

<https://doi.org/10.3176/biol.ecol.2000.2.05>

Proc. Estonian Acad. Sci. Biol. Ecol., 2000, 49, 2, 221–224

FIRST RECORD OF THE TALITRID AMPHIPOD *Orchestia cavimana* IN THE NORTHERN BALTIC SEA

Jonne KOTTA

Estonian Marine Institute, Marja 4d, 10617 Tallinn, Estonia; jonne@sea.ee

Received 14 December 1999

Abstract. *Orchestia cavimana* was found for the first time on the Estonian coast in 1999. The species inhabits *Fucus vesiculosus* wrack. The high abundance and biomass values indicate that the species has formed a permanent population in the region. In the coming years *O. cavimana* will likely expand its distribution area in other parts of the Estonian coastal sea.

Key words: *Orchestia cavimana*, distribution, Baltic Sea.

INTRODUCTION

The modern world is witnessing a reorganization of the biota due to an increasing need for rapid transglobal movement of commercial goods. A variety of species, (unintentionally) accompanying these commodities, face new species and new environments with which they have had no evolutionary history (Carlton, 1999). Introductions may have a detrimental impact on native assemblages (Elton, 1958); however, the specific effect depends on the type of interactions among the species involved (e.g. Mills et al., 1993).

The Baltic Sea may be regarded as an area that is extraordinarily prone to invasions owing to its short geological history, low number of species, and intensive freight transportation. Therefore, it is not surprising that several non-indigenous species have been discovered in the Baltic Sea during last decades (Jansson, 1994; Baltic Marine Biology Working Group, 1995). Among benthic invertebrates *Marenzelleria viridis* and *Hemimysis anomala* are the most recent newcomers (Bick & Burckhardt, 1989; Salemaa & Hietalahti, 1993).

Five species of talitrid amphipods (fam. Talitridae) have been found in the Baltic sea: *Talorchestia deshayesii* Audouin, *Talitrus saltator* (Montagu), *Platorchestia platensis* (Krøyer), *Orchestia gammarellus* (Pallas), and *Orchestia cavimana* Heler. Until the summer of 1999 *O. cavimana* had been recorded only in the southern part of the Baltic Sea (Žmudziński, 1974; Järvekülg, 1979; Persson, 1999). Then the species was found for the first time on the Estonian coast, corresponding to the extension of its Baltic distribution of some 400 km. This paper provides data on the habitat, abundance, and biomass of the species on the Estonian coast.

RESULTS AND DISCUSSION

The wrack fauna was investigated at ten locations in the West-Estonian Archipelago Sea (Fig. 1). The stations 1, 3, 7, 8, and 9 were exposed to wave action and had relatively high salinity values (6–7 psu). Other stations were situated on more sheltered coasts and their water salinity ranged between 5 and 6 psu.

Three 20 × 20 cm frame samples were taken in each location. In the laboratory animals were determined at species level (Lincoln, 1979) and counted. Dry weights were obtained (to the nearest 0.1 mg) after drying the material at 70°C for 48 h.

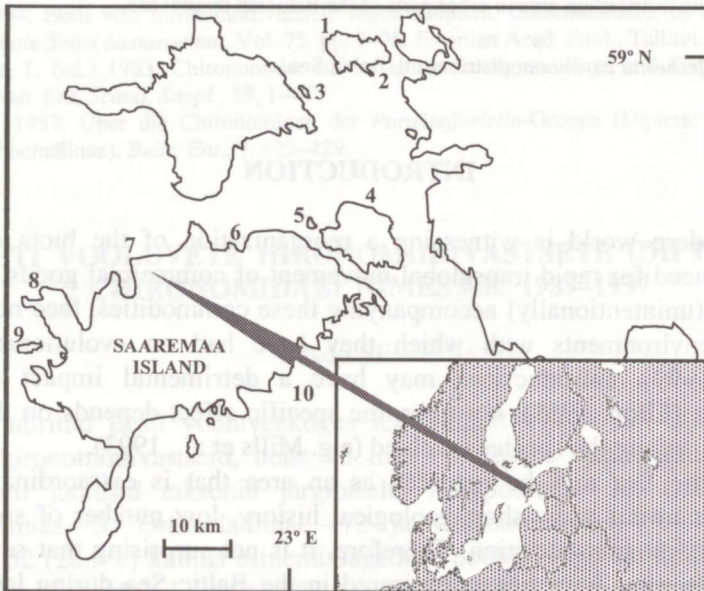


Fig. 1. Study area. Numbers indicate the stations where the wrack fauna was investigated.

The talitrid amphipods were found only in station 7 (58°33.49' N, 22°16.97' E). It is likely that the highly exposed coast (i.e. an extensive splashing zone) may be the reason why the species was found only at this station as the wrack composition did not differ between study sites. This station was characterized by a 1.5 to 2 m wide wrack bed starting at 1 m distance from the shoreline. The wrack was dominated by relatively fresh *Fucus vesiculosus* L.

Because of their singular habitat selection, no quantitative sampling design has been developed for talitrid amphipods and no comparable abundance/biomass data can be found in the literature. However, the biomass estimates in this study may be considered rather reliable as very smooth calcareous rocky surface below the algae made it possible to collect easily all animals within the frame.

The assemblage was represented by only one species – *Orchestia cavimana*. The majority of the population consisted of females. The average length of the individuals was 6 mm and the maximum length was 13 mm. *O. cavimana* were distributed uniformly having similar densities both at the edges and in the central part of the wrack belt. The average abundance and biomass of the species were 22400 ± 2511 (SE) ind m^{-2} and 13.61 ± 2.43 g m^{-2} . The dry weight of *Fucus* was 4.19 ± 0.23 kg m^{-2} .

O. cavimana has a relatively wide distribution area extending from the Atlantic coast of North Africa and Europe, the Mediterranean, Black and Red seas to the southern North Sea (Lincoln, 1979). In the Baltic Sea the species has been previously found only on the coasts of Poland and Germany (Žmudziński, 1974; Järvekülg, 1979). The fact that *O. cavimana* was found only in one locality on the Estonian coast suggests that the species has been either introduced or transported here by drifting algae. High biomass of the talitrid amphipods indicates that the species has formed a permanent population in this region.

O. cavimana inhabits a similar biotope on the Estonian coast as previously reported in other areas of the Baltic and other seas. It has been found in moist habitats under stones or amongst damp vegetation usually close to fresh or brackish waters (Lincoln, 1979). In Poland the species was found also under piles of bricks and broken pieces of reed (Žmudziński, 1974).

It is very likely that in the coming years *O. cavimana*, lacking competitors and predators, will extend its distribution area towards more exposed parts of the West Estonian Archipelago and the mouth area of the Gulf of Finland. These amphipods are omnivores and possibly with preference for algal material over other food items (Bowers, 1964; Moore & Francis, 1985). Therefore, the amphipod grazing, affecting the decomposition rate of decaying algae, has a potential to modify the energy flow in the coastal ecosystem of the northern Baltic.

ACKNOWLEDGEMENTS

My special thanks go to Prof. Ludwik Żmudziński, who introduced me to the fascinating world of talitrid amphipods. This study was partly financed by the Estonian Governmental Programme No. 0200792s98.

REFERENCES

- Baltic Marine Biology (BMB) Working Group. 1995. Deep concern among Baltic marine biologists about NEMOs and GMOs. *WWF Baltic Bull.*, 4–5.
- Bick, A. & Burckhardt, R. 1989. Erstnachweis von *Marenzelleria viridis* (Polychaeta, Spionidae) für den Ostseeraum. *Mitt. Zool. Mus. Berl.*, 65, 237–247.
- Bowers, D. E. 1964. Natural history of two beach hoppers of the genus *Orchestoidea* (Crustacea: Amphipoda) with reference to their environmental distribution. *Ecology*, 45, 677–696.
- Carlton, J. T. 1999. A journal of biological invasions. *Biol. Invasions*, 1, 1.
- Elton, C. S. 1958. *The Ecology of Invasions by Animals and Plants*. Methuen, London.
- Jansson, K. 1994. *Alien Species in the Marine Environment. Introductions to the Baltic Sea and the Swedish West Coast*. Report No. 4357. Swedish Environmental Protection Agency, Solna.
- Järvekülg, A. 1979. *The Bottom Fauna of the Eastern Baltic Sea*. Valgus, Tallinn (in Russian).
- Lincoln, R. J. 1979. *British Marine Amphipoda: Gammaridea*. British Museum (Natural History), London.
- Mills, E. L., Leach, J. H., Carlton, J. T. & Secor, C. L. 1993. Exotic species in the Great Lakes: A history of biotic crises and anthropogenic introductions. *J. Great Lakes Res.*, 19, 1–54.
- Moore, P. G. & Francis, C. H. 1985. Some observations on food and feeding of the supralittoral beach-hopper *Orchestia gammarellus* (Pallas) (Crustacea: Amphipoda). *Ophelia*, 24, 183–197.
- Persson, L. E. 1999. Growth and reproduction in two brackish water populations of *Orchestia gammarellus* (Amphipoda: Talitridae) in the Baltic Sea. *J. Crustacean Biol.*, 19, 53–59.
- Salemaa, H. & Hietalahti, V. 1993. *Hemimysis anomala* G. O. Sars (Crustacea: Mysidacea) – immigration of a pontocaspian mysid into the Baltic Sea. *Ann. Zool. Fenn.*, 30, 271–276.
- Żmudziński, L. 1974. *Świat zwierzęcy Baltiku*. Wydawnictwa Szkolne i Pedagogiczne, Warszawa.

KIRPVÄHILISE *Orchestia cavimana* ESIMENE LEID LÄÄNEMERE PÕHJAOSAS

Jonne KOTTA

Orchestia cavimana leiti Eesti rannikumeres esmakordselt 1999. aastal. Liik asustab rannale uhutud põisadru puhmaid. Arvukuse ja biomassi väärtused on piisavalt kõrged, et tagada populatsiooni püsimine. Lähiaastatel on oodata *O. cavimana* levila laienemist Eesti rannikumeres.