THE ROLE OF SANDHOPPER (TALITRUS SALATOR, MONTAGU 1808) IN SEAWEED DISINTEGRATION IN POLISH COASTAL SANDY BEACH SYSTEM

MARCIN F. JĘDRZEJCZAK

Università degli Studi di Firenze, Dipartimento di Biologia Animale e Genetica <<Leo Pardi>>, Via Romana 17, 50125 Firenze, Italia
Phone: +39 055 2288 215, Fax: +39 055 2252656, E-mail: humbak@idea.net.pl, marcinjedrzejczak@wp.pl

INTRODUCTION

The supralittoral macrofauna can reach a considerable biomass and, in temperate areas, is usually dominated by tailtid amphipods. Sandhoppers are generally considered to be primary consumers of newly stranded wrack and often dominate the supralittoral fauna of Polish beaches with a moderate macrofaunal input (Węsławski et al. 2000a, b). Although stranded wrack material may form a large proportion of the diet of many supralittoral fauna, there is, however, little evidence for the direct contribution of these animals to wrack breakdown (Jędrzejczak 1999, 2002a, b, c).

Once very common along Polish coast, today sandhopper occurs on isolated localities only, avoiding the most visited tourist places. Environmental change, food limitation, and tourism are among the possible factors that have a negative impact on sandhopper occurrence, as demonstrated in a research made in Poland (Węsławski et al. 2000a, b) on the Hel Small Beach and the Sopot Beach. Together with their surf zones, these beaches are ideal recreational areas and a very popular holiday destination in Poland (Fig. 1). Recently, however, sandhopper disappeared from these places previously occupied.

AIM AND HYPOTHESES

The response of major macrofaunal taxa with Talitrus salator-assemblage in particular to the stranded decaying leaf litter of the seagrass Zostera marina were investigated through a field colonization experiment. The null hypothesis was that the sandhoppers might contribute greatly to the breakdown of stranded Z. marina tissue in Polish coastal sandy beach system as a result of their own feeding activity and through the spread of microorganisms, and so accelerate and spread the wrack decay.

The study was carried out on the northern coast of Poland on the Hel Great Beach (Fig. 2) at the end of the Hel Peninsula (54°30′N, 18°47′E, Fig. 2). The beach is situated in a former restricted military area of the Marine Landscape Park, where human impact is still relatively low. It was selected as an example of a relatively undisturbed Polish beach (Fig. 3). T. salator occurs in all zones of the beach in average densities of 30-40 ind. /m², these rise to over 500 ind. /m² near debris and wrack at the strandline (Węsławski et al. 2000a).

MATERIAL AND METHODS

Two parallel experimental trials were done in May, July and September during a three-year study 1999-2001 (Fig. 6). Each trial ran for 27 days and was set up on the strandline (Fig.7a - beach-dune profile, 7b - view from above). Bags of each mesh size were randomly positioned in areas around the driftline from which existing wrack had been removed. Each bag was then lightly covered with sand. Litterbags were sampled at random 1, 3, 6, 9, 12, 18 and 27 days post-placement, in a spatially consistent way. 1440 litterbags were used in all experimental studies (3 years x 3 seasons x 4 mesh fractions in 2 trials x 7 samples x 5 replicates).

RESULTS

The highest densities of most macrofaunal animals were found within 3 days of the bags being placed on site (Fig.8, 10, and 11). Examination of the wrack tissue suggested that Talitrus salator was likely to be the most important of the macrofaunal consumers. Circular holes with diameters of between 1 and 5 mm were found on leaves recovered from the coarse-mesh bags. In the 0.5-mm and 48-mm mesh sieve numbers of Talitrus were lower and no evidence was found of feeding. Abundant abundance in the samples of both trials varied throughout the experiment but was greatest within 3 days of the bags being deployed (Fig.8). Both in the litterbags (Fig.9) and Barber’s samples (Fig.10), the highest abundance of T. salator was noted in July, the lowest in September. High positive correlation was found between abundance of T. salator and wrack mounds, parallel to the shoreline (Fig.12).