TURRITELLA COMMUNIS: AN ADRIATIC ECOSYSTEM ENGINEER

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Abstract
Common tower shell, *Turritella communis* Risso, 1826 is the most abundant gastropod in the Adriatic Sea. This species is considered an "Ecosystem engineer" as it constitutes a substratum for numerous epibionts and its empty shell provides refuge from predation, lowering the levels of physical or physiological stress for organisms living inside. The aim of this study was to understand the *T. communis* role in the benthos community restoration after gas platform installation, generally causing an initial species richness "breakdown", and investigate the multi-symbiotic relationships found inside its shells. These shells seem to play a role in the species enrichment process of the benthic community associated to a gas platform.

Keywords: Adriatic Sea, Biodiversity, Gastropods, Monitoring, Zoobenthos

The Adriatic Sea is an enclosed basin located in the eastern Mediterranean characterized mainly by sandy-mud bottom. The average depth is 35 m in the northern part of the basin and 140 m in the central one. The north-central Adriatic Sea is also seat of an intense gas extraction production with more than 120 platforms. The installation of these structures inevitably cause some impacts on the benthic communities of the natural seabed, mainly consisting in a faunal depletion just after the platform construction followed by a recover and subsequent enrichment within the first 3 years [1]. In the Adriatic Sea *Turritella communis* is one of the most abundant gastropods characterizing specific zoobenthic assemblages. Two zoocenoses called "Turritella" (alive specimens) and "Turritella profunda" (shells of dead organisms) were identified [2]. The first one live on muddy or muddy-sand sediments, from 20-40 m depth up to a maximum depth of 75 m, with the highest abundance in the area located in front of Po River mouth; the latter occurs in the central Adriatic Sea, between 50 and 100 m depth, on muddy-sand sediments enriched with shell detritus originated from *T. communis* dead conches. Empty shells of this organism can be found at 200 m depth, extending this zoocenosis. *T. communis* is considered an "Ecosystem engineering" (EE) as it is able to create, modify and maintain the habitat, improving heterogeneity and complexity through the provision of refuge for boring organisms and substrate for the epibenthic sessile ones [3].

Macrozoobenthic samples were collected around two gas platforms (GP1, GP2) during the two years after installation. The GPs are installed on muddy-sand bottom in the north-central Adriatic Sea at 47 km and 60 km far from the Italian coast, respectively. Two surveys per year were carried out at each GP. At each survey, four sampling sites were randomly selected at rising distances from GP (<10 m, 30 m, 60 m, 120 m, 250 m, 1000 m away from the GP). Six replicates were collected at each site using a Van Veen grab. The data from the four sites in each distance were pooled together. The biological samples were sieved in situ through a 0.5 mm mesh size. Macrozoobenthos was sorted and identified to species level, weighed and quantified. The nomenclature herein follows the World Register of Marine Species (WoRMS) [5].

Nine macrozoobenthic taxa were exclusively found in association with *T. communis* shells: eight within the shells, the polychaete *Syllis parapari* San Martín & López, 2000, the bivalves *Coracuta obliquata* (Chaster, 1897) and *Montacuta phascolionis* Dautzenberg & H. Fischer, 1925, the sipunculids *Aspidosiphon muelleri* Diesing, 1851 and *Phascolion strombus* (Montagu, 1804), the decapods *Anapagurus* sp. Henderson, 1886, *Anapagurus bicornige*r A. Milne-Edwards & Bouvier, 1892, and Paguridae nd and one attached on them, the anthozoan *Epizoanthus* sp. Gray, 1867. The presence of *T. communis* increased the species richness at GP1 from 3% to 8% and from 4% to 12% in the first and second year respectively (Fig. 1) and from 2% to 11% and from 3% to 8% in the first and second year at GP2 (Fig. 2).

The shells of this gastropod seem to have a role in benthic community restoration after the initial species richness "breakdown" due to the GP installation. In addition, their presence seems to positively influence the biodiversity increase synergistically acting with the GPs "effects".

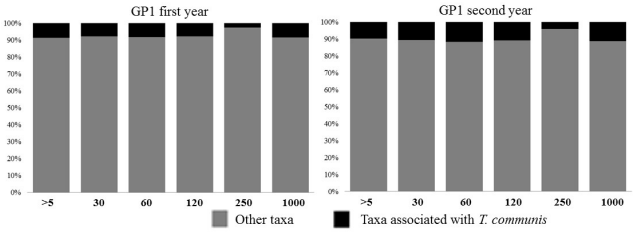

Fig. 1. Percentage of taxa associated with *T. communis* compared to all the other taxa found at different distances from GP1 in the I (left) and II year (right).

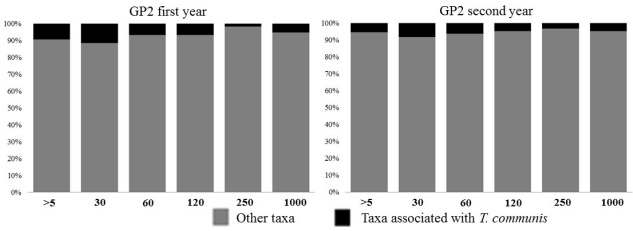

Fig. 2. Percentage of taxa associated with *T. communis* compared to all the other taxa found at different distances from GP2 in the I (left) and II year (right).

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