In vitro experiment on spawning induction of *L. Conchilega* and substrate preference during settlement of the larva

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Counteracting the undesired impacts of coastal erosion in the most beneficial way for both society and the ecosystem has been a topic of discussion many times. In Belgium, concrete dykes are placed perpendicular to the shoreline to diminish the wave impact and flood risk. Besides, regularly a huge amount of sand is nourished on the beaches to counteract the continuous loss. The consistent use of this costly and intensive engineering approach has led to the search for a more sustainable, ecosystem friendly alternative. The COASTBUSTERS project, formed by an agreement between ILVO, DEME, Jan De Nul, Sioen Industries and eCoast, plans on solving this issue by implementing 3 types of bio engineers in the field: mussel reefs, seaweed banks and sand mason worm (*L. conchilega*) aggregations. Reef forming bio engineers enhance resilience of the sediments, making them less susceptible to erosion, and promoting proliferation of abundance and biodiversity of organisms (Alves, 2007; Rabaut, 2009; Callaway, 2010). This work investigates the potential of using *L. conchilega* for coastal defense, by trying to cultivate them and enhancing the settling process by using artificial substrates.

L. conchilega is known to be an important eco system engineer in the intertidal zone. The tubeworms create a local hydrodynamic regime within the aggregations, hereby clogging up the sand and increasing abundance and diversity of other infaunal species (Alves, 2007; Rabaut, 2009). To induce the formation of an *L. Conchilega* aggregation, its pelagic larvae need the appropriate benthic conditions for settlement (Keßler, 1963). The research question is if this can be enhanced? Preliminary *in vitro* observations in the lab revealed that artificial substrate structures are also used as anchoring structure by the larvae, next to adult tubes. On top of this, *in situ* placement of a substrate mat in Bredene seemed to facilitate settlement of the larvae, as multiple *L. conchilega* tubes were detected after a month, in an environment too turbid and dynamic for settlement under normal circumstances. For these reasons, the first *in vitro* substrate preference experiments of the aulophore larvae of the sand mason tubeworm are executed. Both spawning induction of the adults and substrate settlement preference of the larvae are assessed in one recirculating aquaculture system (RAS). The adult containing breeding tanks are linked to Kreisel tanks, that will capture the larvae after each spawning cycle. Within the Kreisel sections, 3 different substrates and a control are carefully positioned, in search for the optimal artificial substrate for larval attachment & settlement. The cultivation of larvae, which is possible based on initial trials, allows to execute substrate tests independently of the availability of larvae from the field. This way, we can consistently repeat the substrate

tests after each spawning induction, whenever in time. The experiment is repeated 2 times with 3 replicate systems each session, to increase the statistical power of the results obtained. With this experiment we hope to statistically quantify this enhanced settling effect previously observed. The results will help to improve the field set-up of *in situ* tests that will follow. If all successful, COASTBUSTERS plans on integrating the use of such biodegradable substrate mats in the field as a barrier against the impact of storm surges, wave erosion and sea level rise on sandy beaches, worldwide.

References

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