**Perla carantana** - a new species of the genus *Perla* (Plecoptera: Perlidae) from Austria and Slovenia

Ignac Sivec¹ & Wolfram Graf²

¹Slovenian Museum of Natural History, Prešernova 20, SI-1000 Ljubljana, Slovenia, E-mail: isivec@pms-lj.si
²BOKU – University of Natural Resources and Applied Life Sciences, Dept. of Hydrobiology, Max-Emanuelstr. 17, A-1180 Vienna, Austria, E-mail: grafwolf@edv1.boku.ac.at

**Abstract.** Members of the genus *Perla* are the largest, and amongst the most endangered European stonefly species. During a revisionary study of this genus, a new species was discovered at several localities in Austria and Slovenia; *Perla carantana* was named after Carantania, a 7th - 11th century political unit within the territories of Austria and Slovenia. Adults and larvae are nearly indistinguishable from the sympatric species, *Perla burmeisteriana* Claassen, but the two species can be clearly distinguished on the basis of egg chorion morphology.

Keywords: Plecoptera, Perla, new species, Austria, Slovenia

**Introduction**

Members of the genus *Perla* are the largest European stoneflies and the genus name is the oldest still in use for a group of stonefly species. In the Illies catalogue (1966) nearly 300 species were assigned to the genus, but Sivec et al. (1988) reduced this number to only eight species found from Britain and Ireland, through the circum-Mediterranean region of Europe and North Africa to the Caucasus and Iran. Taxonomy of the genus has never been studied in detail, but four species names proposed more than a century ago have been applied, with varying accuracy, to the complex of species found in Central Europe.
The present investigation grew out of an attempt to identify new material collected in the Balkans and Turkey and an effort to construct a reliable larval key for the genus. Earlier results (Sivec & Stark 2002) support recognition of a minimum of 12 *Perla* species, including two that had previously been undescribed, and suggest that the only consistently reliable character for species recognition in the genus is egg chorionic detail.

Surprisingly, several specimens were found among recently collected or older museum material from Austria and Slovenia, completely within the range of *P. burmeisteriana*, which have a distinct egg and are therefore recognized as a new species.

Specimens used in this study were made available from the following museums and other institutions. Abbreviations are used with specimen data to indicate the sources of material: University of Natural Resources and Applied Life Sciences (BOKU); National History Museum, Vienna (NHMV); National Museum, Prague (NMP); Slovenian Museum of Natural History, Ljubljana (PMSL).

*Perla carantana* sp. nov. (Figs. 1-11)

*Perla* sp. nov. - Sivec & Stark (2002), Scopolia 49: 10 figs. 16-18.

Material: male holotype, Slovenia: river Iška, Ig, 300 m (PMSL); paratypes: Austria Carinthia: 1 male, 1 female, Wölfnitz at Wölfnitz near Klagenfurt, 454 m, 14.5.2001; 1 male, 1 female, 4.5.2001; 21 larvae, 2 exuvia, 30.3.2002; 4 females, 15.5.1999, leg. M. Konar; 2 males, 1 female, Lammeraubach at Lammerau, Lower Austria, 392 m, 8.5.1999; 2 males, 2 females, Moosgraben, Vienna, 296 m, 14.5.2002; 3 males, Halterbach, Vienna, 270 m, 19.5.1994; 1 female, 1.5. 1995; 1 male, 1 female, 2 exuviae, Kasgraben, Vienna, 254 m, 20.5.2001; 1 female, Mauerbach at Mauerbach, Lower Austria, 274 m, 19.5.2001; 1 larva, 15.4.2001; 1 larva, Grosse Tulln at Abstetten, Lower Austria, 190 m, 11.4.1961, leg. O. Moog (all Austrian material, except material from NHMV, is deposited at the second author’s collection); Slovenia: 1 female, Ljubljana, 300 m, 18.5.1889 (NMP); 1 female, Iška, Ig, 300 m, 2.5.1989; 4 larvae, Gabrje, 310 m, 23.4.1986; 1 female, Velike Bloke, 730 m, May 1974; 2 larvae, river Mirna, 22.4.1986; 3 female, Ljubljansko Barje, May 1967 (Slovenian material, except Prague specimen is deposited at PMSL).
Description

Midsize to larger species, uniformly dark brown coloured. Length of forewings in males 18 mm, females 25 mm. Wings normally developed, brownish coloured with dark brown venation. Occipital area of head, callosities and M-line pale, rest of head dark brown (Fig. 4). Femora and tarsi dark brown, tibiae paler except proximal and distal parts. Antennae uniformly brown, palpi paler, cerci dark brown.

Male genitalia: Abdominal segment 9 and 10 of the typical Perla type (Figs. 1-3). Hemiterga similar in shape to those of P. burmeisteriana, not as simple and straight as those of P. pallida, and not so strongly curved as those of P. marginata. Penis (Fig. 5) indistinguishable from P. burmeisteriana.

Female genitalia: Subgenital plate small, bilobed (Fig. 6) and indistinguishable from several Perla species. Vagina typical of genus.

Egg: Length 0,51-0,54 mm, width 0,28-0,30 mm (Figs. 7-8). Collar short (0,02-0,03 mm long and 0,10-0,12 mm wide). Circumference of collar with about 12 irregular thick ribs extending from rim and continuous with follicle cell impressions of egg body. Collar and chorionic surface perforations in the follicle cell impressions of the same type as in P. burmeisteriana but the two are clearly distinct. Chorion covered throughout with a coarse lattice of raised follicle cell impression walls surrounding a finely pitted floor. Cell impression shape irregularly hexagonal and size varies from about 0,017-0,029 mm in inner diameter. Micropyles set in follicle cell impressions about 0,17-0,24 mm from pole.

Orifices of micropyles with thin raised rims.

For detail comparison of egg structures with other species see in Sivec & Stark (2002).

Larva: Similar in colour pattern to larva of P. burmeisteriana (Figs. 9-11).

Etymology

The species name is based on the historical-territorial unit of the 7th-11th centuries in the area of present day Carinthia in Austria and Slovenia, and is used as a noun in apposition.
Ignac Sivec & Wolfram Graf: *Perla carantana* - a new species of the genus *Perla* ... / Znanstveni članek

Figures: 6. Female terminalia, ventral; 7.-8. SEM photomicrographs of egg: egg lateral, 204x (7); detail of chorion, 1430x (8); 10. Right mandible, ventral; 11. Right lacinia, ventral.
Figure: 9. Habitus of larva
Comments

A closely related species, *P. burmeisteriana*, is widely distributed in Europe and also recorded in North Africa. In Europe *P. burmeisteriana* is reported from the general area bounded by Spain, Netherlands and Luxemburg to the Carpathian Mountains, Macedonia and Montenegro. The type locality is in Germany and there is a clinal variation in egg morphology toward the southeast. Reports of this species further to the east are suspect because a different species in the complex, *P. zwicki* (Sivec & Stark 2002) is reported from Turkey.

*Perla carantana* is known from several localities in Austria and Slovenia within the general distribution range of *P. burmeisteriana*, but that species, now nearly extinct, inhabits larger larger streams and rivers and the new species occurs in smaller streams.

Despite being the largest European stoneflies, taxonomy of genus *Perla* is still insecure. General morphology of most species is very similar making identifications tenuous. Further studies, especially those utilizing techniques of behavioral and molecular investigations, are needed to bring us to a better understanding of the species relationships and boundaries in this important genus.

Acknowledgements

We thank Pavel Chwojka (National Museum, Prague), Michael Sartori (Musée Zoologique, Lausanne), Peter Zwick (Limnologische Flussstation, Schlitz), Otto Moog and Astrid Schmidt-Kloiber (University of Natural Resources and Applied Life Sciences, Vienna), Urike Aspöck (National History Museum, Vienna), and Max Konar (Kärntner Institut für Seenforschung, Klagenfurt) for the loan of comparative material. We thank also to Bill P. Stark for SEM study of eggs, and linguistic help in the manuscript.

Povzetek


To je zelo pomembno, saj so predstavniki iz rodu Perla kot ene najbolj ogroženih vodnih žuželk, pomembni kot indikatorski organizmi pri ocenjevanju onesnaženosti in kvalitete tekočih voda.

Literatura