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The Swamp orb mussel *Sphaerium nucleus* (Studer, 1820) (Sphaeriidae) in Belgium

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Abstract: When comparing material of the Horny orb mussel *Sphaerium corneum* (Linnaeus, 1758) in the collection of the author, some shells labelled as *S. corneum* from ‘De Fonteintjes’, a nature reserve in Zeebrugge, were found to actually belong to the Swamp orb mussel *Sphaerium nucleus* (Studer, 1820). The most striking differences between the two taxa are the more convex valves and the numerous, evenly distributed pores on the shell of the Swamp orb mussel. More differences are described in this article. The species also have slightly different habitat preferences. The Horny orb mussel occurs in a wide range of habitats from stagnant to flowing waters, while the Swamp orb mussel primarily occurs in swampy low-oxygen habitats. In addition to this discovery, four other observations of this species were found in Belgium. However, these should be critically interpreted. The Swamp orb mussel is found from Europe to Central Asia. Its exact distribution, however, is poorly known because it has only recently been distinguished from the Horny orb mussel. In Belgium, the species is not well known, either. This article is therefore a call to properly distinguish both species and to report any observations.

Samenvatting: De auteur ontdekte bij het vergelijken van materiaal van de Gewone hoornschaal *Sphaerium corneum* (Linnaeus, 1758) in zijn collectie dat enkele schelpen van De Fonteintjes, een natuurgebied in Zeebrugge, gelabeld als *S. corneum* eigenlijk behoren tot de Kersenpit-hoornschaal *Sphaerium nucleus* (Studer, 1820). De meest opvallende verschillen tussen beide taxa zijn de bollere kleppen en de talrijke, regelmatig verspreide poriën op de schelp van de Kersenpit-hoornschaal. Meer verschillen worden verder in dit artikel besproken. Bovendien hebben ze licht verschillende habitatpreferenties. Zo komt de Gewone hoornschaal voor in een wijde range aan habitats van stilstaande tot stromende wateren, terwijl de Kersenpit-hoornschaal vooral in zuurstofarme, moerassige habitats voorkomt. Naast deze vondst werden vier andere waarnemingen van deze soort gevonden. Deze moeten

echter kritisch geïnterpreteerd worden. De Kersenpit-hoornschaal komt voor van Europa tot Centraal-Azië. De verspreiding is echter slecht gekend omdat ze pas recent van de Gewone hoornschaal is onderscheiden. Ook in België is de soort nog slecht gekend. Dit artikel is dan ook een oproep om beide soorten goed te onderscheiden en waarnemingen te melden.

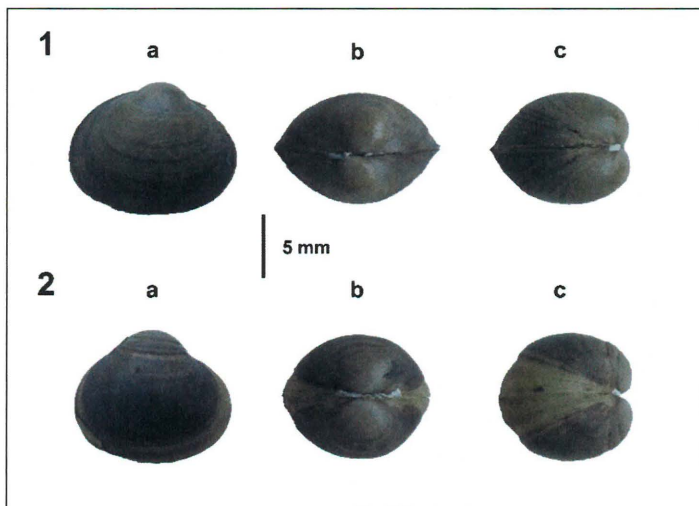
Introduction: On 22 March 2019, the ‘Steenbrugse bosjes’, little patches of forest in a wetland area near Bruges (Belgium), were visited. It was noticed that many empty shells of freshwater gastropods and bivalves were present between stacks of dead stems of Reed (*Phragmites australis*) on the banks of a little stream called Mazelbeek, perhaps the result of an earlier deepening intervention of the stream. Shells of *Bithynia leachii* (Sheppard, 1823), *Bithynia tentaculata* (Linnaeus, 1758), *Ampullaceana balthica* (Linnaeus, 1758), *Lymnaea stagnalis* (Linnaeus, 1758), *Physella acuta* (Draparnaud, 1805), *Anisus vortex* (Linnaeus, 1758), *Gyraulus laevis* (Alder, 1838), *Planorbarius corneus* (Linnaeus, 1758), *Planorbis planorbis* (Linnaeus, 1758), *Valvata piscinalis* (O.F. Müller, 1774), *Euglesa subtruncata* (Malm, 1855) and *Sphaerium corneum* (Linnaeus, 1758) were found. The shells of *S. corneum* were compared with shells in collection labelled as *S. corneum* from ‘De Fonteintjes’ in Zeebrugge (Slak-in-Du excursion, 9 September 2015). The latter, however, were much more spherical than the ones from the ‘Steenbrugse bosjes’ (see Bauwens (2017) for a report of the Slak-in-Du excursion on 9 September). Could the spherical shells from ‘De Fonteintjes’ thus belong to *Sphaerium nucleus*, a species poorly known in Belgium, but recorded from the Netherlands by Jansen (2015)? This led to further research and the search for other observations of this species in Belgium.

Characteristics: Orb mussels (*Sphaerium*) are freshwater bivalves ranging from 10 to 25 mm in size (Killeen et al., 2004). At first glance, *S. corneum* (Horny orb mussel) and *S. nucleus* (Swamp orb mussel) show

strong similarities in shell shape and colour. The most important and obvious characteristics in which these species differ are the much more tumid valves and the numerous, evenly distributed pores on the shell of the Swamp orb mussel. Table 1 shows more differences between the two species (after: Glöer, 2015; Horsák et al., 2013; Jansen, 2015; Killeen et al., 2004; Korniusshin, 2001; Welter-Schultes, 2012).

Horny orb mussel <i>Sphaerium corneum</i>	Swamp orb mussel <i>Sphaerium nucleus</i>
shell morphology	
shell rounded oval, rather equilateral	shell obliquely oval
shell tumid	shell very tumid
shell with few irregularly distributed pores or without pores	shell with numerous, evenly distributed pores
internal hinge features	
hinge plate narrow in the area of the cardinal teeth	hinge plate broad in the area of the cardinal teeth
cardinal teeth of the left valve (C2, C4) slightly curved and parallel	cardinal teeth of the left valve more curved
C4 longer	C4 shorter
anatomy	
moderately elongated nephridium with clearly visible proximal portion	closed type of nephridium with square dorsal lobe
significantly lower numbers of embryos per brood pouch	significantly higher numbers of embryos per brood pouch

Table 1: Differences between the Horny orb mussel *Sphaerium corneum* and the Swamp orb mussel *Sphaerium nucleus*.



Figs 1-2: Orb mussels (*Sphaerium* spp.).

1: Horny orb mussel (*S. corneum*), 'Steenbrugse bosjes' (Assebroek), 22/03/2019.

a. Lateral view. b. Dorsal view. c. Anterior view.

2: Swamp orb mussel (*S. nucleus*), 'De Fonteintjes' (Zeebrugge), 09/09/2015.

a. Lateral view. b. Dorsal view. c. Anterior view.

Habitat: Both species have slightly different habitat preferences. The Swamp orb mussel lives in swampy

waters with low oxygen content like vegetated drainage ditches, swamp pools, sheltered margins of slow-flowing rivers, small bogs and shallow wetlands with dense vegetation. The Horny orb mussel lives in a wider range of lentic and lotic aquatic habitats and is tolerant to moderate pollution (Horsák et al., 2013; Jansen, 2015; Killeen et al., 2004; Korniusshin, 2001; Welter-Schultes, 2012).

Observations in Belgium: The material from Zeebrugge was indeed identified as the Swamp orb mussel based on shell shape and shell surface features (pores - see above) (Figs 1-2), thereby using a stereo microscope. It concerns one adult, one subadult and one juvenile shell. These were collected dead at the edge of the 'Orchis fontein', a small dune lake in 'De Fonteintjes'. In addition to this discovery, only four other observations of this species have been made in Belgium: two shells from the Channel of Maasmechelen (1971) are portrayed online (www.conchology.be) and Welter-Schultes (2012) shows an image of one specimen from cold water basins from a botanical garden in Luik (Liège) (17/10/1991). He shows at least two specimens with same locality and date on his website (www.animalbase.uni-goettingen.de). Tom Van den Neucker also found the species in a ditch in Avelgem (West Flanders) on 31/05/2014 and in a canal in Diksmuide (West Flanders) on 11/10/2014. However, these were only identified by means of the convex shell shape, whereas other characteristics were not considered (Tom Van den Neucker, pers. comm.). No specimens from Belgium are present in the Royal Belgian Institute for Natural Sciences (RBINS) collection, consulted via online DaRWIn database (Marc Hansen, pers. comm.).

N	Location	Coordinates	Date
1	Channel of Maasmechelen (Maasmechelen)	?	1971
2	Botanical garden in Luik (Liège)	50.6346; 5.5624 (?)	17/10/1991
3	Avelgem - Scheldegebied (Avelgem)	51.0292; 2.9136	31/05/2014
4	IJzervallei - Rillebroeken Woumen (Diksmuide)	50.9954; 2.8375	11/10/2014
5	De Fonteintjes (Zeebrugge)	51.3246; 3.1633	09/09/2015

Table 2: Observations of the Swamp orb mussel *Sphaerium nucleus* in Belgium.

Distribution: The Swamp orb mussel occurs from Europe to central Asia (Kyrgyzstan). However, the range of this species is poorly known because it was not distinguished from the Horny orb mussel before 2001 (Korniusshin, 2001; Welter-Schultes, 2012). The taxon was considered an intraspecific variety of the Horny orb mussel (*Sphaerium corneum* var. *nucleus*) (Korniusshin, 2001). This lack of information about the species' range was also reported by Horsák et al. (2013) for its range in the Czech and Slovak Republics, by Killeen et al. (2004)

for its range in Britain and Ireland and by Jansen (2015) for its range in The Netherlands. Yet, these authors state that the species is probably not rare. As stated before, in Belgium, the Swamp orb mussel is only known from 5 locations spread across the country (Fig. 3). Just like in other countries, this is probably because the taxon has only recently been recognised as a separate species. Moreover, it is likewise possible that the species is not rare in Belgium.

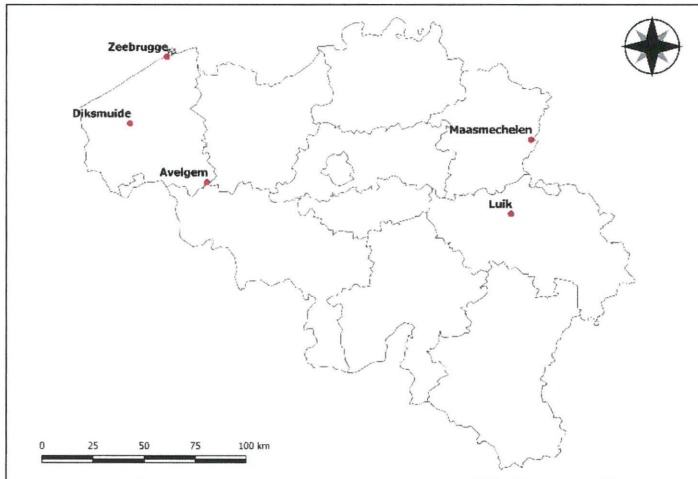


Fig. 3: Known locations of the Swamp orb mussel *Sphaerium nucleus* in Belgium.

Discussion and conclusion: Even after 19 years the Swamp orb mussel is still a poorly known species. In Belgium, too, few records can be found. Five observations are discussed here, but it could be criticised that these do not all belong to the Swamp orb mussel with certainty. As already mentioned, the observations by Tom Van den Neucker are only based on the sphericity of the shells. However, the pictures indeed indicate that they belong to the Swamp orb mussel. The other observations found online also show photos that seem correct. Yet, the only real material examined for this article are the shells from Zeebrugge.

This article intends to raise awareness on these two separate species and to give insight in the distinctive characteristics to properly identify both species. It would also help to report any observations of the Swamp orb mussel to increase our knowledge about this ill-known species.

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