SHORT COMMUNICATION

TWO INVALID GENERA IN THE FAMILY BYTHINELLIDAE LOCARD, 1893 (CAENOGASTROPODA: TRUNCATELLOIDEA)

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ABSTRACT: Within the genus Bythinella Moquin-Tandon, 1856, with about 250 nominal species, the separation of several genera would be helpful in understanding the phylogenetic relationships between these snails, but neither morphology nor molecular loci studied so far can be used to distinguish any natural taxon over the range of species within this genus. Apart from Bythinella there are two other genera listed in the Bythinellidae by WoRMS: Terrestribythinella Sitnikova, Starobogatov et Anistratenko, 1992, and Strandzhia Georgiev et Glöer, 2013. Considering the cytochrome c oxidase subunit I (COI) sequences, as well as poor morphological data, Terrestribythinella should be considered a junior subjective synonym of Bythinella. In the case of Strandzhia, both COI and 18S sequences studied by us, as well as morphology re-examined (misinterpretation of the penis morphology in the original description) clearly show the assignment of Strandzhia to the genus Grossuana Radoman, 1983, thus Strandzhia becomes a junior objective synonym of Grossuana.

KEY WORDS: Bythinella; Terrestribythinella; Strandzhia; morphology; mtDNA; synonymes

Bythinella Moquin-Tandon, 1856, with its type species Bulimus viridis Poiret, 1801, belongs to the family Bythinellidae Locard, 1893. For a long time, it was classified within the Amnicolidae Tryon, 1863, but both morphology (SZAROWSKA 2006) and molecular data (WILKE et al. 2001, 2013) confirmed the distinctness of the Bythinellidae. There are about 250 nominal species of Bythinella (WoRMS 2024). However, neither morphology (GIUSTI & PEZZOLI 1977, FALNIOWSKI 1987, 2018, MAZAN 2000, HAASE et al. 2007, JASZCZYŃSKA in press), nor molecular loci studied so far (BICHAIN et al. 2007a, b, BENKE et al. 2009, 2011, FALNIOWSKI et al. 2009a, WILKE et al. 2010, FALNIOWSKI & SZAROWSKA 2011, SZAROWSKA et al. 2016, JASZCZYŃSKA in press) may be used to separate any natural taxon of the genus level within the Bythinella.

SITNIKOVA et al. (1992) described from Ukraine a genus Terrestribythinella Sitnikova, Starobogatov et Anistratenko, 1992, with its type species T. baidashnikovi Sitnikova, Starobogatov et Anistratenko, 1992. The other species: T. carpathica Sitnikova, Starobogatov et Anistratenko, 1992 was described and new family Terrestribythinellidae Sitnikova, Starobogatov et Anistratenko, 1992 was created in the same publication (SITNIKOVA et al. 1992). Later, the third species of Terrestribythinella: T. amphibiotica Anistratenko, 1995 was described (ANISTRATENKO 1995).
According to Sitnikova et al. (1992) there is no tubular penial gland in the male reproductive organs of Terrestribythinella. There should be said that in such case the presence of a big flagellum would be enigmatic, and most probably the tubular gland was small and thus overlooked. In the female reproductive organs, according to Sitnikova et al. (1992), there was a dialy [meaning the existence of a distinct sperm duct (Davis 1967, Hershler & Ponder 1998) – resulting in two separate female genital openings]. The dialy is characteristic for the Amnicoliidae, but not for the Bythinellidae, since in the latter very broad folds forming the ventral channel mimic a spermathecal duct (Szarowska 2006). According to Sitnikova et al. (1992), there is also a somewhat curious bursa with duct, and no receptaculum seminis. In fact, both bursa and receptaculum are extremely variable in Bythinella (e.g. Giusti & Pezzoli 1977, Falniowski 1987, 2018, Mazan 2000), the receptaculum may be as small as to be easily overlooked. Considering the poor fidelity of the reproduction of the drawings of the shells and reproductive organs of Falniowskia neglectissima (Falniowski et Šteffek, 1989), the type species of Falniowskia Bernasconi, 1990, redrawn from the original description (Falniowski & Šteffek 1989), the drawings and descriptions of Sitnikova et al. (1992) are thus even less convincing. Thus, these morphological characters alone may not constitute the base of systematics in the case of Bythinella and other truncatelloidean gastropods (Falniowski 2018). Molecular data are therefore necessary for clearer taxonomic conclusions.

For Terrestribythinella we performed molecular data analysis following standard methods (Falniowski et al. 2023). The cytochrome c oxidase subunit I (COI) – a marker commonly used in animals’ barcoding – definitely placed Terrestribythinella within the Bythinella, as two species (mOTU A and B; Fig. 1), forming a sister clade with B. viseiana Falniowski, Szarowska et Sirbu, 2009 (Falniowski et al. 2009b; mOTU C),
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and close to the other Bythinella species (mOTUs D–G) from Romania, whose localities were not far from the Ukraine. Such close relationships rather definitely deny the possibility of such substantial anatomical differences as the ones listed above, described by Sitnikova et al. (1992). Terrestribythinella clearly belongs to the genus Bythinella, and it cannot be accepted as a genus without creating a paraphyletic status of Bythinella. Thus, the only solution is to consider Terrestribythinella a junior subjective synonym of Bythinella Moquin-Tandon, 1856. Phylogenetic analyses using all available Bythinella sequences also support this thesis (Benke et al. 2011, JASZCZYŃSKA in press).

Another genus reported in the Bythinellidae in WoRMS (2024) is Strandzhia Georgiev et Glöer, 2013, with its type species S. bythinellopenia Georgiev et Glöer, 2013. Its placement within the Bythinellidae remains enigmatic, since it was described as a member of the Hydrobiidae (Georgiev & Glöer 2013). Our sequences of COI deposited in GenBank (PP752094-PP752096), as well as the one published by Delicado et al. (2024: OP096318) undoubtedly classify S. bythinellopenia as belonging to the genus Grossuana Radoman, 1983, since in our tree Strandzhia bythinellopenia clusters within the mOTU A (Fig. 2), together with Grossuana derventica Georgiev et Glöer, 2013, G. falniowskii Georgiev, Glöer, Dedov et Irikov, 2015, and G. thracica Glöer et Georgiev 2009. The p-distance within this group does not exceed 0.001, and between this group (mOTU A) and other species of Grossuana (Falniowski et al. 2016)

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REFERENCES


FALNIOWSKI A. 2007a. Species delimitation in the genus *Strandzhia* bythinellopenia to the genus *Grossuana* (Fig. 3). Our dissection of paraphytes of this species showed the simple penis typical of *Grossuana*. This, coupled with careful examination of the photograph published by GEORIEV & GLŐER (2013) clearly show that the region where the simple penis is bent typically for *Grossuana*, was erroneously interpreted as the base of bi-armed penis, and the base was misrecognised as the tip of the second arm. To conclude, *Strandzhia* Georgiev et Glőer, 2013 becomes a junior objective synonym of *Grossuana* Radoman, 1983.
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