

**CHANGES IN LOCATION OF POPULATION  
OF SANDHOPPERS *TALORCHESTIA DESHAYESII* (AUDOUIN, 1826),  
ACCORDING TO AGE**

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**Abstract**

Search on population of sandhoppers *Talorchestia deshayesii*, was carried out on the beach in Jurata, Hel Peninsula, at the Puck Bay (SE part of the Baltic Sea). In 2000, 2001 and 2002 the samples were taken if possible from five places situated at different distances from the water line. It was noticed that there was tendency to variety of location of *Talorchestia deshayesii*, according to age (length) of invertebrates. Generally young animals (< 7 mm) gather closer to the water line, otherwise there is only a small percent of the young of the population in long distance from the water line.

**Key words:** Baltic Sea, sandy beach, Talitridae, *Talorchestia deshayesii*, water line, young sandhoppers.

**INTRODUCTION**

In 2000, 2001 and 2002 observations of distribution of *Talorchestia deshayesii* (Audouin, 1826) across the beach were carried out. The place of search was located in deserted part of the beach at the Hel Peninsula, at the Puck Bay, in Jurata (SE part of the Baltic Sea).

The landscape of coastal line at the research place consists of three elements such as: edge of sea forest (with the majority of pine *Pinus silvestris*), reedy area (*Phragmites australis*) and sand beach (Fig. 1). Characteristic feature of the place are seasonal changes on surface (breath) of the beach. Parallel to the change of wind power and rising and falling of the level of marine water (about 40 cm), at some time the beach is 2-3 metres wide and covered only by small amount of organic matter. During other periods the sand is covered by rotten layers of organic matter, mainly sea grass, *Zostera marina*, which is often flooded by sea water.

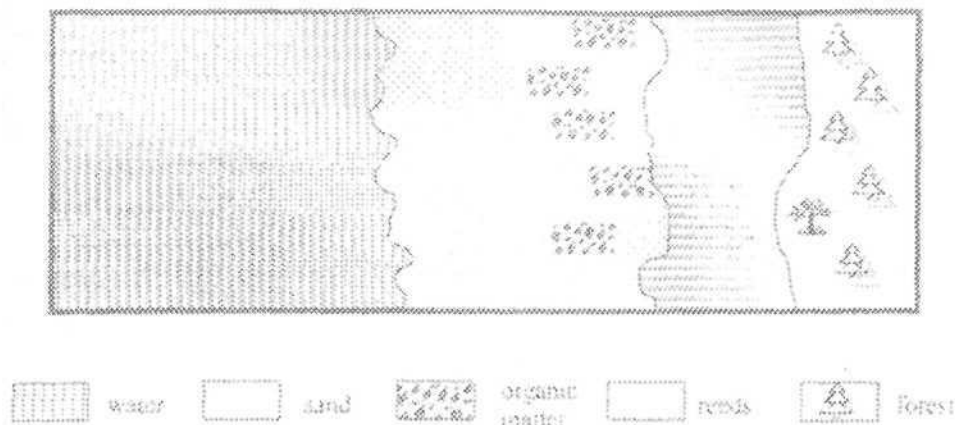


Fig. 1. Diagrammatic picture of the research place

It was noticed that smaller individuals appeared in places where humidity of the sand was quite high (at the boarder of the wet and dry sand). However, bigger individuals appear mainly at the places situated farther from the water line. For the first time *Talorchestia deshayesii* was found in Poland in 1960 by Drzycimski and Nowodzińska (1965). It occurred across the southern part of the Hel Spit (SE part of the Baltic Sea). About presences of *Talorchestia deshayesii* in this area have written also Feliga (2001), Fiałkowski et al. (2003), Kozieł (2004) and Żmudziński (1990).

Moreover along Polish beaches of the Baltic Sea two others species of the family Talitridae were noted, namely: *Talitrus saltator* (Montagu, 1808) and *Orchestia cavimana* (Heller, 1865). The first species belong to common inhabitants of sandy beaches of the open sea (Drzycimski, Nawodzińska 1965, Feliga 2001, Fiałkowski et al. 2003, Stanek 1998, Węśławski et al. 2000 a, b, c, Żmudziński (1990, 1999), while the second lives at stony banks of covered Polish lagoons in betaoligohaline zone (Żmudziński 1956, 1959, 1990, Urbański 1948, Trynduś 1997).

## MATERIAL AND METHODS

Samples were collected across the sand beach including the drift covered plentifully by reed, *Phragmites australis*. The material was collected with a metal tube 11.3 cm in diameter (Fig. 2), screwing it into sand to depth of about 10 cm. Every time (if it was possible) five samples were taken, at five different locations, at the distance of every 70 cm. A plastic pad was used to prevent sandhoppers from escaping. Then the rest was put into bucket, covered with sieve and washed out of sand. In 2000 every week from the 9<sup>th</sup> July to 29<sup>th</sup> September (13 samples altogether) search was carried out. In 2001 12 samples from 2 May to 21 September were taken every two weeks (12 samples altogether). Analogue search was continued from 18<sup>th</sup> May to 13<sup>th</sup> October 2002 (11 samples altogether).

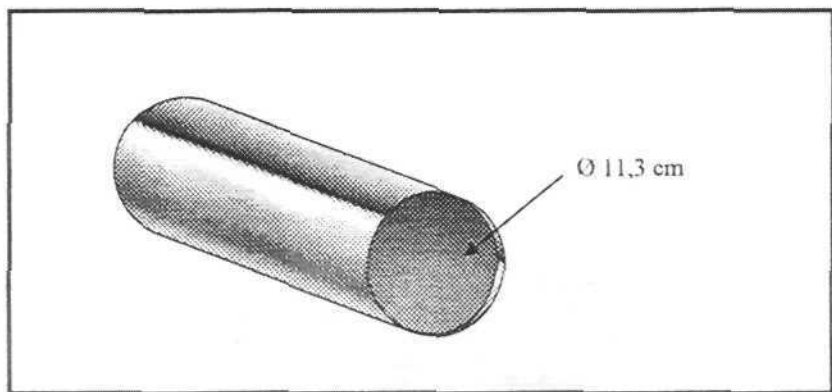


Fig. 2 Metal tube to collecting samples from the sand

All collected organisms were preserved in 60% alcoholic solution. In 2002 in addition sleeping tablets as magnesium sulfate, pouring with small rations salt crystals into the water, were added to the collected samples before the preservation. After that individuals were counted and measured (the length of the body) with the magnifying glass, the type MST 131, magnification 1.4-9.2. The individuals were measured from root of the tentacles to the telson's beginning (with exactitude to 1 millimetre), with the straight backs.

During the next visits at the places of the search, it occurred that natural habitat of the population *Talorchestia deshayesii* changed according to weather conditions and the look of the beach. It was not always possible to take five samples. Many times it was necessary to decrease the number of samples to fourth or even to third locations, because the beach was too narrow.

## RESULTS

Young and adult individuals were measured and counted at every location (from the first to the fifth) and were shown on the diagrams. The picture showed the percentage of the young in the collected samples (Figs 3 - 5).

This simple division let us show more legible and graphical picture of the sandhoppers location at the next research places. The first location was situated at the closest point to the water line (about 50 cm). During first year of research the beach was quite wide (about 2-3 m) and the last research location (no. 5) was at the place of reed. In 2001 the length of the beach was changeable: from about 2 m to nearly several centimetres. That summer there were some storms and the beach was periodically flooded by a lot of water. After storms the beach was narrow and covered with weeds (sea grass *Zostera marina*). In conclusion, such extreme difficult weather phenomena do not have a big influence on population and reproduction of these species. The third season of our research, in 2002, was very similar to the last during first half, however from the half of July it become quite dry and part of sandy beach disappeared. It was hard to collect the samples because of the situation.

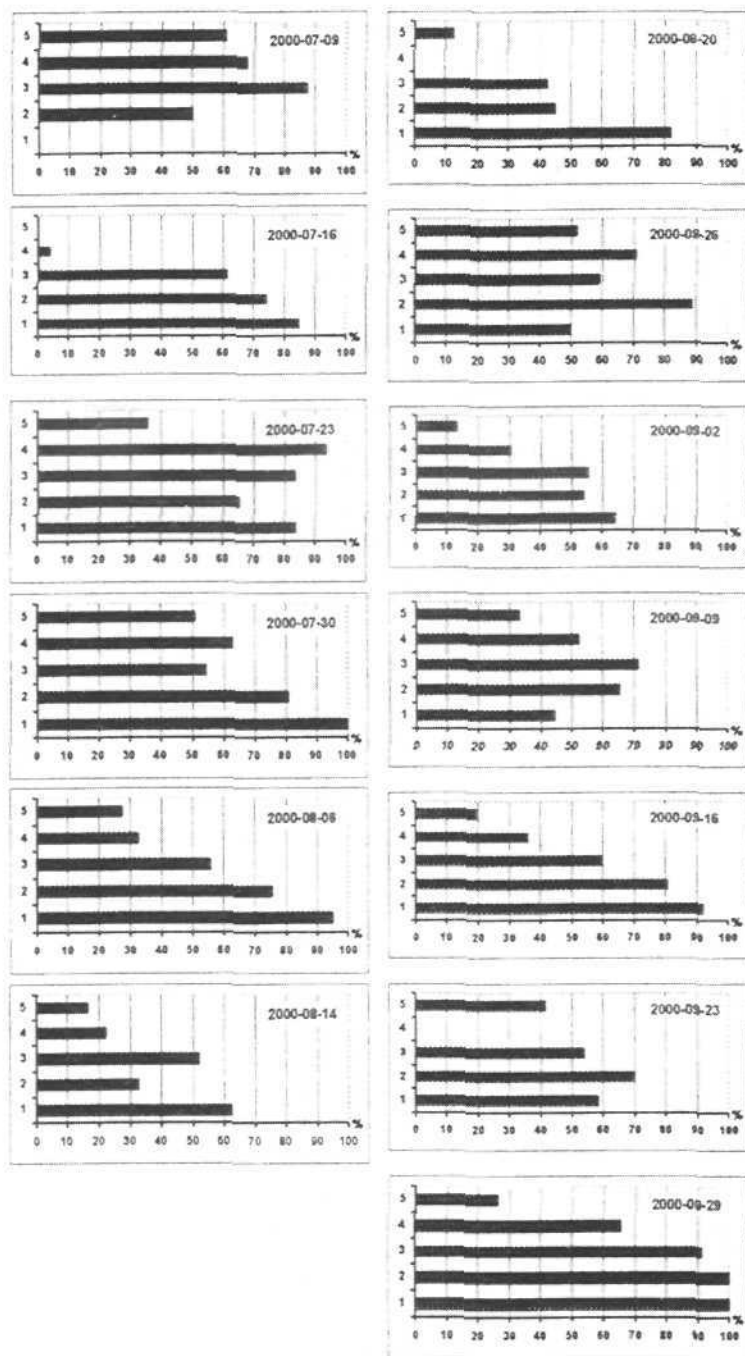


Fig. 3. The diagrams show the percentage of the young individuals (1-6 mm) in the population of *Talorchestia deshayesi* at the next locations in 2000

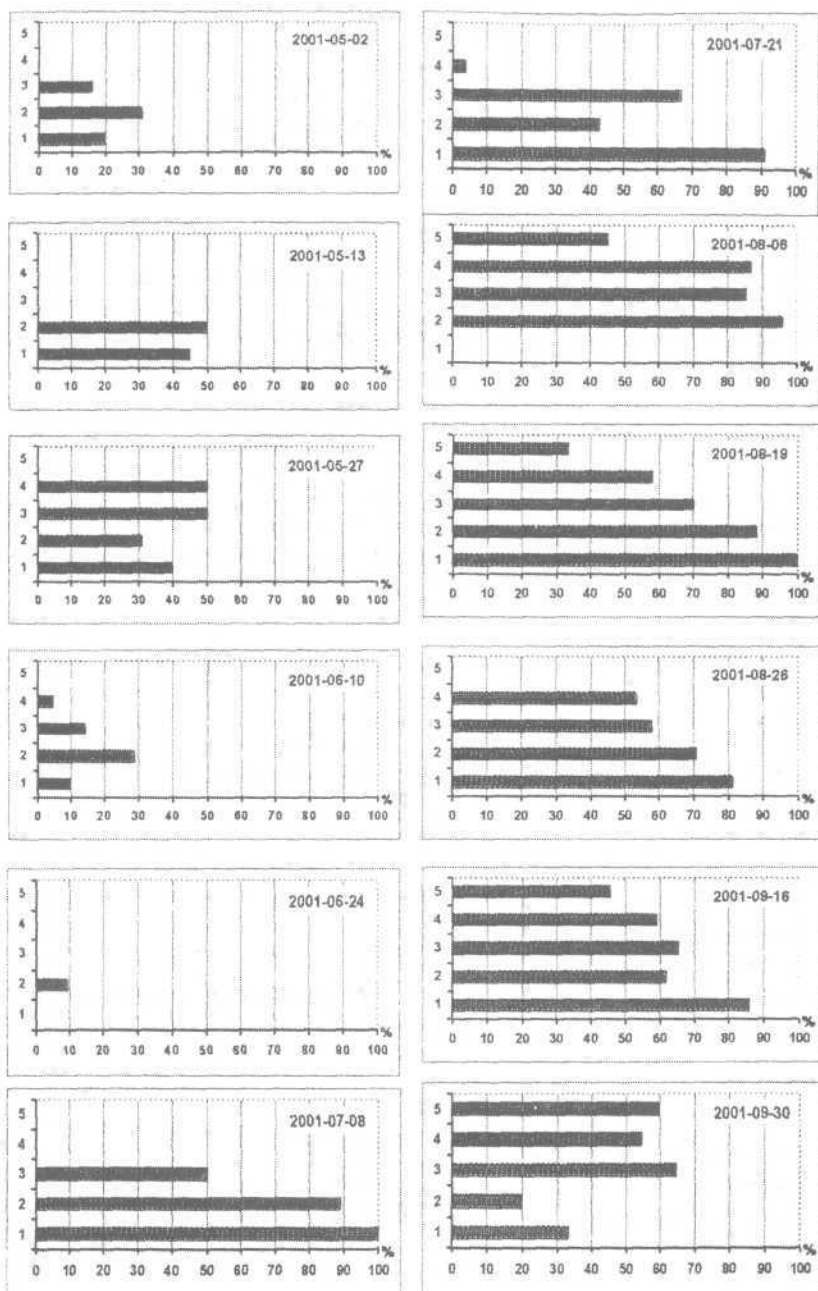


Fig. 4. The diagrams show the percentage of the young individuals (1-6 mm) in the population of *Talorchestia deshayesii* at the next locations in 2001

NOTE: Because of the narrowing of the beach in this season, no samples from the 5th location were taken in: 2.05, 13.05, 27.05, 24.06, 8.07

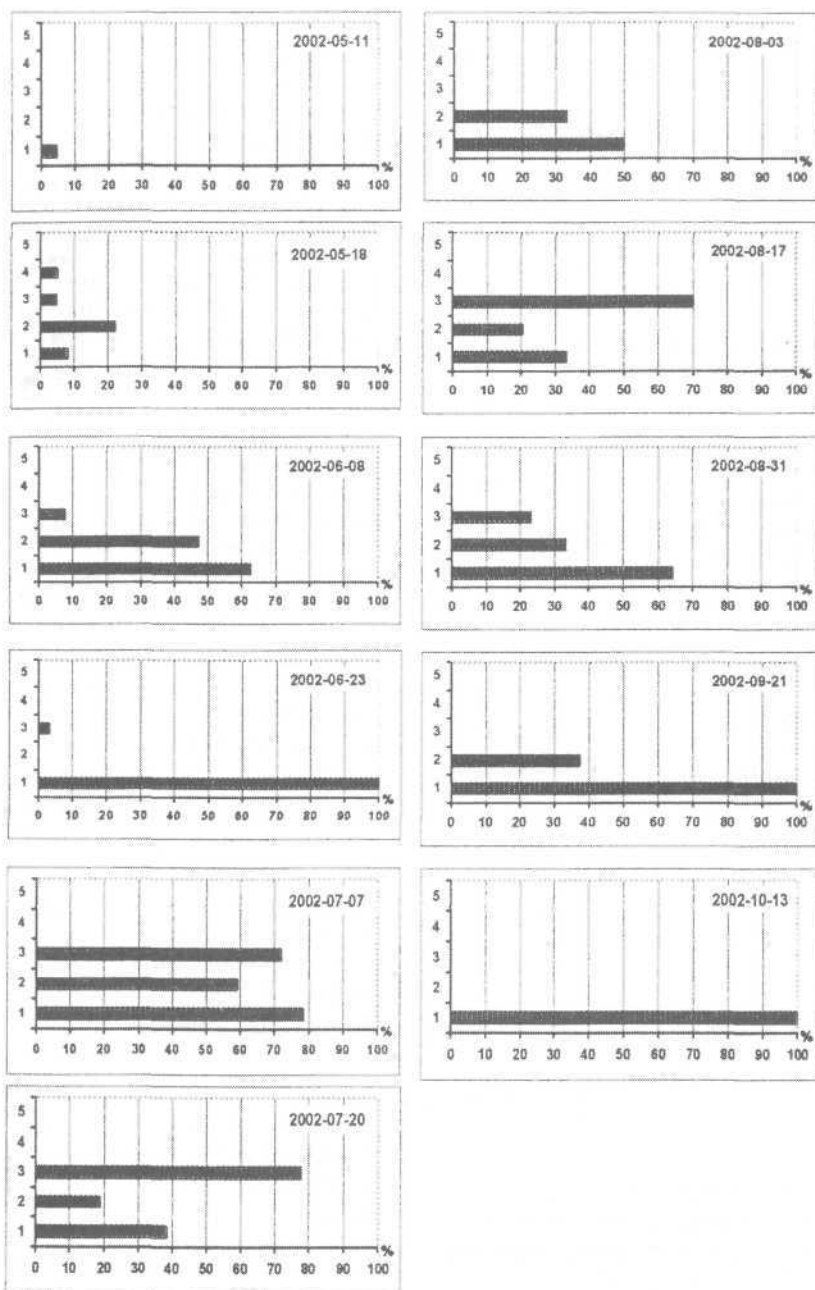


Fig. 5. The diagrams show the percentage of the young individuals (1-6 mm) in the population of *Talorchestia deshayesii* at the next locations in 2002

NOTE: Because of the narrowing of the beach in this season, the 5th sample was taken only once, in 18.05. From the same reason no samples from the 4th location were taken in: 11.05, 23.06, 7.07, 3.08, 17.08, 21.09.

On account of thick reed it was impossible to drive the metal core into the ground and reach the sand. Moreover, collecting samples had to be limited from 1 to 3 locations. During the drought, in 2002 it was affirmed that number of the crustaceans in the searched material was fewer.

## DISCUSSION

Observations carried out on the beach in Jurata, confirm conclusions of other scientists. Drzycimski and Nowodzinska (1965) claim that the young *Talorchestia deshayesii* jump on the surface and are very active. The phenomenon is being observed at present, at every visit at the place of research. With great accuracy it is said that the young individuals behave in this way the locations closer to the water line. Utko (1999) says that the young individuals, allied species *Talitrus saltator*, feed on edge of the beach in July, very close to the water line, however older individuals live farther from the water. Familiar phenomenon was observed among *Talorchestia deshayesii*. According to Scapini et al. (1992) it was alleged that the young are exposed to drying function of the sun beams but living in the most humid zone make up for the loss of the water. Drzycimski and Nowodzinska (1965) gave information about *Talorchestia deshayesii* which used to live in the Hel Peninsula in area between 3 and 5 m and the nearest land is more or less wet. At present in area of research, which is about 4 m width, there is not wet meadow. So the wet meadow is not the factor of existing the population of *Talorchestia deshayesii* in the Hel Peninsula.

## CONCLUSIONS

1. Studied fragment of sea shore including pure sandy beach it is very narrow, usually only 8-10 m widths, while the pure sandy beach is only 1-3 m widths. In same periods as a result of considerable water dynamic and liftings of sea level the total width narrows to 7 m, and the pure sandy beach deminished sometimes only to 10-20 cm. General number of *Talorchestia deshayesii* hardly depends from width of the beach.
2. In the presented diagrams there is a clear tendency to concentrate young individuals at the closest locations to the water line (mainly the first and the second location). Number of young diminished violently further from water.
3. During the period of intensified reproduction (July), at the remote places from water line only a few young organisms can be met. In the late period of the summer the participation of the young is becoming bigger at the further locations from the water line.
4. The young individuals of *Talorchestia deshayesii* feed on surface of the sandy beaches very close to the water line and they did not show such a big tendency to hiding in the sand as adults. In the sun they are exposed to becoming dry so the water inhabitat makes up for loss of humidity.

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ZMIANY W ROZMIESZCZENIU POPULACJI ZMIERACZKA ZATOKOWEGO  
*TALORCHESTIA DESHAYESII* (AUDOUIN, 1826)  
W ZALEŻNOŚCI OD WIEKU

Streszczenie

Badania nad populacją *Talorchestia deshayesii* prowadzono na plaży w Juracie, na Półwyspie Helskim, nad Zatoką Pucką. W latach 2000–2002 pobierano próby najczęściej na pięciu stanowiskach, różnie oddalonych od linii wody. Zauważono, że występuje charakterystyczna tendencja do zróżnicowania rozmieszczenia *Talorchestia deshayesii* w zależności od wieku skorupiaków. Zjawisko to poddano szczegółowej analizie ilościowej. Stwierdzono, że młode organizmy gromadzą się bliżej linii wody, zaś w miarę oddalania się od tego stanowiska ich procentowy udział w populacji maleje.