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## A new genus of Harpalina Bonelli, 1810 from Madagascar and Europa Island (Coleoptera: Carabidae, Harpalinae)

**Riassunto:** *Un nuovo genere di Harpalina Bonelli, 1810 del Madagascar e dell'Isola Europa (Coleoptera: Carabidae, Harpalinae).*

Viene descritto *Harpalomimus*, nuovo genere di Harpalina Bonelli, 1810 per *Harpalus bitinctus* Jeannel, 1948. Viene inoltre descritta una nuova specie proveniente dall'Isola Europa: *Harpalomimus europae* n. sp. Sono infine raffigurati l'habitus e il lobo mediano dell'edeago della nuova specie e di *H. bitinctus*, che era noto in precedenza sul solo holotipus femmina.

**Abstract:** *Harpalomimus*, a new genus of the subtribe Harpalina Bonelli, 1810, is described for *Harpalus bitinctus* Jeannel, 1948 (type species) from Madagascar and for *H. europae* n. sp. from Europa Island. The habitus and male genitalia of the treated taxa are illustrated.

**Key words:** *Harpalomimus* n. gen., *europae* n. sp., Europa Island, taxonomy, zoogeography.

### INTRODUCTION

The subtribe “Bradybaenina” *sensu* Basilewsky (1950, 1951) includes 7 genera of Harpalina Bonelli, 1810 from continental Africa, Madagascar and Oriental Region characterized by the abdomen with sterna bearing a row of long setae: *Bradybaenus* Dejean, 1829, *Ooidius* Chaudoir, 1847, *Geodromus* Dejean, 1829, *Boeomimetes* Péringuey, 1896, *Harpalomorphus* Péringuey, 1896, *Parasiopelus* Basilewsky, 1946 (= *Tukyellus* Basilewsky, 1947) and *Pseudoselenophorus* Péringuey, 1896. Moreover, Basilewsky (1976) describes the genus *Paulianoscirtus*, with 2 new species (*P. madecassus* and *P. cordicollis*); this genus shows the abdomen with sterna bearing a row of long setae in the middle, missing at sides; the habitus of *Paulianoscirtus* is similar to that of *Ectinothorax* Alluaud, 1941, but the presence of setae on the sterna in the middle of the abdomen of *Paulianoscirtus* could place it inside “Bradybaenina” *sensu* Basilewsky (1950, 1951), in particular close to the genus *Parasiopelus* Basilewsky, 1946 (= *Tukyellus* Basilewsky, 1947), however Basilewsky (1976) expresses doubts about the systematic position of *Paulianoscirtus*, which will require a more detailed study in the future. On the other hand, Noonan (1976) considered *Bradybaeni* Csiki, 1932 as a synonym of Harpalina Bonelli, 1810 and Lorenz (2005a,b) underlined that the name *Bradybaeni*

is a junior homonym of a well-known family-group name in Mollusca, resulting from similar generic names (*Bradybaena* Beck, 1837). Although *Harpalus bitinctus* Jeannel, 1948 has been known for a long time only from the female holotype, only a few years ago it has been possible to find additional specimens, including males, from a new locality in Madagascar. Thanks to the examination of the holotype of *H. bitinctus* and the new specimens recently collected it has been possible to highlight that, despite the habitus similar to *Harpalus*, this species does not belong to this genus. This because the abdomen with penultimate and two preceding sterna showing a row of long setae near hind margin and the shape of the median lobe of the aedeagus are typical of “Bradybaenina” *sensu* Basilewsky (1950, 1951). For this species it is appropriate to describe a new genus related to *Harpalomorphus*, which currently includes 7 species, 4 described by Péringuey (1896) (together with the genus *Harpalomorphus*) and subsequently treated by Basilewsky (1951) and 3 later described by Facchini (2011).

Moreover, in a recent expedition to Europa Island some specimens attributable to a new species belonging to the new genus have been collected, with the shape of the median lobe of the aedeagus moderately similar to that of *H. bitinctus* but with some morphological external characters that allow to attribute them to a new species. Europa Island (it takes its name

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from the ship Europa, which visited the island in the eighteenth century) is a tropical atoll located in the Mozambique Channel, about 7 km in diameter and with maximum altitude of 6 m, surrounded by a fringing reef and with a mangrove lagoon open to the sea on the north side. This small island is a natural reserve and supports different populations of birds and is an important nesting site for green sea turtles.

#### MATERIALS AND METHODS

This work is based upon specimens of Harpalina from continental Africa, Madagascar and India. Typical material examined: *Bradybaenus robustus* Facchini & Sciaky, 2004 (Holotypus), *B. czeppeli* Facchini & Sciaky, 2004 (Holotypus), *B. exiguus* Facchini 2011 (Holotypus), *B. cephalotes* Basilewsky, 1946 (Holotypus), *B. halli* Basilewsky 1946 (Paratypus), *B. neavei* Basilewsky, 1946 (Paratypus), *B. obscurus* Basilewsky, 1984 (Holotypus), *B. opulentus insularis* Jeannel, 1948 (Holotypus), *B. scalaris somalicus* Alluaud, 1922 (Paratypus), *B. sellatus* Dejean, 1831 (*Typus*), *B. mauritanicus* Basilewsky, 1946 (Holotypus), *B. periphanus* Basilewsky, 1951 (Holotypus), *B. perrieri* Jeannel, 1948 (Holotypus), *B. plumbeus* Basilewsky, 1948 (Holotypus), *B. puncticollis* Burgeon, 1936 (Holotypus), *Harpalomorphus modestus* Péringuey, 1896 (Syntypus), *H. aeneipennis* Péringuey, 1896 (Syntypus), *H. minor* Facchini 2011 (Holotypus), *H. sinuaticollis* Facchini 2011 (Holotypus), *H. pseudocapicola* Facchini 2011 (Holotypus), *Ooidius crassiceps* G.Muller, 1942 (Paratypus), *O. dorsiger melanopterus* G. Müller, 1942 (Paratypus), *Bradybaenus madecassus* Jeannel, 1948 (Paratypus), *Boeomimetes jeanneli* Basilewsky, 1946 (Holotypus), *B. jeanneli somalicus* Basilewsky, 1964 (Paratypus), *B. confusus* Basilewsky, 1948 (Paratypus) and *Tukyellus somalicus* Basilewsky, 1957 (Holotypus), *Paulianoscirtus madecassus* Basilewsky, 1976 (Paratypus), *P. cordicollis* Basilewsky, 1976 (Paratypus). Other material examined: *Bradybaenus scalaris* (Olivier, 1808), *B. opulentus* Boheman, 1848, *B. oxyomus* Chaudoir, 1843, *Ooidius dorsiger* (Klug, 1853), *O. ephippium* (Dejean, 1829), *Harpalomorphus capicola* Péringuey, 1896, *H. rufipennis* Péringuey, 1896, *Tukyellus ornatus* (Peringuey, 1892), *Boeomimetes atratus* Peringuey, 1896, *B. ephippium* (Boheman, 1860), *Pseudoselenophorus imitator* Péringuey, 1896 and *Geodromus dumolinii* Dejean, 1829, det. P. Basilewsky and specimens of *Bradybaenus festivus*

Dejean, 1829 and *Ooidius advolans* (Nietner, 1857) (Det. Facchini).

The material concerning the new species is preserved in MNHNP = Museum National d'Histoire Naturelle, Paris (France); CFa = Sergio Facchini Coll., Piacenza (Italy); CGi = Pier Mauro Giachino Coll., San Martino Canavese (TO) (Italy); CPo = Jacques Poussereau Coll., Dax (France); CSc = Peter Schüle Coll., Herrenberg (Germany).

Measurements were taken with the ocular micrometer of a Leica MZ 12.5 stereomicroscope. The total length of specimens was measured from the apex of mandibles (closed) to the apex of elytra. Measurements of body parts and abbreviations used for them in the text are: El = length of elytra from the apex of scutellum to the elytral apex; Ew = maximum width of elytra; Pl = length of pronotum along median line; Pw = maximum width of pronotum. Ratios used are Pw/Pl and El/Ew. The photographs are composite images obtained with progressive focusing with a Nikon D80 digital camera equipped with a lens AF Micro Nikkor 60 mm 1:2,8D, then processed with HeliconFocus® 6.7.1 program and optimized with Photoshop® CS4.

#### **Harpalomimus** n. gen. (Figs. 1-5)

TYPE SPECIES: *Harpalus bitinctus* Jeannel, 1948

DIAGNOSIS. A genus of Harpalina Bonelli, 1810 characterized as follows: body glabrous, head without clypeo-ocular grooves, mentum with median tooth, paraglossae rounded, glabrous, ligula not expanded at apex, with two setae, slightly shorter than paraglossae, labrum almost straight anteriorly, mandibles short, protarsomeres 1-4 and mesotarsomeres 2-4 of male dilated, with two rows of scale-like bristles ventrally (mesotarsomere first sometimes with adhesive vestiture, this markedly reduced), metatarsomere first markedly shorter than second and third together, abdomen with penultimate and two preceding sterna with a row of long setae near hind margin, median lobe of aedeagus with ostium moderately deflected to the left.

DESCRIPTION. Head without frontal furrow, labrum almost straight anteriorly, only very slightly concave at middle; clypeus with 1 seta on each side; mentum with median tooth; mentum and submentum completely separated by a distinct suture; paraglossae rounded,

glabrous, ligula not expanded at apex, with two setae, slightly shorter than paraglossae; mandibles short, penultimate articles of labial palpi each with more than four setae on anterior margin; antennae with antennomere 2 short, 1 and 3-11 medium sized.

Pronotum with one lateral seta on each side, anterior angles without setae, base completely bordered.

Elytra glabrous, with basal border complete; scutellar stria on interval 2, basal setigerous pore present; umbilicate series composed by numerous setigerous pores, sparser in the middle; abdomen with penultimate and two preceding sterna with a row of long setae near hind margin.

Onychium with some thin setae ventrally; pro-tarsomeres 1-4 and mesotarsomeres 2-4 of male dilated, ventrally with two rows of scale-like bristles (mesotarsomere first sometimes with adhesive vestiture, this markedly reduced), metatarsomere first

markedly shorter than 2 and 3 ones together, claws not denticulate.

Median lobe of the aedeagus with ostium moderately deflected to the left.

Female genitalia: hemisternite with two long setae distally. Basal stylomere with 2-3 long setae latero-distally. Apical stylomere long and thin, weakly curved, with 3 long and thin setae at dorsal margin of scrobe and one short and thin proximal seta at ventral margin of scrobe; sensorial pit with 2 setae very close to each other.

ETYMOLOGY. The name of the genus derives from its habitus similar to that of *Harpalus*. The gender name is masculine.

AFFINITIES. *Harpalomimus* n. gen. is related to *Harpalomorphus* Péringuey, 1896 by the ligula slightly shorter



Figs. 1-2. Habitus of *Harpalomimus* sp.: 1) *H. europae* n. sp. (Holotypus) (body length 7.5 mm); 2) *H. bitinctus* (Jeannel, 1948) (Type)(body length 8 mm).

than paraglossae, the labrum almost straight anteriorly, the mandibles short, the anterior angles of pronotum without setae, the elytra with only one discal setigerous puncture on each side on interval 3 or missing, the first metatarsomere markedly shorter than 2 and 3 together, the protarsomeres and mesotarsomeres of male dilated and the median lobe of the aedeagus with ostium more or less deflected to the left, but it can be distinguished by the mentum with an evident median tooth (without median tooth in *Harpalomorphus*), the paraglossae glabrous [even though Basilewsky (1951) described the paraglossae as glabrous in *Harpalomorphus*, there are some lateral or apical setae] and a different chaetotaxy of the sternites: abdomen with penultimate and two preceding sterna with a row of long setae near hind margin in *Harpalomimus* n. gen. and a row of long setae near the anterior margin (not posterior) of the last 3 sternites

and close to the posterior margin of the fourth-last sternite in *Harpalomorphus* (Figs. 5-6).

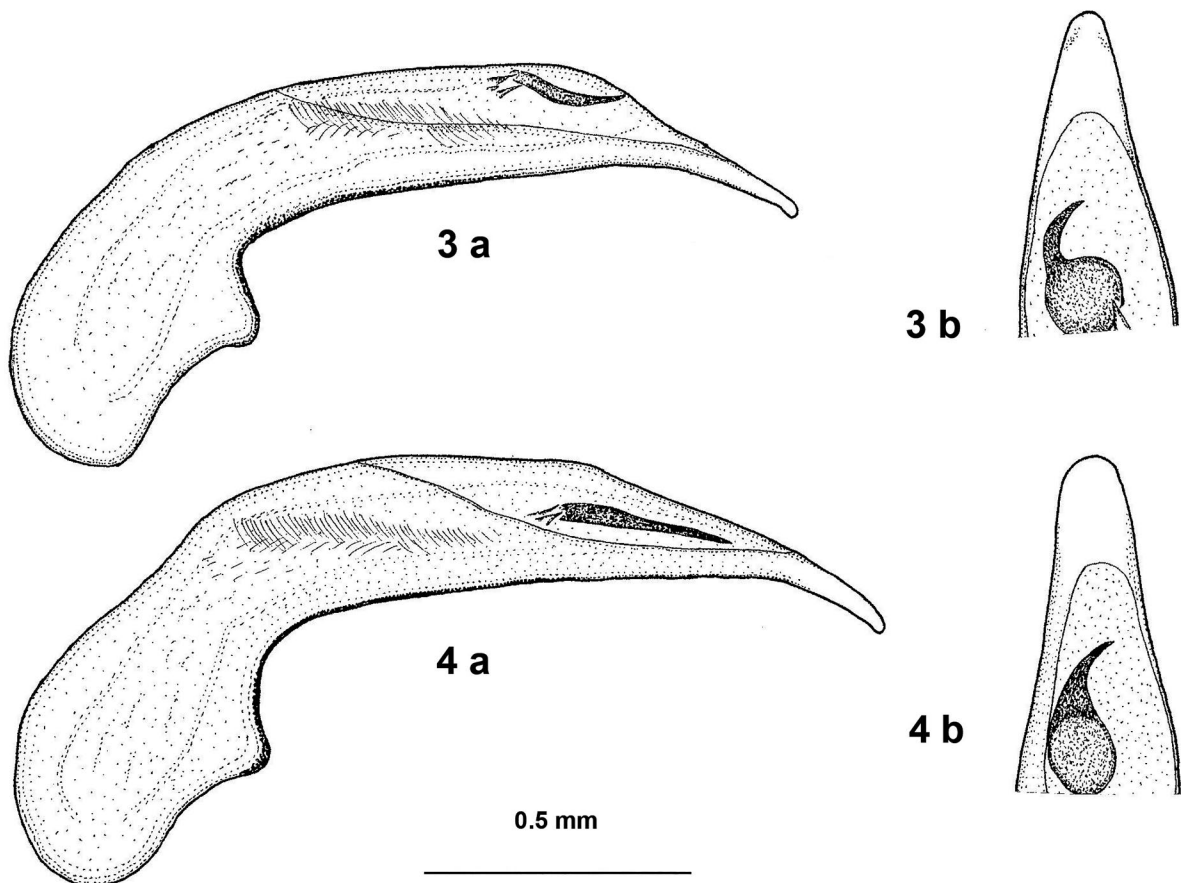
***Harpalomimus bitinctus*** (Jeannel, 1948) **comb. nov.**  
(Figs. 2-3)

*Harpalus bitinctus* Jeannel, 1948

TYPE MATERIAL EXAMINED: Holotypus ♀: S Madagascar, Ambovombé, dans l'Androy (MNHNP).

ADDITIONAL MATERIAL EXAMINED: SW Madagascar, Tuléar Prov., plots S and SW Besamata and northwestern part of Tsimanampetsotsa NP, SuLaMa Projekt 2013, Univ. Marburg, 24 ♂♂, 13 ♀♀ (CSc, CFa).

DIAGNOSIS. Body slender, reddish-brown, elytra with



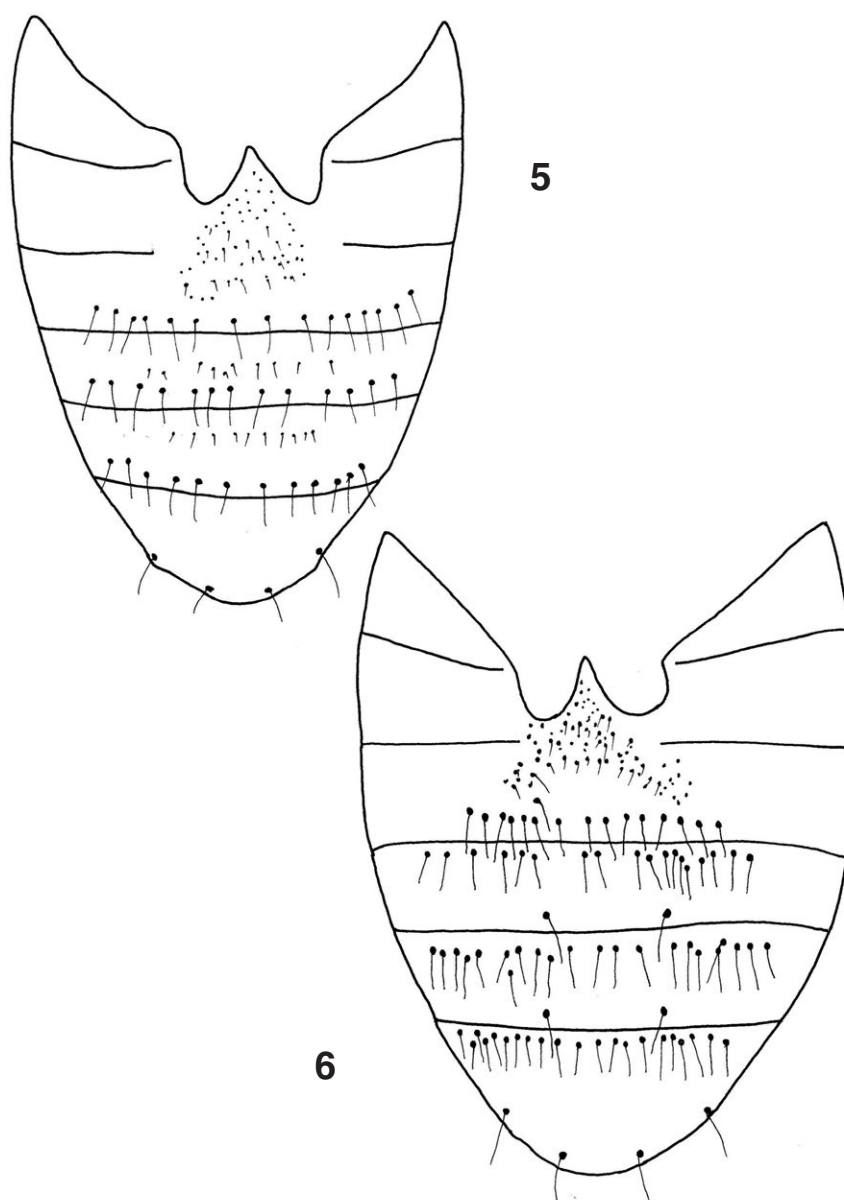
Figs. 3-4. Median lobe of aedeagus of *Harpalomimus* spp. in lateral view (a) and dorsal view (b): 3) *H. bitinctus* (Jeannel, 1948) from SW Madagascar, Besamata-Tsimanampetsotsa N. R.; 4) *H. europae* n. sp. (Holotypus).

faint greenish reflection, palpi, antennae and legs yellowish brown.

RE-DESCRIPTION. Body length 7.9 mm in holotype (9 mm in original description); 5.8-8.8 mm in non-typical material. Habitus as in Fig. 2. Body reddish-brown, elytra with faint greenish reflection, palpi, antennae and

legs yellowish brown, ventrally brown. Body moderately convex. Wings fully developed. Microsculpture very shallow, isodiametric on head, partially made by transverse meshes and partially isodiametric on pronotum; made by transverse meshes on elytra.

Head medium sized, smooth, without frontal furrow. Labrum almost straight anteriorly, only very



Figs. 5-6. Abdomen of : 5) *Harpalomimus europae* n. sp., (Holotypus); 6) *Harpalomorphus aeneipennis* Péringuey, 1896 from RSA, SW Cape.

slightly concave at middle; clypeus almost straight at anterior margin, with one seta on each side; mentum with tooth; paraglossae wide, rounded apically, glabrous; ligula with two setae, not expanded at apex, slightly shorter than paraglossae; apical labial palpomere slender, sparsely pubescent, constricted toward apex, penultimate palpomere of labial palpi with more than four setae. Eyes convex, tempora medium sized.

Pronotum transverse ( $Pw/Pl = 1.48$  in holotype), with lateral gutter narrow; sides rounded anteriorly, almost rectilinearly converging toward base, maximum width anterior to middle; basal angles obtuse, rounded at the apex; lateral seta anterior to middle; anterior angles not protruding, rounded; median longitudinal impression moderately deep, effaced near the anterior and posterior margin; basal foveae narrow, one on each side of pronotum; base completely bordered; dorsal surface smooth. Pro- and metasternum sparsely punctate and pubescent, mesosternum almost smooth, pro-, meso- and metepisterna smooth.

Elytra moderately wide ( $El/Ew = 1.55$  in holotype), moderately convex, glabrous; basal border entire. Striae quite deep, complete, impunctate. Intervals very slightly convex, smooth. Scutellar stria long, on interval 2 scutellar setigerous puncture present at base of scutellar stria, without a discal setigerous puncture on interval 3. Umbilicate series less dense in the middle. Abdomen with penultimate and two preceding sterna with a row of long setae near the posterior border, last visible sternite with two marginal setae on each side in male and female.

Legs relatively short; first metatarsomere markedly shorter than 2 and 3 together; onychium with some thin setae ventrally; protarsomeres 1-4 and mesotarsomeres 2-4 of male dilated, ventrally with two rows of scale-like bristles.

Median lobe of the aedeagus (Fig. 3) medium-sized, with ostium moderately deflected to the left; in lateral view slender, slightly bent downwards near the apex, in dorsal view straight. Internal sac with 1 big spine.

Female genitalia: hemisternite with two long setae distally. Basal stylomere with 2-3 long setae latero-distally. Apical stylomere long and thin, weakly curved, with 3 long and thin setae at dorsal margin of scrobe and one short and thin proximal seta at ventral margin of scrobe; sensorial pit with 2 setae very close to each other.

DISTRIBUTION. Known from "S Madagascar, Ambovombé, dans l'Androy" (Holotype) and SW Madagascar, Besamata-Tsimanampetsotsa N. R. (Fig. 7).

### **Harpalomimus europae** n. sp. Figs. 1, 4, 5)

TYPE LOCALITY: Europa Island.

TYPE SERIES: Holotypus ♂: Europa, 1/54, au sol, a vue, 05.04.2011 (MNHNP). Paratypes: 1 ♂ 2 ♀♀, same data (CFa, CGi, CPo).

DIAGNOSIS. Body stout, almost black, elytra with faint greenish reflection almost effaced, palpi, antennae and legs yellowish brown.

DESCRIPTION. Body length 7.5 mm (holotype); 7.4-8.3 mm in the paratypes. Habitus as in Fig. 1. Body almost black, elytra with faint greenish reflection almost effaced, palpi, antennae and legs yellowish brown, ventrally dark brown. Body moderately convex. Wings fully developed. Microsculpture very shallow, isodiametric on head, partially made by transverse meshes and partially isodiametric on pronotum; made by transverse meshes on elytra.

Head medium sized, smooth, without frontal furrow. Labrum almost straight anteriorly, only very slightly concave at middle; clypeus almost straight at anterior margin, with one seta on each side; mentum with an obtuse tooth; paraglossae wide, rounded apically, glabrous; ligula with two setae, not expanded at apex, slightly shorter than paraglossae; apical labial palpomere slender, sparsely pubescent, constricted toward apex, penultimate palpomere of labial palpi with more than four setae. Eyes convex, tempora medium sized.

Pronotum transverse ( $Pw/Pl = 1.5$  in holotype), with lateral gutter narrow; sides rounded anteriorly, almost rectilinearly converging toward base, maximum width slightly anterior to middle; basal angles obtuse, rounded at the apex; lateral seta anterior to middle; anterior angles not protruding, rounded; median longitudinal impression moderately deep, effaced near the anterior and posterior margin; basal foveae narrow, one on each side of pronotum; base completely bordered; dorsal surface smooth. Pro- and metasternum sparsely punctate and pubescent, mesosternum almost smooth, pro-, meso- and metepisterna smooth; metepisterna

longer than wide, constricted; prosternal process unbordered, with some setae at apex.

Elytra wide ( $EI/Ew = 1.35$  in holotype), moderately convex, glabrous; basal border entire. Striae quite deep, complete, impunctate. Intervals very slightly convex, smooth. Scutellar stria long, on interval 2 scutellar setigerous puncture present at base of scutellar stria, usually without a discal setigerous puncture on interval 3 (one paratype with one discal setigerous puncture on each side on interval 3). Umbilicate series less dense in the middle. Abdomen with penultimate and two preceding sterna with a row of long setae near the posterior border, last visible sternite with two marginal setae on each side in male and female.

Legs relatively short; first metatarsomere markedly shorter than 2 and 3 together; onychium with some thin setae ventrally; protarsomeres 1-4 and mesotarsomeres 2-4 of male dilated, ventrally with two rows

of scale-like bristles, (first mesotarsomere with adhesive vestiture, this markedly reduced).

Median lobe of the aedeagus (Fig. 4) medium-sized, with ostium moderately deflected to the left; in lateral view slender, slightly bent downwards near the apex, in dorsal view straight. Internal sac with 1 big spine.

Female genitalia: hemisternite with two long setae distally. Basal stylomere with 2 long setae latero-distally. Apical stylomere long and thin, weakly curved, with 3 long and thin setae at dorsal margin of scrobe and one short and thin proximal seta at ventral margin of scrobe; sensorial pit with 2 setae very close to each other.

ETYMOLOGY. From the type locality of the new species.

DISTRIBUTION AND ECOLOGY. *H. europae* n. sp. is known only from Europa Island, a tropical atoll lo-

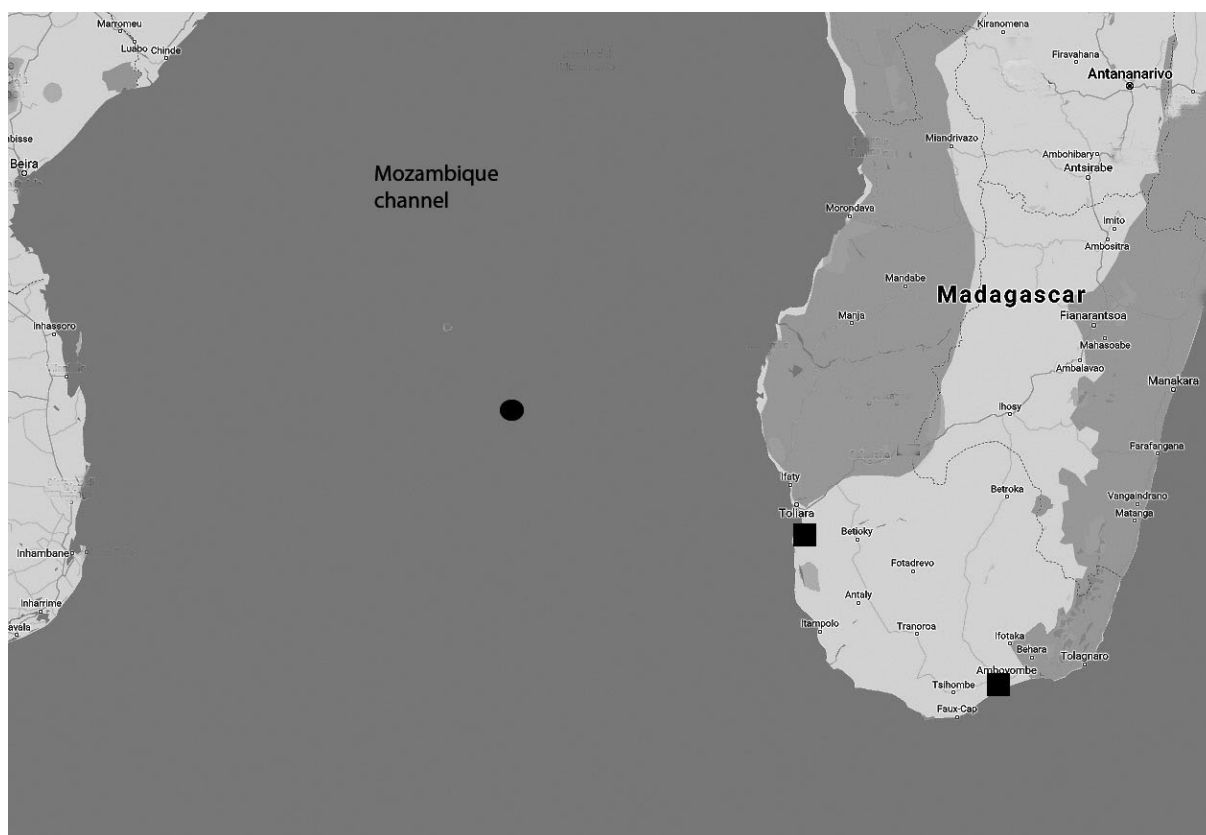


Fig. 7. Distribution map of *Harpalomimus* sp.: ●) *H. europae* n. sp. ; ■) *H. bitinctus* (Jeannel, 1948).

cated in the Mozambique Channel. At Europa Island *H. europae* n. sp. was collected at sight on sector SO1 by Jacques Rochat during a mission from the Museum of St Denis.

REMARKS. *H. europae* n. sp. can be distinguished from *H. bitinctus* (Figs. 1 and 2) by its body stouter, almost black (body slender, reddish-brown, elytra with faint greenish reflection more evident in *H. bitinctus*), head smaller, pronotum wider, less constricted towards the base, elytra wider. The shape of the median lobe of the aedeagus of the new species is moderately similar to that of *H. bitinctus* (Figs. 3 and 4).

From a zoogeographic point of view, it should be noted that Europe Island is an oceanic island. It is in fact a coral atoll dating back to the Karimbolian period (about 125,000 years BC), formed on an existing oceanic hot spot (Battistini, 1966). The current atoll represents the final outcome of the phenomena of marine regression and transgression that affected it (Battistini, 1966).

Its fauna, therefore, must have occurred due to recent dispersion phenomena and, in the case of the genus *Harpalomimus*, probably from the southern coasts of Madagascar (where is present *H. bit-*

*inctus*), as can also be seen from the distribution map of Fig. 7.

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