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Гайирбег Магомедович Абдурахманов
Gayirbeg Magomedovich Abdurakhmanov
(1942–2018)

**New and little known species of Alleculini
(Coleoptera: Tenebrionidae: Alleculinae):
extinct from Eocene Baltic Amber and extant from Lebanon**

**Новые и малоизвестные виды Alleculini
(Coleoptera: Tenebrionidae: Alleculinae):
вымерший из эоценового балтийского янтаря
и рецентные из Ливана**

© M.V. Nabozhenko^{1, 2}, I.A. Chigray³

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Key words: Coleoptera, Tenebrionidae, Alleculinae, new extinct and extant species, Baltic amber, Lebanon.

Ключевые слова: Coleoptera, Tenebrionidae, Alleculinae, новые вымерший и рецентные виды, балтийский янтарь, Ливан.

Abstract. Three new species of comb-clawed beetles of the tribe Alleculini (Tenebrionidae: Alleculinae) are described. *Gonodera baygushevae* Nabozhenko et I. Chigray, **sp. n.** (Eocene Baltic amber) is similar to extant *Gonodera rufoaenea* Reitter, 1900 by very finely and sparsely punctated elytral intertriae, but differs in the small size of body (6.6 mm, while other species of *Gonodera* Mulsant, 1856 have a minimal length of 8 mm), elongate punctuation of head, subequal width of elytral and pronotal bases and six teeth on both clavae (other *Gonodera* have seven teeth). *Gonodera kasatkini* Nabozhenko, **sp. n.** (extant, Lebanon) belongs to the species-group with subequal antennomeres 3 and 4 of male and differs from all other species of this group in the absence of basal impression on pronotal disc and strongly depressed 5th elytral interstria at base. *Mycetochara* (s. str.) *abdurakhmanovi* Nabozhenko, **sp. n.** (extant, Lebanon) differs from all Western Palaearctic *Mycetochara* s. str. in the combination of red protorax with black elytra, large longitudinal oval impression in the middle of anterior half of pronotum and 10 long lanceolate spines on apical lobe of aedeagus. New distributional data for *Isomira* (s. str.) *antennalis* Reitter, 1884 (the first record for Lebanon), *Mycetochara* (*Ernocharis*) *ruficollis* Baudi di Selve, 1877 and *Hymenalia ehdenica* Novák, 2017 are given.

Резюме. Описано 3 новых вида пыльцеядов трибы Alleculini (Tenebrionidae: Alleculinae). *Gonodera baygushevae* Nabozhenko et I. Chigray, **sp. n.** (эоценовый балтийский янтарь) похож на рецентный вид *Gonodera rufoaenea* Reitter, 1900 очень тонко и

редко пунктированными междурядьями надкрылий, но отличается небольшими размерами (длина тела 6.6 мм, в то время как другие *Gonodera* Mulsant, 1856 с минимальной длиной 8 мм), удлинённой пунктировкой головы, примерно равной шириной основания надкрылий и переднеспинки и 6 зубчиками на коготках (другие виды *Gonodera* с 7 зубчиками). *Gonodera kasatkini* Nabozhenko, **sp. n.** (рецентный вид, Ливан) относится к видам с почти равной длиной антенномеров 3 и 4 самца и отличается от всех представителей этой группы отсутствием базального вдавления переднеспинки и сильно вдавленным в основании 5 междурядьем. *Mycetochara* (s. str.) *abdurakhmanovi* Nabozhenko, **sp. n.** (рецентный вид, Ливан) отличается от всех западнопалеарктических видов подрода комбинацией красного проторакса и черных надкрылий, крупным продольно-овальным вдавлением в передней половине переднеспинки и 10 длинными ланцетовидными шипиками на апикальной доле эдеагуса. Приведены новые данные по распространению *Isomira* (s. str.) *antennalis* Reitter, 1884 (первое указание для Ливана), *Mycetochara* (*Ernocharis*) *ruficollis* Baudi di Selve, 1877 и *Hymenalia ehdenica* Novák, 2017 в Ливане.

Alleculinae is one of the largest subfamily in the world within the family Tenebrionidae with 188 extant and 6 extinct genera [Bousquet et al., 2015]. This group is known since the Mesozoic Era. The earliest comb-clawed *Cistelites insignis* with unclear taxonomic position has

been described from the Lower Jurassic of Switzerland (Schambelen, Insektenmergel formation, Aargau, Switzerland) [Heer, 1865]. The oldest accurate species of Alleculinae was described from the Upper Jurassic of the Kara-Tau (Karabastau Formation, Callovian, Kazakhstan) [Medvedev, 1969]. Other Mesozoic species of the subfamily are known from the Lower Cretaceous of Yixian (Yixian formation, Liaoning Province, China) [Nabozhenko et al., 2015; Chang et al., 2016] and Upper Cretaceous of Sakhalin (Mgrach, Santonian Stage, Sakhalin, Russia) [Heer, 1878]. Most fossil taxa of Alleculinae were found in Eocene Baltic amber (eight taxa) and the Florissant Formation (three taxa, Chadronian, Colorado, USA).

Baltic amber contains species of the extinct genus *Mycetocharoides* Schauffuss, 1888 and the extant genera *Isomira* Mulsant, 1856, *Mycetochara* Berthold, 1827, *Hymenalia* Mulsant, 1856, *Cteniopus* Solier, 1835 and *Cteniopinus* Seidlitz, 1896. The last four genera are based on the lost material listed in Klebs [1910]. The genus *Isomira* (Alleculini: Gonoderina) dominates among Baltic amber samples and is represented by 2–3 species (including fossil *Isomira avula* Seidlitz, 1896) from the Eastern Palaearctic species-groups (unpublished data of M.V. Nabozhenko with co-authors). Below we describe the first member of the genus *Gonodera* Mulsant, 1856 from Baltic amber. Extant species of this genus are distributed in Southern Europe, Turkey, the Caucasus and Iran [Novák, Pettersson, 2008; Novák, 2011]. One fossil *Gonodera* was described from the late Eocene Florissant Formation of USA [Wickham, 1913]. So, this group had a significantly wider range in the Eocene if Wickham correctly determined the genus.

Below we also describe several species of alleculine beetles of the tribe Alleculini from Lebanon. Comb-clawed beetles of the Middle East are poorly studied, many genera with numerous old species need revision. Important revisions on Alleculinae of this region were published in the 20th Century on the genus *Gonodera* [Mařan, 1944], the tribe Cteniopodini [Ogloblin, Znojko, 1950], the genus *Isomira* Mulsant, 1856 of the former USSR and adjacent countries [Dubrovina, 1982; Yablokov-Khuzoryan, 1983]. The most important contribution in the 21st Century was added by Novák with co-authors [Novák, 2006a, b, c, 2007, 2011, 2013, 2017; Novák, Pettersson, 2008; Novák et al., 2013, 2015], who partly revised some genera from Iran and Turkey. The subfamily Alleculinae of Lebanon is the most poorly studied within the Middle East fauna. Only 10 species are known from this territory, in the genera *Allecula* Fabricius, 1801 (one species), *Prionichus* Solier, 1835 (two species), *Mycetochara* (subgenus *Ernocharis* C.G. Tomson, 1859) (two species), *Hymenalia* Mulsant, 1856 (one species) *Omophlus* Dejean, 1834 (four species) [Novák, Pettersson, 2008; Novák, 2017], of which four species are endemic.

Material and methods

The material examined comes from the collection of Mr Carsten Gröhn (Glinde, Germany) and is deposited in the Center of Natural History (CeNak) (formerly Geological-Paleontological Institute and Museum, GPIH)

of the University of Hamburg, Germany. The amber piece was hand-polished allowing improved views of the included specimen, and was not subjected to any additional fixation.

We also studied the material on extant comb-clawed beetles collected by Dr Denis Kasatkin in Lebanon in 2018, which will be deposited in Zoological Institute of the Russian Academy of Sciences (ZIN, St Petersburg, Russia) and partly in the private collection of M.V. Nabozhenko (CN, Rostov-on-Don, Russia).

Tribe Alleculini

Subtribe Gonoderina

Gonodera baygushevae Nabozhenko et I. Chigray, **sp. n.**

(Figs 1, 2)

Material. Holotype, ♀, single incision, with label: "GPIH 4989, coll. Gröhn 0026 *Gonodera baygushevae* HT Nabozhenko 2018. The holotype is deposited in GPIH – Geologisch-Paläontologische Museum Universität Hamburg, now: CeNak (Centrum of Natural History). In the Museum of GPIH the collection of Mr. Carsten Gröhn is separately deposited (4989 is the museum number, 0026 is the number of the collection of C. Gröhn).

Description. Body length 6.6 mm. Body moderately robust, glabrous, shiny. Head widest at eye level, with coarse and dense (puncture diameter subequal to interpuncture distance) punctation, punctures around frons elongate, sometimes merged, frontoclypeus with coarser and denser punctation of elongate punctures, frons with sparser punctation of round punctures (puncture diameter 1.5–2 times shorter than interpuncture distance). Apical maxillar palpomeres weakly triangular, with strongly oblique apical margin. Eyes large, reniform, convex, transverse (height 2.3 times as long as transverse length), 1.5 times as long as interocular space of frons. Antennae comparatively short, with 2 apical antennomeres extended beyond base of pronotum, antennomere 3 much shorter than antennomere 4. Length(width) of 2–11 antennomeres: 10(8), 22.5(10), 36(13), 37(13.5), 38(11), 37.5(17), 35(17.5), 36.5(17), 35.5(16.5), 45(15.5).

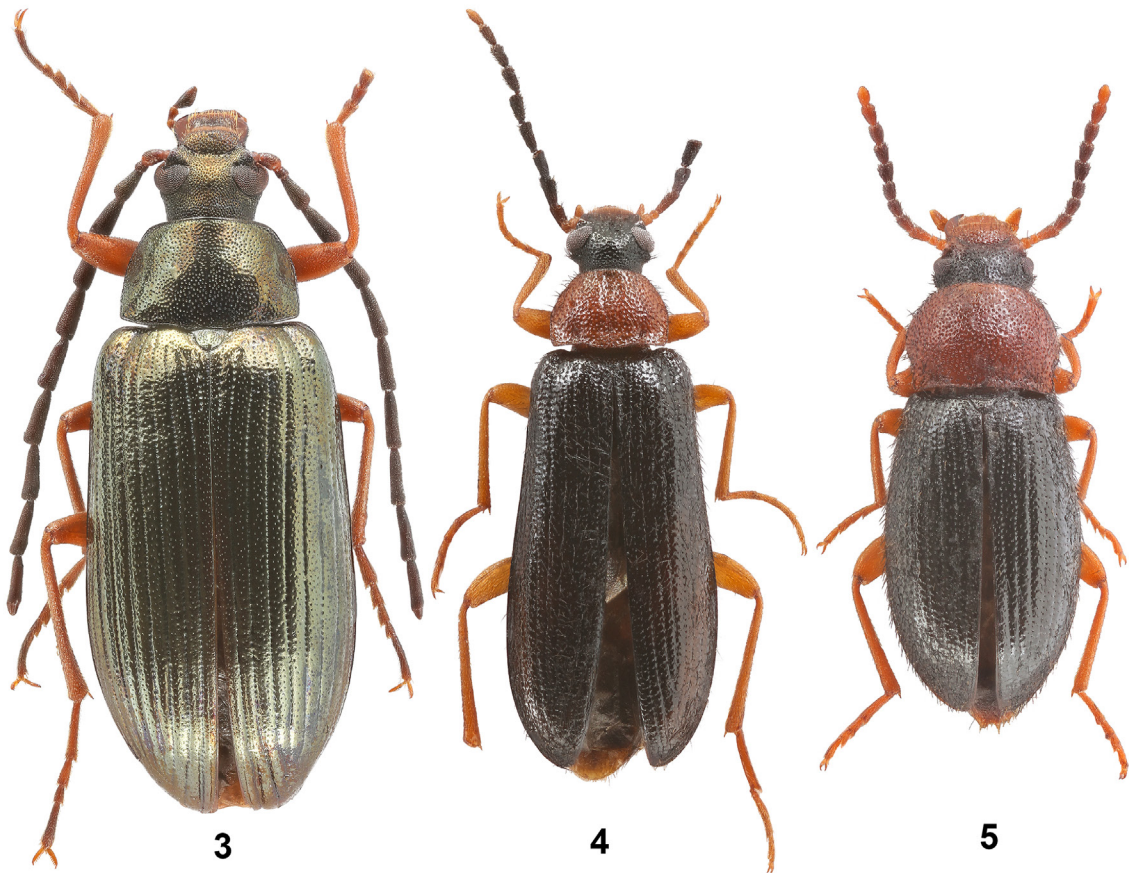
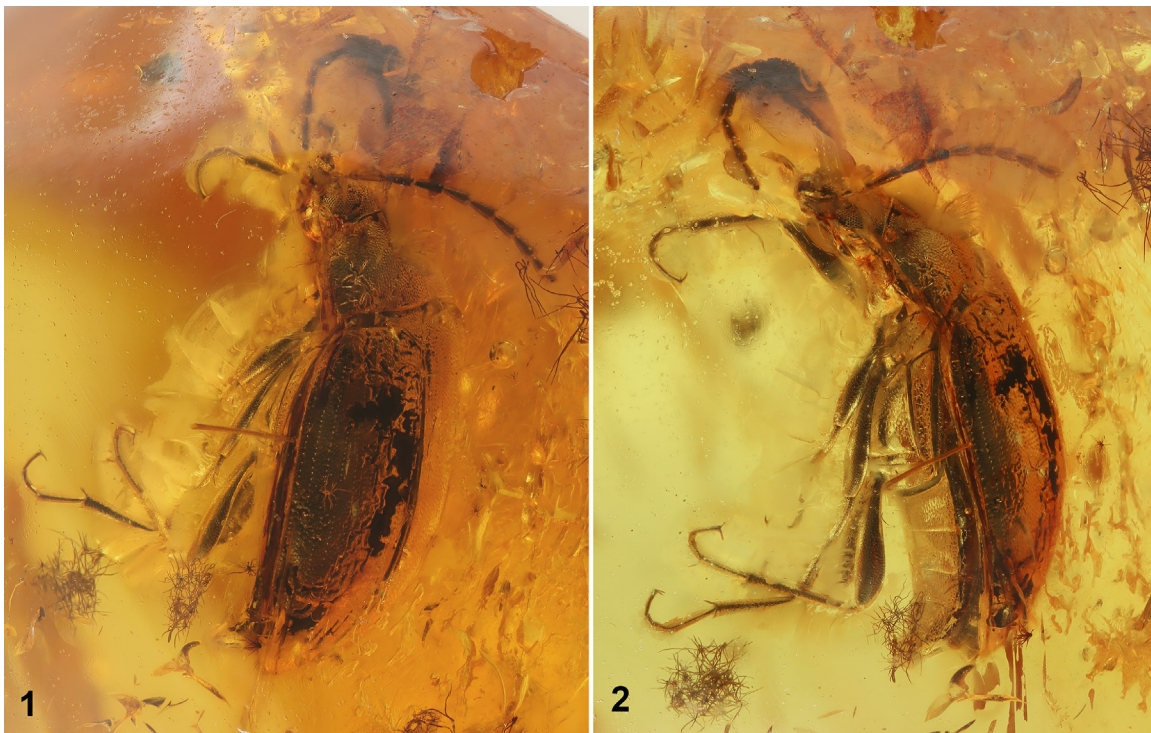
Pronotum transverse, nearly 1.3 times as wide as long, bell-shaped, widest at base; anterior margin widely rounded; base bisinuate, weakly rounded in middle; lateral margins weakly rounded in basal half and strongly rounded converging to anterior margin. Anterior angles not visible, widely rounded, posterior ones acute, narrowly rounded at apex. Base narrowly beaded, anterior margin beaded near anterior angles, lateral margins with very narrow, inconspicuous beading. Punctuation of pronotum coarse and dense (puncture diameter subequal to interpuncture distance), punctures round. Disc evenly weakly convex, with weak oblique impressions near base on each side. Prohypomera with fine sparse punctation in anterior part.

Scutellum triangular, with straight margins. Elytra 3.6 times as long as pronotum, with striae of round, not connected punctures; interstriae flat, with fine and sparse punctation. Base of elytra subequal in width to base of pronotum. Epipleura not reaching sutural angle of elytra. Mesepisterna punctured with sparse moderately coarse punctures; mesepimera without punctation; metepisterna with coarse and dense punctation (puncture diameter near 1.5 times as wide as interpuncture distance); metaventrite with coarse and dense punctation on sides and fine, sparse, rasp-like punctation on other surfaces.

Abdominal ventrites sparsely and coarsely punctured near margins, wrinkled and sparsely punctured on sides.

Legs slender, profemora 1.2 times longer than protibiae, mesofemora 1.4 times longer than mesotibiae, metafemora 1.17 times longer than metatibiae. Ratio of length of protarsomeres 1–5 – 1.4 : 1.4 : 1.1 : 1.1 : 3.9; mesotarsomeres lost; ratio of metatarsomeres 1–4 – 4.8 : 1.7 : 1.3 : 2.7. Both tarsal claws with 6 visible teeth.

Comparative diagnosis. The holotype of *G. baygushevae* **sp. n.** is female and we can not includethis



Figs 1–5. Alleculini, habitus.

1–2 – *Gonodera baygushevae* sp. n., female, holotype: 1 – dorso-lateral view, 2 – ventro-lateral view; 3 – *Gonodera kasatkini* sp. n., male, holotype; 4 – *Mycetochara* (s. str.) *abdurakhmanovi* sp. n., male, holotype; 5 – *Mycetochara* (*Ernocharis*) *ruficollis*, male.

Рис. 1–5. Alleculini, габитус.

1 – *Gonodera baygushevae* sp. n., самка, голотип; 1 – дорсолатерально; 2 – вентролатерально; 3 – *Gonodera kasatkini* sp. n., самец, голотип; 4 – *Mycetochara* (s. str.) *abdurakhmanovi* sp. n., самец, голотип; 5 – *Mycetochara* (*Ernocharis*) *ruficollis*, самец.

species in any species-group based on male antennomeres or male ocular index. Flat interstriae show that this species probably belongs to the *macrophtalma* species-group (all species of this group have flat interstriae, while members of the *luperus* species-group have convex or subconvex interstriae). Within this species-group the new species is similar to *Gonodera rufoaenea* Reitter, 1900 by very finely and sparsely punctated elytral interstriae, but differs in the small size of body (6.6 mm, while other species of *Gonodera* have a minimal length of 8 mm), elongate punctation of head, subequal width of elytral and pronotal bases and 6 teeth on both clavae (other *Gonodera* have 7 teeth).

Etymology. The species is named in honour of Vera Sever'yanovna Baygusheva, the renowned palaeozoologist from Rostov-on-Don (Russia) in connection with her 90th anniversary.

Gonodera kasatkini Nabozhenko, **sp. n.**
(Figs 3, 6–9)

Material. Holotype, ♂ (ZIN): Lebanon, Batroun, near Harissa, Tannourine reserve, 34°12'21.15"N / 35°55'55.58"E, 17–18.05.2018 (leg. D.G. Kasatkin).

Description. Body length 12 mm. Body slender, metallic shiny, copper-green dorsally and bronze ventrally, legs rufous, antennomeres 1, 2 and maxillar palpomeres 1, 2 red, apical maxillar palpomere, antennomeres 3–11 and coxae brown. Anterior margin of head straight. Lateral margins of genae obtuse angled, rounded at middle; lateral margin of head with wide obtuse emargination between genae and frontoclypeus. Dorsal surface of head with deep transverse arcuate impression between frons and frontoclypeus. Punctuation of head coarse and dense, punctures round, diameter of punctures 2 times as wide as interpuncture distance. Dorsal ocular index 37.97, ventral ocular index 62.85. Apical maxillar palpomeres triangular, longitudinal with oblique anterior margin. Ventral side of head with coarse and sparse punctation. Antennae long, with 6 apical antennomeres extended beyond base of pronotum, reaching 2/3 of elytral length. Length of antennomere 3 subequal to length of antennomere 4. Comparative length : width of antennomeres 1–11 as follows: 1.2 : 0.5, 0.4 : 0.4, 1.4 : 0.6, 1.7 : 0.7, 1.9 : 0.6, 2 : 0.6, 2 : 0.6, 2.1 : 0.5, 2.1 : 0.6, 2.1 : 0.6, 2.2 : 0.5.

Pronotum transverse (1.68 times as wide as long), 1.57 times as wide as head, widest at base, base 1.68 times wider than anterior margin; lateral margins weakly almost evenly rounded, anterior margin widely rounded, base trisinate at middle; anterior angles obtuse, rounded apically, but visible; posterior angles straight, narrowly rounded at apex; disc evenly weakly convex, only slightly widely impressed on lateral sides. Punctuation of disc the same as on head, but visibly sparser (puncture diameter subequal to distance between punctures). All margins of disc distinctly beaded. Prosternum longer than maximal diameter of procoxa, with coarse and dense punctation of round punctures (puncture diameter 2 times as wide as interpuncture distance); prohypomera with sparse moderately coarse punctation; prosternal process widened apically, flattened, without tubercle.

Scutellum weakly transverse, with rounded margins. Elytra elongate (1.76 times as long as wide), subparallel, 1.78 times as wide as head, 1.47 times as wide and 4.28 times as long as pronotum; striae punctures round, not merged; interstriae convex, densely and moderately coarsely punctate (puncture diameter 1.5 times as short as interpuncture distance); striola 1/7 of elytral length; 5th interstriae strongly depressed basally. Epipleura reaching sutural angle, impressed at base.

Mesoventrite with coarse and dense punctation and deep V-shaped impression before mesocoxae; intercoxal process long

and narrow; mesepisterna with coarse and sparse punctation; metepisterna with coarse, moderately dense punctation (puncture diameter subequal to interpuncture distance); metaventrite with sparse and coarse punctation on sides (puncture diameter 3 times as short as interpuncture distance) and fine sparse rasp-like punctation in middle.

Abdominal ventrites 1–3 with fine sparse punctation and very finely wrinkled on sides; ventrites 4–5 with almost invisible punctation, microshagreened.

Legs long and slender, protarsi not widened, comparative length of protarsi 1.3, 0.9, 0.8, 0.5, 2.1, mesotarsi 1.7, 1, 0.9, 0.6, 2.2, metatarsi 2.5, 1.2, 1.3, 2. Both clavae with 7 teeth.

Comparative diagnosis. The new species belongs to the group with subequal antennomeres 3 and 4 of male according to Mañan [1944] and Novák [2011]. This group includes three Asian species occurring in the Caucasus, Iran, Turkey and Syria. *Gonodera kasatkini* **sp. n.** differs from the Iranian *G. gilanica* Novák, 2011 by the pronotum widest at base, from the Caucasian-Anatolian *G. macrophtalma* Reitter, 1884 in convex interstriae and distinct anterior angles of pronotum, from the Anatolian and Syrian *G. rufoaenea* by the smaller eyes, the green-metallic colour of body and reddish legs and the antennomere 1. The new species differs from all three mentioned taxa in the absence of a basal impression on the pronotal disc and strongly depressed 5th elytral interstria at the base.

Etymology. The species is named in honour of our friend Dr Denis Kasatkin, who collected this species and many other interesting Tenebrionidae in the Middle East.

Isomira (s. str.) *antennalis* Reitter, 1884

Material. 1 specimen (CN), Lebanon, Shouf, 1.6 km E Fraidis, 33°42'26.32"N / 35°42'21.83"E, 10–11.05.2018 (leg. D.G. Kasatkin); 3 specimens (ZIN), Lebanon, Bcharre, Horsh Ehden Reserve, 34°18'33.34"N / 35°58'56.66"E, 15–17.05.2018 (leg. D.G. Kasatkin); 2 specimens (CN), Lebanon, Batroun, near Harissa, Tannourine reserve, 34°12'21.15"N / 35°55'55.58"E, 17–18.05.2018 (leg. D.G. Kasatkin); 1 specimen (CN), Lebanon, Akkar, Fnaydek vill., Ezer forest, 34°28'22.00"N / 36°12'26.21"E, 24–25.05.2018 (leg. D.G. Kasatkin); 1 specimen (CN), Lebanon, Bekaa, Kornet-el-Jamal Mt., 34°13'3.69"N / 36° 4'3.64"E, 2500 m, 26.05.2018 (leg. D.G. Kasatkin).

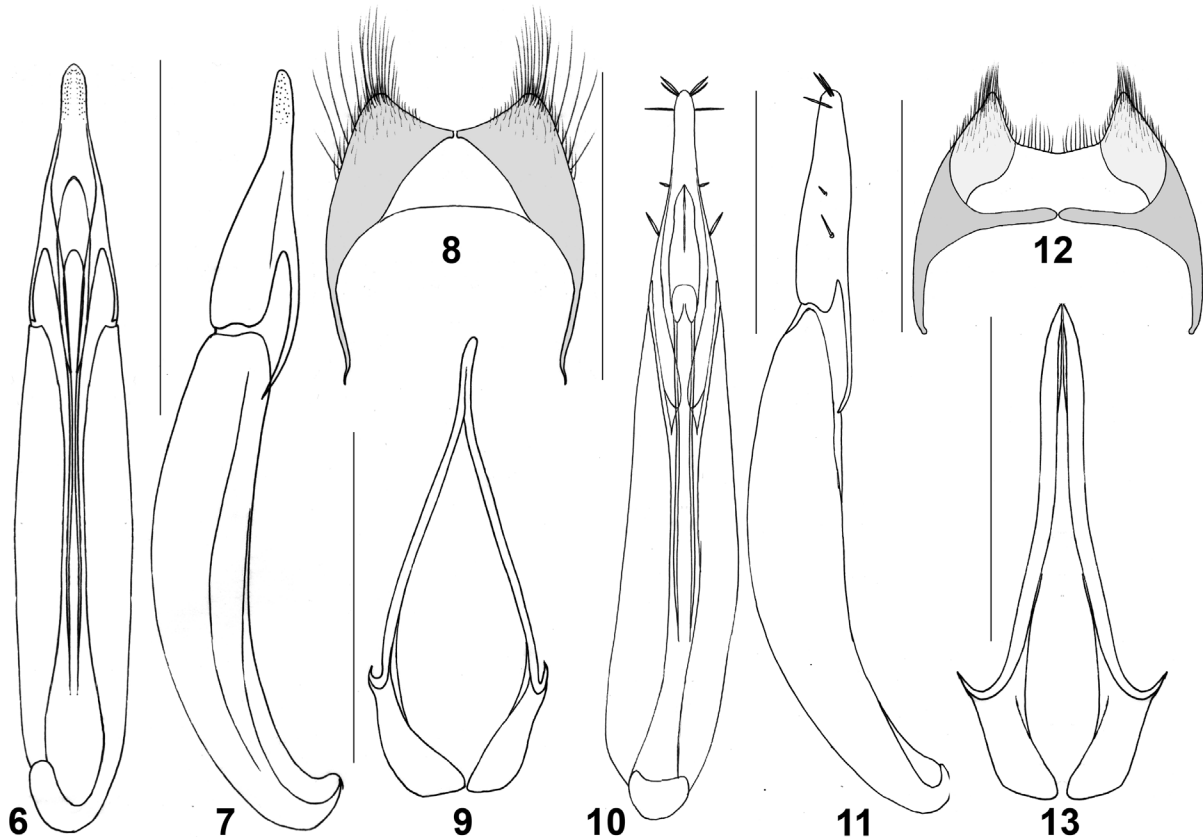
Distribution. Transcaucasia, Northern Iran, Eastern Anatolia [Dubrovina, 1982], Lebanon (the first record for the country).

Subtribe Mycetocharina

Mycetochara (s. str.) *abdurakhmanovi* Nabozhenko, **sp. n.**
(Figs 4, 10–13)

Material. Holotype, ♂ (ZIN): Lebanon, Bcharre, Horsh Ehden Reserve, 34°18'33.34"N / 35°58'56.66"E, 15–17.05.2018 (leg. D.G. Kasatkin). Paratype: 1♂ (ZIN), same label.

Description. Body length 5–7 mm. Body slender, shiny, narrow, pubescence with long black suberect hairs, head black (except for reddish-brown frontoclypeus), maxillar and labial palpomeres, antennomeres 1, 2 and legs reddish, pronotum red, elytra and ventral side black (except for yellow-brown coxae). Anterior margin of head slightly rounded; lateral margin of genae weakly rounded; lateral margin of head between genae and frontoclypeus with distinct obtuse emargination. Dorsal ocular index 45.88, ventral ocular index 46.15. Temples constricted behind eyes, strongly convex. Head dorsally with coarse and dense punctation of large round punctures (puncture diameter 2 times as wide as interpuncture distance),



Figs 6–13. *Gonodera* and *Mycetochara*, males, details of structure.

6–9 – *G. kasatkini* sp. n.; 10–13 – *M. abdurakhmanovi* sp. n. 6, 10 – aedeagus, ventral view; 7, 11 – aedeagus, lateral view; 8, 12 – VIII sternite; 9, 13 – gastral spicula.

Рис. 6–13. *Gonodera* и *Mycetochara*, самцы, детали строения.

6–9 – *G. kasatkini* sp. n.; 10–13 – *M. abdurakhmanovi* sp. n. 6, 10 – эдегус, вид снизу; 7, 11 – эдегус, вид сбоку; 8, 12 – VIII стернит; 9, 13 – гастральная спикула.

frontoclypeus with sparser punctation. Head ventrally shiny, without punctation and pubescence; gula very long, reaching level of eyes, surface before gula with coarse transverse wrinkles. Apical maxillar palpomeres triangular, longitudinal, with strongly oblique apical margin. Antennae moderately long, narrowed to apex, with 5 apical antennomeres extended beyond base of pronotum, almost reaching half of elytral length. Comparative length : width of antennomeres 2–11 as follows: 0.5 : 0.5, 1.4 : 0.7, 1.4 : 0.8, 1.5 : 0.8, 1.5 : 0.8, 1.5 : 0.8, 1.4 : 0.7, 1.3 : 0.6, 1.2 : 0.5, 1.2 : 0.5.

Pronotum transverse (1.53 times as wide as long), widest at basal third, 1.34–1.35 times as wide as head. Lateral margins slightly roundly narrowed from widest level to base and sharply weakly roundly narrowed from widest level to anterior margin; anterior margin rounded, base widely bisinuate, with short emargination in middle; anterior angles not expressed, posterior angles distinct, straight; disc weakly convex, with large longitudinal oval impression in middle of anterior half, two deep round impressions at sides of base and weak transverse impression in middle near base; base and lateral margins narrowly beaded; anterior margin not beaded. Punctation of disc coarse and dense, as on head. Length of prosternum subequal to maximal diameter of procoxa, with sparse long recumbent hairs. Prohypomera with smoothed coarse and sparse punctation. Prosternal process very narrow, but not laminar, weakly widened to apex and with small tubercle apically.

Scutellum triangular, margins straight. Elytra elongate (2.08 times as long as wide), subparallel, 2.25 times as wide as head,

1.6 times as wide and 5 times as long as pronotum; humeral angles protruded, interval 6 depressed basally; stria punctures round, not merged; interstriae weakly convex, with coarse and dense rasp-like punctures (1–2 punctures in cross section of one interstria); epipleura not reaching sutural angle, coarsely punctured.

Mesoventrite without V-shaped depression between mesocoxae, with coarse and dense punctation (puncture diameter 1.5 times as wide as interpuncture distance). Mesepisterna, mesepimera, metepisterna and lateral sides of metaventrite with very coarse and dense punctation of large foveae; metaventrite convex, with long medial impression from base, sparse, moderately coarse rasp-like punctation and a covering of recumbent black hairs.

Abdominal ventrites with sparse and coarse (puncture diameter 3–4 times as short as interpuncture distance).

Mesocoxae longitudinal; legs long and slender, comparative length of protarsi 1.2, 0.8, 0.8, 0.5, 1.2, mesotarsi 2.1, 1.2, 1.1, 0.6, 1.5, metatarsi 4, 2.3, 1.1, 1.5. Both clavae with 6 teeth.

Differential diagnosis. The species differs from all Western Palearctic *Mycetochara* s. str. in the colour of body (especially red prothorax and black elytra), large longitudinal oval impression in middle of anterior half of pronotum and 10 long lanceolate spines on apical lobe of aedeagus.

Etymology. The species is named in the memory of our friend and the famous Caucasian entomologist Gayirbeg Magomedovich Abdurakhmanov.

Mycetochara (Ernocharis) ruficollis Baudi di Selve, 1877
(Fig. 5)

Material. 7 specimens (5 in ZIN, 2 in CN), Lebanon, Bcharre, Horsh Ehdan Reserve, 34°18'33.34"N / 35°58'56.66"E, 15–17.05.2018 (leg. D.G. Kasatkin); 1 specimen (CN), Lebanon, Batroun, near Harissa, Tannourine reserve, 34°12'21.15"N / 35°55'55.58"E, 17–18.05.2018 (leg. D.G. Kasatkin).

Distribution. Cyprus, Syria, Lebanon [Novák, Pettersson, 2008].

Subtribe Alleculina

Hymenalia ehdenica Novák, 2017

Material. 1 ♀ (ZIN), Lebanon, Akkar, Fnaydek vill., Ezer forest, 34°28'22.00"N / 36°12'26.21"E, 24–25.05.2018 (leg. D.G. Kasatkin).

Distribution. Lebanon [Novák, 2017].

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