Taxonomic notes on the genus *Leprosoma* (Heteroptera: Pentatomidae)

Таксономические заметки о роде *Leprosoma* (Heteroptera: Pentatomidae)

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The pygophore, parameres and aedeagus of *Leprosoma reticulatum* (Herrich-Schaeffer, 1851) are described for the first time. Based on new comparative data, *L. olcesii* Fairmaire, 1886 is shown to be a separate species. An improved key to species of the genus *Leprosoma* is given.

Впервые описано строение пигофора, парамеров и эдеагуса *Leprosoma reticulatum* (Herrich-Schaeffer, 1851). На основании новых сравнительных данных показано, что *L. olcesii* Fairmaire, 1886 является самостоятельным видом. Приведена уточненная определительная таблица для видов рода *Leprosoma*.

Key words: pygophore, paramere, aedeagus, improvement of taxonomy status, Heteroptera, Pentatomidae, Podopinae, *Leprosoma reticulatum*, *Leprosoma olcesii*

Ключевые слова: пигофор, парамеры, эдеагус, уточнение таксономического статуса, Heteroptera, Pentatomidae, Podopinae, *Leprosoma reticulatum*, *Leprosoma olcesii*

INTRODUCTION

During the preparation of the review of the genus *Leprosoma* Baerensprung, 1859 (Gapon, 2008), I did not have any male specimens of *Leprosoma reticulatum* (Herrich-Schaeffer, 1851), therefore only the external morphology and the female terminalia of this species were described. The problem of the taxonomic status of another species of this genus, *L. olcesii* Fairmaire, 1886, which some authors considered to be conspecific with *L. reticulatum*, remained unsolved for the same reason. In this paper the male terminalia of the latter species are described and the taxonomic status of *L. olcesii* is discussed.

MATERIAL AND METHODS

The study is based on the material from the collection of the Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZIN), Muséum National d'Histoire Naturelle, Paris (MNHN), and the personal collection of R. Linnavuori (Raisio, Finland) (CL). The aedeagi are described in a completely inflated state. The method of inflation follows Gapon (2001) and the nomenclature of aedeagal structures as in Konstantinov & Gapon (2005).

DESCRIPTION OF THE MALE TERMINALIA OF *LEPROSOMA RETICULATUM*

Order **HETEROPTERA**

Family **PENTATOMIDAE**

Subfamily PODOPINAE

Tribe VENTOCORINI

Leprosoma Baerensprung, 1859

Leprosoma reticulatum
(Herrich-Schaeffer, 1851)
(Figs 1–4)

Material examined. **Egypt**, Fajum; U. Sahlb[erg] coll.; 1 female; CL. **Afghanistan**, N of Shahristan; 19 July 1970; O.N. Kabakov coll.; 1 male; ZIN (**new record**).

The male terminalia of *L. reticulatum* have common characters with those of the *L. reticulatum* species group (see Gapon, 2008).

Pygophore (Figs 1, 2) slightly wider than long, narrowed at the base, widened caudad. Its latero-apical angles pointed, slightly extending beyond ventral rim of pygophore. The latter with very shallow, wide, rounded-trapezoid notch (Fig. 2) and almost straight, slightly concave lateral parts. Ventral infolding of rim of pygophore (Fig. 1, *v. inf*) very short and slightly elevated as in *L. tenuimarginatum* Gapon, 2008. Dorsal infolding of rim of pygophore rather long and strongly elevated, with deep rounded notch. Dorsal and ventral rims of pygophore covered with sparse, very short setae. *Parandria* (Fig. 1, *prd*) rather small, slightly longer than wide. Their external sclerotised walls convex, internal membranous walls incurved inwards.

Parameres similar to those in *L. tuberculatum* Jakovlev, 1874. In dorso-caudal view inner margin of hypophysis smoothly concave, outer margin slightly concave in ventral part and sharply convex before pointed apex (Fig. 1, *prm*). Outer margin of hypophysis bearing row of very small obtuse denticles.

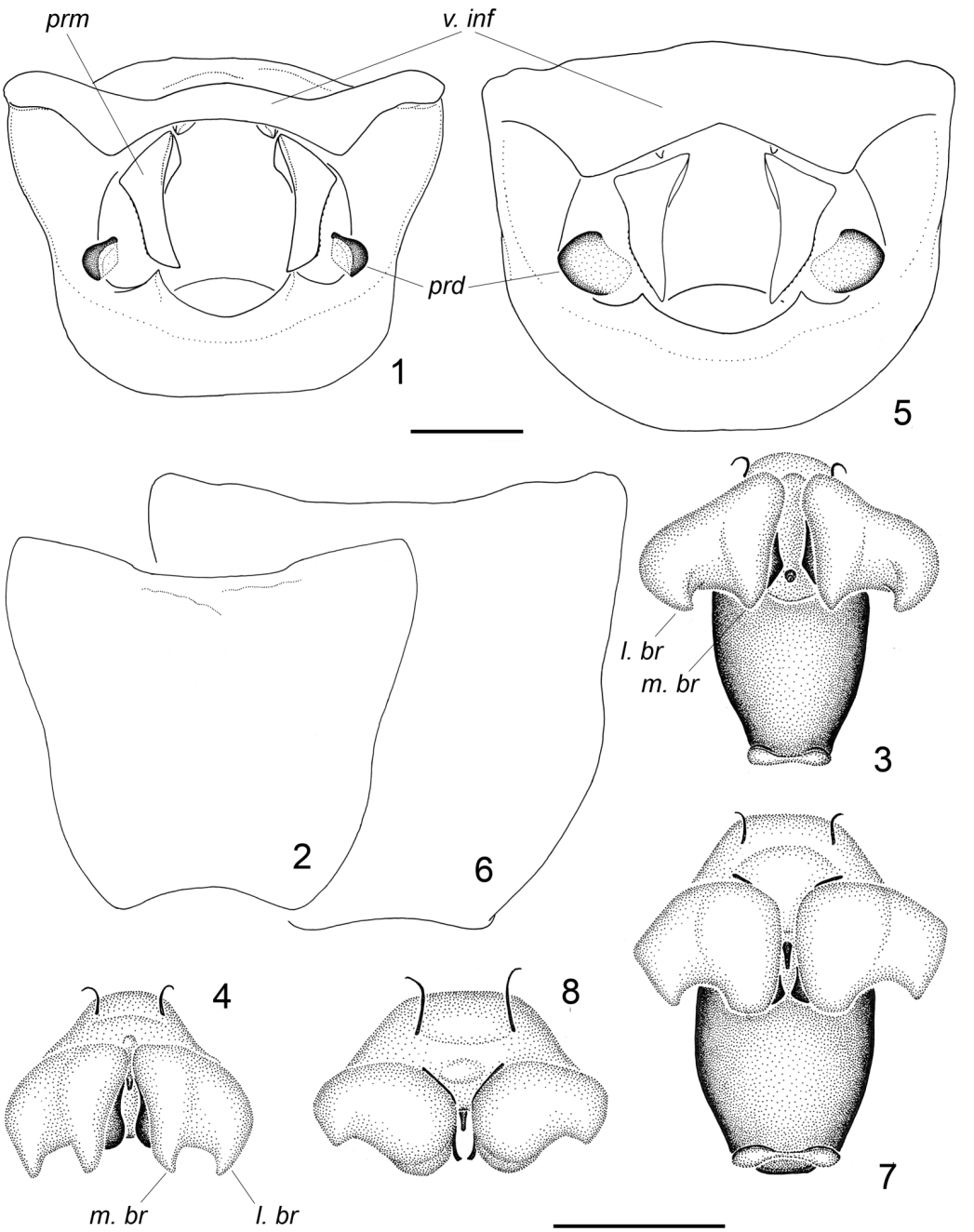
Aedeagus (Figs 3, 4). Medial and ventral branches of ventro-lateral lobes of conjunctiva equal in length and pointed apically. Lateral walls of lateral branches smoothly convex (as in *L. tenuimarginatum*), their apices slightly bent mediad.

THE TAXONOMIC STATUS OF *LEPROSOMA OLCESII*

Leprosoma olcesii Fairmaire, 1886 (Figs 5–8)

Material examined. No locality data; V.E. Yakovlev coll.; 2 females; ZIN. **Morocco**; A. Puton coll.; 2 males, 2 females; MNHN. Same locality; 1898; M. Noualhier coll.; 2 females; MNHN. Same locality; 1900; Vaucher coll.; 1 female; ZIN. Same locality; Lalla ST; June 1914; de Bergevin coll.; 1 male, 1 female; ZIN.

Fairmaire (1886) in the first description of *L. olcesii* showed this species to be different from *L. reticulatum* from Egypt in a larger body size; in a more distinct zigzag pattern of the transversal carina on the pronotum and more prominent humeral angles; in a rougher surface of the scutellum on each side of a median; in wider lateral parts of the abdomen and larger tubercles on them. Despite these differences he considered this species to be a local variety of *L. reticulatum* and supposed that the prominent humeral angles as well as the coarser surface of the scutellum and larger tubercles on the widened connexivum could be related to the larger body size of individuals. Puton (1886) in his catalogue synonymised *L. olcesii* with *L. reticulatum* without any explanation. Horváth (1911) restored *L. olcesii* and pointed out that this species differed from *L. reticulatum* in a larger and wider body (body length 6.67–7.00 mm, pronotum and abdomen width 4.25–4.75 mm / 5.75–6.25 and 3.75–4.00 mm, respectively in *L. reticulatum*), subtruncate humeral angles (rounded in *L. reticulatum*) and strongly prominent tubercles on lateral margins of the abdomen. Vidal (1949) used in his key the characters listed by Fairmaire and Horváth and added some more characters that do not always have a diagnostic value (lateral margins of jugae strongly concave, transversal carina on the pronotum very high in *L. olcesii* / lateral margins of jugae hardly concave, transversal carinae more or less high in *L. reticulatum*). In Stichel's key (1960) *L. olcesii* differs from *L. reticulatum* in having the abdomen wider than the pronotum between humeral angles. However, specimens of *L. olcesii* from Morocco examined by me show the following variability of the ratio of pronotum width to abdomen width: 1.0 (2 specimens), 1.11, 1.12 (2 specimens), 1.13, 1.16. The subtruncate humeral angles of *L. olcesii*, mentioned by Horváth (1911) and Vidal (1949), also have no diagnostic value: one of the two specimens of *L. reticulatum* examined by me has similar humeri. Thus, the actual characters distin-



Figs 1–8. *Leprosoma*. **1–4**, *L. reticulatum*; **5–8**, *L. olcesii*. Pygophore with parameres (1, 5); pygophore (2, 6); aedeagus (3, 4, 7, 8). Dorso-caudal view (1, 5), ventral view (2, 3, 6, 7) and apical view (4, 8). *L. br*, lateral branch of ventro-lateral lobe of conjunctiva; *m. br*, medial branch of ventro-lateral lobe of conjunctiva; *prd*, parandrium; *prm*, paramere; *v. inf*, infolding of ventral rim of pygophore. Scale bar: 0.20 mm.

guishing *L. olcesii* from *L. reticulatum* are a larger body size, more prominent humeral angles, and a more expanded connexivum with larger tubercules. However, according to Fairmaire's assumption, these differences may be mere consequences of a general increase in the body size of individuals from Morocco; moreover, considerable variation of the relative length of humeral angles is typical of another species of this genus, *L. tuberculatum*.

The male terminalia of *L. olcesii* show reliable differences from those of *L. reticulatum* and other species of this genus. In particular, the pygophore of *L. olcesii* has a very long infolding of the ventral rim (as in *L. tuberculatum*) (Fig. 5, *v. inf*), unlike the short one in *L. reticulatum*. The notch of ventral rim of the pygophore in *L. olcesii* (Fig. 6) is slightly shallower than in *L. reticulatum*. The parandria of *L. olcesii* (Fig. 5, *prd*) are somewhat larger than those of *L. reticulatum*, their inner membranous wall is not incurved inwards. The outer margin of paramere hypophysis of *L. olcesii* (Fig. 5, *prm*) is slightly convex in the middle of its length, as opposed to the outer margin of hypophysis in *L. reticulatum*, which is strongly convex before apex. *L. olcesii* has wide medial branches of ventro-lateral lobes of conjunctiva (Figs 7, 8) with widely rounded apices, which are unique in the *L. reticulatum* species group. The outer walls of lateral branches of ventro-lateral lobes of conjunctiva of *L. olcesii* are sharply concave (as in *L. tuberculatum*) (Fig. 7) in contrast to the smoothly rounded walls in *L. reticulatum*.

Key to species of genus *Leprosoma*

1(4). Body without incrustation resembling hoarfrost in texture. Head wider than long. Longitudinal carinae on frons obscure or absent. Humeral angles not incrassate and not separated from pronotal disc by impression. Cicatrices pale. Anterior transverse carina very low, obliterated laterally, often absent or vestigial. Scutellum broad, 0.58–0.65 times as wide as long; tubercles at its base small, rounded (*L. inconspicuum* species group).

2(3). Tubercles in anterior portion of pronotum small. Connexivum thin (in strictly lateral view), its laterotergites smooth, with very fine punctation. Tubercles on posterior angles of abdominal segments very small . . . ***Leprosoma inconspicuum*** Baerensprung, 1859

3(2). Tubercles in anterior portion of pronotum large. Connexivum thicker (in strictly lateral view), its laterotergites with rough punctation and transverse elevation, sometimes strongly smoothed. Tubercles on posterior angles of abdominal segments usually rather large . . . . . ***Leprosoma stali*** Douglas & Scott, 1868

4(1). Body covered with incrustation resembling hoarfrost in texture. Head as long as wide. Longitudinal carinae on frons distinct. Humeral angles incrassate, separated from pronotal disc by impression. Cicatrices black. Anterior transverse carina high. Scutellum rather narrow, 0.50–0.57 times as wide as long, tubercles at its base large, clearly longitudinal (*L. reticulatum* species group).

5(10). Humeral angles long, strongly projecting beyond lateral margins of hemelytra.

6 (9). Body length 5.25–6.55 mm. Posterior pronotal transversal carina strongly and smoothly curved. Elevations on connexival laterotergites moderately convex, tubercles on posterior angles of abdominal segments moderately large. Medial part of spermathecal duct long, extending beyond anterior margin of abdominal sternum V.

7(8). Humeral angles broadly or rectangular rounded, directed laterad. Pronotal transverse carinae distinct. Ventral infolding of rim of pygophore very long, perpendicular to ventral wall of pygophore . . . . . ***Leprosoma tuberculatum*** (in part)

8(7). Humeral angles shaped like horns curved forward. Pronotal transverse carinae obsolete and masked by incrustation. Ventral infolding of rim of pygophore very short and slightly elevated . . . . . ***Leprosoma tenuimarginatum***

9(6). Body length 6.00–6.80. Posterior pronotal carina weakly and sharply curved. Elevations on connexival laterotergites strongly convex, tubercles in posterior corners of abdominal segments very large. Ventral infolding of rim of pygophore very long (Fig. 5). Medial part of spermathecal duct as long as abdominal sternum VI or slightly extending beyond its anterior margin . . . . . ***Leprosoma olcesii***

10(5). Humeral angles short, slightly projecting beyond lateral margins of hemelytra.

11(12). Ventral infolding of rim of pygophore very long (as in Fig. 5). Medial part of spermathecal duct long, extending beyond anterior margin of abdominal sternum V. (Russia, Turkey, Transcaucasia, Central Asia and China) . . . . ***Leprosoma tuberculatum*** (in part)

12(13). Ventral infolding of rim of pygophore short (Fig. 1). Medial part of spermathecal duct short, slightly extending beyond anterior margin of abdominal sternum VI. (North Africa, Israel, Syria, Iran, Afghanistan) . . . . . ***Leprosoma reticulatum***

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REFERENCES

Fairmaire, L. 1886. Notes sur quelques Hémiptères du Maroc. *Revue d'Entomologie*, **4**: 351–355.

Gapon, D.A. 2001. Inflation of heteropteran aedeagi using microcapillaries (Heteroptera: Pentatomidae). *Zoosystematica Rossica*, **9**(1): 157–160.

Gapon, D.A. 2008. A revision of Leprosoma Baerensprung, 1859 (Heteroptera: Pentatomidae). *In*: **Grozeva, S. & Simov, N.** (Eds.) *Advances in Heteroptera Research. Festschrift in Honour of 80th Anniversary of Michail Josifov*: 105–120. Pensoft Publishers, Sofia–Moscow.

Horváth, G. 1911. Hemiptera nova vel minus cognita e regione palaearctica II. *Annales Historico-Naturales Musei Nationalis Hungarici*, **9**: 573–610.

Konstantinov, F.V. & Gapon, D.A. 2005. On the structure of the aedeagus in shield bugs (Heteroptera, Pentatomidae): 1. Subfamilies Discocephalinae and Phyllocephalinae. *Entomologicheskoye Obozreniye*, **84**(2): 334–352. (In Russian; translated in *Entomological Review*, **85**(3): 221–235).

Puton, A. 1886. *Catalogue des Hémiptères (Hétéroptères, Cicadines et Psyllides) de la faune Paléarctique*, 3d Edt. Blanc-Hardel, Caen. 100 p.

Stichel, W. 1960. *Illustrierte Bestimmungstabellen der Wanzen. II. Europa (Hemiptera-Heteroptera Europae). Pentatomorpha, Pentatomidae, Scutellerinae (2)*, **4**(16): 481–512. Berlin–Hermsdorf.

Vidal, J.P. 1949. Hémiptères de l'Afrique du Nord et des pays circum-méditerranéens. *Mémoires de la Société des Sciences Naturelles du Maroc*, **48**: 1–238.

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