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Short Communication

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THE FIRST FINDING OF BRYOZOAN *PECTINATELLA MAGNIFICA* (LOPHOPODIDAE) IN LOWER DANUBE

B. Aleksandrov[1], O. Voloshkevich[2], A. Kurakin[1], A. Rybalko[1], V. Gontar[3]

[1]*Odessa Branch, Institute of Biology of the Southern Seas, NAS of Ukraine, Odessa, 65011 Ukraine*
[2]*Danube Biosphere Reserve, National Academy of Sciences of Ukraine, Vilkovo, Kiliya District, Odessa Region, 68355 Ukraine*
[3]*The Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, 199034 Russia*
E-mail: alexandrov@paco.net

The First Finding of Bryozoan *Pectinatella magnifica* (Lophopodidae) in Lower Danube. Aleksandrov, B., Voloshkevich, O., Kurakin, A., Rybalko, A., Gontar, V. — The freshwater bryozoan *Pectinatella magnifica* (Leidy, 1851) was found for the first time in the Ukrainian part of the Danube Delta (Poludionniy arm, 45°25'00" N, 29°45'25" E) in 2005. Since then, it has increased in abundance. The greatest colony numbers occurred on both dead and living reed stems in the delta region 1.5–2.0 km upstream from the Black Sea.

Key words: *Pectinatella magnifica*, invasion, Danube, Black Sea, Ukraine, non-indigenous.

Первая находка мшанки *Pectinatella magnifica* (Lophopodidae) в Нижнем Дунае. Александров Б., Волошкевич А., Куракин А., Рыбалко А., Гонтарь В. — Мшанка *Pectinatella magnifica* (Leidy, 1851) впервые зарегистрирована в украинской части дельты Дуная (Полуденный рукав, 45°25'00" N, 29°45'25" E) в 2005 г. С тех пор отмечается здесь во всё возрастающем количестве. Максимальная численность колоний отмечена на стеблях тростника в рукавах дельты на удалении 1,5–2,0 км от Чёрного моря.

Ключевые слова: *Pectinatella magnifica*, Дунай, Чёрное море, Украина, вселенец.

The natural range of the bryozoan *Pectinatella magnifica* (Leidy, 1851), syn. *Cristatella magnifica* (Leidy, 1851) extends along the eastern part of North America from New Brunswick and Ontario to Louisiana and Texas in the south. The species was most probably introduced to Europe with shipping along with many other bryozoan species. The first account of this species outside of its natural range was from Hamburg in 1883. It was later recorded in the basin of the river Elbe. This species was also found in the pond of the Zoological Institute in Wroclaw, close to the river Oder and in Silesia and Brandenburg provinces in Germany. The first time statoblasts that were ascribed to *P. magnifica* were obtained from near the source of the Elbe during 1950. The statoblast and colony stages were later found in the Elbe and Havel in Spandau in Berlin and in the Oder near Wroclaw, Poland (Balounová et al., 2013). These were also found in Zuidlaardermeer Lake in the north of the Netherlands in 2004 (Waaij van der, 2013) and in 2009 *P. magnifica* was found in a pond near the city of Tilburg and Piepertkolk in Zwartsluis (Netherlands). In 1972 *P. magnifica* was found in Japan for the first time in Lake Kawaguchi to the north of Mount Fuji (Mawatari 1973). Then in 1996, *P. magnifica* was found in South Korea (Seo, 1998).

In 1951 there was the first literature data about the occurrence of *P. magnifica* in the catchment area of the Black Sea (Knoz, 1960) in the Danube river basin correspondently. Later on *P. magnifica* has been found in Austria since 2003 and in Slovakia 1880 km upstream of the Danube Delta (Bernauer, Jansen, 2006; Balounová et al., 2011). This bryozoan was not recorded from the Danube region of Germany nor in Romania although it was present in the 1950s in freshwater lakes and ponds in these countries (Lacourt, 1968). Preparing responses to comments from reviewer we found the publication of *Pectinatella magnifica* registration in Hungarian section of the Danube River in the area between 1586 and 1642 km (Szekeres et al., 2013).

In accordance with the results of the survey rangers of Danube Delta Biosphere Reserve the first record of *P. magnifica* was in 2005 from the Ukrainian part of the Danube Delta in the Poludionniy channel (45°25'00" N, 29°45'25" E). For a long time this particular species has received little attention, because it was often misidentified for the gelatinous mass of other species, for example the moonjelly *Aurelia aurita* trapped amongst the reeds. These occurrences would appear to have been frequent at the time and currently, this species is well distributed and commonly found in most channels of the Ukrainian part of the Danube Delta (fig. 1).

Special monitoring of *Pectinatella magnifica* occurrence in natural channels (arms) of the Ukrainian part of the Danube Delta (Kiliya branch) was carried out in 2013 starting in August and was continued monthly up to November, when the bryazoan colonies practically completely ruined. Visual observations of bryozoan colonies number on twenty five-meters transect along the coast in Danube river arms of different part of the delta were done (fig. 1). Transects were selected randomly in order to cover different type of coastal vegetation. Each investigated area consisted of not less than 3 transects. During observations the water temperature was measured. Identification of the species was carried out

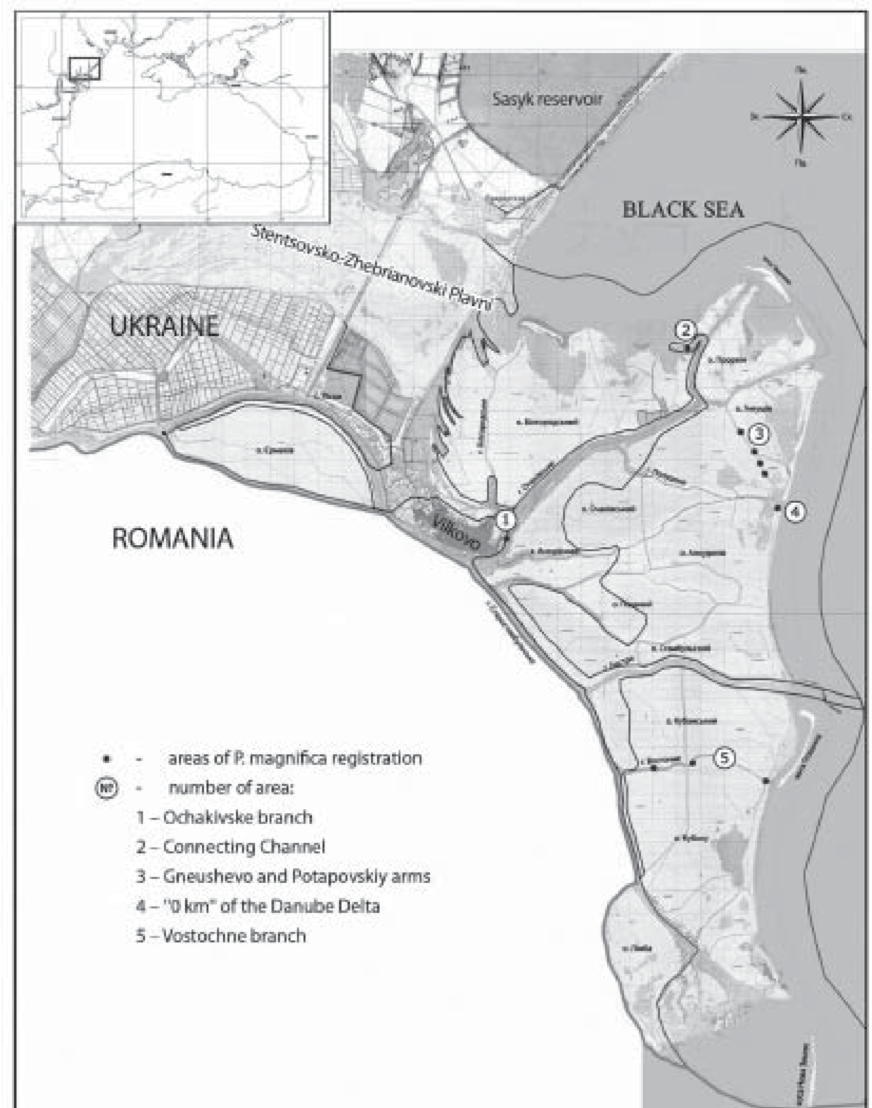

Fig. 1. Schematic map of the bryozoan *Pectinatella magnifica* detection areas (black circles).

Рис. 1. Карта-схема районов обнаружения мшанки *Pectinatella magnifica* (чёрные кружки).

on temporary preparations of statoblasts extracted from bryozoan colonies on guidebooks (Kluge, 1949; Gontar, 2012 b). Photographing statoblasts and their measurements were performed under a microscope...

In the Potapovskiy side channel of the delta, the colonies of *P. magnifica* occur at levels of 15 to 20 colonies for each 25 m length of reeds along the edge of the channel. In the Gneushevo channel the colonies were more frequent being found on 95 % of the reed stalks bordering the channel (fig. 1, area 3). The greatest number of colonies that were found was 1.5 to 2 km upstream in the delta from the Black Sea. Further upstream at 16 km from the sea at Vilkovo, the number of colonies noticeably declined with none being found upstream of this town. We believe that the species is now well established in this area over the last eight years and it is able to overwinter as the resistant statoblast stage.

P. magnifica belongs to the same Phylactolaemata family of bryozoans (Lophopodidae), as *Lophopodella carteri* (Hyatt, 1866) which has recently been found in the Ukrainian part of the Danube Delta (Sanzhak et al., 2011). Both species have very different spinoblast features (Gontar, 2012). The spinoblast of *P. magnifica* resembles those of the Cristatellidae, such as *Cristatella mucedo* Cuvier, 1798. The two species can be distinguished by the anchor-like thorns occurring in two sets of rows, with 12–20 dorsal thorns and 20–40 occurring ventrally in *C. mucedo* (Waaij van der, 2013). *P. magnifica* has a single row of 11–21 thorns with a mean number of thirteen (Davenport, 1900) (fig. 2). Both species have similar statoblast shapes; the colonies of *C. mucedo* are relatively small, up to one centimeter, whereas *P. magnifica* can be up to 40 cm in extent and has a different anatomy (Gontar, 2012).

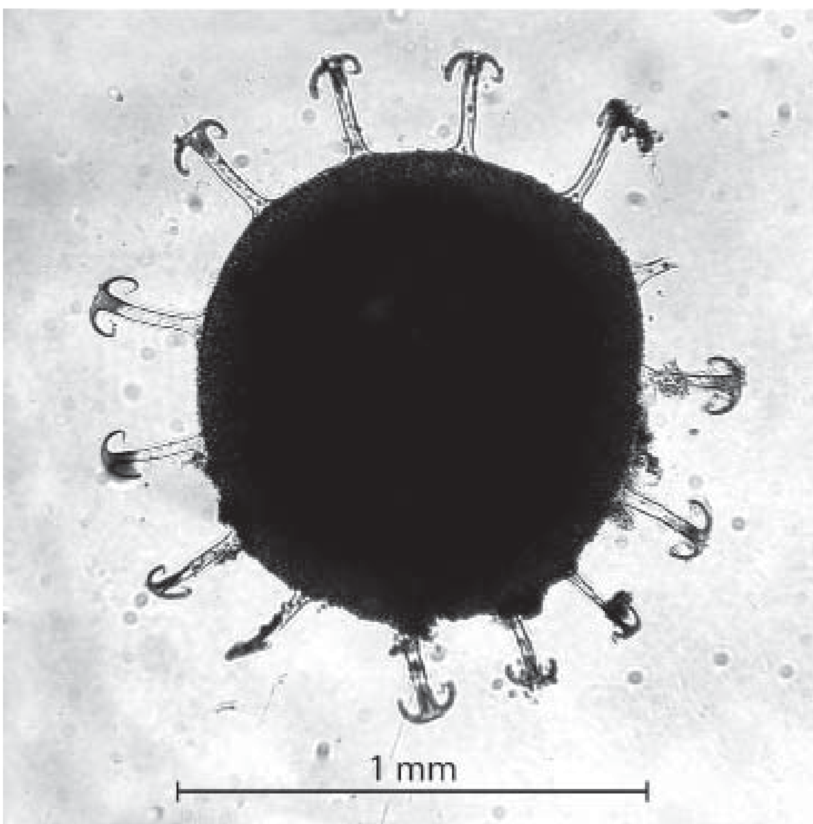

Fig. 2. Statoblast of bryozoan *Pectinatella magnifica* from the Ukrainian part of the Danube Delta.

Рис. 2. Статобласт мшанки *Pectinatella magnifica* из украинской части дельты Дуная.

Kluge (1949), wrote that members of the genus *Pectinatella* had not been found in the USSR. However, at that time the bryozoans had not been well studied. Nevertheless, it is expected that *P. magnifica* would have been detected at that time and so was probably absent although it was known to be widely spread in Western Europe and North America (Kluge, 1949). Kluge (1949) predicted that this species would be found in the southern part of the USSR. This type of statoblasts is large, up to 1 mm or more in diameter, the rounded shape, with the wide swimming ring , with 10 to 20 anchors shaped hooks, that are located in one flatness and are slightly flattened, going from the edge of the ring. Studied the anatomy of

Fig. 3. General view of the colony of bryozoan *Pectinatella magnifica* on the reed stem from the Ukrainian part of the Danube Delta.

Рис. 3. Общий вид колонии мшанки *Pectinatella magnifica* на стебле тростника из украинской дельты Дуная.

statoblasts and the number of hooks of bryozoans from the Danube Delta were identical to specimens found in France (Rodriguez, Vergon, 2002).

The colonies of *P. magnifica* found in the Danube delta occurred in slow-flowing and stagnant waters. These colonies are fusiform, 7 to 40 cm long, have a gelatinous appearance, greenish-gray color and are found attached to reeds and wooden structures. Colonies form clearly observable rosettes of autozooids and these are usually visible attached to the submerged part of reed stems (fig. 3).

It is expected that in the lakes and rivers in the Ukraine, and some other regions, those colonies will be found on stones, submerged tree roots, aquatic plants, sponges, shells of freshwater molluscs and even on the surface of other bryozoans. Although colonies may attach to fishing nets or within pipes where water is abstracted, such as those of power plants and municipal water treatment systems, to date no such fouling has been reported.

The Phylactolaemata are suspension feeders relying on the capture of food in water using cilia which capture bacteria, unicellular algae, rotifers, protozoa and small crustaceans (Wood, 2001). The color of the colonies will depend on the principal food type that is captured and this is most usually translucent green to brown. In addition, the color may also be dependent upon some bacteria and algae that have a symbiotic relationship with this species (Šetlíková et al., 2013). In the Danube Delta *P. magnifica* prefers the illuminated side of an attachment site and the green colouration can be due to both the presence of symbiotic algae and algae captured for food.

Water temperature is the main environmental factor that controls the growth and survival of *P. magnifica* colonies. In temperate latitudes colonies collapse in the winter and survive only due statoblasts. New colonies formed from overwintered statoblasts reach their greatest development in the summer and early autumn, and then colaps again (Gontar, 2012 a). Results of our investigations in the Ukrainian part of the Danube Delta have shown that the mass destruction of the bryozoan colonies begins with a decrease in water temperature from 15 °C. Based on regular monitoring of the water temperature in the Danube Delta during the last decade (http // pogoda.by/gidro) destruction of colonies of bryozoans occurs from second decade of October to the second decade of November.

Very often bryozoan species can act as key species within certain environments by providing shelter even when colonies break down entering the cold winter period. Often unicellular algae, ciliates, sponges, hydra, rotifers, mites, crustaceans and other invertebrates are found in close association with bryozoan colonies. The bryozoan zooidal tubes provide shelter for insect larvae, which may feed on the soft tissue of the colonies but also statoblasts. Some turbellarians, oligochaetes and molluscs may also prey upon bryozoan colonies (Kluge, 1949). In the Ukrainian part of the Danube Delta the abundance of *P. magnifica* is found mainly associated with *Phragmites australis* reedbeds that line the river. Since colonies are active filter feeders they may contribute to increases in water transparency (Gontar, 2012 a). The changes to the environment by *P. magnifica* may encourage the abundance of some native species. This new type-community will require a special study of its role in the energy-cycle of the floodplain of Danube ecosystems.

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