

# ENTOMOLOGISCHE ABHANDLUNGEN

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### Morphology and systematics of larvae of some *Chrysolina* species (Insecta: Coleoptera: Chrysomelidae)

With 18 Figures

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**Abstract.** The article includes original descriptions of both *Chrysolina chalcites* last instar and *Ch. pliginskii* first instar larva, redescription of *Ch. varians* last instar larva, and keys to the larvae of species allied to *Ch. chalcites* and *Ch. varians*. Further the host plants are reported at the first time for *Ch. chalcites* and *Ch. pliginskii*.

**Kurzfassung.** Morphologie und Systematik der Larven einiger *Chrysolina*-Arten (Insecta: Coleoptera: Chrysomelidae). – Die Arbeit beinhaltet Originalbeschreibungen des letzten Larvenstadiums von *Chrysolina chalcites* und *Ch. pliginskii*, eine Wiederbeschreibung des letzten Larvenstadiums von *Ch. varians*, und Bestimmungsschlüssel der Larven der mit *Ch. chalcites* und *Ch. varians* verwandten Arten. Außerdem werden erstmals die Wirtspflanzen von *Ch. chalcites* und *Ch. pliginskii* benannt.

#### Introduction

The materials were collected and reared by the author and deposited in the author's collection, some specimens of *Ch. chalcites* (GERMAR, 1824) and *Ch. varians* (SCHALLER, 1783) larvae are sent to the Staatliches Museum für Tierkunde Dresden. Host plant records are given after MEDVEDEV & ROGINSKAJA (1988), BOURDONNÉ & DOGUET (1991) and own author's observations.

#### *Chrysolina (Minckia) chalcites* (GERMAR, 1824)

##### Last instar larva

**Description.** Body including pronotal sclerite yellowish white; head pale flavous; sclerites and sclerite-like plates on thoracic and abdominal segments, labrum, mandibles, dorsum of femora and tibiotarsi pale brown; antennae, ocelli, tubercles on frons and vertex, spiracles, trochantins and coxae dark brown.

Frons (Fig. 1) with 24–30 setae of almost equal length, mostly, anteriorly and medially, and with several tubercles posteriorly. Frontal sutures parallel posteriorly, forming very narrow stripe.

Vertex (Fig. 1) with 10–11 setae (1–2 along frontal suture, 5 near ocelli, 3 behind antenna and 1 posteriorly) at each side, and with tubercles of irregular shape.

Clypeus (Fig. 1) with 6 setae and 2 sensillae dorsally, 2 groups of 4–5 sensillae ventrally.

Labrum (Fig. 2) evenly coloured. Anterior margin with wide deep emargination, which is more heavily sclerotized and bearing 4 short setae, and with 4–5 marginal setae at each side. Upper side

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with 4 sensillae, 4 long discal setae and 2 shorter ones behind anterior emargination. Lower side with 10–11 sensillae.

Mandibles (Fig. 1) with 1 sensilla at face, 2 setae and 1 sensilla at dorsum, and 5 teeth, outer one small, others large, serrate on both edges or only inwardly.

Antennae (Fig. 1, 6) situated on large conical palpifer (Fig. 1, a). Segment 1 with 4 sensillae, segment 2 with 3 setae and conical sense-process (Fig. 6, a), which is sclerotized basally, and 1.5 times shorter than segment 3, segment 3 elongate, with group of 5–6 small setae and 1 sensilla at apex.

Maxillae. Cardo without setae; stipes with 2 large setae and 1 small one, masticatory blade (galea + lacinia) with 1–2 sensillae at side and 11–12 setae at apex. Maxillary palpi: segment 1 with 2 setae, segment 2 with 2 sensillae, segment 3 with 3 setae and 1 sensilla, segment 4 with 1 seta and 1–2 sensillae at side and 11 minute setae at apex.

Labium. Submentum with 2 long setae and 3–6 short ones; mentum with 2 sensillae, 2 long setae and 2 short ones; mental sclerite weakly developed, with 2 short setae; praementum with 8 setae; labial palpi: segment 2 with 1 sensilla at side and 7 minute setae at apex.

Prothorax (Fig. 3). Pronotal sclerite with cell microstructure and sparse tubercles of irregular shape, bearing numerous sparse minute setae at whole surface. Hypopleural sclerite (Fig. 3, c) with 4 setae. Sternite with sclerite-like plates and several setae.

Meso- (Fig. 3) and metathorax. Tergal area without sclerites, bearing 2 transverse rows, each of 20–22 minute setae, and some additional setae. Dorso-lateral sclerite (Fig. 3, d) weakly sclerotized, with 5–6 setae; epipleural area (Fig. 3, e) with 6 setae; mesothoracic spiracle surrounded by sclerotized ring; hypopleural sclerite with 3–4 setae; sternal area with 16 setae, some of them situate on sclerite-like plates.

Legs. Trochantin (Fig. 3, a) with 1 seta or without setae. Coxa with 10–12 setae. Trochanter with 4 (fore leg) or 5–7 (mid and hind leg) setae, and 1–2 sensillae on fore leg. Femur with 2 setae dorsally and 3–5 ones ventrally. Tibiotarsus (Fig. 5) with 3 setae dorsally and 2 ones ventrally. Claw (Fig. 5) hardly curved, with small basal spur bearing 1 seta.

Abdomen. Segments 1–7 (Fig. 4): tergal area without sclerites, bearing 2 transverse rows, each of 18–22 minute setae, and some additional setae; spiracle surrounded by sclerotized ring; epipleural area (Fig. 4, a) with 4–5 minute setae; hypopleural area (Fig. 4, b) with 4–5 (on segment 1) or 5–7 (on segments 2–7) sclerite-like plates, each bearing 1 seta; sternal area with 16 (on segments 1–6) or 12 (on segment 7) sclerite-like plates, each bearing 1 seta. Segment 8 with tergal sclerite bearing 10 setae; epipleural area with spiracle and 3–5, hypopleural area with 3, sternal area with 6–8 sclerite-like plates, each bearing 1 seta. Segment 9 with tergal sclerite bearing 8 setae; epipleural area with 2, hypopleural area with 1, sternal area with 4 sclerite-like plates, each bearing 1 seta.

Upperside with microstructure presented by rounded or oval pale plates, distance between them nearly equal to their width. Underside with more sparse microstructure presented by narrow transverse dark plates.

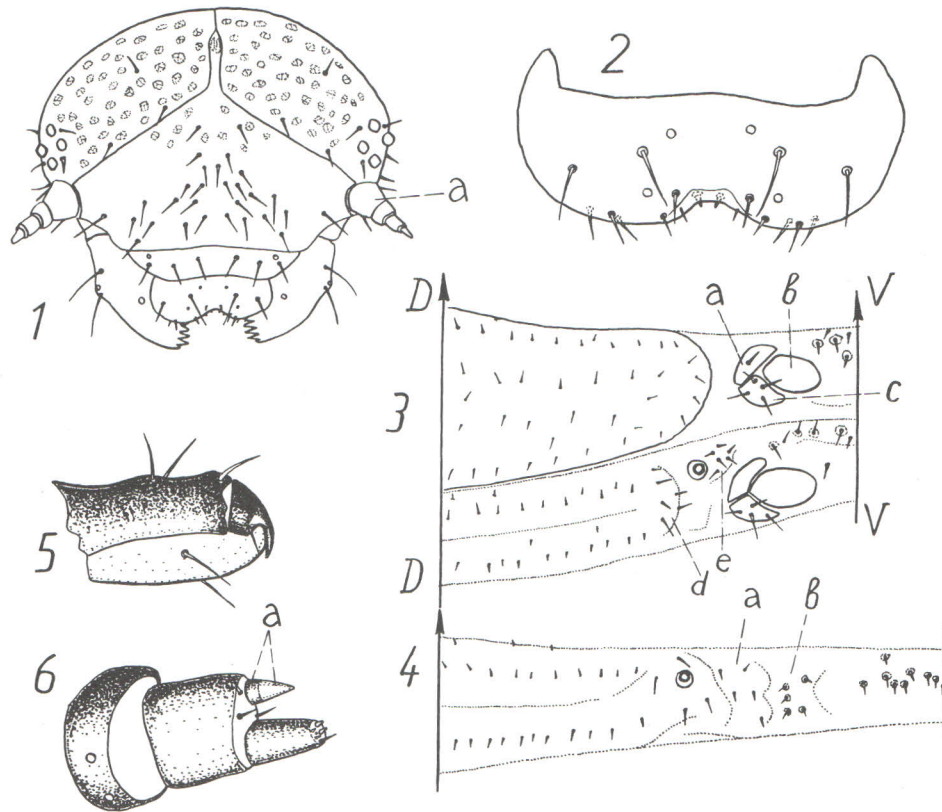
Body length 6.4 mm; head width 1.7 mm.

**Systematic position.** Larva of *Ch. chalcites* belongs to species group in which tergal area of meso-, metathorax and abdominal segments 1–5 devoid of sclerites, body including head and pronotum is pale coloured (pronotal sclerite darkened medially in some specimens of *Ch. fastuosa* (SCOPOLI, 1763)), labrum with deep anterior emargination, claws with basal spur, and distinguishes from the species of this group by the following key (characters of *Ch. (Colaphoptera) marcasitica* (GERMAR, 1824) are after BRODVIJ (1976), of *Ch. (Minckia) oricalcia* (MÜLLER, 1776) are after HENNIG (1938) and MARSHALL (1979)):

#### Key to species

- 1(2) Tergal setae on abdominal segments arranged in 5–7 confused rows. Frons with 34–40 setae; tarsal claws with only small basal spur; integument microstructure widely scattered. On *Mentha*, *Lamium*, *Salvia*, *Galeopsis*, *Trollius*, *Ranunculus*, *Plantago*.

*Ch. (Chrysolina) staphylaea* (LINNAEUS, 1758)



Figs. 1-6: *Chrysolina chalcites* (GERMAR), last instar larva, structural details. 1: head (a - palpifer); 2: labrum; 3: pro- and mesothorax (D-D - middle of dorsal side, V-V - middle of ventral side, a - trochantin, b - place of coxa, C - hypopleural sclerite, d - dorso-lateral area, e - epipleural area); 4: abdominal segment 1 (a - epipleural area, b - hypopleural area); 5: tibiotarsus and claw; 6: antenna (a - sense-process).

- 2(1) Tergal setae on abdominal segments arranged in 2 distinct but irregular rows.
- 3(4) Tarsal claws with large basal spur. Frons with 10 long setae and 10-16 short ones; integument microstructure dense. On *Lamium*, *Leonurus*, *Galeopsis*, *Stachys*, *Mentha*, *Melissa*, *Linaria*, *Urtica*.  
*Ch. (Fastuolina) fastuosa* (SCOPOLI, 1763)
- 4(3) Tarsal claws with small basal spur.
- 5(6) Frons with not numerous setae; integument microstructure indistinct. On *Chaerophyllum*, *Anthriscus sylvestris*, *Aegopodium podagraria*.  
*Ch. (Minckia) oricalcia* (MÜLLER, 1776)
- 6(5) Frons with numerous (24-30) setae; integument microstructure dense, distinct.
- 7(8) Frons with 24-30 setae of almost equal length (Fig. 1); pronotal sclerite with setae at whole surface (Fig. 3). On *Anthriscus nemorosa*.  
*Ch. (Minckia) chalcites* (GERMAR, 1824)
- 8(7) Frons with 6-7 long and 8-10 short setae at each side; pronotal sclerite with setae situated at sides. On *Chaerophyllum*, *Geranium*, *Petasites*.  
*Ch. (Colaphoptera) marcasitica* (GERMAR, 1824)

**Material.**

*Ch. chalcites*: 4 larvae, reared in cages up to the last instar, 1 larval exuvium (only head) of specimen reared up to adult. Russia, Krasnodar Territory, environs of Novorossisk, near Malij Utrish: clearing in a forest, on grass, 9.5.1995: 1 larva (balsam slide), 1 larva (in alcohol), M. ORLOVA & A. BIENKOWSKI leg.; the same place, border of a forest, on stems and leaves of *Anthriscus nemorosa* (Apia-

ceae), 13.5.1995: 1 exuvium (balsam slide), 1 larva (in alcohol), M. ORLOVA & A. BIEŃKOWSKI leg.; the same place, on *Anthriscus nemorosa*, 17.5.1995: 1 larva (balsam slide), M. ORLOVA & A. BIEŃKOWSKI leg.

*Ch. staphylaea*: Russia, Karelia, Louchi Distr.: village Tschornaja Reka, Tschornaja river bank, meadow, on soil under *Ranunculus repens*, *R. acris* and *Potentilla anserina*, 22.7.1990: 1 larva (in alcohol), A. BIEŃKOWSKI leg.; the same place, under *Galeopsis*, 20.7.1990: 1 larva (in alcohol), A. BIEŃKOWSKI leg.; Uzkij Raz'ezd, on soil under *Achillea millefolium*, 19.7.1990: 1 larva (in alcohol), A. BIEŃKOWSKI leg.; the same place, among grasses including *R. acris*, *A. millefolium*, in leaf debris, 18.7.1990: 2 larvae (in alcohol), A. BIEŃKOWSKI leg.; Murmansk reg., 12 km ZO Poyakonda, biological station, among grasses including *R. acris*, *Plantago major*, 3.7.1990: 2 larvae (in alcohol), M. ORLOVA & A. BIEŃKOWSKI leg. Available elder instar larvae were associated with adults, mainly correspond to the description by MARSHALL (1979) and differ only by presence of numerous setae on frons and pronotum. Young (first?) instar larva, which was described by OGLOBLIN & MEDVEDEV (1971), distinguishes from the elder instar one by the following characters: abdominal tergites have 2 distinct rows of sclerite-like plates, each bearing 1 seta, head and pronotum are dark brown.

*Ch. fastuosa*: Russia, Moscow reg., near Zelenograd, border of forest, on Lamiaceae and on soil, 24.6.1991: 7 larvae (in alcohol), M. ORLOVA & A. BIEŃKOWSKI leg.; the same place, on *Galeopsis speciosa*, 24.6.1991: 1 larva (in alcohol), M. ORLOVA & A. BIEŃKOWSKI leg. Available elder instar larvae were associated with adults, mainly correspond to the descriptions by HENNIG (1938) and MEDVEDEV & ZAITZEV (1978) and differ only by presence of short setae on frons.

**Host plant notes.** Besides larvae, one adult of *Ch. chalcites* was found on soil among leaf debris under *Anthriscus nemorosa* on 13.5.1995, and 8 more adults on the same plant species on 21.5.1995. Collected larvae and adults fed on *A. nemorosa* in cages. Host plants of *Ch. chalcites* were unknown till now. However, the all other species of the same subgenus, *Ch. (Minckia) oricalcia*, *Ch. (M.) peregrina* (HERRICH-SCHÄFFER, 1839) and *Ch. (M.) rufoaenea* (SUFFRIAN, 1851) feed on Apiaceae, too.

#### *Chrysolina (Colaphoptera) pliginskii* (REITTER, 1913)

##### First instar larva

**Description.** Head, pronotal sclerite, legs and sclerites of thoracic and abdominal segments dark brown; body surface whitish.

**Frons** (Fig. 7) with 5 pairs of long setae and 2 sensillae. Frontal sutures parallel posteriorly, forming very narrow strip, epicranial suture short. Frons covered with dense rounded tubercles posteriorly. **Vertex** (Fig. 7) covered with dense rounded tubercles; bearing 14 long clavate setae, 2 shorter simple setae and 6 very minute ones.

**Clypeus** (Fig. 7) with 6 setae and 2 sensillae dorsally, 2 groups of 6–7 sensillae ventrally.

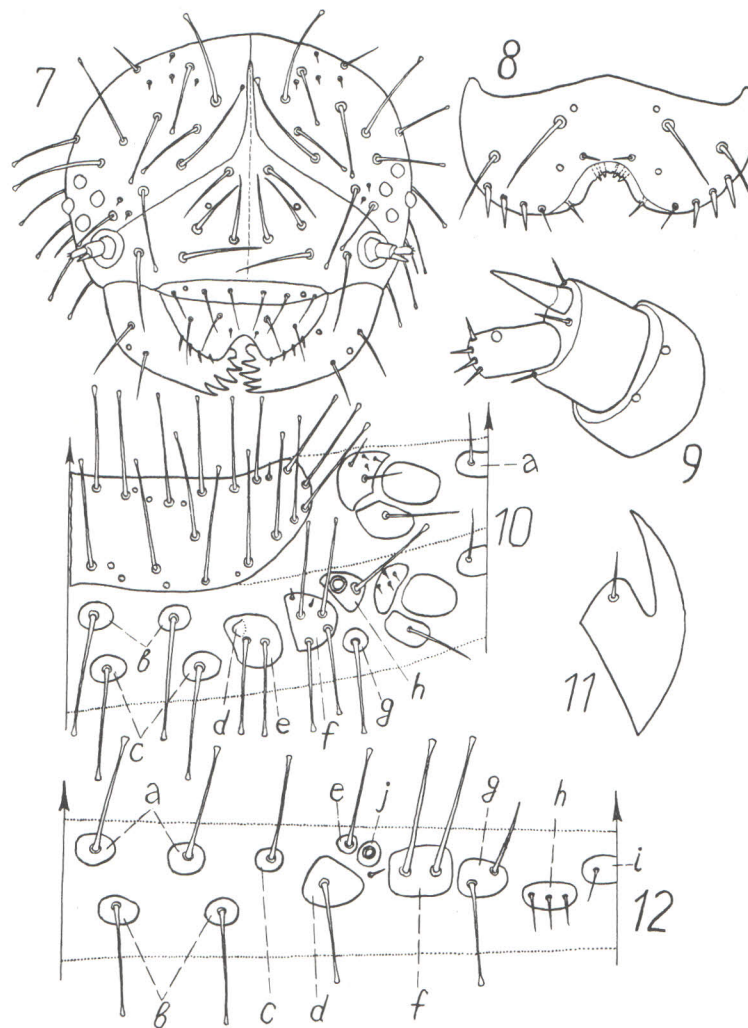
**Labrum** (Fig. 8) evenly coloured. Anterior margin with narrow deep emargination, which is more heavily sclerotized and bearing 2 relatively short setae and 4 very minute ones, and with 4 marginal setae at each side. Dorsal side with 4 sensillae, 4 long discal setae and 2 shorter ones behind anterior emargination. Ventral side with 2 group of 3–4 sensillae.

**Mandibles** (Fig. 7) with 2 setae and 1 sensilla at dorsum, 1 sensilla at face, the latter sometimes absent, and 5 teeth, inner tooth obtuse, others sharp, 2 external ones serrate only inwardly, 2 following ones on both edges.

**Antennae** (Fig. 9). Segment 1 with 4 sensillae, segment 2 with 3 setae and conical sense-process, which is sclerotized basally, segment 3 elongate, with 1 sensilla at side or without it, and 4–6 setae at apex.

**Maxillae.** Stipes with 1 seta, masticatory blade (galea + lacinia) with 12 setae. Maxillary palpi: segment 1 with 2 setae, segment 2 with 1 sensilla, segment 3 with 2 setae and 1 sensilla, segment 4 with 1 long seta and 1 minute one at side, and group of minute setae at apex.

**Labium.** Mentum with 2 long setae, 2 short ones and 2 sensillae, mental sclerite with 2 setae, labial palpi: segment 2 with 1 sensilla at side group of 10 minute setae at apex.



Figs. 7-12: *Chrysolina pliginskii* (REITTER), first instar larva, structural details. 7: head; 8: labrum; 9: antenna; 10: pro- and mesothorax (a-c, e-h - sclerites: a - eusternal, b - anterior tergal, c - posterior tergal, e - interior dorso-lateral, f - exterior dorso-lateral, g - posterior epipleural, h - anterior epipleural; d - hatching spine); 11: claw; 12: abdominal segment 1 (a-j - sclerites: a - anterior tergal, b - posterior tergal, c - interior anterior dorso-lateral, d - posterior dorso-lateral, e - exterior anterior dorso-lateral, f - hypopleural, g - parasternal, h - sternellar, i - eusternal, j - anterior epipleural).

Prothorax (Fig. 10). Pronotal sclerite with fine granulation, bearing 16-19 long clavate setae (7-9 along anterior margin, 7-8 along posterior margin and 1-2 at disk), 1 minute seta near anterior lateral corner and 5-9 sensillae at each side. Hypopleural sclerite with 1 seta; eusternal (Fig. 10, a) with 2 ones.

Meso- (Fig. 10) and metathorax. Sclerites distinct. Tergite with 2 anterior tergal sclerites (Fig. 10, b) and 2 posterior tergal ones (Fig. 10, c), each bearing 1 long clavate seta, at each side. Interior dorso-lateral sclerite (Fig. 10, e) with hatching spine (Fig. 10, d) and 2 long clavate setae; exterior dorso-lateral sclerite (Fig. 10, f) with 3-6 long clavate setae and 1-2 very minute simple ones; anterior epi-

pleural sclerite (Fig. 10, h) with spiracle and 1 long clavate seta on mesothorax, 2–3 such setae on metathorax; posterior epipleural sclerite (Fig. 10, g) with 1 long clavate seta; hypopleural sclerite with 1–2 long simple setae; sternal sclerite with 2 simple ones.

Legs. Trochantin (Fig. 10) with 2–3 relatively short setae on fore leg, and 3–4 very minute setae on all legs. Coxa covered with rounded tubercles, bearing 2 long setae and 3 short ones. Trochanter with 3 setae and 5–6 sensillae. Femur with 2 setae dorsally and 4 ones ventrally. Tibiotarsus with 8 setae. Claw (Fig. 11) moderately curved, with large prominent basal spur bearing 1 seta.

Abdomen. Sclerites distinct. Segments 1–7 (Fig. 12): tergite with 2 anterior (Fig. 12, a) and 2 posterior (Fig. 12, b) tergal sclerites, each with 1 long clavate seta, at each side; interior anterior dorso-lateral sclerite (Fig. 12, c) and exterior anterior dorso-lateral sclerite (Fig. 12, e) each with 1 seta; posterior dorso-lateral sclerite (Fig. 12, d) twice larger than tergal sclerites on segment 1, as large as tergal sclerites on segments 2–7, bearing 1 long clavate seta; anterior epipleural sclerite (Fig. 12, j) with spiracle; 1 minute seta situated behind epipleural sclerite; hypopleural sclerite (Fig. 12, f) with 2–3 long clavate setae; parasternal (Fig. 12, g) large, with 1 longer clavate seta and 1 shorter simple one; sternellar sclerite (Fig. 12, h) weakly sclerotized and sometimes divided in 2 parts, with 2–4 short setae; eusternal sclerite (Fig. 12, i) weakly sclerotized, with 2 short setae. Tergal and dorso-lateral sclerites on segments 8–9 joined, with 10–12 long clavate setae and 4–5 very minute ones. Spiracle, hypopleural, parasternal and eusternal sclerite on segment 8 as those on precedent ones. Sternal area weakly sclerotized, with 5 setae on segment 9.

Microstructure presented by short conical thorns, separated by intervals which 2–4 times broader than thorns.

Head width 0.6 mm.

**Material.** Three first instar larvae in balsam slides and 1 larva in alcohol, reared from female, collected in: Ukraine, the Crimea, 10 km NW Alushta, Chatyrdag mountain, pasture, 1000 m, under *Sideritis taurica* (Lamiaceae), 11.5.1994, M. ORLOVA & A. BIEŃKOWSKI leg.

**Host plant notes.** Collected adults and hatched larvae fed on leaves of *S. taurica* in a cage. Host plants of *Ch. pliginskii* were unknown till now. However, the some other species of the same subgenus, such as *Ch. (Colaphoptera) hemisphaerica* (GERMAR, 1817) and *Ch. (C.) globosa* (PANZER, 1805), feed on Lamiaceae, too.

**Morphological age variation.** First instar larva of *Ch. pliginskii* differs from that of the last instar, which have been described by BROVDIJ (1977), mainly, by having of only 10 primary setae on front, the lesser number of setae on pronotal sclerite, which are placed, mostly, along the margins, only 2 transverse rows of tergal sclerites on meso-, metathorax and abdominal segments 1–7, by presence of clavate setae on vertex, thoracic and abdominal tergites, and also by dark brown colour of the head and pronotal sclerite. Similar morphological age variation is described by ZAITZEV (1982, 1990) for *Ch. limbata discipennis* (FALDERMANN, 1835) and by ZAITZEV & OKHRIMENKO (1989) for *Ch. porphyrea* (FALDERMANN, 1837).

#### *Chrysolina (Sphaeromela) varians* (SCHALLER, 1783)

##### Last instar larva

**Description.** Head, spiracles and setae dark brown, sclerites of meso- and metathorax, legs and tergite of abdominal segments 8–9 pale brown, body surface pale cream- coloured with dark brown microstructure.

Frons (Fig. 13) wrinkled, with 5 setae, 3 sensillae, and 6–7 small white triangular markings at each side. Frontal sutures parallel posteriorly, forming relatively wide stripe; epicranial suture short.

Vertex (Fig. 13) wrinkled, with 9–12 relatively long setae, 4 minute ones and 6–9 small white triangular markings at each side.

Clypeus (Fig. 13) with 6 setae and 2 sensillae dorsally, 2 groups of 5–6 sensillae ventrally.

Labrum (Fig. 14) dark brown except wide colourless arched stripe bordering anterior emargination. Anterior margin with deep emargination, bearing 4 short setae, and with 1 marginal and 2 submarginal setae at each side. Dorsal side with 4 sensillae, 4 long discal setae and 2 shorter ones behind anterior emargination.

Mandibles (Fig. 13) with 2 setae at dorsum, and 5 teeth, inner tooth obtuse, others sharp, 3–4 inner teeth serrate on both edges.

Antennae (Fig. 15). Segment 1 with 4 sensillae, segment 2 with 3 setae and short conical sense-process, which is sclerotized basally, segment 3 short, as wide as long, with 5–6 minute setae, or 3 setae and 3 sensillae.

Maxillae. Cardo without setae; stipes with 1 short seta and 2 long ones, masticatory blade (galea + lacinia) with 1 sensilla at side and 10–11 setae at apex. Maxillary palpi: segment 1 with 2 setae and 1 sensilla, or without sensillae, segment 2 with 1–2 sensillae, segment 3 with 3 setae and 1 sensilla, segment 4 with 1 seta and 1 sensilla at side, 10–11 minute setae and 2 sensillae at apex.

Labium. Submentum with 2 long setae and 2 short ones; mentum with 2 long setae, 4 short ones and 2 sensillae; mental sclerite well-sclerotized, divided in 2 parts, each with 1 short seta; praementum with 8 setae and 2 sensillae; labial palpi: segment 1 with 1 minute seta, segment 2 with 1 sensilla at side, 3–5 minute setae and 6 sensillae at apex.

Prothorax (Fig. 16). Pronotal sclerite slightly wrinkled, with numerous very minute setae at whole surface. Hypopleural sclerite with 2–3 short setae. Sternite with weakly sclerotized plate and 8 short setae.

Meso- (Fig. 16) and metathorax. Tergal area without sclerites, covered by sparse minute setae and sensillae, mostly, arranged in 2 transverse rows: anterior group of 12 setae and 5 sensillae on mesothorax, 21–26 and 13–26 on metathorax respectively, posterior group of 14–15 setae and 10–11 sensillae on mesothorax, 20 and 13–17 on metathorax respectively; base of some outer setae slightly sclerotized; dorso-lateral sclerite wrinkled, moderately sclerotized, with 4–5 minute setae; epipleural area with 8 minute setae, mesothoracic spiracle surrounded by sclerite-like plate; hypopleural sclerite with 3–5 setae; sternal area with sclerite-like plate and 8–10 setae.

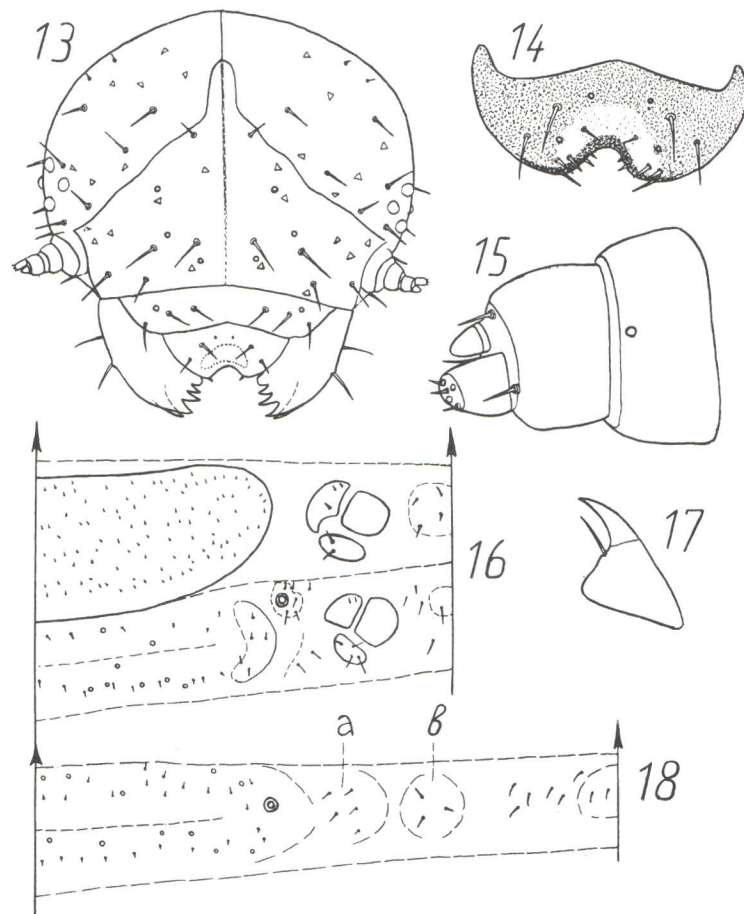
Legs. Trochantin (Fig. 16) with 1–3 setae; coxa with 4–5 long setae and 6–7 short ones; trochanter with 2 setae and 5 sensillae on mid and hind legs, 2 and 7 on fore leg respectively; femur with 2 setae dorsally and 3–4 ones ventrally; tibiotarsus with 3 setae dorsally and 2 ones ventrally; claw (Fig. 17) hardly curved, devoid of basal spur, or with weak spur, and bearing 1 seta.

Abdomen. Segments 1–7 (Fig. 18): tergal area devoid of sclerites, with sparse minute setae and sensillae arranged, mostly, in 2 transverse rows: anterior group of 21–25 setae and 12–20 sensillae, posterior group of 14–23 and 11–17 respectively; spiracle surrounded by sclerotized ring; epipleural area (Fig. 18, a) bearing 5–6 minute setae, which are slightly sclerotized at bases; hypopleural area (Fig. 18, b) bearing 3–5 minute setae, which are slightly sclerotized at bases; sternal area with weakly sclerotized sclerite-like plate and 8–9 minute setae at each side. Segment 8 dorsally sclerotized, with 16 setae; epipleural area with spiracle and 2–4 setae; hypopleural area with 3–4 setae; sternal area with 8–10 setae. Segment 9 dorsally sclerotized, with 10–18 setae.

Microstructure distinct, presented by rounded or irregular brown plates; distance between plates equal to their width; sometimes microstructure more sparse on thoracic sternites.

Body length about 5 mm; head width 1.3–1.5 mm.

**Systematic position.** Morphology and systematics of *Ch. varians* larva were not sufficiently studied till now. HENRIKSEN (1927) has shown this larva is allied to those of *Ch. hyperici* (FORSTER, 1771). After him, both larvae are distinguished by the colour of head: black in *Ch. varians*, and brown in *Ch. hyperici*. HENNIG (1938) has added, that setae of meso-, metathorax and abdomen are some stronger in *Ch. varians* than in *Ch. hyperici*. OGLOBLIN & MEDVEDEV (1971) pointed to the difference of both species by the chaetotaxy of meso- and metathorax: 4 anterior tergal setae are present in *Ch. hyperici*, and 6 in *Ch. varians*. Larvae of *Ch. varians* at my disposal have 12–26 anterior tergal setae on thoracic segments. This disparity, probably, takes place because of the specimens of young-



Figs. 13–18: *Chrysolina varians* (SCHALLER), last instar larva, structural details. 13: head; 14: labrum; 15: antenna; 16: pro- and mesothorax; 17: claw; 18: abdominal segment 1 (a – epipleural area, b – hypopleural area).

er instars were studied by the above named authors. MEDVEDEV & ZAITZEV (1978) have correctly stated that head and pronotum of *Ch. varians* are pale brown. MARSHALL (1979) closed *Ch. varians* larva to *Ch. graminis* (LINNAEUS, 1758), *Ch. polita* (LINNAEUS, 1758) and *Ch. oricalcia*, rather than *Ch. hyperici*, on the base of the presence of a spur on claws. However, *Ch. varians* has small or obsolete spur, but *Ch. polita* and *Ch. graminis* have distinct one, and *Ch. oricalcia* easily distinguishes by the pale coloured head and pronotum (HENNIG, 1938; MARSHALL, 1979). After all, WARCHAŁOWSKI (1993) again closed *Ch. varians* larva with *Ch. hyperici* and *Ch. geminata* (PAYKULL, 1799) and distinguished it from the former by the number of anterior tergal setae on meso- and metathorax (following OGLOBLIN & MEDVEDEV, 1971) and from the latter by the colour: body is wholly light bronze in *Ch. varians*, and head is blackish in *Ch. geminata*.

My examination of the available specimens shows, that *Ch. varians* larva belongs to the species group in which meso-, metathorax and abdominal segments 1–7 devoid of sclerites, head and pronotal sclerite is brown, body surface pale, covered by sparse minute setae, only 10–14 setae present on frons, claw without spur, or with a small one, labrum with a deep anterior emargination, and dis-



tinguishes from the species of this group by the following key (characters of *Ch. hyperici* and *Ch. brunsvicensis* (GRAVENHORST, 1807) are after MARSHALL (1979), of *Ch. difficilis* (MOTSCHULSKY, 1860) are after TAKIZAWA (1971) [larval description of *Ch. difficilis yezoensis* (MATSUMURA, 1911)] and MEDVEDEV & ZAITZEV (1978), and of *Ch. cuprina* (DUFTSCHMIDT, 1825) are after OKHRIMENKO (1993)):

#### Key to species

- 1(2) Pronotal sclerite with setae situated, mostly, at sides. *Chrysolina difficilis* (MOTSCHULSKY, 1860)  
 2(1) Pronotal sclerite with setae at whole surface.  
 3(4) Labrum dark with colourless arched strip. *Chrysolina varians* (SCHALLER, 1783)  
 4(3) Labrum evenly coloured. *Chrysolina hyperici* (FORSTER, 1771)  
*Chrysolina brunsvicensis* (GRAVENHORST, 1807)  
*Chrysolina cuprina* (DUFTSCHMIDT, 1825)  
*Chrysolina geminata* (PAYKULL, 1799)
- (To separate the latter 4 species, see MARSHALL (1979) and OKHRIMENKO (1993))

#### Material.

*Chrysolina varians*: 3 larvae in balsam slides and 15 ones in alcohol, reared in a cage up to the last instar from females, collected in: Russia, Moscow reg., 10 km W Zelenograd, border of forest, on *Hypericum*, 19.6.1993, M. ORLOVA & A. BIEŃKOWSKI leg.

*Chrysolina geminata*: 1 larva in balsam slide and 1 in alcohol, reared in a cage up to the last instar from female, collected in: Russia, Moscow reg., 10 km W Zelenograd, border of forest, on *Hypericum*, 19.6.1993, M. ORLOVA & A. BIEŃKOWSKI leg.

#### Summary

Last instar larva of *Chrysolina chalcites* is close to those of *Ch. oricalcia* and *Ch. marcasitica* and differs from the former by the numerous frontal setae (24–30) and distinct integument microstructure, and from the latter by the chaetotaxy of pronotal sclerite, which is covered by setae at the whole surface, and frons, which is covered by setae of almost equal length. First instar larva of *Ch. pliginskii* differs from the last instar one by having of only 10 primary setae on front, the lesser number of setae on pronotal sclerite, which are placed, mostly, along the margins, only 2 transverse rows of tergal sclerites on meso-, metathorax and abdominal segments 1–7, by presence of clavate setae on vertex, thoracic and abdominal tergites, and also by dark brown colour of the head and pronotal sclerite. Last instar larva of *Ch. varians* is close to those of *Ch. hyperici*, *Ch. brunsvicensis*, *Ch. cuprina* and *Ch. geminata* and differs from them by the labrum, which is dark with colourless arched strip. *Anthriscus nemorosa* (Apiaceae) and *Sideritis taurica* (Lamiaceae) are found to be the host plants of *Ch. chalcites* and *Ch. pliginskii* respectively.

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#### References

- BOURDONNÉ, J.-C. & DOGUET, S. (1991): Données sur la biosystématique des *Chrysolina* l.s. (Coleoptera: Chrysomelidae). – Annales de la Société Entomologique de France (N.S.) 27, 1: 29–64.  
 (BROVDIJ, V.M.) Бровдий, В. М. (1976): Описание личинок хризомелин (Coleoptera, Chrysomelidae) с территории Украинских Карпат. – Доклады АН УССР, Сер. Б, N 4: 355–362.  
 (BROVDIJ, V.M.) Бровдий, В. М. (1977): Личинки трех видов жуков-листоедов рода *Chrysolina* MOTSCH. (Coleoptera, Chrysomelidae). – Энтомологическое обозрение 56, N 3: 656–661.  
 HENNIG, W. (1938): Übersicht über die Larven der wichtigsten deutschen Chrysomelinen (Coleoptera). – Arbeiten über physiologische und angewandte Entomologie aus Berlin-Dahlem 5, 2: 85–136.

- HENRIKSEN, K.L. (1927): Larverne. – In: V. HANSEN. Biller 7. Bladbiller og Bonnebiller. Danmarks Fauna **31**: 290–376. Copenhagen.
- MARSHALL, J.E. (1979): The larvae of the British species of *Chrysolina* (Chrysomelidae). – Systematic Entomology **4**: 409–417.
- (MEDVEDEV, L. N. & ROGINSKAJA, E. Ya.) МЕДВЕДЕВ, Л. Н., РОГИНСКАЯ, Е. Я. (1988): Каталог кормовых растений листоедов СССР, 192 с. Москва.
- (MEDVEDEV, L. N. & ZAITZEV, Yu. M.) МЕДВЕДЕВ, Л. Н., ЗАЙЦЕВ, Ю. М. (1978): Личинки жуков-листоедов Сибири и Дальнего Востока, 184 с. Наука, Москва.
- (OGLOBLIN, D. A. & MEDVEDEV, L. N.) ОГЛОБЛИН, Д. А., МЕДВЕДЕВ, Л. Н., (1971): Личинки жуков-листоедов (Coleoptera, Chrysomelidae) Европейской части СССР, 124 с. Наука, Ленинградское отделение, Ленинград.
- (OKHRIMENKO, N. V.) ОХРИМЕНКО, Н. В. (1993): Неизвестная личинка жука-листоеда рода *Chrysolina* (Coleoptera, Chrysomelidae) с Кавказа. – Вестник зоологии **2**: 78–81.
- TAKIZAWA, H. (1971): On the larvae of the genus *Chrysolina* Motschulsky in Japan (Coleoptera: Chrysomelidae). – Ent.Rev. Japan **23**, 2: 102–109.
- WARCNAŁOWSKI, A. (1993): Chrysomelidae. Stonkowate (Insecta: Coleoptera) Cz. 3. Fauna Polski **15**, 279 s. Muzeum i Instytut Zoologii PAN, Warszawa.
- (ZAITZEV, Yu. M.) ЗАЙЦЕВ, Ю. М. (1982): Личинки листоедов (Coleoptera, Chrysomelidae) из Монголии. – Насекомые Монголии **8**: 296–307. Наука, Ленинградское отделение, Ленинград.
- (ZAITZEV, Yu. M.) ЗАЙЦЕВ, Ю. М. (1990): К познанию личинок жуков-листоедов (Coleoptera, Chrysomelidae) Монголии. – Насекомые Монголии **11**: 205–215. Наука, Ленинградское отделение, Ленинград.
- (ZAITZEV, Yu. M. & OKHRIMENKO, N. V.) ЗАЙЦЕВ, Ю. М., ОХРИМЕНКО, Н. В. (1989): Неизвестные личинки жуков-листоедов рода *Chrysolina* (Coleoptera, Chrysomelidae) с Кавказа. – Вестник зоологии **2**: 72–75

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