterior ones broadly obtuse and slightly rounded. Base sub-rectilinear. Disc slightly convex, with sparse and medium length pubescence; median groove very shallow, slightly marked. Marginal groove narrow and flattened, enlarged near base; anterior marginal setae long and inserted inside marginal groove, almost at anterior fifth; basal setae long and placed before posterior angles.
Legs robust, with protarsi pentamerous, two protarsomeres slightly dilated in male.
Elytra oval, very short and wide (max length/max width ratio=1.26), with maximum width near middle, not emarginated in pre-apical area. Disc moderately convex; integuments shiny, with a light microsculpture, with sparse and medium length pubescence. Humeri totally blunted, posthumeral margin smooth, not denticulate; elytral apices separately and broadly rounded. Marginal groove wide and distinct up to 9th pore of umbilicate series.
Chaetotaxy: basal umbilicate pore big, foveate. Umbilicate series of type B (*sensu* Jeannel, 1963), with first three pores of humeral group almost equidistant, 4th pore decidedly farther and inserted just after base of anterior third of elytron; 5th pore placed after base of posterior third of elytron; 5th, 6th, 7th and 7th, 8th and 9th ones equidistant; 8th one displaced onto disc. Posterior discal seta inserted at level of 6th umbilicate pore.
Aedeagus (Fig. 18) small, with basal bulb small, prebasally strongly restricted. Median lobe, in lateral view, long, right, showing subacute apex; ventral margin sub-rectilinear; apical blade short, subtriangular and not curved downward. Endophallus showing large, dorsal vesicula and long flagellum. Parameres different in length, relatively long and slender, reaching apical fourth of median lobe; bearing two long apical setae.

Etymology. This interesting new species is named after Bruno Basolo, a fraternal friend and esteemed doctor and musician, a companion of many youthful adventures.

Distribution and ecology. *Caeconannus brunobasoloi* n. sp. is presently only known from two different sites in Rivieresonderend Mts., Western Cape Province (South Africa): Oudebos Ind. Forest and Olifantsbos Forest. The altitude of these sites is 400-570 m a.s.l.; all specimens were collected by sifting litter in forest patches.



Figs. 3-10. Habitus and aedeagus in lateral view of *Caeconannus* spp.: 3, 7) *C. silvanae* n. sp. holotype ♂; 4, 8) *C. confusus* n. sp. holotype ♂; 5, 9) *C. giovanniboanoi* n. sp. holotype ♂; 6, 10) *C. brunobasoloi* n. sp. holotype ♂. Scale bar: 0.1 mm.

***Caeconannus mariozuninoi* n. sp.** (Figs. 11, 15)
lsid:zoobank.org:act:
DB837481-9671-44BD-B061-4D918639D2CD

Locus typicus: South Africa, W. Cape, Kogelberg NR, Oudebos for., 34°20'1"S 18°56'7"E.

Type material: HT ♂, South Africa, W. Cape, Kogelberg NR, Oudebos for., 34°20'1"S 18°56'7"E, 19.X.2019, P. Bulirsch lgt, (DMNHP).

Diagnosis. *Caeconannus mariozuninoi* n. sp. is closely related to *C. rotundicollis* Jeannel, 1963, *C. bulirschi* Giachino, 2015, *C. giovanniboanoi* n. sp. and *C. brunobasoloi* n. sp. by the absence of microserrulation in the basal part of the elytral margin. It differs from these species in the different and peculiar shape of the median lobe of the aedeagus (Fig. 15).

Description. Total length (from anterior margin of labrum to apex of elytra) 1.0 mm. Body short, stumpy, depigmented, yellow-testaceous with legs, antennae, and palpi slightly lighter; integuments shiny, with light microsculpture, with sparse and very short pubescence.
Head small, stout, narrower than pronotum. Labium tooth absent. Antennae delicate, moniliform, short, just overcoming half length of pronotum when stretched backward. Clypeo-frontal groove distinct; anterior margin of epistome sub-rectilinear.
Pronotum transverse (max width/max length ratio=1.35) with maximum width at about base of anterior fourth, basally narrowed, where it is narrower than anterior edge; sides regularly arcuate anteriorly, not sinuate posteriorly. Anterior angles broadly obtuse and rounded, not prominent; posterior ones broadly obtuse and slightly rounded. Base sub-rectilinear. Disc slightly convex, with sparse and very short pubescence; median groove very shallow, slightly marked. Marginal groove narrow and flattened, progressively enlarged to base; anterior marginal setae long and inserted inside marginal groove, almost at anterior fifth; basal setae long and placed before posterior angles.
Legs robust, with protarsi pentamerous, two protarsomeres slightly dilated in male.
Elytra oval, very short and wide (max length/max width ratio=1.33), with maximum width near middle, not emarginated in pre-apical area. Disc moderately convex; integuments shiny, with light microsculpture, with sparse and very short pubescence. Humeri totally blunted, posthumeral margin smooth, not denticulate; elytral apices separately and broadly rounded. Marginal groove wide and distinct up to 9th pore of umbilicate series.
Chaetotaxy: basal umbilicate pore big, foveate. Umbilicate series of type B (*sensu* Jeannel, 1963), with the first three pores of the humeral group almost equidistant, the 4th pore decidedly farther and inserted just after base of anterior third of elytron; 5th pore placed before base of posterior third of elytron; 5th, 6th, 7th ones equidistant; 5th, 7th and 8th ones displaced onto the disc. Posterior discal seta inserted at level of 8th umbilicate pore.
Aedeagus (Fig. 15) small, with basal bulb small, prebasally not restricted. Median lobe, in lateral view, long, slightly curved, showing rounded apex. Ventral margin sub-rectilinear; apical blade long, stout and not curved downward. As shown in Fig. 15, median lobe shows a sort of strange preapical narrowing and it is not clear whether this is really the case, or an artifact of preparation. Endophallus showing a long and convoluted flagellum. Parameres different in length, relatively long and slender, reaching apical fourth of median lobe; bearing two long apical setae.

Etymology. This interesting new species is named after my good friend Mario Zunino, entomologist, biogeographer and short story writer.

Distribution and ecology. *Caeconannus mariozoninoi* n. sp. is presently only known from the type locality, the Oudebos Forest, in Kogelberg NR, Western Cape Province (South Africa). The altitude of this site is about 400 m a.s.l.; a single specimen was collected by sifting litter in forest patches.

***Caeconannus montaguensis* n. sp.** (Figs. 12, 16)
lsid:zoobank.org:act:
549B212A-958D-48EF-A609-CC79AB12103F

Locus typicus: South Africa, W Cape, below Montagu pass Ind. Forest, 33°53.25'S 22°25.7'E.

Type material: HT ♂, South Africa, W Cape, below Montagu pass Ind. Forest, 33°53.25'S 22°25.7'E, 24.XI.2022, P. Bulirsch lgt. (DMNHP).
PTT: 5 ♂♂ 6 ♀♀, South Africa, W Cape, below Montagu pass Ind. Forest, 33°53.25'S 22°25.7'E, 24.XI.2022, P. Bulirsch lgt. (CBu, CGi).

Diagnosis. *Caeconannus montaguensis* n. sp. is closely related to *C. rotundicollis* Jeannel, 1963, *C. bulirschi* Giachino, 2015, *C. giovanniboanoi* n. sp., *C. brunobasoloi* n. sp. and *C. mariozuninoi* n. sp. by the absence of microserrulation in the basal part of the elytral margin. It differs from these species in the different shape of the median lobe of the aedeagus.

Description. Total length (from anterior margin of labrum to apex of elytra) 1.0-1.1 mm. Body short, stumpy, depigmented, yellow-testaceous with legs, antennae, and palpi slightly lighter; integuments shiny, with a light microsculpture, with sparse and very short pubescence.
Head large, stout, narrower than pronotum. Labium tooth absent. Antennae delicate, moniliform, short, just overcoming half length of pronotum when stretched backward. Clypeo-frontal groove distinct; anterior margin of epistome sub-rectilinear.
Pronotum transverse (max width/max length ratio=1.29) with maximum width at about base of anterior fourth, narrowed basally, where it is as wide as anterior edge; sides regularly arcuate anteriorly, sub-rectilinear, not sinuate posteriorly. Anterior angles broadly obtuse and rounded, not prominent; the posterior ones broadly obtuse and widely rounded. Base sub-rectilinear. Disc slightly convex, with sparse and very short pubescens; median groove very shallow, slightly marked. Marginal groove wide and flattened, enlarged near base; anterior marginal setae long and inserted inside the marginal groove, almost at anterior fifth; basal setae long and placed well before posterior angles.
Legs robust, with protarsi pentamerous, two protarsomeres slightly dilated in male.
Elytra oval, very short and wide (max length/max width ratio=1.34), with maximum width after middle, not emarginated in the pre-apical area. Disc moderately convex; integuments shiny, with a light microsculpture, with sparse and very short pubescence. Humeri totally blunted, post-humeral margin smooth, not denticulate; elytral apices separately and broadly rounded. Marginal groove wide and distinct up to 9th pore of umbilicate series.
Chaetotaxy: basal umbilicate pore big, foveate. Umbilicate series of type B (*sensu* Jeannel, 1963), with first three pores of the humeral group almost equidistant, 4th pore decidedly farther and inserted just after base of anterior third of elytron; 5th pore placed after base of posterior third of elytron; 5th, 6th and 7th ones equidistant; the 7th and 8th ones displaced onto the disc. Posterior discal seta inserted at level of 7th umbilicate pore.
Aedeagus (Fig. 16) small, with basal bulb small, prebasally slightly restricted. Median lobe, in lateral view, long, gently curved, showing a subtriangular apex; ventral margin gently curved; apical blade wide, subtriangular and not curved downward. Endophallus showing large, basal, beam-shaped phanera and short flagellum. Parameres different in length, relatively long and slender, reaching apical fourth of median lobe; bearing two long apical setae.

Etymology. From its type locality, Montagu pass.

Distribution and ecology. *Caeconannus montaguensis* n. sp. is presently only known from the type locality, Montagu pass Ind. Forest, in Western Cape Province (South Africa). The altitude of this site is 300-800 m a.s.l.; all specimens were collected by sifting litter in forest patches.

***Caeconannus gigas* n. sp.** (Figs. 13, 17)
lsid:zoobank.org:act:
E3A8AB2A-EE6B-472B-8F74-89C22A19D3CF

Locus typicus: South Africa, Eastern Cape, Cata env. ind. Forest, 32°34'0"S 27°8'57"E.

Type material: HT ♂, South Africa, Eastern Cape, Cata env. ind. Forest, 32°34'0"S 27°8'57"E, 19.I.2016, P. Bulirsch lgt. (DMNHP).
PTT: 2 ♂♂ 1 ♀, South Africa, Eastern Cape, Cata env. ind. Forest, 32°34'0"S 27°8'57"E, 19.I.2016, P. Bulirsch lgt. (CBu, CGi).

Diagnosis. *Caeconannus gigas* n. sp. is closely related to *C. orientalis* Giachino, 2015 by the body shape, the elytral chaetotaxis and the shape of the median lobe of the aedeagus. It differs from these species in the absence of microserrulation in the basal part of elytral margin.

Description. Total length (from anterior margin of labrum to apex of elytra) 1.5-1.6 mm. Body short, stumpy, depigmented, yellow-testaceous with legs, antennae, and palpi slightly lighter; integuments shiny, with light microsculpture, with sparse and long pubescence.

Head very large, stout, narrower than pronotum. Labium tooth absent. Antennae delicate, moniliform, short, just overcoming half length of pronotum when stretched backwards. Clypeo-frontal groove distinct; anterior margin of epistome sub-rectilinear.

Pronotum transverse (max width/max length ratio=1.36) with maximum width at about base of anterior fourth, basally narrowed, where it is narrower than anterior edge; sides regularly arcuate anteriorly, sub-rectilinear, not sinuate posteriorly. Anterior angles broadly obtuse and rounded, not prominent; posterior ones broadly obtuse and rounded. Base sub-rectilinear. Disc slightly convex, with sparse and long pubescence; median groove very shallow, slightly marked. Marginal groove wide and flattened, enlarged near base; anterior marginal setae inserted inside the marginal groove, almost at anterior fourth; basal setae placed before posterior angles.

Legs robust, with protarsi pentamerous, two protarsomeres slightly dilated in male.

Elytra oval, very short and wide (max length/max width ratio=1.37), with maximum width near the middle, not emarginated in the pre-apical area. Disc moderately convex; integuments shiny, with light microsculpture, with sparse and long pubescence. Humeri totally blunted, posthumeral margin smooth, not denticulate; elytral apices separately and broadly rounded. Marginal groove wide and distinct up to 9th pore of umbilicate series.

Chaetotaxy: basal umbilicate pore big, foveate. Umbilicate series of type B (*sensu* Jeannel, 1963), with first three pores of humeral group almost equidistant, 4th pore decidedly farther and inserted just after base of anterior third of elytron; 5th pore placed at base of posterior third of elytron; 6th, 7th and 8th ones equidistant and displaced onto disc. Posterior discal seta inserted before 7th umbilicate pore.

Aedeagus (Fig. 17) small, with basal bulb small, prebasally slightly restricted. Median lobe, in lateral view, long, stout, gently curved, showing broadly rounded apex; ventral margin gently curved. Endophallus without evident phanerae or flagellum. Parameres different in length, relatively long and slender, reaching apex of median lobe; bearing two long apical setae.

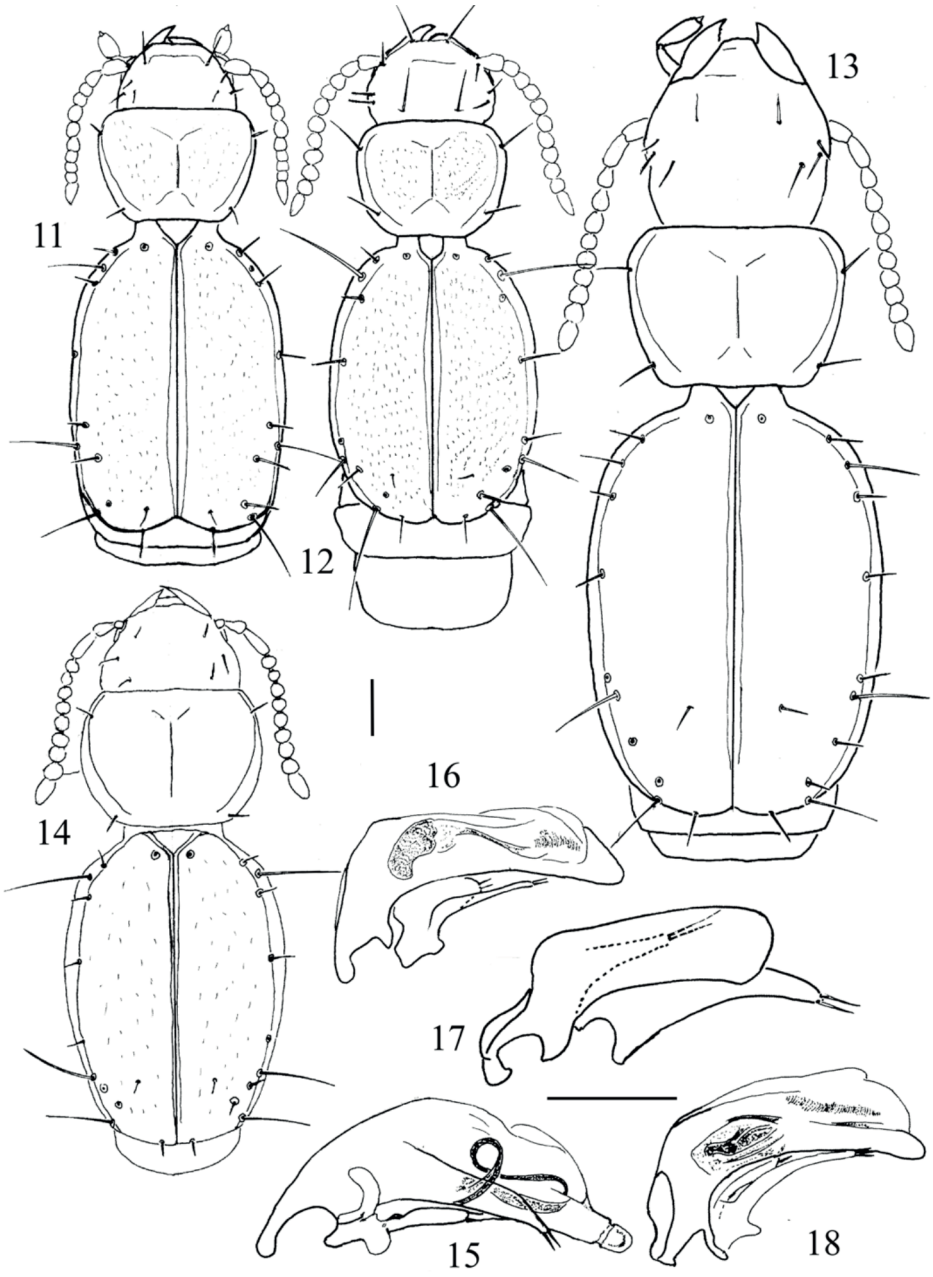
Etymology. The name emphasizes the large size of this new species, clearly than the others known.

Distribution and ecology. *C. gigas* n. sp. is presently known only from the type locality of Cata Forest, Eastern Cape Province (South Africa). The altitude of this site is about 1100 m a.s.l.; all specimens were collected by sifting litter in forest patches.

Caeconannus rotundicollis Jeannel, 1963 (Figs. 14, 18)

Material examined. 1 ♂ 3 ♀♀, R. South Africa, W. Cape, 8.0 km W Suurbraeck; Summerset Getaway Farm above river; 29.XI.2015, 33°59’94”S 20°35’33”E, 120 m, Arriaga – Varela – Seldel lgt., RSA44 (CBu, NMP); 84 ♂♂♀♀, R. South Africa, W. Cape, W of Suurbraeck; Buffeljags r., trib. 1, 33°59.9’S 20°35.35’E, 27.XI.2022, P. Bulirsch lgt. (CBu, CGi); 11 ♂♂♀♀, South Africa, W. Cape, Marloth NR, Wamakersbos, 33°59’5”S 20°28’6”E, 23.I.2020, P. Bulirsch lgt. (CBu, CGi); 1♀, South Africa, W. Cape, Marloth NR, Koloniesbos for. 33°59’5”S 20°27’1”E, 26.X.2019, P. Bulirsch lgt. (CBu).

Note: The type locality of this species is “Grootvaterbus foret sur le Sederberg, district de Swellendam (Capland)”. The transcription given by Jeannel (1963, p. 158) of the type locality (Grootvaterbus) is very approximate. The correct name is Grootvadersbosch. The location of this site provided by Schüle (2004: Fig. 1), probably misled by the wrong spelling, is largely incorrect.



Figs. 11-18. Habitus and aedeagus in lateral view of *Caeconannus* spp.: 11, 15) *C. mariozuninoi* n. sp. holotype ♂; 12, 16) *C. montaguensis* holotype ♂; 13, 17) *C. gigas* holotype ♂; 14, 18) *C. rotundicollis* Jeannel, 1963. Scale bar: 0.1 mm.

Caeconannus marlothi Schüle, 2004

Material examined. 31 ♂♂♀♀, South Africa, W. Cape, Marloth NR, Wamakersbos, 33°59'5"S 20°28'6"E, 23.I.2020, P. Bulirsch lgt. (CBu, CGi); 15 ♂♂♀♀, South Africa, W. Cape, Marloth NR, Koloniesbos for. 33°59'5"S 20°27'1"E, 26.X.2019, P. Bulirsch lgt. (CBu, CGi); 8 ♂♂♀♀, South Africa, W. Cape, Marloth NR, Duiwelsbos-waterfall env., 33°59.6'S 20°27.6'E, 23.I.2020, P. Bulirsch lgt. (CBu, CGi); 31 ♂♂♀♀, RSA, Western Cape, Marloth NR, Koloniesbos for. 33°59'5"S 20°27'1"E, 26.X.2019, R. Kmeco lgt. (CKm, CGi).

Caeconannus bulirschi Giachino, 2015

Material examined. 4 ♂♂♀♀, South Africa, W. Cape, Hottentot Holland NR borders, Mt Rochelle, sifting, 33°54.2'S 19°9.8'E, 18.XI.2022, P. Bulirsch lgt. (CBu, CGi).

CONCLUSIONS

As already pointed out by Giachino (2015), the phyletic lineages of the Anillini of Southern Africa and Madagascar were correctly defined by Jeannel in his two monographic contributions regarding this group (Jeannel 1937, 1963).

Jeannel (1963) established three phyletic lineages: a *Paranillus* phyletic lineage, now including the genera *Paranillus* Jeannel, 1949 and *Afranillus* Giachino, 2015; an *Argiloborus* phyletic lineage with the genera *Pelocharis* Jeannel, 1960, *Argiloborus* Jeannel, 1937 and *Neodipnus* Jeannel, 1957; a *Microtyphlus* phyletic lineage including 14 genera, three of which are present in South Africa: *Afrodipnus* Giachino, 2015, *Microdipnus* Jeannel, 1963 and *Caeconannus* Jeannel, 1963. In this regard, the real phyletic affinities of *Anillopsis capensis* should be better defined with respect to the placement proposed by Jeannel, 1963 (phyletic lineage of *Stylulus*).

As can be seen from the distribution map in Fig. 19, all the currently known species of the four

Fig. 19. Distribution map of the genus *Caeconannus* Jeannel, 1963, in Western Cape Province (SA). 1) *C. silvanae* n. sp.; 2) *C. confusus* n. sp.; 3) *C. giovanniboanoi* n. sp.; 4) *C. brunobasoloi* n. sp.; 5) *C. mariozuninoi* n. sp.; 6) *C. montaguensis* n. sp.; 7) *C. marlothi* Schüle, 2004; 8) *C. rotundicollis* Jeannel 1963; 9) *C. bulirschi* Giachino, 2015; 10) *C. occidentalis* Giachino, 2015.

genera present in South Africa have short-range distribution patterns. This suggests that, given the vastness of the unexplored territory, a number of unknown taxa are still waiting to be discovered.

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