

Xandarovula patula (Gastropoda: Ovulidae) new to Scandinavia

TØRE HØISÆTER¹, JON-ARNE SNELI², CHRISTOFFER SCHANDER^{1,3,4}, HANS TØRE RAPP^{1,3,4}
AND MATZ BERGGREN⁵

¹University of Bergen, Department of Biology, PO Box 7800, NO-5020 Bergen, Norway, ²NTNU, Department of Biology, Trondhjem Biological Station, NO-7491 Trondheim, Norway, ³University of Bergen, Centre for GeoBiology, Allégaten 41, NO-5007 Bergen, Norway, ⁴Uni Environment, Thormøhlensgate 49B, N-5020 Bergen, Norway, ⁵Department of Marine Ecology, University of Gothenburg, Kristineberg 566, SE-445034 Fiskebäckskil, Sweden

In August 2009 six specimens of the ovulid gastropod Xandarovula patula (Pennant, 1777) (formerly known as Simnia patula Pennant, 1777), were found in dredge samples from a locality west of Smögen in western Sweden (58°22'N 11°05'E). In June and November 2010 a total of three specimens of the same species were found in dredge samples from near Svelgen Bridge, Øygarden, Hordaland, western Norway (60°27'N 04°57'E). Several small colonies of the presumed prey species, Alcyonium digitatum Linnaeus, 1758 and Tubularia indivisa Linnaeus, 1758, were found in the same dredge hauls. Xandarovula patula has been recorded from the Atlantic coast of southern Spain to the western end of the English Channel, with scattered records from the west coasts of Ireland and Britain, as far north as the Orkneys. More recently it has been reported from most Irish coasts, several parts of the Scottish coast and also from some places in the North Sea. Until now there have been no confirmed records from Scandinavian waters. The specimens recorded here may indicate recent immigration of a southern species due to warmer water temperatures.

Keywords: Ovulidae, '*Simnia*' *patula*, species new to Sweden, species new to Norway

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INTRODUCTION

Benthic gastropods are without doubt one of the best known of the higher groups of marine benthic animals in Scandinavia, both taxonomically and as regards distribution (see e.g. Høisæter, 2009). While a number of questions remain concerning small and morphologically diverse species groups, the distribution of the larger and more conspicuous members of the class is supposedly well known. In addition to faunistic investigations around the coast of Norway and western Sweden, a growing number of biologically knowledgeable underwater photographers have contributed to our knowledge. Thus it was quite unexpected when the fairly large and colourful ovulid *Xandarovula patula* (Pennant, 1777) was found during three separate collecting trips in 2009 and 2010. In August 2009 six specimens were taken from five dredge hauls at a locality in the Swedish part of the Skagerrak (approximately 58°21'N). Then in June and again in November 2010 a total of three specimens were found in dredge samples from the Norwegian west coast (approximately 60°27'N).

MATERIALS AND METHODS

In Sweden the snails were found when the University of Gothenburg, in collaboration with the Swedish Species

Information Centre, arranged a sampling cruise using their research vessel, RV 'Skagerak'. The cruise was arranged to investigate the shallow sea banks along the Swedish west coast from the south of Gothenburg to the area west of Smögen by request from the Swedish Environmental Protection Agency. Here the sea bank 'Svaberget/Det grunda' was particularly interesting as most of its hard substrate is dominated by a cover of the octocoral *Alcyonium digitatum* Linnaeus, 1758. A small sample, using a rectangular dredge (25×50 cm opening) from 55 to 20 m depth, could contain 5 to 10 l of *Alcyonium*. Together with *A. digitatum*, the brittle stars *Ophiocomina nigra* (Abildgaard, 1789) and *Ophiothrix fragilis* (Abildgaard, 1789) were also present in large numbers. In all thirty-five hauls were taken.

When sorting the material brought on deck a small pinkish gastropod was observed among the *Alcyonium* in five of the hauls. These were subsequently identified as *Xandarovula patula*. In the material collected from one of the stations (SK 247) there was also an empty shell of *X. patula* measuring 15 mm in shell length.

A live specimen of *X. patula* about 10 mm long was photographed aboard the ship in a small aquarium, using a Canon D60 with 100 mm EF Macro USM lens on a piece of the bryozoan *Flustra foliacea* (Linnaeus, 1758) (Figure 1).

On the west coast of Norway, one year later in June 2010 *X. patula* was found in one of five dredge hauls taken by the RV 'Hans Brattström' at Svelgen Bridge, an often visited dredging locality in Øygarden, Hordaland County. This specimen (Figure 2) was collected from a depth of 10–20 m. The bottom substrate was rocky, with small stones, large shell

Corresponding author:

T. Høisæter

Email: tore.hoisater@bio.uib.no



Fig. 1. *Xandarovula patula* with almost white shell collected 25 August 2009 from the Swedish west coast, photographed aboard the ship in a small aquarium. Size approximately 10 mm. Photograph: Matz Berggren.

fragments and small colonies of *A. digitatum*. The hydroid *Tubularia indivisa* Linnaeus, 1758 was also among the more conspicuous organisms present. Another two specimens of *X. patula* were found in two dredge hauls at the same locality during a field course in November 2010. The largest of these were 16.8 mm long.

The Swedish specimens are all deposited in the Gothenburg Natural History Museum, while two of the Norwegian specimens are deposited in the Zoological Museum of the University of Bergen. The third Norwegian specimen is lost.

RESULTS AND DISCUSSION

Xandarovula patula has so far not been reliably reported from Scandinavian waters. The species, long known as *Simnia patula* (Pennant) (e.g. Fretter & Graham, 1981; Graham, 1988; Rowley, 2008; Reijnen *et al.*, 2010), was in 1973 transferred to *Xandarovula* Cate, 1973 (see Cate, 1973; Dolin & Ledon, 2002; CLEMAM, 2010; Gofas, 2011). This change of generic placement is of some importance as Dolin & Ledon (2002) proposed that *Simnia* and *Xandarovula* belong to different subfamilies and are therefore not particularly closely related. The taxonomic disparity between *Simnia* and



Fig. 2. A 14.3 mm long specimen of *Xandarovula patula* from Norway. Right hand side shows structural details of the apical and basal parts of the shell. Photograph: Jon Anders Kongsrud and Tore Høisæter (details).

Xandarovula is accepted by Fehse (2007), who places *Simnia* in the subfamily Simniinae, and *Xandarovula* in Ovulinae. In spite of this Lorenz & Fehse (2009) apparently do not accept the genus change for '*Simnia*' *patula*, the type species of *Xandarovula*. We understand that the decision hinges on the interpretation of the type specimen of *Simnia nicaeensis* Risso, 1826, type species of *Simnia*. This specimen is illustrated in Schilder (1932), and we agree with Dolin & Ledon (2002) and the CLEMAM editor (as well as one of the referees, but as opposed to Schilder, 1932) that this specimen is a juvenile of the well known species *Simnia spelta* (Linnaeus, 1758), therefore making *Simnia* Risso 1826 an older name for *Neosimnia* Fischer, 1884 and leaving *Xandarovula* valid for species congeneric with *X. patula*.

The shell (Figure 2), maximum reported length 22 mm (see however Graham, 1988, who cites 15 mm as maximum length), is convolute, elongate-oval, thin, polished and drawn out into apical and basal canals; juvenile shells (<4 mm long) have a short visible spire. Fine sculpture of low strap-like spiral striae, most distinct near the apical and basal parts of the shell. The aperture is curved, wider below the parietal bulge of the last whorl; the apical canal is short, the basal canal is wide and bordered on the left by a ridged columella. The shell colour may be yellow, whitish or sometimes pink. The mantle, which covers the shell when the animal is feeding is yellow to whitish with brown or reddish brown lines and spots (see Figures 1 & 2).

As with all members of the family, *Xandarovula patula* is regarded as an obligate predator of various cnidarians. It is known to prey on *Alcyonium digitatum* and, more rarely, on *A. glomeratum* (Hassall, 1843) (Rowley, 2008). It has however also been collected from the gorgonian *Eunicella verrucosa* (Pallas, 1766) and the hydroid *Tubularia indivisa* (Jeffreys, 1867; Lebour, 1932; Fretter, 1951; Fretter & Graham, 1981; Rowley, 2008). Of these only *A. digitatum* and *T. indivisa* are known from Scandinavian waters where they are common and widespread. The association with *Tubularia* is however not very well documented, apparently based solely on Jeffreys (1867: 408) 'Mr. Horace Marryat found it living among tufts of *Tubularia indivisa* in the Gouliot caves at Sark, at low water.' We have not been able to find any further documented references. We therefore assume that *A. digitatum* is the substrate in Scandinavia on which *X. patula* is likely to be found.

Xandarovula patula is seemingly confined to the north-eastern Atlantic, with its main distribution along the coasts of Ireland and south-western England with scattered records from western British coasts as far north as the Orkneys, and the Atlantic coasts of France (Fretter & Graham, 1981). There are only few and imprecise records from further south along the coasts of Spain and Portugal (Rolán, 1983). It has, however been recorded from as far south as the Cape Verde Islands (two specimens from 300 m; photograph in Rolán, 2005). Dolin & Ledon (2002) indicate that *X. patula* also occurs in the western Mediterranean. A related species, *X. aperta* (Sowerby G.B. II, 1849) is found in the western Mediterranean (Dolin & Ledon, 2002, as *X. purpurea* Risso, 1826; see CLEMAM, 2010).

Jeffreys (1867) reported it (as *Ovula patula*) from the coasts of Dorset, Devon and Cornwall, the Channel Islands, the Irish coast, and the south-western coast of Scotland. Later it has been reported from northern Scotland, the Orkneys and a couple of localities on the northern North Sea coast of

England (Rendall, 1936; Fretter & Graham, 1981; Seaward, 1990; Rowley, 2008). Most recently the species has been reported from the Dutch part of the North Sea (Reijnen *et al.*, 2010). *Xandarovula patula* has been found regularly by Belgian fishermen in the Danish part of the North Sea, 15 miles west of Hanstholm at a depth of 65 m among stones. It was found at a specific locality (57°10'N 7°50'E) one or two specimens each time every year since 2005 (Jean-Paul Kreps, personal communication). According to Dr Kreps it was not known from the Danish part of the North Sea before 2005. These records are summarized in Figure 3.

Lorenz & Fehse (2009) reported *X. patula* from Norway, but give no supporting documentation. There is another unverified record from Norway online: http://www.gastropods.com/Taxon_pages/Class_GASTROPODA.shtml. We have not been able to trace the origin of these two. Thus the records reported here represent the first fully documented ones from Scandinavian waters*.

While Lebour (1932) states that *X. patula* is common trawled in Plymouth waters, other authors report it as uncommon in British waters (e.g. Fretter & Graham, 1981; Graham, 1988). The species is however regarded as probably under-recorded (Rowley, 2008). The tidal currents around the British Isles transport warm Atlantic water along the western side of the isles and join the North Atlantic drift around the Orkney and Shetland Islands. An arm of these surface water masses then drifts down the Scottish and British east coast before it turns towards Denmark and the Skagerrak (Figure 4). According to Lebour (1932) 'Simnia' must have a long larval life, as she noted that the late larvae lived for several weeks in a plunger jar without losing the velum. Drifting larvae of *X. patula* could therefore be transported in these water masses north to the west coast of Norway or east to the Swedish area of the Skagerrak where they would find a suitable habitat for settling. This transport pattern could also explain the records for the east coast of Britain. The immigration to the Skagerrak coast could of course also have taken a different route, passing across the southern North Sea north of Denmark, and across the Skagerrak in the Jutland current to the Swedish west coast. Here it meets the north-going Baltic surface current that will transport planktonic larvae up the Swedish west coast.

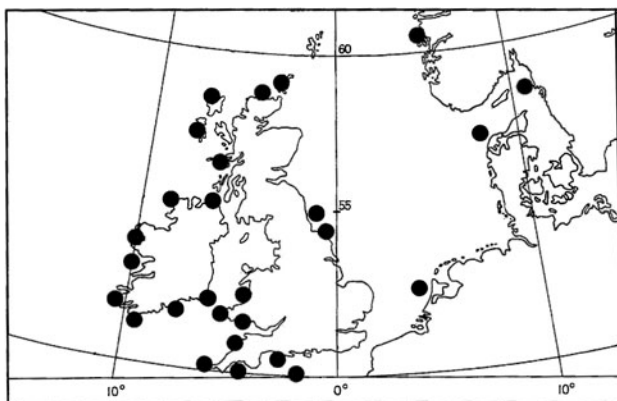


Fig. 3. Records of *Xandarovula patula* from the English Channel and northwards based on information from Seaward (1990), Rowley (2008) and BioMar data from Ireland (<http://www.habitats.org.uk/marinelife/biomarspecies.asp?item=w7320>). Black dots (•) denote all the known records, including the new Scandinavian and North Sea records (each dot may include more than one specimen per location).

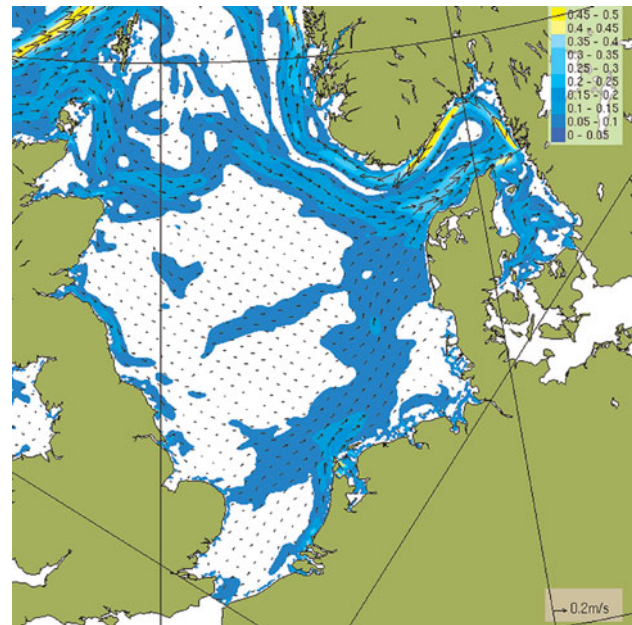


Fig. 4. Map showing the current patterns found around the British Isles, the North Sea and the Skagerrak (courtesy John Albretsen).

At the location where this species was found (Svaberget) is probably the first suitable locality for settling for many larval forms. In this location more rare species have also been found in high numbers for Swedish waters, such as the hairy crab *Pilumnus hirtellus* and the seven-armed starfish *Luidia ciliaris*. With the confirmed, persistent, population in the Danish part of the North Sea this immigration route to Sweden is a possibility.

Several lines of evidence indicate that the species has invaded Scandinavian waters during the last decade, and is now established in at least two localities. The fact that the species, in spite of being large (for a Scandinavian gastropod) and with a very characteristic appearance, has not been reported from any locality in Scandinavia before, and that it was for the first time recorded from the North Sea locality west of Hanstholm in 2005, suggests that the invasion to Scandinavia is a fairly recent phenomenon, while the fact that large specimens have been found twice (in two consecutive years) at the Norwegian locality and in several dredge hauls at the Swedish one, argues for an established population at both sites. The records reported in this note may therefore be taken as evidence of a successful expansion of the distribution of this species over recent years.

This report is the first published record of a species of the family Ovulidae from Scandinavian waters, and an addition to the distribution list of Høisæter (2009).

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*Note added in proof.

Recently we have become aware of two online photographs of a specimen of *Xandarovula patula* from Norwegian waters, photographs that somehow have evaded the most commonly used search engines. These photographs (at <http://www.espenrekdal.no/>) are of excellent quality, well documented, and prove that the species was present in Norwegian waters in 2003. They also extend the northern distributional limit of the species to Trondheimsfjorden (roughly 63°30'N), and expand the list of host species to include the plexaurid alcyonacean *Paramuricea placomus* (Linnaeus, 1758). Judging from the photographs, the length of the specimen is close to 20 mm. The photographer (Espen Rekdal, personal communication) has since 2003 observed the species several times in the same general area of Øygarden as reported in our note above. In this general area the host species was always *Alcyonium digitatum*.

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Correspondence should be addressed to:

T. Høisæter
University of Bergen
Department of Biology
PO Box 7800, NO-5020 Bergen, Norway
email: tore.hoisater@bio.uib.no