

Morphology of immature stages of *Cryptocephalus flavipes* F., 1781 (Coleoptera: Chrysomelidae)

Морфология преимагинальных стадий жука-листоеда *Cryptocephalus flavipes* F., 1781 (Coleoptera: Chrysomelidae)

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КЛЮЧЕВЫЕ СЛОВА: Chrysomelidae, Cryptocephalinae, личинки.

ABSTRACT: Egg and larval stages of *Cryptocephalus flavipes* F., 1781 are described. A key to the nearest species is given.

РЕЗЮМЕ: Описаны яйцо и личиночные стадии жука-листоеда *Cryptocephalus flavipes* F., 1781. Дан ключ для сравнения с ближайшими видами рода.

Cryptocephalus flavipes F., 1781 is a very usual paleartic species. Beetles are polyphagous, but prefer different Rosaceae and Salicaceae [Medvedev, Roginskaya, 1988]. Nevertheless wide distribution, immature stages of this species remained not adequately explored. There was only description of third instar larva published by Rupertsberger in 1880, on the basis of which Steinhausen [1994] has included this species in the key. It is based extremely on a structure of head capsule and does not satisfy to the modern requirements. Because of this a description of egg and all instars larvae is proposed below. Terminology of sclerites and chaetotaxy is given according to the nomenclature accepted by Medvedev & Zaitzev [1978].

Egg fulvous, length 0.6 mm, width 0.4 mm, chorion smooth.

Egg case covered with spiral ridges, divergent from the pole and not connected in the middle. There are 11–12 ridges from each pole.

First instar larva. Width of head capsule 0.3 mm. Vertex with dense net-like rugosity and with sparse bristles, two of them being longer. Frontal ridge with 6 bridges, the 3rd being longer and slightly serrate on apex, other bristles serrate and clavate. Frontal ridge smooth, there are only 6–7 cells epicranial structure. All bristles of frons serrate and clavate. Middle process of labrum well developed. Punctures of frons not uniform, punctures arrange net-like structure with impunctate cells. Mandible tridentate, apical tooth elongate and acute, other small and obtuse (Fig. 6). Thoracic segments feebly sclerotized, sclerite of prothorax smooth and light, only in middle of each side there is a small dark spot, covered with feeble cells, anterior margin with regular row of 5 macro-, 2 microchaetae and 2 pores on each side, central irregular row

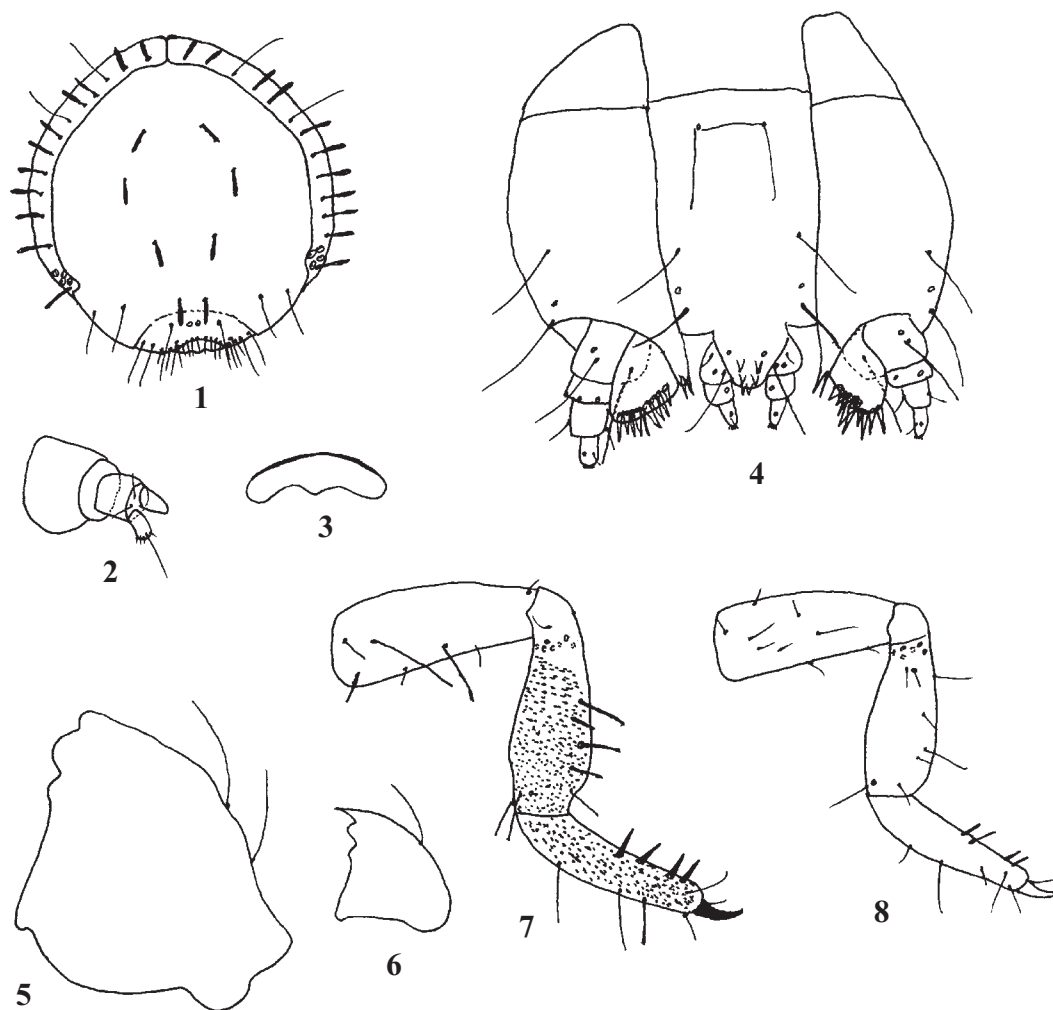
consisting from 6 macrochaetae, hind margin with 2 pores, 1 macro- and 1 microchaetae. Wing sclerites with 4 macro- and 1 microchaetae. External sclerites of mesothorax with 1 pore, 1 macro- and 1 microchaetae, on metathorax a pore absent. Internal sclerites with 1 pore, 2 macro- and 2 microchaetae (Fig. 11). All stigmatae not large, stigmal plates in form of elongate rings (Figs. 16, 17). Stigmatae of thorax placed out of wing sclerite (Fig. 11). Legs (Fig. 8) not sclerotized, tibiotalar with 4 spines and 5 bristles, femora with 9 bristles, a pore on apex and a group of 7 pores near base.

Young larva, placed in egg case rebuilt it in a smooth **larval case**, about 1.5 mm in length.

Second instar larva. Width of head capsule 0.7 mm. Vertex with dense net-like rugosity, with numerous bristles. Frontal ridge with 12 bristles on each side, among them the 1st one being small and simple, slightly removed to behind, 3rd and 6th long and simple, other serrate and clavate. Frons with 6 pairs of bristles. F1–F4 serrate and clavate, F5 and F6 feebly serrate. Mandible with 3 obtuse teeth, apical tooth shorter than preceding one. Thorax (Fig. 10) feebly sclerotized, sclerite of prothorax more or less dark with light stripe on hind margin, broadened in middle. Chaetotaxy as in 3rd instar (see below), but 4 microchaetae on anterior and posterior margins absent. Wing sclerites with 4 macro- and 1 microchaetae, external sclerites with 1 macro- and 2 microchaetae, internal sclerites with 1 pore, 2 macro- and 2 microchaetae on mesothorax and with an additional microchaeta on metathorax. Stigmatae being intermediate between 1st and 3rd instars (Figs. 14, 15).

Larval case smooth, up to 3 mm.

Third instar larva. Width of head capsule 1.1 mm. Vertex with dense net-like rugosity and numerous bristles, frontal ridge with 13 bristles on each side, among them 3rd (or 2nd), 7th and 10th from suture being simple and long, the rest of bristles being short and serrate. There are also 3–4 rows of cells on frontal ridge between 2nd and 10th bristles. General shape of frons rounded pentagonal, bristles F1 and F2 serrate, F3 and F4 serrate and clavate, F5 and F6 simple. Middle process of labrum well developed, as long or slightly shorter as lateral processes. Mandible with 3 obtuse teeth, apical tooth shorter than preapical one. Labio-maxillar complex typical to the genus (Fig. 4). Antenna as in Fig. 2. Sclerite of



Figs 1–8. 1 — head capsule; 2 — antenna; 3 — labrum; 4 — labio-maxillary complex; 5, 6 — mandible; 7, 8 — leg. 1st instar (6, 8); 3rd instar (5, 7).

Рис 1–8. 1 — головная капсула; 2 — антенна; 3 — верхняя губа; 4 — лабио-максиллярный комплекс; 5, 6 — мандибула; 7, 8 — нога. 1-й возраст (6, 8); 3-й возраст (5, 7).

prothorax with rugose sculpture, transformed anteriorly in a granulate one, grey brown with two dark stripes on each side (one near middle, another at sides) and 3 dark spots: one at base, two near middle stripe. Front margin with confused row of 24 bristles and 4 pores, hind margin with 19 bristles and 2 pores on each side. Wing sclerites with 4 macro- and 1 microchaetae, external tergal sclerites with 1 macro- and 3 microchaetae, internal ones with 2 macro-, 2 microchaetae and 1 pore. Stigmae of breast and abdomen not large, stigmal plates on breast small and elongate, on abdomen almost entirely reduced and represented by 4 cells. Legs (Fig. 7) rather strongly chitinised, tibiotarsus with 4 long thin bristles on upper side, and with 4 spines and 1 bristle on underside. Mid and hind femora with 5 spines, 1 bristle, a pore on apex and a group of 7 pores near base, anterior femora with 7 bristles, with two of them more thick.

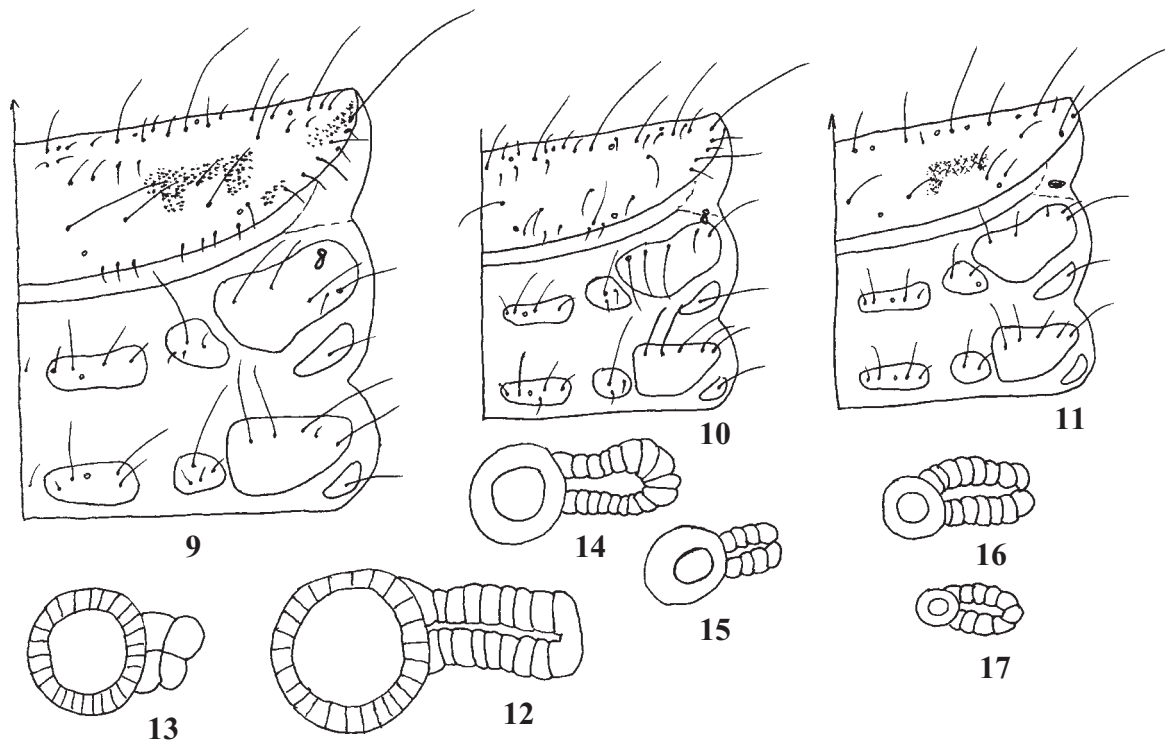
Larval case thin and smooth, up to 5 mm in length.

Larvae of *C. flavipes* differ well from most known larvae of *Cryptocephalus* with rather numerous number of bristles on frontal ridge (more than 5), being similar in this character with *C. sericeus* L., 1758, *C. undulatus* Suffr., 1854 and *C.*

coerulans Mars., 1875. A key for determination of these species (3rd instar larvae) is given below:

- 1(4) Frontal ridge with simple bristles.
- 2(3) Frons without distinct granulation. Inner tergal sclerites of metathorax with 2 macrochaetae and 2 microchaetae, wing sclerite with 3 macro- and 1 microchaetae *C. sericeus* L., 1758
- 3(2) Frons with punctiform granulation arranged in feeble irregular rows. Inner tergal sclerites of metathorax with 2 macro- and 5–6 microchaetae, wing sclerites with 3 macro- and 6–7 microchaetae *C. undulatus* Suffr., 1854
- 4(1) Frontal ridge with serrate and clavicorn bristles, at least partly.
- 5(6) Frontal ridge with 9–10 bristles, long bristles feebly serrate. Labrum with median protuberance almost not distinct *C. coerulans* Mars., 1875
- 6(5) Frontal ridge with 13 bristles, long bristles simple. Median protuberance of labrum well developed and quit distinct *C. flavipes* F., 1781

Material. About 40 larvae were reared from beetles (4 females, 3 males) collected on 25.05.2001 in Yagorlyk Reservation, Dubossar District, Dniester Region of Moldavia.



Figs 9–17. 9–11 — breast; 12–17 — stigma: thoracic stigma (12, 14, 16), abdominal stigma (13, 15, 17). 1st instar (11, 16, 17); 2nd instar (10, 14, 15); 3rd instar (9, 12, 13).

Рис 9–17. 9–11 — грудь; 12–17 — стигма: грудная стигма (12, 14, 16), брюшная стигма (13, 15, 17). 1-й возраст (11, 16, 17); 2-й возраст (10, 14, 15); 3-й возраст (9, 12, 13).

Ecology. This species inhabits dry meadows and more or less dry steppe-like localities with preferable foodplants, among them *Rosa* and different *Compositae*. In forest–steppe and steppe zone 3rd instar larvae hibernate, pupating in spring. Imagoes appear in middle of May and after intensive feeding they lay eggs on soil and leaves of foodplants. Eggs develop during 2 weeks, young larvae crawl in the litter and feed with dry and rotting leaves. In the laboratory larvae feed only on dry leaves of *Rosa canina* and refused from fresh ones. Possibly pupation is in soil.

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