

Jurassic bugs (Hemiptera: Heteroptera) from the Museum of Natural History in Vienna

Die jurassischen Wanzen (Hemiptera: Heteroptera) des Naturhistorischen Museums in Wien

By YURI A. POPOV¹⁾

(With 2 textfigures and 1 plate)

Manuscript submitted on June 27th 1991

Summary

Two fossil bugs from the Lower Jurassic of Dobbertin in Mecklenburg (Lias epsilon, Toarcian; Schwerin, FRG) from the collection of the Museum of Natural History in Vienna (NHMWien) are described and their systematic position discussed. HANDLIRSCH's type of terrestrial bug *Probascanion megacephalum* HANDLIRSCH, 1939 is redescribed. Also described is the first representative of the water boatman *Acromocoris similis* nov. sp. belonging to the recent subfamily Micronectinae from this locality. *Copidopus jurassicus* HANDLIRSCH, 1906 does not belong to Heteroptera and is referred to Insecta incertae sedis. The belostomatid bug *Stanislawia ewaae* LAKSHMINARAYANA is synonymized under *Mesobelostomum deperditum* (GERMAR).

Zusammenfassung

Zwei fossile Wanzen aus dem Unteren Jura von Dobbertin in Mecklenburg (Lias epsilon, Toarcien; Schwerin, BRD) aus der Sammlung des Naturhistorischen Museum in Wien werden beschrieben und ihre systematische Stellung wird diskutiert. HANDLIRSCHS Holotypus der Landwanze *Probascanion megacephalum* HANDLIRSCH, 1939 wird neu beschrieben. Der erste Vertreter der Ruderwanze *Acromocoris similis* nov. sp. (Unterfamilie Micronectinae) aus diesem Fundort wird vorgestellt. *Copidopus jurassicus* HANDLIRSCH, 1906 gehört nicht zu den Heteroptera und muß den Insecta incertae sedis zugeordnet werden.

Introduction

During Dr. A. G. PONOMARENKO's stay in the Naturhistorisches Museum in Vienna in 1984, he reexamined the collection of insect remains from the Jurassic of Solnhofen, Eichstätt, Bavaria, and Dobbertin in Mecklenburg, including some of A. HANDLIRSCH's types (PONOMARENKO 1985, PONOMARENKO & SCHULTZ 1988). His study of this collection enabled me to examine two of HANDLIRSCH' types –

¹⁾ Address: Palaeontological Institute, Russian Academy of Sciences, Profsoyuznaya ul. 123, Moscow, 117868. – Russia.

Cercopinus ovalis HANDLIRSCH, 1939 (POPOV & SHCHERBAKOV 1991) and *Probascanion megacephalum* HANDLIRSCH, 1939 – and a new corixid from Dobbertin in Mecklenburg, as well as to examine a photo of the type of *Copidopus jurassicus* HANDLIRSCH, 1906 from Solnhofen (Lowermost Tithonian, Bavaria).

The bugs from the famous Upper Liassic (Lower Toarcien) insect fauna of Dobbertin in Mecklenburg are usually considered to be typical of the Lower Jurassic. Dobbertin is located southwest of Güstrow in Mecklenburg. Most Dobbertin Hemiptera were described and all of them reviewed by HANDLIRSCH (1906, 1925, 1939). His descriptions and figures, which lack details or revision by specialists, give little indication of the relationships of taxa. Having the opportunity to redescribe the terrestrial bug *Probascanion megacephalum* HANDLIRSCH and a new aquatic corixid bug *Acromocoris similis* nov. sp., I venture a revision of the genotyp *Probascanion* HANDLIRSCH and briefly discuss their systematic position.

Based on the original photo of the type specimen (PONOMARENKO & SCHULTZ 1988, Pl. 3, Fig. 7) *Copidopus jurassicus* HANDLIRSCH from the Jurassic of Solnhofen should be excluded from not only the saldooid Archegocimicidae (= Eonabidae), but also from Heteroptera as a whole; since it is rather poorly preserved I would leave it among Insecta incertae sedis, all the more so because this specimen lacks any features characteristic of bugs.

The study of the *Probascanion megacephalum* HANDLIRSCH type shows that on the one hand this insect belongs to the terrestrial bugs of the infraorder Pentatomomorpha and not to water bugs of the family Naucoridae (HANDLIRSCH, 1939). On the other hand, a comparison of *Probascanion megacephalum* HANDLIRSCH with type descriptions and general illustrations of the genus species *Protocoris* (Protocoridae) made by HEER (1852, 1865) from the Lower Lias of Aargau (Switzerland) as well as with the unpublished *Protocoris indistinctus* nov. sp. (DOOLING, POPOV & WHALLEY in press) from the Lower Lias of Binton (Warwickshire, U. K.) has shown an unusual similarity between these Early Jurassic bugs. This allows us to reexamine the interrelationship of Jurassic Probascanidae and Protocoridae, in particular the problem of identity of these families. Characteristic features of both include a distinctly transverse head, small eyes, transverse trapeziforme pronotum with weakly concave anterior margin, small scutellum, short and rather wide clavus, and absence of distinct venation of the strongly sclerotized hemelytrae (especially membrana). The differences are most probably generic and mainly involve size fluctuations: from 4.5 to 10 mm. The presence in *Probascanion megacephalum* HANDLIRSCH of a weak cubital (Pcu) vein on the clavus and the fact that *Protocoris* has not been placed to the genus *Protocoris* due to the poor preservation of the latter. Unfortunately the systematic position of this group of Early Jurassic Heteroptera continues to remain rather unclear. O. HEER (1852) tentatively referred the type species of the genus *Protocoris planus* HEER to a peculiar coreid group of bugs. Yet the decision of HANDLIRSCH (1906) to include it with the Coreidae has remained unclear, as has

the decision of HEER (1865) to refer *Protocoris insignis* HEER to the same group of bugs. Here one must note that a complete absence of venation on membrana as well as weakly expressed veins on the clavus are not characteristic of coreid bugs. The poor preservation of these fossil bugs has made it difficult to accurately decide where they should be placed or how close their affinity is to one or the group of known Heteroptera families. Their habitus most closely resembles that of the pentatomid branch of terrestrial Heteroptera; the latter were already rather specialized and most probably died out at the end of the first half of the Jurassic. The further study of HEER's type material on Protocoridae may be done with a greater degree of confidence; it is possible to determine the systematic position of this group of terrestrial bugs and finally solve the question of their synonymization.

The partially preserved specimen of a water bug from the family Corixidae is the first find of a water boatman in the Lower Jurassic deposits of Dobbertin in Mecklenburg. Prior to that, only water bugs of the family Naucoridae (*Apopnus magniclavus* HANDLIRSCH, *Aphlebocoris nana* HANDLIRSCH and *Aphlebocoris punctata* HANDLIRSCH) were known. They were described and revised in the works by HANDLIRSCH (1906, 1925), POPOV (1971) and POPOV & WOOTTON (1977). Another specimen of Corixidae from the Dobbertin beds, whose new genus and species have not been described, also exists. It is kept in the collection of the Institute und Museum für Geologie und Paläontologie der Universität Göttingen, FRG.

Firstly, the corixid bug specimen was shown to be very similar to the earlier described specimens of water bugs of the *Acromocoris* BODE genus from the insect bed outcrop of Braunschweig (BODE 1953) of a similar age. Secondly, this material reinforced my belief (POPOV 1989 a, b) that these bugs belong to the modern, widespread corixid subfamily Micronectinae. It has also become clear that micronectines were already an independent and isolated corixid group in the Early Jurassic: they showed quite a distinct specialization (e. g. strongly sclerotized hemelytrae), but still preserved a very narrow and flattened emboliar groove, although without the frosted areas so characteristic of recent Corixinae and Cretaceous Diapherinae. Based on the open scutellum (not covered by the pronotum hind margin), the absence of a costal fracture, a relatively short clavus (claval commissure), V-shaped formation vein of P_{cu} and A_1 at the inner basal angle of clavus (preserved in the recent representatives of some modern micronectines as a V-shaped transparent mark), as well as on its size, *Acromocoris* is most similar to the modern representatives of the neotropical genus *Tenagobia* BERGROTH. An open and rather well-developed scutellum as well as a very narrowed and flattened emboliar groove are also characteristic of another Early Jurassic corixid (Shurabellidae) from Mid-Asia of the Kyrgyzstan. The character of the changeable, spotty coloration of hemelytrae in representatives of the Early Jurassic micronectine genus *Acromocoris* is reminiscent of recent *Micronecta* KIRKALDY, also as pointed out by N. NIESER (1977), the coloring of the latter is more variable. Examination of the subgenus *Incertagobia*, which is

the closest to *Micronecta*, proves the affinity of modern *Tenagobia* and *Micronecta* (NIESER 1977).

Therefore, the paleontological data allows to state that Micronectinae appeared earlier than traditionally assumed by other scholars, i. e. in the Early Jurassic. However, the definition of the relation of Micronectinae to other subfamilies must await a final revision of Late Jurassic Archaeorixinae and Velocorixinae with a corresponding correction of my latest tentative phylogenetic scheme of both fossil and recent subfamilie of Corixidae (POPOV 1989a).

Acknowledgements: I wish to express my deep gratitude to Dr. A. G. PONOMARENKO for his help and for providing me with some fossil Heteroptera material kept at the Geologisch-Paläontologische Abteilung of the Natural History Museum in Vienna. For the opportunity and permission to restudy HANDLIRSCH's type of *Probascanion megacephalum* and study a new species of the water bug, I am deeply indebted to Dr. Heinz KOLLMANN, Director of this Museum, and to Dr. Ortwin SCHULTZ for his kind support in publishing this paper in this journal. Finally I wish to thank Mrs. L. M. SHEVCHENKO, who kindly corrected the English version of the manuscript.

Systematic part
Order Hemiptera
Suborder Heteroptera

Infraorder Pentatomomorpha LESTON, PENDERGRAST & SOUTHWOOD, 1954

Family Probascaniidae HANDLIRSCH, 1939

1925 Probascanionidae HANDLIRSCH: 209 (nomen nudum).

1939 Probascanionidae – HANDLIRSCH: 118.

1988 Probascaniidae – PONOMARENKO & SCHULTZ: 15.

Diagnosis: Middle-sized. Head transverse, with small eyes. Pronotum transverse. Scutellum small, triangularly broadened. Hemelytrae strongly sclerotized, with not particularly expressed venation; clavus well developed, with distinct vein; membrane weakly marked.

Genus *Probascanion* HANDLIRSCH, 1939

1925 *Probascanion* HANDLIRSCH: 209 (nomen nudum).

1939 *Probascanion* – HANDLIRSCH: 118.

Type species: *Probascanion megacephalum* HANDLIRSCH, 1939 from the Upper Liassic of Germany (Dobbertin in Mecklenburg).

Diagnosis: About 6 mm long. Body oblong-oval, dorsally convex; ca. 2 times longer than wide. Eyes not protuberant. Pronotum strongly transverse, with weakly concave anterior margin. Small scutellum almost twice as short as claval commissure. Pcu arch-like and set off from the claval fracture.

***Probascanion megacephalum* HANDLIRSCH, 1939**

(Textfig. 1; Plate 1, Fig. 1)

1925 *Probascanion megacephalum* HANDLIRSCH: 209 (nomen nudum).

1939 *Probascanion megacephalum* – HANDLIRSCH: 118, Pl. 12, Fig. 221.

1988 *Probascanion megacephalum* – PONOMARENKO & SCHULTZ: 15, Pl. 3, Fig. 6.

Holotype: Geologisch-Paläontologische Abteilung of the Naturhistorisches Museum in Wien, Nr. 1984/33/6; positive impression of bug without antennae or any pairs of legs.

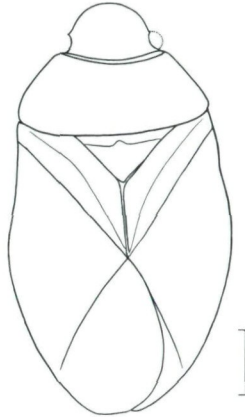


Fig. 1: *Probascanion megacephalum* HANDLIRSCH. – Holotype, NHMWien 1984/33/6 (scale on all text-figures is 1 mm).

Locus typicus: Dobbertin, Mecklenburg, FRG.

Stratum typicum: Lower Jurassic, Lias epsilon, Toarcian.

Redescription: Sub-oval bug. Body rugous above, in the membranous part gradually flattened to apex. Head nearly twice as broad as long. Pronotum 2.5 times as broad as long, tapered anteriorly; anterior and posterior angles rounded; posterior part elevated and callus-like. Scutellum twice as broad as long. Clavus wide, ca. 4 times as long as wide.

Dimensions: length of body 6.0 mm; width, 3.3 mm. Head length, 0.85 mm; width, ca. 1.6 mm. Pronotum length, 1.15 mm; width 2.8 mm. Scutellum length, 0.6 mm; width, 1.2 mm. Hemelytra length, 4.1 mm. Clavus length, 2.5 mm; width, 0.65 mm; claval commissure, 1.0 mm, length of membrana, 1.7 mm.

Infraorder Nepomorpha YU. POPOV, 1968

Family Corixidae LEACH, 1815

Subfamily Micronectinae JACZEWSKI, 1924

Genus *Acromocoris* BODE, 1953

1953 *Acromocoris* BODE: 145.

1953 *Dichaspis* BODE: 137 (synonymy by POPOV 1989b).

1953 *Strobilocoris* BODE: 138 (synonymy by POPOV 1989b).

Type species: *Acromocoris angustus* BODE, 1953 from the Lower Jurassic (Lias epsilon) of Germany (Lower Saxony).

Diagnosis: Exposed small scutellum, short and shallow emboliar groove without nodal furrow, and also rather small in size (about 5 mm); the color pattern of hemelytrae of these Liassic corixids are principally the same as in certain modern micronectine species of the genus *Micronecta*. The shorter clavus (claval commissure) and presence of teh Pcu and A₁ of the clavus are well distinguished from other micronectines. The previously investigated specimens of *Acromocoris angustus* BODE were not well preserved and therefore it was impossible to clearly distinguish Pcu and A₁ veins of the clavus (POPOV 1989b). The systematic position of these bugs was preliminary discussed earlier (POPOV 1985, 1989a, b).

***Acromocoris similis* YU. POPOV, nov. sp.**

(Textfig. 2, Plate 1, Fig 2, 3)

Derivatio nominis: Derived from „similis“ (Latin), similar.

Holotype: Geologisch-Paläontologische Abteilung of Naturhistorisches Museum in Wien, Nr. 1984/33/14; negative impression of bug without head, pronotum or any pairs of legs.

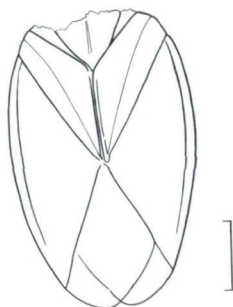


Fig. 2: *Acromocoris similis* nov. sp. – Holotype, NHMWien 1984/33/14.

Locus typicus: Dobbertin, Mecklenburg, FRG.

Stratum typicum: Lower Jurassic, Lias epsilon, Toarcian.

Description: Moderately oblong bug, about 5 mm. Body less than 2 times longer than broad. Hemelytrae dorsally slightly convex, with large dark spot on corium and wide dark longitudinal stripe on clavus; membrana with light medial spot; Pcu and A₁ of clavus weakly expressed.

Dimensions: Length of body ca. 5.0 mm; width, 2.7 mm. Hemelytra length, 4.2 mm; clavus length, 2.1 mm, width, 0.65 mm; claval commissure, 1.2 mm.

Remarks: The new species is clearly distinguished from *Acromocoris angustus* BODE (Plate 1, Fig. 4) from the Upper Lias (Lower Toarcian) of Lower Saxony by a broader body and the color pattern of the hemelytrae.

Addendum

Infraorder Nepomorpha YU. POPOV, 1968

Family Belostomatidae LEACH, 1815

Subfamily Lethocerinae LAUCK & MENKE, 1961

Genus *Mesobelostomum* HAASE, 18901890 *Mesobelostomum* HAASE: 20.1984 *Stanislawia* LAKSHMINARAYANA: 155 (syn. n.).***Mesobelostomum deperditum* (GERMAR, 1839)**1839 *Scarabaeides deperditus* GERMAR: 218, Pl. 23, Fig. 17.1890 *Mesobelostomum deperditum* – HAASE: 20, Fig. 8.1984 *Stanislawia ewaae* LAKSHMINARAYANA: 155, Figs. 4–6 (syn. n.).

During my short visit to the Geological Laboratory, Polish Academy of Sciences, Krakow, in 1990, I had the opportunity to examine the holotype of the belostomatid bug *Stanislawia ewaae* LAKSHMINARAYANA from Solnhofen limestones (Upper Jurassic, Malm, Tithonian, Bavaria). Of two specimens earlier assigned to *Mesobelostomum deperditum* (GERMAR), one was referred by K. V. LAKSHMINARAYANA to the new genus and species and described as *Stanislawia ewaae* (LAKSHMINARAYANA, 1984). The main distinctive characters are the anterolateral angles of the pronotum continuing into spinous protuberances (Fig. 6). I was able to establish that the spinous protuberances of the pronotum are in reality the traces of the forefemur, and in fact this specimen belongs to the most common water belostomatid bug *Mesobelostomum deperditum* (GERMAR) widespread in Solnhofen limestone deposits in Bavaria. Thus, *Stanislawia ewaae* LAKSHMINARAYANA is a junior synonym of *Mesobelostomum deperditum* (GERMAR).

Bibliography

- DOLLING, W. R., POPOV, YU. A. & WHALLEY, P. E. S. (in press): British Lower Jurassic Hemiptera. – Syst. Ent. – London
- HANDLIRSCH, A. (1906–1908): Die fossilen Insekten und die Phylogenie der rezenten Formen. – 1430 S. – Leipzig (W. Engelmann).
- (1925): Palaeontologie. Systematische Übersicht. – In: Schröder's Handbuch der Entomologie. – 117–299, 377–1140. – Leipzig.
- (1939): Neue Untersuchungen über die fossilen Insekten mit Ergänzungen und Nachträgen sowie Ausblicken und phylogenetische, palaeogeographische und allgemein biologische Probleme II. – Ann. Naturhist. Mus. Wien, **49**: 1–240. – Wien.
- BODE, A. (1953): Die Insektenfauna des Ostniedersächsischen oberen Lias. – Palaeontographica, (A) **103**: 1–375. – Stuttgart.
- HEER, O. (1852): 1. Über die Lias-Insel im Aargau. – 1–15. – Zwei geologische Vorträge. – Zürich.
- (1865): Die Urwelt der Schweiz. – 622 S. – Zürich.
- LAKSHMINARAYANA, K. V. (1984): On some fossil Cryptocerata (Heteroptera: Insecta) with description of a new genus et species. – Bull. zool. Surv. India, **5/2–3**: 153–158. – Madras.
- NIESER, N. (1977): A revision of the genus *Tenagobia* BERGROTH (Heteroptera: Corixidae). – Studies Neotrop. Fauna Environm., **12**: 1–56. – Amsterdam.

- PONOMARENKO, A. G. (1985): Fossil insects from the Tithonian „Solnhofener Plattenkalke“ in the Museum of Natural History, Vienna. – Ann. Naturhist. Mus. Wien, **87/A**: 135–144. – Wien.
- & SCHULTZ, O. (1988): Typen der Geologisch-Paläontologischen Abteilung: Fossile Insekten. – Kat. wiss. Samml. Naturhist. Mus. Wien, **6** (Paläozool. 1): 1–39. – Wien.
- POPOV, YU. A. (1971): The historical development of bugs of the infraorder Nepomorpha (Heteroptera). – Proc. Paleont. Inst. Acad. Sci. USSR, **129**: 230 pp. – Moscow. [in Russian]
- (1989a): On the Miocene bug genus *Diacorixa*, with the description of a new fossil species from Southern Germany (Insecta: Heteroptera, Corixidae). – Stuttgarter Beitr. Naturk., (B) **156**: 1–12. – Stuttgart.
- (1989b): On the names and a systematic position of some Mesozoic water bugs (Heteroptera, Nepomorpha). – Paleontol. J., 1989/4: 122–124. – Moscow. [in Russian]
- & SHCHERBAKOV, D. E. (1991): Mesozoic Peloridioidea and their ancestors (Hemiptera, Coleorrhyncha). – Geolog. & Palaeont. **25**: 215–235. – Marburg.
- & WOOTTON, R. J. (1977): The Upper Liassic Heteroptera of Mecklenburg and Saxony. – Syst. Ent., **2**: 333–351. – London.

Plate 1

Fig. 1: *Probascanian megacephalum* HANDLIRSCH. Holotype, NHMWien 1984/33/6 (× 11.7). Dobbertin.

Fig. 2: *Acromocoris similis* nov. sp. – Holotype, NHMWien 1984/33/14 (× 13.8), Dobbertin.

Fig. 3: *Acromocoris similis* nov. sp. – Holotype, NHMWien 1984/33/14 (× 13.8), Dobbertin (in alcohol).

Fig. 4: *Acromocoris angustus* BODE. – Holotype, GPJG 402–11 (Or. 132) (× 14.4), Hondelage. Locality resp. age: Dobbertin, Mecklenburg, Schwerin, FRG; Upper Liassic (Lias epsilon), Toarcian. „Posidonienschiefer“, Hondelage, Braunschweig, FRG; Upper Liassic, Toarcian.

Specimens in figures 1–3 from the Geologisch-Paläontologische Abteilung, Naturhistorisches Museum Wien (NHMWien); specimen in figure 4 from the Geologisch-Paläontologisches Institut and Museum Göttingen (GPJG).

