

Two new *Thyrecephalus* from Madagascar (Coleoptera: Staphylinidae: Xantholinini)

Jiří JANÁK

Rtyně nad Bílinou č. 4, CZ-417 62 Czech Republic,
e-mail: jiri.janak@heineken.com

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Abstract. Two new species of the genus *Thyrecephalus* Guérin-Méneville, 1844 from Madagascar, *T. banari* sp. nov. and *T. flavioviolaceus* sp. nov. were described, illustrated and distinguished from related species.

INTRODUCTION

The genus *Thyrecephalus* Guérin-Méneville, 1844 is distributed in warm regions of the earth. Within the last decades the genus has been redescribed several times (Smetana 1982, Janák 2010, Janák & Bordoni 2015) and revised at specific level for America north of Mexico (Smetana 1982), Mexico (Márquez & Asiain 2016), Africa south of Sahara (Janák & Bordoni 2015) and for the Oriental and Australasian regions (Bordoni 2002, 2005a, 2005b). Herman (2001) listed only one species of *Thyrecephalus* from Madagascar, namely: *T. anachoreta* (Erichson, 1839). Additional four species will be transferred from *Eulissus* Mannerheim, 1830 to *Thyrecephalus* in near future (Newton, pers. comm.).

MATERIAL AND METHODS

The present study is based on specimens collected by Petr Baňář and his collaborators during a long term research in Madagascar and specimens from my collection. Aedeagi of dissected males were embedded in Euparal (both holotypes and some paratypes) or glued on paper cards using a water-soluble glue. Dry-mounted specimens were studied using an MBS 10 binocular stereomicroscope. Microsculpture was observed under 56 × magnification. Habitus images (Figs. 1, 2, 20, 21) were taken with a Canon EOS 5D mark II camera in combination with a Canon MP-E65 1-5x macro lens. Images of aedeagi, tergites and sternites were made using a Canon EOS 700D camera mounted on a Motic BA 410E-T compound microscope in transmitted light. Some body details were taken with the above mentioned camera and microscope in diffused reflected light. Resulting images were focus stacked using Zerene Stacker and then postprocessed in Adobe Photoshop CC 2017 (habitus images) or in Paint.Net, Paint, XnView and Live Photogallery (remaining images).

Measurements were as follows: body length, from the front of closed mandibles to the tip of the abdomen; forebody length, from the front of the clypeus to the apical margin of the elytra; head length, from the front of the clypeus to the front of the neck; head width, across the widest part of the head including the eyes; elytral length, from the base of the

shoulder to the posterior angle measured parallel to the sutural line (as in Janák & Bordoni 2014: Fig. 12); elytral width, combined width of elytra across their widest part; length of the aedeagus, from the base of the median lobe to the apex of the paramere. The terminology of the aedeagus follows Smetana (1982: 9), with the voluminous part of the aedeagus as the basal bulb and the apical portion between the parameres as the median lobe (see also Janák & Bordoni 2014: Fig. 39).

Locality labels for the material examined were cited in the original version and marked with quotation marks („“). Additional data were marked with brackets [/].

The material examined is deposited in the following collections:

BMNH British Museum of Natural History, London, Great Britain (M. Barclay);

JJRC coll. J. Janák, Rtyň nad Bílinou, Czech Republic;

MMBC Moravian Museum, Brno, Czech Republic (P. Baňář);

Abbreviations: n- number of specimens measured, L- length, W- width, M- arithmetic mean, R- ratio, HT- holotype.

RESULTS

THYREOCEPHALUS GUÉRIN - MÉNEVILLE, 1844

Type species: *Thyreocephalus jekelii* Guérin-Ménéville, 1844

Last redescription of the genus based on detailed characters was published by Janák & Bordoni (2015).

Thyreocephalus banari sp. nov.

(Figs. 1-5, 10-15, 29)

Type material. Holotype (♂): Madagascar: “AKR/Jan.2016/FIT nr. 1, N MADAGASCAR, ANKARANA NP, FIT [flight intercept trap] in dark forest, S12°57'E49°07'; 113m, 23-25.1.2016; P. Baňář lgt.” (MMBC). Paratypes: same data as in holotype, 4 ♂♂, 15 ♀♀ (1 ♂, 11 ♀♀ in MMBC, 1 ♂ in BMNH, 2 ♂♂, 4 ♀♀ in JJRC); “MDA/Jan.2016/FIT nr. 3, N MADAGASCAR, MONTAGNE D'AMBRE NP [12°31'37.8”S 49°10'16.7”E], 1035 m; FIT by big tree, 13-18.1.2016; P. Baňář lgt.”, 1 ♂ (MMBC); “AKR/Jan.2016/YPT nr. 1, N MADAGASCAR ANKARANA NP, YPT [yellow pan trap] in dark forest, S12°57'E49°07'; 113 m, 23-25.1.2016; P. Baňář lgt.”, 1 ♀ (MMBC).

Description (n = 10). Body length 21.0-26.4 mm (M = 22.6 mm, HT = 22.3 mm), forebody length 11.0-11.8 mm (M = 11.2 mm, HT = 11.3 mm). Body elongate, moderately slender. Black, antennae and legs brownish, basal and apical part of antennal segment 1, complete antennal segment 2 and apical half of antennal segment 11, knees and tarsi reddish-brown (Fig. 1).

Head (Fig. 2) rounded trapezoidal, slightly convex, disc flattened, slightly wider than long (R = 1.02-1.08, M = 1.05, HT = 1.04), markedly dilated and arcuate posteriorly. Maximum width situated in posterior third. Eyes moderately large, not prominent from head outline, temples distinctly longer than length of eyes seen above (R = 1.95-2.08, M = 2.04, HT = 2.08). Posterior angles angular with small teeth seen above. Ocular puncture

situated close to inner margin of eye, distance separating ocular puncture from inner margin of eye about as large as diameter of puncture. Temples with two small contiguous setiferous postocular punctures situated in small impression. Surface shining, without microsculpture, but with moderately dense micropunctures of two sizes (Fig. 3). Frontal grooves „V“ shaped, external groove terminating in ocular puncture. Ocular grooves very short and shallow, leading from inner margin of eye to ocular puncture. Two postocular punctures bearing seta close to each other and situated in one depression. Labrum with six not prominent lobes (Fig. 5), maxillary palpi 3 segmented, labial palpi 3 segmented, both glabrous, except for terminal setae. Antennae moderately long and narrow, first segment long, distinctly bent, about as long as segments 2-5 combined; second segment subconical, inner margin moderately concave, about 1.8x longer than wide; third segment long, about 2.5 times as long than wide, longer and slightly wider than second segment (Fig. 4), slightly shorter than segments 4 and 5 combined; distal segments transverse; fifth segment slightly transverse ($R = 0.71-0.84$, $M = 0.77$, $HT = 0.84$); tenth segment strongly transverse ($R = 0.58-0.66$, $M = 0.62$, $HT = 0.64$); last segment suboval, about 1.3 longer than wide.

Pronotum (Fig. 2) rounded trapezoidal, moderately convex, slightly longer than wide ($R = 1.09-1.16$, $M = 1.11$, $HT = 1.09$), slightly longer and markedly narrower than head (length of pronotum/length of head 1.03-1.08, $M = 1.05$, $HT = 1.03$; width of pronotum/width of head 0.84-0.93, $M = 0.90$, $HT = 0.91$), anterior margin rounded, towards anterior angles slightly emarginate, anterior angles well marked; markedly narrowed posteriorly, lateral margins concave behind middle, posterior angles less distinct, rounded. Lateral margins with lateral rows of punctures bearing long or moderately short setae. Anterior angles with rounded impression without seta far from lateral margin of pronotum and with a few large punctures bearing long setae at anterior margin. Surface shining, without microsculpture, but with scattered, fine micropunctures. Prosternum in middle slightly elevated longitudinally, with narrowly triangular intercoxal process. Scutellum triangular, sparsely and coarsely punctured, surface with dense microsculpture of transverse waves.

Elytra trapezoidal, slightly longer than wide ($R = 1.02-1.08$, $M = 1.05$, $HT = 1.05$), moderately longer and larger than pronotum (length of elytra/length of pronotum = 1.02-1.08, $M = 1.05$, $HT = 1.05$; width of elytra/width of pronotum 1.07-1.17, $M = 1.14$, $HT = 1.14$), flat, with prominent humeral angles, lateral sides slightly widened posteriorly; with sutural, dorsal and lateral rows of punctures, base and lateral margins with punctures bearing long setae. Surface between punctures with scattered, extremely fine micropunctures.

Abdomen moderately narrowed posteriorly, with seventh tergite bearing very fine whitish palisade fringe; punctation sparse and very fine, most punctures bearing moderately long setae, some of them bearing very long semierect setae. Surface between punctures with scattered, extremely fine punctures.

Legs moderately long and narrow. Meso- and metatibia with apical ctenidium and with subapical ctenidium above it.

Male. Temples with series of moderately fine and dense punctures, punctures rounded or slightly elongate, interstices on average as large as diameter of puncture. Sternite VIII as long as tergite VIII, broadly rounded apically. Sternite IX (Fig. 12) asymmetrical, apical portion weakly sclerotized and furnished with a thick brush of fine hairs. Tergite X (Fig. 13) elongate, apical margin slightly rounded and bearing several moderately long bristles.

Aedeagus (n = 5) 1.64-1.76 mm long (M = 1.71 mm, HT = 1.76 mm), bulbus subovoid (Figs. 10, 14), median lobe elongate, markedly widened and pointed apically (Figs. 11, 15), parameres moderately long and slender, symmetrical or almost symmetrical. Internal sac moderately long and very narrow, covered with very weakly sclerotised fine scales.

Female. Temples with smaller number of finer punctures than in males, interstices on average larger than punctures. Shape of genital segment as in other species of *Thyrecephalus*.

Differential diagnosis. *T. banari* sp. n. differs from all other Xantholinini species distributed in Madagascar by very large, black body, by the head with two small contiguous setiferous postocular punctures, the pronotum without dorsal series of punctures with one large puncture without the seta in anterior angles, with a superior line of pronotal hypomeron turning downwards well before the middle, joining or almost joining inferior line next to front margin of procoxae and continuing onto anterior margin of the pronotum. This new species represents first Madagascan species of *Thyrecephalus ater*-group, hitherto known only from Africa south of Sahara, which was defined by Janák & Bordoni (2015) as follows: very large species (19-27 mm), body entirely black, at most last two abdominal segments and genital segment reddish; head with interior ocular puncture situated close to inner margin of eye, ocular groove between interior ocular puncture and inner border of eye very short and shallow, temples with two small contiguous setiferous postocular punctures situated in small impression, labrum lobate. *T. banari* sp. nov. is most similar to *T. meridionalis* Janák et Bordoni, 2015 distributed in southern Africa which differs from the new species by distinctly shorter and wider antenna (Fig. 6), by the labrum with much more prominent lobes (Fig. 9), finer micropunctures on the head (Fig. 8), smaller punctured area on temples (Fig. 7), and different shape of aedeagus with shorter median lobe with less widened apical part (Figs. 16-19).

Bionomics. Specimens were collected in flight intercept and yellow pan traps placed in a forest.

Distribution. The new species is known only from Ankarana and Montagne d'Ambre Mts in northern part of Madagascar (Fig. 29).

Note. Single specimen from Montagne d'Ambre Mts differs from specimens from Ankarana Mts by small yellowish brown spot on humeral angles.

Etymology. This new species is dedicated to my colleague and friend Petr Baňář, specialist in systematics of Heteroptera, who organised several research trips to Madagascar in last years and introduced to large extent various very effective collecting methods in his research.

MODIFIED KEY TO THE SPECIES OF THE *T. ATER*-GROUP

- 1 Labrum with short, only slightly protruding lobes (Fig. 5), antenna longer and slender, antennal segment 3 about 2.5 times as long as wide (Fig. 4), antennal segments 8-10 about 1.5 times as wide as long; micropunctures on head coarser. Aedeagus (Figs. 10, 14) with symmetrical parameres and with short and wide apical part of median lobe (Figs. 11, 15). Madagascar. *T. banari* sp. nov.

- Labrum with longer, distinctly protruding lobes (Fig. 9 in this paper and Figs. 66, 71, 76 in Janák & Bordoni 2015), antenna shorter and wider, antennomere 3 about twice as long as wide (Fig. 6), antennal segments 8-10 about twice as wide as long; micropunctures on head finer. Aedeagus different. Africa south of Sahara. 2
- 2 Body less robust and wide, temples rounded, middle part of labrum roundly emarginate (Fig. 66 in Janák & Bordoni 2015). Aedeagus (Fig. 69 in Janák & Bordoni 2015) with asymmetrical parameres and tube-like inner sac. From Tanzania to Kenya *T. alluaudi* (Fauvel, 1907)
- Body more robust and wide, temples angled, middle part of labrum sharply emarginate (Figs. 71, 76 in J. Janák & Bordoni 2015). Aedeagus with symmetrical parameres 3
- 3 Body narrower, pronotum longer than wide (length/width > 1.08, Fig. 70 in Janák & Bordoni 2015). Aedeagus (Figs. 16-19 in this paper and Fig. 74 in Janák & Bordoni 2015) sub-ovoid; inner sac shorter. Botswana, Mozambique, Namibia, South Africa, Zambia, Zimbabwe *T. meridionalis* Janák et Bordoni, 2015
- Body wider, pronotum as long as wide (length/width < 1.01, Fig. 75 in Janák & Bordoni 2015). Aedeagus (Fig. 79 in Janák & Bordoni 2015) slender and narrow; inner sac filiform. Almost entire Africa south of the Sahara to Malawi and North Zimbabwe *T. ater* (Laporte, 1835)

***Thyrecephalus flavoviolaceus* sp. nov.**
(Figs. 20-30)

Type material. Holotype (♂): Madagascar: “MADAGASCAR, Tamatave distr., Moramanga env., 14.-18.12.1995, Ivo Jeniš leg.” (JJRC). Paratypes: “Madagascar, h= 900 m, 135 km E Antananarivo, Andasibe env., 26.XI-10. XII.2000, S. Murzin leg.”, 3 ♂♂ (JJRC); “MTD/Jan.2017/1/II - FIT [flight intercept trap], C MADAGASCAR ANDASIBE-MANTADIA N.P.; 19-22.i.2017, Mantadia, circuit „Eulophia“, 941m, S18°48'14“ E48°25'43“ P. Baňar lgt.”, 1 ♀ (MMBC).

Description (n = 5). Body length 18.5-20.5 mm (M = 19.3 mm, HT = 20.3 mm), forebody length 8.6-10.6 mm (M = 9.9 mm, HT = 9.8 mm). Body elongate, slender. Black, elytra light reddish yellow, abdomen with distinct violaceous shine, antennae and legs reddish brown, first three antennal segments and legs lighter, reddish yellow (Fig. 20).

Head (Figs. 21, 22) rounded subrectangular, slightly convex, about as long as wide (L/W = 0.95-1.05, M = 1.01, HT = 1.01), only slightly dilated posteriorly. Maximum width situated in posterior quarter. Eyes moderately large, not prominent from head outline, temples distinctly longer than length of eyes seen above (R = 1.57-1.84, M = 1.75, HT = 1.57). Posterior angles angular with small teeth seen above (Fig. 22). Ocular puncture situated close to inner margin of eye, distance separating ocular puncture from inner margin of eye about twice as large as diameter of puncture. Punctuation very dense and coarse, several punctures setiferous, some punctures contiguous. Postocular region with several setiferous punctures. Surface shining, without microsculpture. Frontal grooves „V“ shaped, less distinct in coarse punctuation, external groove leading to ocular puncture. Ocular grooves very short and shallow, leading from inner margin of eye to ocular puncture. Labrum rounded (Fig. 22), maxillary palpi 3 segmented, labial palpi 3 segmented, both glabrous, except for terminal setae. Antennae moderately long and wide, first segment long, distinctly bent, about as long as 2-5 combined; second segment subconical, inner margin moderately concave, about 1.8x longer than wide; third segment long, distinctly longer and slightly wider than second segment, markedly shorter than segments 4 and 5 combined; distal segments transverse; fifth segment markedly

transverse (R = 0.64-0.75, M = 0.72, HT = 0.70); tenth segment strongly transverse (R = 0.49-0.58, M = 0.54, HT = 0.49); last segment rounded triangular.

Pronotum (Fig. 21) rounded trapezoidal, moderately convex, longer than wide (R = 1.15-1.17, M = 1.16, HT = 1.17), about as long as and markedly narrower than head (length of pronotum/length of head 0.98-1.05, M = 1.00, HT = 0.99; width of pronotum/width of head 0.85-0.89, M = 0.86, HT = 0.85), anterior margin rounded, towards anterior angles slightly emarginate, anterior angles well marked; pronotum markedly narrowed posteriorly, lateral margins concave behind middle, posterior angles less distinct, widely rounded. Anterior angles with rounded impression without seta, situated far from lateral margin of pronotum, and with about five large punctures bearing long setae at anterior margin. Margins of pronotum with punctures bearing long or moderately short setae. Surface shining, without microsculpture, but with scattered, fine punctures. Prosternum in middle slightly elevated longitudinally, with narrowly triangular intercoxal process. Scutellum triangular, sparsely and coarsely punctured, surface with dense microsculpture of transverse waves.

Elytra slightly trapezoidal, longer than wide (R = 1.07-1.16, M = 1.12, HT = 1.13), markedly longer and larger than pronotum (length of elytra/length of pronotum = 1.18-1.33, M = 1.26, HT = 1.30; width of elytra/width of pronotum 1.25-1.37, M = 1.31, HT = 1.35), flat, with prominent humeral angles, lateral sides slightly widened posteriorly; with sutural, dorsal and lateral rows of punctures, base and lateral margins with punctures bearing long setae. Surface between punctures with scattered, fine micropunctures.

Abdomen moderately narrowed posteriorly, with seventh tergite bearing very fine whitish palisade fringe; punctation sparse and very fine, most punctures bearing moderately long setae, some of them bearing very long semierect setae. Surface between punctures with scattered, fine punctures.

Legs moderately long and narrow. Meso- and metatibia with apical ctenidium and with subapical ctenidium above it.

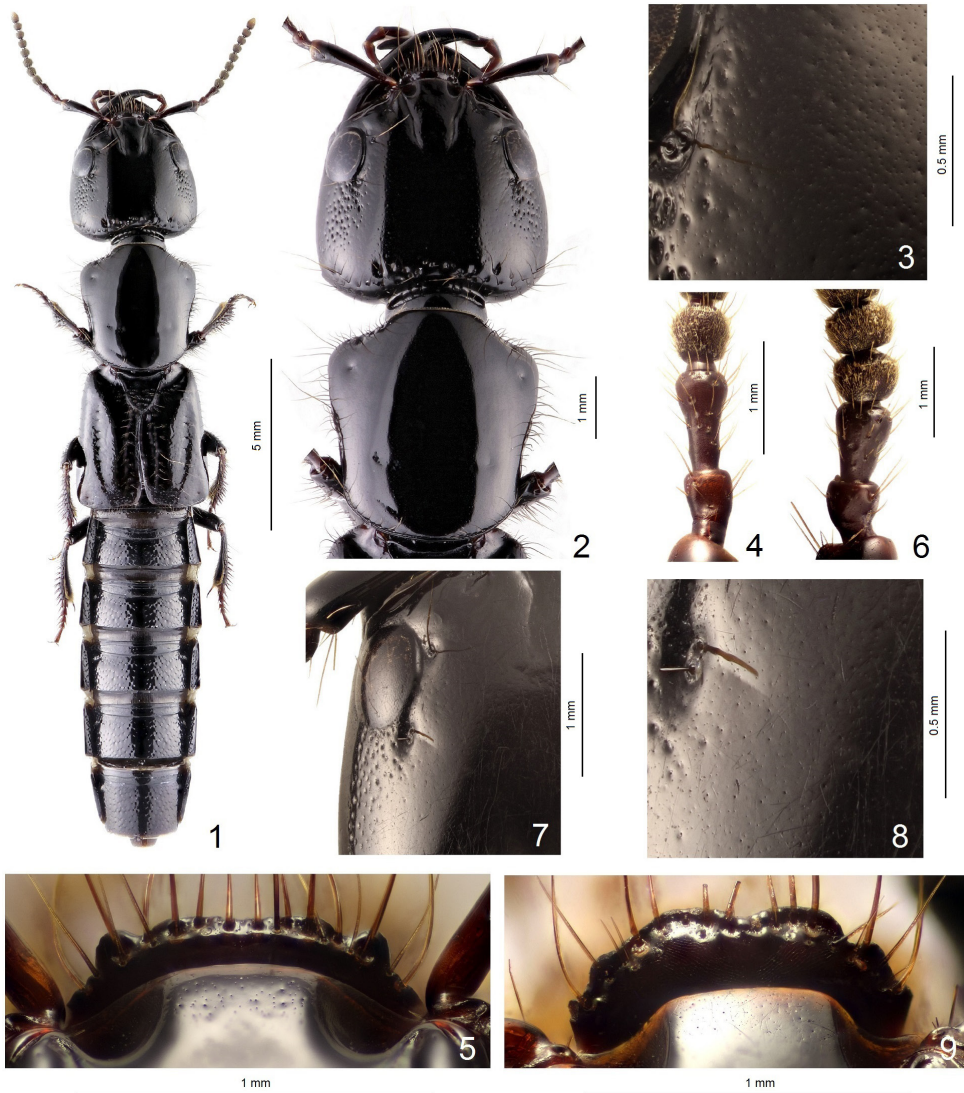
Male. Sternite VIII as long as tergite VIII, broadly rounded apically. Sternite IX (Fig. 25) asymmetrical, apical portion weakly sclerotized and furnished with a thick brush of fine hairs. Tergite X (Fig. 26) elongate, apical margin slightly rounded and bearing several moderately long bristles. Aedeagus (n = 3) 2.68-2.76 mm long (M = 2.72 mm, HT = 2.73 mm), bulbous subovoid (Figs. 23, 27), median lobe elongate, markedly widened and rounded apically (Figs. 24, 28), parameres long and slender, symmetrical. Internal sac very long, many times curved, covered with very weakly sclerotised fine scales.

Female. Shape of genital segment as in other species of *Thyreocephalus*.

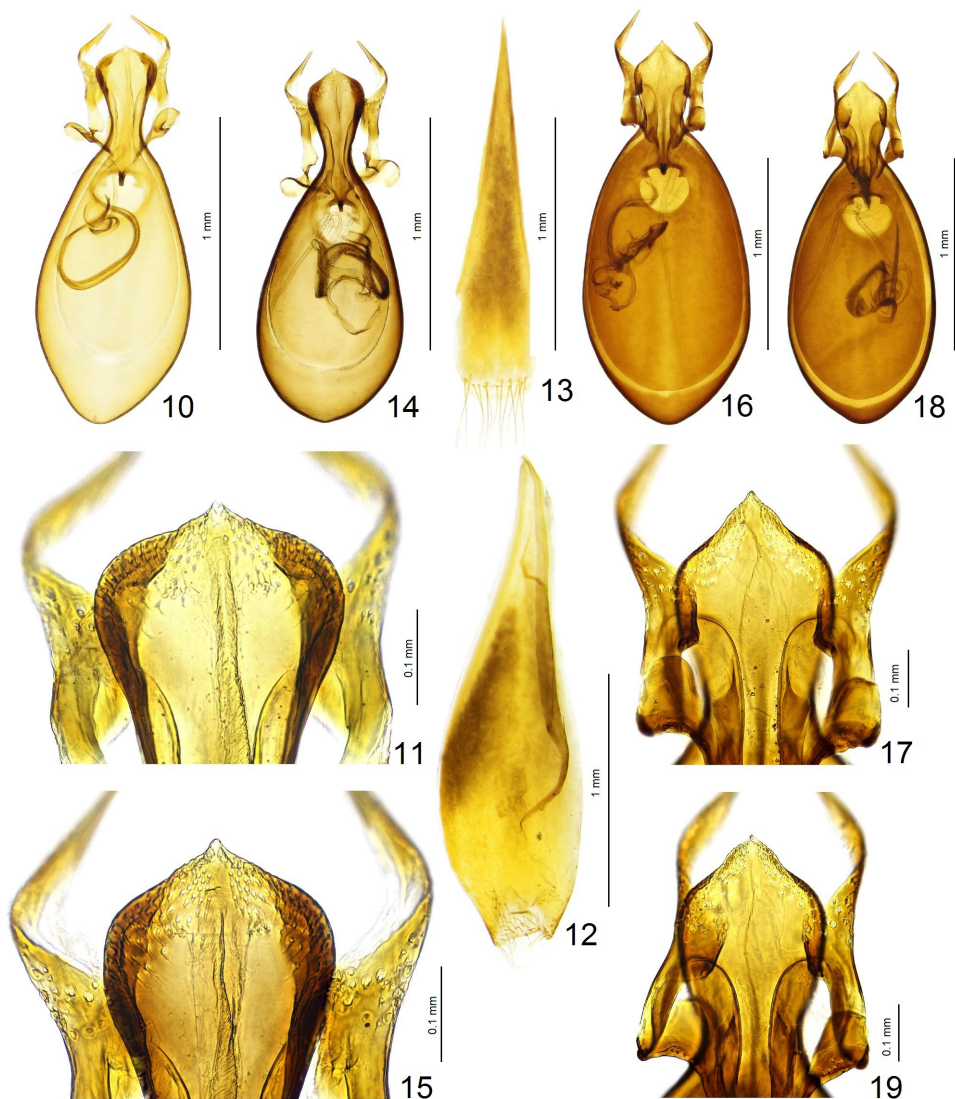
Differential diagnosis. *T. flavoviolaceus* sp. nov. differs from all other Xantholinini species distributed in Madagascar by very large, black body with reddish yellow elytra and violaceous shiny abdomen, pronotum without dorsal series of punctures, only with one large puncture without seta in anterior angles, with superior line of pronotal hypomeron turning downwards well before middle, joining or almost joining inferior line next to front margin of procoxae and continuing onto anterior margin of pronotum. The new species can be tentatively ranged in the vicinity of *T. ferox* group defined by Janák & Bordoni (2015) due to rounded labrum and more than two postocular punctures. *T. flavoviolaceus* sp. nov. differs from the single species of this group - *T. ferox* (Harold, 1881) by different colour - reddish

yellow elytra and violaceous shiny abdomen and also by much more dense punctation of head and by different shape of aedeagus.

Bionomics. The holotype specimen was collected while moving in the forest (Jeniš, pers. comm.). The specimen from Mantadia was collected in flight intercept trap placed in forest (Fig. 30).



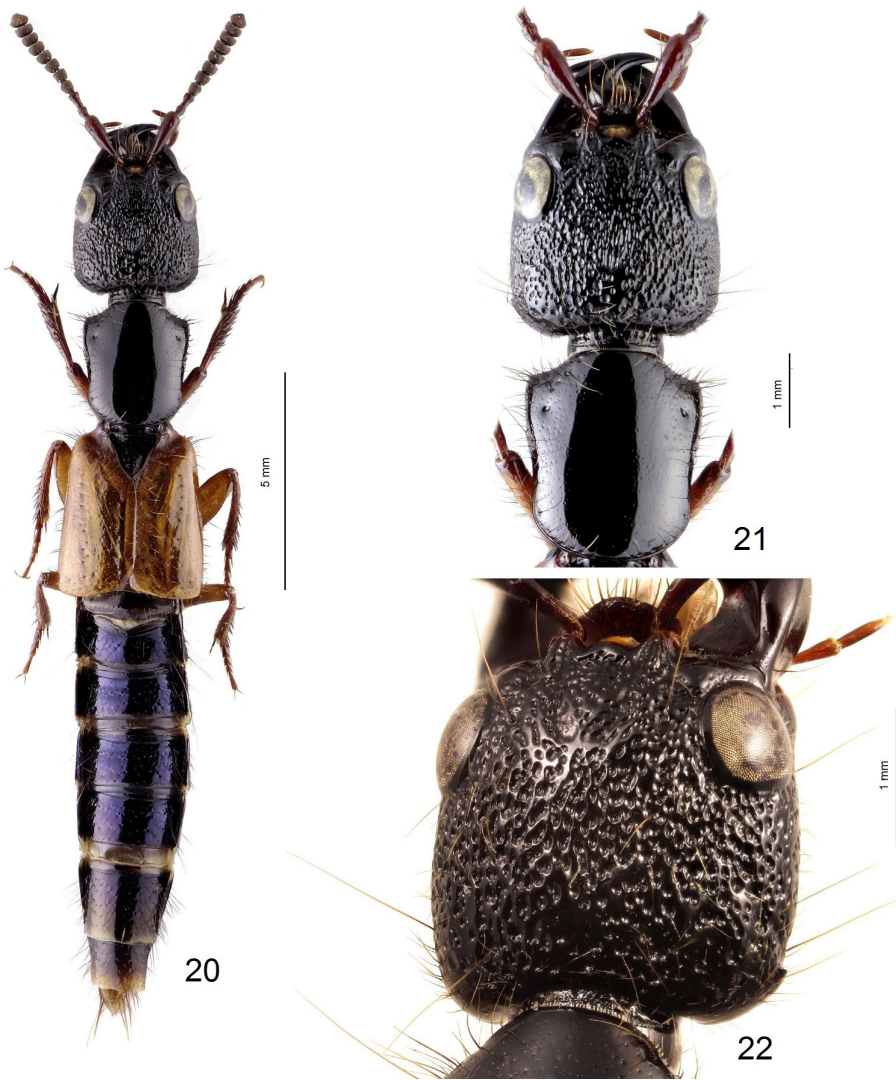
Figs. 1-9. 1-5: *Thyreocephalus banari* sp. nov. 6-9: *T. meridionalis* Janák et Bordoni. 1- habitus; 2- head and pronotum; 3, 8- detail of head surface; 4, 6- base of antenna; 5, 9- labrum; 7- left side of head. 1, 2- holotype; 3-5: paratype from Ankarana; 6-8: paratype from Zimbabwe, Naletale ruins; 9- paratype from Botswana, 10 km N of Maun.



Figs. 10-15. *Thyrecephalus banari* sp. nov. 16-19. *T. meridionalis* Janák et Bordoni. 10, 14, 16, 18- aedeagus; 11, 15, 17, 19- apical part of median lobe; 12- sternite IX; 13- tergite X. 10-13: holotype; 14-15: paratype from Montagne d'Ambre. 16-17: paratype from Zambia, Victoria Falls. 18-19: paratype from Zimbabwe, Naletale ruins.

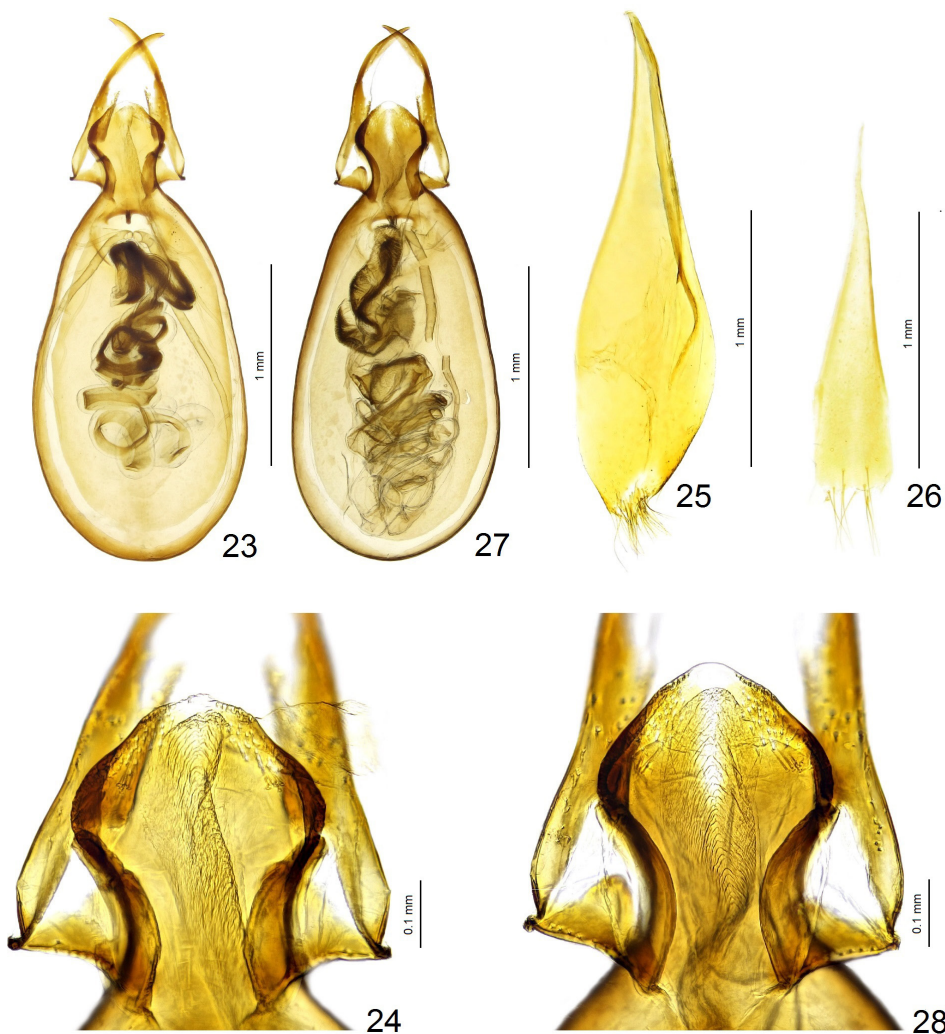
Distribution. The new species is known only from three nearby situated localities east of Moramanga in central part of Eastern Madagascar (Fig. 29).

Etymology. The new species was named according to the yellowish colour of elytra and violaceous shining abdomen.



Figs. 20-22. *Thyreocephalus flavoviolaceus* sp. nov. 20- habitus; 21- head and pronotum; 22- head. 20, 21- holotype, 22- paratype from Andasibe.

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Figs. 23-28. *Thyrecephalus flavoviolaceus* sp. nov. 23, 27- aedeagus; 24, 28- apical part of median lobe; 25- sternite IX; 26- tergite X. 23-26: holotype; 27-28: paratype from Montagne d' Ambre.

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Fig. 29. Distribution of *Thyreocephalus banari* sp. nov. (black rectangles) and *T. flavoviolaceus* sp. nov. (black triangles).



Fig. 30. Forest in Mantadia with three flight intercept traps (locality of *Thyreocephalus flavoviolaceus* sp. nov.).

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