ZOOSYSTEMATICA ROSSICA

ISSN 2410-0226 [online] 0320-9180 [print]

Zoological Institute, Russian Academy of Sciences, St Petersburg ▪ https://www.zin.ru/journals/zsr/
Vol. 28(2): 317–322 ▪ Published online 27 December 2019 ▪ DOI 10.31610/zsr/2019.28.2.317

RESEARCH ARTICLE

New genus and species of cockroaches, *Coriaceolamprodes rubidus* gen. et sp. nov. (Dictyoptera: Blaberidae: Epilamprinae), from the island of Borneo (Sarawak)

Новые род и вид тараканов, *Coriaceolamprodes rubidus* gen. et sp. nov. (Dictyoptera: Blaberidae: Epilamprinae), с острова Борнео (Саравак)

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Abstract. New genus and species of cockroaches of the subfamily Epilamprinae, *Coriaceolamprodes rubidus* **gen.** et **sp. nov.**, are described from the Malaysian state of Sarawak (Borneo Island). This genus is closely related to the genera with asymmetrical armament of tarsi: *Calolamprodes* Bey-Bienko, 1969, *Pseudocalolampra* Roth et Princis, 1971, and *Paracalolamprodes* Anisyutkin, 2015.; however, it readily differs from these genera by the nearly symmetric hypandrium and the unique pressbutton-like shape of the apex of sclerite L3 of the male genitalia.

Резюме. В статье описываются новые род и вид тараканов подсемейства Epilamprinae – *Coriaceolamprodes rubidus* **gen.** et **sp. nov.** – из малазийского штата Саравак (остров Борнео). Этот род близок к родам с асимметричным вооружением лапок: *Calolamprodes* Bey-Bienko, 1969, *Pseudocalolampra* Roth et Princis, 1971 и *Paracalolamprodes* Anisyutkin, 2015. Однако, он хорошо отличается от них почти симметричным гипандрием и уникальной, схожей с кнопкой, формой вершины склерита L3 гениталий самцов.

Key words: cockroaches, taxonomy, morphology, Borneo, Sarawak, Dictyoptera, Blaberidae, Epilamprinae, new genus, new species

Ключевые слова: тараканы, таксономия, морфология, Борнео, Саравак, Dictyoptera, Blaberidae, Epilamprinae, новый род, новый вид

Zoobank Article LSID: urn:lsid:zoobank.org:pub:6337DE56-7FC2-47F4-9B06-F91B5DC2119A

Introduction

The new genus and species of cockroaches, *Coriaceolamprodes rubidus* **gen.** et **sp. nov.**, are described here from the Malaysian state of Sarawak (Borneo Island). This genus undoubtedly belongs to the blaberid subfamily Epilamprinae and is related to the genera *Calolamprodes* Bey-Bienko, 1969, *Pseudocalolampra* Roth et Princis, 1971, and *Paracalolamprodes* Anisyutkin, 2015. Some morphological features of the new taxa are very peculiar and probably reflect a shift to a more hidden habit of life compared to species of the above-mentioned genera.

Material and methods

The studied material was collected and kept in ~70% ethanol (including the male genital structures). This material, including the holotype of the new species, is deposited at the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg (ZIN).

The author generally follows the methods of description published by Anisyutkin (2014, 2015). Description of the anterior margin of fore femur armament follows Bey-Bienko (1950) and Roth (2003). The terminology of male genital sclerites follows Klass (1997), with some modifications. The terminology used by Grandcolas (1996) for genital structures is given in parentheses.

Abbreviations used in the figures (see text for further details): *VIII*, *IX*, *X* – 8th–10th abdominal tergites, respectively; *a.s.* – "additional spines", i.e. spines bordering euplantulae from inside and outside; *b.L3* – basal subsclerite of sclerite L3 in male genitalia; *c.p.R1T* – caudal part of sclerite R1T of male genitalia; *cr.p.R1T* – cranial part of sclerite R1T of male genitalia; *e.r.* – exterior row of spines along lower margin of hind metatarsus (*metatarsus* = 1st tarsal segment or basitarsus); *i.r.* – interior row of spines along lower margin of hind metatarsus; *L3*, *L4U* – sclerites of male genitalia; *R1T*, *R2*, *R3*, *R4*, *R5* – sclerites of male genitalia; *t.f.* – transverse furrow of anal plate (*anal plate* = 10th abdominal tergite).

Taxonomy

Order **Dictyoptera** Clairville, 1798

Family **Blaberidae** Brunner von Wattenwyl, 1865

Subfamily **Epilamprinae** Brunner von Wattenwyl, 1865

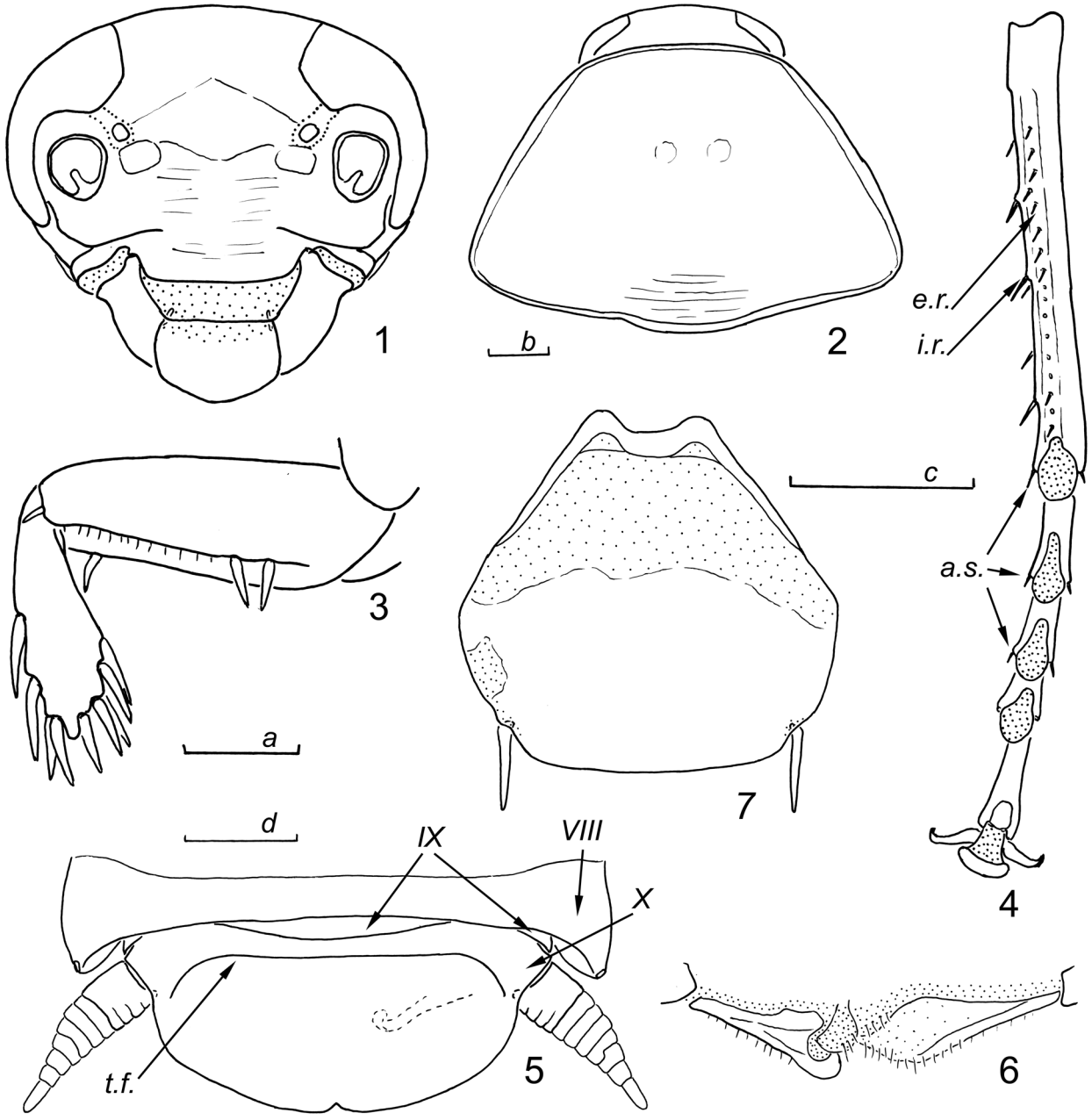
Genus ***Coriaceolamprodes* gen. nov.**

Type species *Coriaceolamprodes rubidus* **sp. nov.**

Description. Uniformly dark coloured. Male with tegmina and wings completely developed, surpassing abdominal apex. Tegmina in proximal part strongly sclerotised, with subobsolete venation (veins partly replaced with rows of punctures); venation in distal part of tegmina distinct. Legs short; femora and tibiae distinctly flattened; tibial spines well developed. Fore tibiae distally thickened (Fig. 3). Structure of hind tarsi (Fig. 4): metatarsus slightly longer than other tarsal segments combined, and with two unequal rows of spines along lower margin [complete exterior row (Fig. 4, *e.r.*) having 13–17 spines, and incomplete interior row (Fig. 4, *i.r.*) having six to seven spines and displaced on lateral side of metatarsus]; 1st–4th segments with small (as compared with metatarsus length) apical euplantula on first segment, with comparatively large euplantulae on 2nd–4th segments, and with a pair of "additional spines" (one inside and one outside) bordering each euplantula on 1st–3rd segments, and without other spines on 2nd–4th segments (Figs 4, *a.s.*); claws symmetrical, simple; arolium distinct, about half as long as claw. Fore and mid tarsi similar to hind ones, but with following differences: they shorter; fore tarsi lacking spines; mid tarsi having single short row of five spines along lower margin of metatarsus; and "additional spines" on their 4th segment sometimes absent. Abdomen without visible glandular specialisations. Spiracles of VIII abdominal tergite located on apices of attenuate posterolateral angles (Fig. 5). Anal plate transverse (Fig. 5). Paraprocts of blaberid-type (Fig. 6). Hypandrium nearly symmetrical, with caudal margin very widely rounded and lacking median incision; styli long, cylindrical and well sclerotised (Fig. 7).

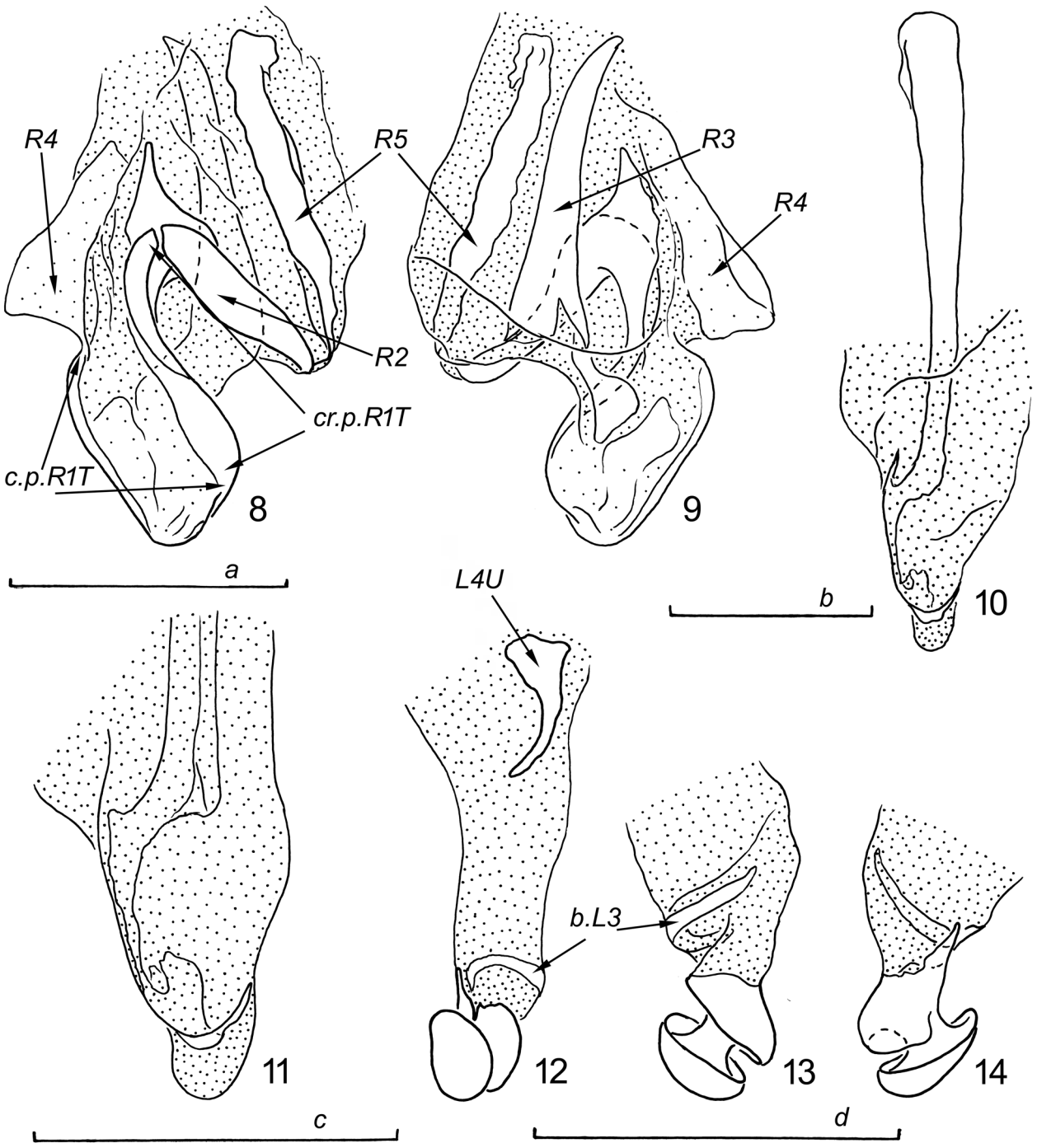
Male genitalia (Figs 8–14). Right phallomere (R+N) with caudal part well sclerotised and subrectangular in shape (Figs 8, 9, *c.p.R1T*), and with cranial part of R1T and R2 widely rounded; R3 elongated, with branches of unequal length; R4 weakly sclerotised; R5 in shape of long sclerotised strip, fused with sclerite R2; bristles absent. Sclerite L2D (L1) not divided into basal and apical parts, rod-like, very weakly widened cranially (Fig. 10), curved caudally, and with membranous lobe at apex; bristles absent (Fig. 11). Sclerite L3 (L2d) short (Figs 12–14); basal subsclerite developed, ring-like (Figs 12, 13, *b.L3*); "folded structure" absent; apex of sclerite in shape of pressbutton, not hook-like. Sclerite L4U (L3d) distinct, in shape of curved plate (Fig. 12).

Differential diagnosis. Based on the complex of somatic (shape of pronotum, fore femora, tarsi, anal plate and hypandrium) and genital (right phallomere) morphological structures (Princis, 1960; McKittrick, 1964), the genus *Coriaceolam-*



Figs 1–7. *Coriaceolamprodes rubidus* **gen.** et **sp. nov.**, male, holotype: **1**, facial part of head; **2**, head and pronotum from above; **3**, fore tibia and femur, anterior view; **4**, left hind tarsus from below; **5**, abdominal apex from above; **6**, paraprocts from below; **7**, hypandrium from below. Dotted areas show membranous parts; dotted lines in Fig. 1 show pale spots. Abbreviations: *VIII*, *IX*, *X*, *a.s.*, *e.r.*, *i.r.*, *t.f.* – see *Material and methods* section, for details see text. Scale bars: 1 mm (1, 3 – *a*; 2 – *b*; 4 – *c*; 5–7 – *d*).

prodes **gen. nov.** belongs to the subfamily Epilamprinae. This genus is similar to the genera *Calolamprodes* Bey-Bienko, 1969, *Pseudocalolampra* Roth et Princis, 1971 and *Paracalolamprodes* Anisyutkin, 2015 in the structure of both tarsi (all their tarsi with two unequal rows of spines along lower margin of tarsal segments; Fig. 4) and right phallomere (sclerite R3 elongated, sclerite R4 weakly sclerotised and fused with caudal part of R1T; Figs 8, 9).



Figs 8–14. *Coriaceolamprodes rubidus* **gen. et sp. nov.**, male genitalia, holotype: **8**, **9**, right phallomere from above (8) and from below (9); **10**, sclerite L2D from above; **11**, caudal part of sclerite L2D; **12**, sclerites L3 and L4U; **13**, **14**, sclerite L3. Dotted areas show membranous parts. Abbreviations: *b.L3*, *c.p.R1T*, *cr.p.R1T*, *L4U*, *R2*, *R3*, *R4*, *R5* – see *Material and methods* section, for details see text. Scale bars: 1 mm (8, 9 – *a*; 10 – *b*; 11 – *c*; 12–14 – *d*).

The new genus clearly differs from these genera in the following characters:

– from *Calolamprodes*, in nearly symmetric hypandrium, more sclerotised caudal part of sclerite R1T, R5 fused with R2, absence of bristles on right phallomere, undivided L2D, and shape of L3 [compare Figs 7, 8–14 with figures in Anisyutkin, 1999 (figs 18–33, 37), 2006 (figs 6, 12, 14, 15–41)];

– from *Pseudocalolampra*, in the structure of paraprocts (in the latter genus, both paraprocts with hook-shaped caudomedial process), nearly symmetric hypandrium, shape of sclerites R1T, R2 and R5, undivided L2D, and shape of L3 [compare Figs 6, 7, 8–14 with figures in Anisyutkin, 2018 (figs 74–86)];

– from *Paracalolamprodes,* in completely developed tegmina and wings of male, nearly symmetric hypandrium, shape of sclerite R5, undivided L2D, and shape of L3 [compare Figs 7, 8–14 with figures in Anisyutkin, 2015 (figs 7–15)].

Included species. Type species only.

Etymology. The new name is derived from the Latin adjective *coriaceus* (leathery) and the part of the taxonomic name *Calolamprodes.* Gender is masculine.

Note. The shape of sclerite L3 (Figs 12–14) of the male genitalia of *Coriaceolamprodes* **gen. nov.** is unique for Epilamprinae. This sclerite is not hook-like, as usual in cockroaches, but it rather has the shape of a pressbutton. The reduction of L3 is reported for some Panesthiinae (Roth, 1977). At least many representatives of Panesthiinae have a reclusive habit of life in decaying logs or straight-through burrows (Roth, 1977). Some morphological features of *C. rubidus* **sp. nov.** may indicate a hidden mode of live: comparatively short legs and cerci, distally thickened fore tibiae, and sclerotised tegmina. Perhaps this explains the features of the structure of sclerite L3. The peculiarity of this structure is probably reflects a specialised type of copulation. Unfortunately, at the present time nothing is known about the habit of life of this species.

Coriaceolamprodes rubidus sp. nov.
(Figs 1–14)

Holotype. Male, **Malaysia**, **Borneo I.**, *State of Sarawak*, ~30 km from Bintulu City, Similajau National Park, 3°25′26′′N 113°13′59′′E, primary forest not far from sea, almost at sea level, 12–16 Nov. 2016, A. Gorochov, M. Berezin, E. Tkatsheva, I. Kamskov, and N. Grigoreva coll. (ZIN).

Paratypes. 4 males, same data as for holotype (ZIN).

Description. Male (holotype). General colour reddish brown; eyes black; areas around ocellar spots and anteclypeus pale (Fig. 1); antennae yellowish brown; distal halves of tegmina yellowish; metathorax from above and abdominal tergites yellow. Surfaces smooth and lustrous; distal parts of antennae (from 9–10th segment) dull; facial part of head and pronotum with weak punctuation; facial part of head with weak wrinkles above clypeus (Fig. 1). Head wide and rounded (Fig. 1); ocellar spots small, but distinct; distance between eyes about as long as eye; distance between antennal sockets 2.5 times as long as scape (~0.7 mm); approximate lengths of 3rd–5th segments of maxillary palps related to each other as 1.4:1.0:1.5. Pronotum transverse (Fig. 2); anterior and lateral margins widely rounded; posterior margin distinctly projected caudally. Anterior margin of fore femur armed as in Fig. 3 (type B), with three spines including one apical spine. Structure of legs and hind tarsi as described for this genus (see above). Anal plate (tergite X) with widely rounded caudal margin and weak median incision (Fig. 5); caudal part of anal plate separated by distinct transverse furrow (Fig. 5: *t.f.*). Cerci short, flatten, with segments distinctly separated in distal part.

Male genitalia (Figs 8–14) as described for this genus (see above).

Variations. Head with distance between eyes as 0.8–1.0 eye length; distance between antennal sockets as 2.1–2.6 scape length (~0.7–0.9 mm); relative lengths of 3rd–5th segments of maxillary palps approximately 1.1–1.4:1.0:1.4–1.6. Mid metatarsi with single short row consisting of three–five spines; hind metatarsi with ten–seventeen spines in exterior row and with five–seven spines in interior row. Hypandrium sometimes with caudal margin more projected than in holotype.

Female unknown.

Measurements (in mm). Head length 3.2–3.5 (3.4); head width 3.4–3.6 (3.5); pronotum length 4.8–5.5 (5.0); pronotum width 6.5–7.2 (6.9); tegmen length 17.5–18.0 (17.8); tegmen width 5.6–6.0 (6.0). The measurements in parenthesis are those of the holotype.

Etymology. This species name is the Latin adjective *rubidus* – dark red.

Comparison. As given for the genus.

Remark. Right hind tarsus of the holotype has only four segments. Probably the fourth tarsomere is absent. The reduction of tarsal segments is usual for the subfamily Epilamprinae.

Acknowledgements

The author wishes to express his sincere thanks to members of expedition who collected the specimens of the species described above, and to reviewers for their valuable comments on the manuscript. This study was performed in the frames of the state research project No. AAAA-A19-119082990107-3 (Russian Federation).

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Received 26 July 2019 / Accepted 10 December 2019. Editorial responsibility: A.V. Gorochov