REVIEW OF THE GENUS CRYPTOPIAGUS HERBST, 1863 (COLEOPTERA CRYPTOPIAGIDAE) FROM GEORGIA

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INTRODUCTION

The family Cryptophagidae (silken fungus beetles) is a group of small beetles with about 800 described species represented in all biogeographic realms. Both adults and larvae of silken fungus beetles are commonly found on mold, fungi, under bark, as well as in decaying vegetation (LYUBARSKY and PERKOVSKY, 2011). Genus Cryptophagus Herbst, 1863 belongs to the family Cryptophagidae. The genus comprises approximately 200 species in the world (LESCHEN, 1996).

Investigation of the above mentioned genus has been started from the 1890s in Georgia (LYUBARSKY, 1992). Before our investigation twenty three species of the genus Cryptophagus have been recorded from Georgia (BRUCE, 1936; LYUBARSKY, 1992; JOHNSON et al., 2007). Cryptophagus axillaris Reitter, 1785 was sampled by the third and fourth authors in Savekuo Cave (Western Georgia) in 2014, while C. lycoperdi (Scopoli, 1763) from Bichvinta (=Pitsunda) is a new record for Georgian beetle fauna. Twenty five species of the Cryptophagus beetles are recorded in Georgia. Sampling data and distribution map for the genus Cryptophagus species are given. Identification key to the genus Cryptophagus in Georgia is provided.

KEY WORDS: Silken fungus beetle, new record, sampling sites, identification key, Caucasus.

RESULTS AND DISCUSSION

LIST OF CRYPTOPIAGUS SPECIES

C. axillaris Reitter, 1875


Distribution in the world: E: AL, MD, RO, UK (JOHNSON et al., 2007).

Comment: New record for the beetle fauna of the Caucasus.

C. bruckii Reitter, 1875

C. cellaris (Scopoli, 1763)

Distribution in Georgia: Tbilisi, Sampling date and collector's name are not on the label, det. G. Lyubarsky, ZIN (unpublished locality).

Circassicus Reitter, 1888


Distribution in the world: E: GG, ST (Kavkaz) (JOHNSON et al., 2007).

Fig. I – Sampling sites of the Cryptophagus beetles in Georgia.

Sampling localities


Distribution in the world: E: AB, AR, BH, GG, SP, ST (Kavkaz); A: AF, FE, IN, IS, JO, PA, SY, TM, TR (JOHNSON et al., 2007).

C. cirassicus (Scopoli, 1763)

Distribution in Georgia: Tbilisi, Sampling date and collector's name are not on the label, det. G. Lyubarsky, ZIN (unpublished locality).

Distribution in the world: E: GG, ST (Kavkaz) (JOHNSON et al., 2007).
C. dentatus Bruce, 1934


**Distribution in the world:** E: AR, AU, CT, CZ, EN, FI, GB, GE, GG, HU, NR, NT, PL, SK, SP, SV, SZ, UK; A: FE, EU (JOHNSON et al., 2007).

C. denticulatus (Herbst, 1793)


**Distribution in Georgia:** Kashtag, 27.viii.1975, leg. V.V. Belov, det. G. Lyubarsky, ZMMU (unpublished); Sokhumi, 23.viii.1975, leg. V.V. Belov, det. G. Lyubarsky, ZMMU (unpublished locality).

**Distribution in the world:** E: AB, AL, AN, AR, AU, BEM BH, BU, BY, CR, CT, CZ, DE, EN, FI, FR, GB, GE, GG, GR, HU, IC, IR, IT, LA, LT, MA, NL, NR, NT, PL, PT, RO, SK, SL, SP, ST (Kavkaz), SV, SZ, UK; A: AF, ES, FE, IN, JA, KI, KZ, MG, NC, TM, TR, AU, NAR (Johnson et al., 2007).

C. lycoperdi (Scopoli, 1763)


**Distribution in the world:** E: AB, AR, AU, BE, BH, BU, BY, CR, CT, CZ, DE, FI, FR, GB, GE, GG, GR, HU, IC, IR, IT, LA, LT, MA, NL, NR, NT, PL, PT, RO, SK, SL, SP, ST (Kavkaz), SV, SZ, UK; A: AF, FE, IN, IS, IQ, JO, KA, KJ, LE, NP, SY, TM, TR, UP, UZ, XIN AFR, AUS, NAR, ORR (Johnson et al., 2007).

**Comment:** New record for beetles fauna of Georgia.

C. laticollis Lucas, 1846


**Distribution in the world:** E: AN, AU, BE, BH, BU, BY, CR, CT, CZ, DE, FI, FR, GB, GE, GG, GR, HU, IR, IT, LA, LT, MD, NL, NR, NT, PL, PT, RO, SK, SL, SP, ST (Kavkaz), SV, SZ, UK, YU; N: TU; A: TR NAR (Johnson et al., 2007).


**Distribution in the world:** E: AB, AL, AR, CT, FI, GG, ST (Kavkaz), UK; A: ES, FE, IQ, KI, KZ, MG, NMO, SY, TD, TM, UZ, WS NAR (Johnson et al., 2007).

C. reflexus Rey, 1882


**Distribution in the world:** E: AB, AL, AR, BE, BH, BU, BY, CR, CT, CZ, DE, EN, FI, FR, GB, GE, GG, GR, HU, IR, IT, LA, LT, MC, MD, NL, NR, NT, PL, PT, RO, SK, SL, SP, ST (Kavkaz), SV, SZ, TR, UK, YU; N: LB, MO, TU; A: IN, IS, KI, LE, MG, NMO, TD, TR, WS (Johnson et al., 2007).

C. saginatus Sturm, 1845


**Distribution in the world:** E: AB, AU, BE, BH, BU, BY,
CR, CT, CZ, DE, EN, FI, FR, GB, GE, GG, HK, IR, IT, LA, LT, MC, MD, NL, NR, NT, PL, RO, SK, SL, SP, ST, SV, SZ, UK, YU; N: AG, AZ, CI, CR, EU, FR, GE, GG, GR, IT, SP, ST (Kavkaz); A: ES, FE, NL, NT, PL, RO, SK, SL, SP, SV, SZ, UK; A: ES, FE, NL, NT, PL, RO, SK, SL, SP, SV, SZ, UK (JOHNSON et al., 2007).

C. scanicus (Linnaeus, 1758)


**Distribution in the world:** E: AB, AR, CR, CZ, FR, GE, GG, GR, IT, SP, ST (Kavkaz); A: AF, ES, IN, KA, KI, KZ, PA, TD, TM, TR, UZ (JOHNSON et al., 2007).

C. schmidti Sturm, 1845


**Distribution in the world:** E: AU, BE, CR, CT, CZ, DE, EN, FI, FR, GB, GE, GG, GR, HK, IC, IR, IT, LA, LT, MD, NL, NR, NT, PL, RO, SK, SL, ST (Kavkaz); A: FE, KZ, SY (JOHNSON et al., 2007; OTERO, 2011).

C. scutellatus Newman, 1834


**Distribution in the world:** E: AU, BE, CR, CT, CZ, DE, EN, FI, FR, GB, GE, GG, HK, IC, IT, LA, MD, NL, NR, NT, PL, RO, SK, SL, ST (Kavkaz); N: AG; A: AF, ES, IN, KA, KI, KZ, PA, TD, TM, TR, UZ (JOHNSON et al., 2007).

C. skalitzkyi Reitter, 1875


**Distribution in the world:** E: AB, AR, CR, CZ, FR, GE, GG, GR, IT, SP, ST (Kavkaz); A: AF, ES, IN, KA, KI, KZ, PA, TD, TM, TR, UZ (JOHNSON et al., 2007).

C. subdepressus Gyllenhal, 1827


**Distribution in the world:** E: AU, BE, CR, CT, CZ, DE, EN, FI, FR, GB, GE, GG, HK, IC, IT, LA, MD, NL, NR, NT, PL, RO, SK, SL, ST (Kavkaz); A: AF, ES, IN, KA, KI, KZ, PA, TD, TM, TR, UZ (JOHNSON et al., 2007).

Based on literature and our data thirty four sampling sites of twenty four Cryptophagus beetles were found in Georgia (Fig. I). Beetle species frequency of occurrence is shown in Fig. II. C. denticulatus is found from 12 sampling sites, C. lapidicola – from 9 localities, C. reflexus – from 8 localities, 2 species – from 7 localities, 1 species – from 5 localities, 2 species – from 4 localities, 3 species – from 3 localities, 4 species – from 2 localities, while remaining 9 species, including newly recorded 2 species are known only from single locality (Fig. II). 1 species – C. scutellatus were recorded for the beetle fauna of Georgia without indicating sampling sites (JOHNSON et al., 2007).

Species density in each sampling sites is shown in Fig. III. Maximum number of species – 9 species was collected in Sokhumi, while only single species were sampled in 20 sampling localities (Fig. III). Sampling localities for eight previously recorded species, which were listed in JOHNSON et al. (2007) without indicating sampling sites, are reported for the first time. Besides, twenty three sampling localities

Fig. II – Cryptophagus species frequency of occurrence in Georgia.
for eleven species are given for the first time. Maximum number of beetle species (15) and sampling sites (10) were registered in Abkhazia, while only one species from one locality was registered in Kvemo Kartli Region (Table 1). Cryptophagus beetles were not investigated in Racha-Lechkhumi and Guria regions of Georgia (Table 1). Cryptophagus axillaris Reitter, 1785 was the first record in the beetle fauna of the Caucasus. C. lycoperdi (Scopoli, 1763) was the first records in the beetle fauna of Georgia. C. lycoperdi was sampled in Bichvinta, while C. axillaris— in Twilight zone of Savekuo Cave. Besides, mollusk – Oxychilus sucinaceus sucinaceus (Bottger, 1883) and spider – Linipria sp. are inhabitants of Savekuo Cave (BARJADZE et al., 2015).

Table 1 – Number of sampling sites and beetle species in each region of Georgia.

<table>
<thead>
<tr>
<th>N</th>
<th>Region</th>
<th>Number of sampling sites</th>
<th>Number of species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abkhazia</td>
<td>10 (1-10)</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>Mingrelia-Svanetia</td>
<td>3 (12-14)</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Guria</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Ajaria</td>
<td>1 (11)</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Racha-Lechkhumi</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>Imereti</td>
<td>2 (16-17)</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Samekh-Javakheti</td>
<td>4 (15, 18-20)</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Shida Kartli</td>
<td>1 (21)</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>Kvemo Kartli</td>
<td>1 (22)</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Tbilisi</td>
<td>1 (26)</td>
<td>6</td>
</tr>
<tr>
<td>11</td>
<td>Mtskhet-Mtianeti</td>
<td>4 (23, 24, 25, 27)</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>Kakheti</td>
<td>7 (28-34)</td>
<td>7</td>
</tr>
</tbody>
</table>

Fig. III – Cryptophagus species density in each sampling site in Georgia

Key to the species of the genus Cryptophagus Herbst, 1863 recorded from Georgia

1. Hind wings present ........................................ 2
   - Hind wings reduced or absent ................................ 22

2. Pubescence double ...................................... 3
   - Pubescence simple ........................................ 8

3. Elytral long adpressed hairs set in rows. Diameter of eye facet more than 11 m. Length of body 2.2-2.7 mm ....... C. cellaris
   - Elytral pubescence not set in rows. Diameter of eye facet less than 11 m. ......................................................... 4

4. Anterior tibia dilated apically. Callosity of pronotum with apical point. Length of body 2.5-3.5 mm. Lateral tooth of pronotum located before the middle of lateral margin
   - Anterior tibia not dilated apically. Callosity of pronotum usually without apical point. Lateral tooth of pronotum located in the middle or before the middle of lateral margin ............. 5

5. Size large, 2.6-3.3 mm. Callosity of pronotum forms an angle with the lateral edge, fluently turning into lateral margin. Length of body 2.6-3.3 mm ..................................... C. schmidtii
   - Size small, 1.7-2.5 mm. Callosity of pronotum forms an angle with the lateral edge .................................................. 6

6. Eyes conical, usually asymmetrically prominent. Length of body 1.7-2.3 mm ........................................... C. laticollis
   - Eyes hemispherical, normal symmetrically prominent ........ 7

7. Lateral margin of pronotum thick, more than 1/3 of length of scutellum. Lateral tooth of pronotum located in the middle of length of lateral margin. Pronotum weakly narrowed basally. Eyes
normal in size, hemispherical, eye facets medium-sized, diameter of facet 8-10 m. Length of body 1.9-2.5 mm _______ C. confusus
- Lateral margin of pronotum thin, less than 1/3 of length of scutellum. Lateral tooth of pronotum located before the middle of length of lateral margin. Pronotum strongly narrowed basally. Eyes small, hemispherical or conical, eye facets small, diameter of facet less than 8 m. Length of body 1.7-2.3 mm _______ C. skalytskyi

8. Callosity of pronotum with apical point 9
- Callosity of pronotum without apical point 12

9. Antennae long, with club reaching beyond base of pronotum. Lateral tooth of pronotum located in the middle or before the middle of length of lateral margin 10
- Antennae short, with club not reaching beyond base of pronotum. Lateral tooth of pronotum located behind the middle of length of lateral margin. Length of body 1.6-2.3 mm _______ C. distinguendus

10. Pronotum weakly transverse, weakly narrowed basally. Length of body 2.0-2.5 mm _______ C. labilis
- Pronotum strongly transverse, strongly narrowed basally 11

11. Eye facets medium-sized, diameter of facet 8-10 m. Pronotum strongly narrowed basally. Length of body 2.0-3.2 mm _______ C. punctipennis
- Eye facets small, diameter of facet less than 8 m. Pronotum weakly narrowed basally 12

12. Lateral tooth of pronotum located in the middle or near before the middle of length of lateral margin. Paramere broad, with four long setae apically. Body sometimes bicolorous, usually red- or light-yellow, elytra more light. Length of body 2.1-2.7 mm _______ C. dilatus
- Lateral tooth of pronotum located in the middle of length of lateral margin. Paramere narrow, triangular, with two long setae apically. Body monochromatic, yellow-brown. Length of body 2.0-2.4 mm _______ C. brachii

13. Size small, lateral tooth of pronotum located before the middle of length of lateral margin. Length of body 1.2-1.7 mm _______ C. scutellatus
- Size large, lateral tooth of pronotum located in the middle or before the middle of length of lateral margin. Length of body 1.7-2.8 mm _______ C. skalytskyi

14. Elytra with transverse black band, and with dark strip along suture. Length of body 2.2-2.5 mm _______ C. quadromaculatus
- Elytra without transverse black band 15

15. Front bare surface of callosity of pronotum when viewed from above is not visible. Callosity of pronotum smaller, occupying 1/6-1/7 of length of lateral margin of pronotum. _______ 16
- Front bare surface of callosity of pronotum when viewed from above is visible. Callosity of pronotum usually larger _______ 17

16. Callosity of pronotum flat, not forms an angle with the lateral edge, frequently turning into lateral margin. Lateral tooth of pronotum before the middle of lateral margin of pronotum. Body usually light-brown. Length of body 1.8-2.6 mm _______ C. saginatus
- Callosity of pronotum forms an angle with the lateral edge. Angle between front bare surface of callosity and longitudinal axis of body 35-45°. Lateral tooth of pronotum in middle or behind the middle of length of lateral margin. Body usually dark-brown. Length of body 1.6-2.3 mm _______ C. dorialis

17. Lateral margin of pronotum very thin. Antennae usually short, with club not reaching beyond base of pronotum. Eyes with facets in small size, less than 8 m. Length of body 2.0-2.6 mm _______ C. paludosus
- Lateral margin of pronotum ordinary thick. Antennae usually long, with club reaching beyond base of pronotum. Eyes with facets in medium size, more than 8 m _______ 18
- Lateral margin of pronotum big, occupying ¼ of length of lateral margin of pronotum 19
- Callosity of pronotum small, occupying less than ¼ of length of lateral margin of pronotum (1/5 of length of lateral margin) 20

19. 3rd antennal joint longer than 2nd. Apodema of aedeagus dilated apically. Length of body 1.8-2.5 mm _______ C. reflexa
- 3rd antennal joint not longer than 2nd. Apodema of aedeagus not dilated apically. Length of body 1.5-2.8 mm _______ C. sicanius

20. Pronotum flat. Basal groove of pronotum reduced, basal pits slightly developed. Length of body 1.7-2.3 mm _______ C. subdepressus
- Pronotum convex. Basal groove of pronotum and basal pits normal developed 21

21. Antennae usually short, with club not reaching beyond base of pronotum. Caudolateral angle of callosity of pronotum obtuse. Lateral margin of pronotum between callosity and lateral tooth straight or weakly concave. Lateral tooth of pronotum located before the middle of length of lateral margin. Aedeagus long, its length 1.2-1.7 times as long as its breadth. Paramere long, more than 0.7 time as long as length of aedeagus. Length of body 2.0-2.8 mm _______ C. dentatus
- Antennae long, with club reaching beyond base of pronotum. Caudolateral angle of callosity of pronotum right or acute angle. Lateral margin of pronotum between callosity and lateral tooth straight. Lateral tooth of pronotum often located in the middle of length of lateral margin. Aedeagus short, length less than 1.2 times as long as its breadth. Paramere short, 0.5-0.7 times as long as length of aedeagus. Length of body 2.0-2.8 mm _______ C. denticulatus

22. Pubescence double 23
- Pubescence simple 24

- Size small, body fairly flat, narrow. Pronotum weakly transverse. Body light-yellow. Length of body 1.7-2.3 mm _______ C. skalytskyi

24. Callosity of pronotum with apical point 25
- Callosity of pronotum without apical point 26

25. Pronotum with cutting along the front edge. Length of body 1.7-2.4 mm _______ C. ciricassus
- Pronotum without cutting along the front edge. Length of body 2.0-2.6 mm _______ C. avellanii

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