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DESCRIPTION OF THE LARVA OF *PROTAETIA INSPERATA* LEWIS (COLEOPTERA: SCARABAEIDAE) WITH A KEY TO THE LARVAE OF THE GENUS *PROTAETIA* FROM THE RUSSIAN FAR EAST

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Summary. The larva of the *Protaetia* (*Liocola*) *insperata* (Lewis, 1879) is described and illustrated for the first time. The larva of *P. insperata* similar to larvae of *P. famelica* and *P. brevitarsis*, but differs from both by a number of spinules in symmetrical rows on the anal sternite, and by a chaetotaxy of head capsula and epipharengial surface. A key to larvae of the genus *Protaetia* from the Russian Far East is given.

Key words: Coleoptera, Scarabaeidae, Cetoniinae, *Protaetia*, rose chafers, morphology, larva.

С. А. Шабалин. Описание личинки *Protaetia insperata* Lewis (Coleoptera: Scarabaeidae) с определительной таблицей личинок рода *Protaetia* Дальнего Востока России // Дальневосточный энтомолог. 2022. N 456. С. 17-21.

Резюме. Впервые дано иллюстрированное описание личинки *Protaetia* (*Liocola*) *insperata* (Lewis, 1879). Личинка *P. insperata* сходна с личинками *P. famelica* и *P. brevitarsis*, но отличается от них числом шипиков в симметричных рядах на анальном стерните, хетотаксией головной капсулы и эпифарингеальной поверхности. Приведена определительная таблица личинок рода *Protaetia* Дальнего Востока России.

INTRODUCTION

Among the seven species of the flower-chafer genus *Protaetia* Burmeister, 1842 reliably recorded from the Russian Far East (Shabalin, 2011), larvae of six species were known (Medvedev, 1952; Zhang, 1984; Sawada, 1991; Shabalin, 2014, 2018). The larvae of *P.* (*Liocola*) *insperata* (Lewis, 1879) have remained unknown up to the present time. In the course of the field studies carried out in the Sakhalin Island (environs of Sokol) in 2021, the beetles of *P. insperata* were collected and produced larvae under the laboratory conditions. The description of these larvae is given below. The morphological terminology follows those of Böving (1936), Edmonds & Halfter (1978), and Medvedev (1952). The examined material is deposited in the Center of the East Asia Terrestrial Biodiversity, Far East Branch of Russian Academy of Sciences (Vladivostok). The photographs were taken with an Olympus SZX16 stereomicroscope and an Olympus DP74 digital camera, and then stacked using Helicon Focus software. The final illustrations were postprocessed for contrast and brightness using Adobe® PhotoshopTM software.

DESCRIPTION OF LARVA

***Protaetia* (*Liocola*) *insperata* (Lewis, 1879)**
Figs 1–11

Cetonia insperata Lewis, 1879: 463. Type locality: "Yezo" [Japan, Hokkaido].

MATERIAL. **Russia**: Sakhalin Island, 4 larvae of 3rd instar was obtained from 5 beetles collected on 24.VII 2021 in the environs of Sokol village by S.A. Shabalin.

DESCRIPTION. Third-instar larva of typical C-shape form. Head surface smooth dark brown. Medial part of pleural sclerites, apical part of mandibula, and base of frons a bit darker than remaining part of the head capsule. Head width of third-instar larva 5.0 mm, length (without clypeus and labrum) 3.1 mm. Epicranial suture is short, narrowly dark, dark brown, slightly convex. Frontal sutures visible, as fine light lines, tortuous. The length of the epicranial suture is about three times shorter than the height of the frons. Dorsoepicranium with groups of short setae more or less arranged in row on each side; normally with a long seta on each side. Each pleural sclerite with three shorten and one longer anterior epicranial setae; with 4 shorten posterior epicranial setae. Frons with pair longer posterior frontal setae, with 2 pairs shorten anterior frontal setae, and with pair anterior frontal angle setae. Ocelli absent. Clypeus trapezoidal, with two pairs of setae laterally and pair of anterior clypeal setae. The basal part of the clypeus (2/3 length of clypeus) significantly darken than the apical. Labrum trilobed anteriorly, with 2 rounded shallow pits in a central part; with 2 longer central setae; with 4 short posterocentral setae, with 6 long lateral setae, and usual marginal setae (Fig. 1). Corypha with 4 marginal setae. Right and left clithrum being present, it surfaces thinly sclerotized. Epizygum and zygum absent. Haptomerum with 2 rows of sencillae. Apical row with 21 shorten sencillae. Basal row with 7 long triangular acuminated apically sencillae. Plegmatium and proplegmatium absent. Acanthoparia with 6–7 almost subequal setae, surrounded by distinct sheath at base. Posterior 1–2 setae of acanthoparia often smaller than the remaining ones. Gymnoparia absent. Chaetoparia asymmetrical, right part with 58 hair-like to stout setae, left part with 32 hair-like setae. Pedium oval, it occupying between one-eight epipharengial surface. Dexiotorma prolonged, right pternotorma absent. Laeotorma narrow, shorter than dexiotorma, left pternotorma well developed. Haptolachus with rounded sense cone with 4 apical sensilla. Anteriorly to sense cone distinct plate-shaped sclerome. Crepis absent (Fig. 2). Mandibles triangular, asymmetrical. Left mandible slightly longer than right one, its scissorial part wider. Base of mandibles darken brown, scissorial and molar part almost black. Right mandible with one apical, acute scissorial tooth followed by two wide, scissorial blade. Lateral part of right mandible with 7setae dorsally. Dorsal surface with two longer setae in apical-lateral part (Fig. 4). Molar area complex of right mandibula, bilobed, with apical depression, basal molar lobe wide, dorso-longitudinally compressed. Right mandible with stridulatory area and two shortens seta in central part ventrally. Stridulatory area elongated-oval (Fig. 5). Left mandible with 1 apical, acute scissorial tooth and 3 wide scissorial blade. Lateral part of left mandible with 8 setae dorsally. Dorsal surface with two longer setae in apical-lateral part (Fig. 3). Molar area complex of left mandibula, bilobed, apical molar lobe with subtriangular shorten teeth, basal molar lobe wide, dorso-longitudinally compressed. Left mandible with elongated-oval stridulatory area (Fig. 6). A well-developed brush of bristles at base of both right and left molar parts (Figs 3–6). Maxillae symmetrical. Ventral side of cardo with 4 long setae laterally; with 12 setae medianny (Fig. 8). Dorsal side of cardo with 4 long setae laterally and with 17 short medial setae. Ventral side of stipes with 3 short basal setae, 3 long lateral setae, and 2 long central setae. Dorsal side of stipes with 7

Figs 1–11. Third-instar larva of *Protaetia* (*Liocola*) *insperata* (Lewis, 1879). 1 – head capsula; 2 – epipharynx; 3 – left mandible, dorsal view; 4 – right mandible, dorsal view; 5 – right mandible, ventral view; 6 – left mandible, ventral view; 7 – maxilla, dorsal view; 8 – maxilla, ventral view; 9 – front leg; 10 – anal sternite; 11 – pali.

shorten-thin basal setae; with 2 longer lateral setae; with 6 central setae. Stridulatory area placed in a basal part of distal surface of stipes; consisting of a row of 6 acute teeth basally (Fig. 7). Galea and lacinia fused forming mala. Mala with large uncus at apex and 2 subterminal unci fused at base. Median side of mala with long setae. Palpifer dorsally without stridulatory teeth. Maxillary palp 4-segmented. Third segment of maxillary palp wit pair of setae ventrally. First antenna segment is the longest; two times longer the second or third antenna segments. The second segment of the antenna is the same length as the third segment of the antenna. The fourth segment of the antenna is one and a half times as long as the second or third antennae segments. Apical parts of legs with cylindrical-conical appendages. Appendage with 10 hair-like setae in apical third (Fig. 9). Dorsa of thoracic segments with 1–2 rows of short setae, each posterior row with long to short setae. Respiratory plate with superior lobe slightly larger than

inferior lobe. Thoracic spiracle same size as a spiracle of abdominal segments. Abdominal segments I–VIII with 1–2 rows of short setae, each posterior row with long to short setae. Abdominal segments IX–X fused, densely setose with short setae and a single row of long to short setae in the middle and at the apex. Tegilla composed of short, acute setae and sparse long setae. Lower anal lip with many short and curved setae and long, acute setae. Venter of last abdominal segment with short setae and a single of long to short setae in the middle and at the apex, with areas without setae and spines (Fig. 10). Raster with a pair of palida joined anteriorly and diverging posteriorly, surrounded on the sides by scattered setae. Each palidium consisting of caudomesally directed 16–18 pali. Apex of pali blunt almost flat (Fig. 11).

NOTES. The larva of *Protaetia insperata* similar to larvae of *P. famelica* and *P. brevitarsis*, but differs from both by a number of spinules in the rows on the anal sternite, and by a chaetotaxy of head capsula and epipharengial surface. Additional features that allow to recognize the larvae of these species are given in a key below.

DISTRIBUTION. Russia (Sakhalin, Kunashir). – Japan (Hokkaido).

A key to the larvae of the genus *Protaetia* from the Russian Far East

1. Frons with antero-marginal setae 2
– Frons without antero-marginal setae 5
2. Anterior epicranial setae 7, posterior epicranialsetae 6 at each side of head. – Middle-frontal setae 4, antero-marginal frontal setae 2 (Sawada, 1991: Pl. 21, fig. 5). Symmetrical rows of spinules starting near anal opening and extending up to posterior 1/3 of anal sternite (Sawada, 1991: Pl. 138, fig. 14) ..... *P. orientalis*
– Anterior epicranial setae 4 or 5, posterior epicranial setae 4 at each side of head 3
3. Antero-marginal frontal setae 4. ……..…… 4
– Antero-marginal frontal setae 2. – Anterior epicranial setae 4, genal setae 2 at each side of head (Shabalin, 2018: fig. *a*). Coryphe with pair of elongate setae. Acroparia with 5 elongate setae at each side. Haptomerum with zigum slightly raised over basal surface of labrum, with pair of short flattened sensory setae in apical direction from zigum, with 2 irregular rows of sensory setae in basal direction (1st row consisting of 13, and 2nd of 10 wide flattened setae). Pedium rounded, occupying about 1/5 of inner surface of labrum (Shabalin, 2018: fig. *b*). Symmetrical rows of spinules on anal sternite consisting of 20–22 spinules, starting near anal opening and extending up to halflength of anal sternite (Shabalin, 2018: fig. *k*) ..... *P. famelica*
4. Anterior epicranial setae 5, genal setae 1 at each side of head (Medvedev, 1952: fig. 392). Coryphe with 8 elongate setae. Pedium in shape of "8," occupying about 1/10 of inner surface of labrum (Zhang, 1984: Pl. 6, fig. 71). Symmetrical rows of spinules on anal sternite consisting of 14–19 spinules, starting near anal opening, with anterior ends reaching middle 1/4 of anal sternite (Medvedev, 1952: fig. 394; Zhang, 1984: Pl. 6, fig. 73) ..... *P. brevitarsis*
– Anterior epicranial setae 4, genal setae 1 longer and 3 shorten at each side of head. Coryphe with 4 elongate setae. Pedium oval, it occupying between one-eight epipharengial surface. Symmetrical rows of spinules on anal sternite consisting of 16–18 spinules, starting near anal opening, with anterior ends reaching middle 1/3 of anal sternite …… ……..…….....…. *P. insperata*
5. Lateral setae of clypeus 4 (Medvedev, 1952: fig. 414). Symmetrical rows of spinules starting near anal opening, with anterior ends not projecting beyond posterior 1/4 of anal sternite or even not reaching its anterior end (Medvedev, 1952: fig. 416) ……. *P. cuprea*
– Lateral setae of clypeus 2. Symmetrical rows of spinules starting near anal opening, with anterior ends projecting beyond posterior 1/3 of anal sternite 6

6. Symmetrical rows in posterior part of anal sternite each consisting of 14–17 spinules, strongly approximate (maximum distance between them less than 1/4 of their length), with anterior ends not reaching midlength of sternite but passing into its middle 1/3 (Medvedev, 1952: fig. 402) ..... *P. mandschuriensis*
– Symmetrical rows in posterior part of anal sternite each consisting of 17 or 18 (less frequently 21) spinules; these rows rather regular, forming strongly elongate oval occasionally slightly compressed in middle and 4 times as long as wide; symmetrical rows occupying caudal 1/3 of anal sternite (Medvedev, 1952: fig. 308) ..... *P. marmorata*

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