Observation Based Science As A Tool For Deep Mediterranean Management And Conservation

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The need for science based management of the overcrowded Deep Mediterranean is strongly emerging as anthropogenic pressure and competition over EEZ resources soar. Although the EEZ draws a big economic interest, very little is known about its biology. Recent reports (Israel Marine Plan, IOLR) emphasized the need for strong, observational based, baseline in this patchy environment. This talk will feature two unique examples studied by utilizing ROV's for observation and guided sampling.

The colonial black corals (Leiopathidae, Antipatharia) were collected at ~700m bsl within the Palmachim disturbance. They forage on young labile particulate organic matter (POM), freshly exported from the water surface interface, a scarce and time variant food source. The *Leiopathes* relies on its L/D ratio in order to maximize its capture rate efficiency by reducing the critical Reynolds number, thus enabling high mixing rate and turbulence for each individual branch. The long interweaving branches and the perpendicular branchlets create a designated mesh for the falling POM capture, yet brachlets are separated enough to allow high leakiness as if the colony is sweeping through the water, actively foraging, at 40% the energetic cost.

Spionidae (*Prionospio* sp) worms, a family within the Polychaeta, were observed across the shores of Palmachim and Acre, inhabiting hydrocarbon enriched euxinic sediment, ~ 1000 m bsl. Gas bubbling within the dense populated patch, a resuspended organic matter source, has triggered the spionids to move their upper body part and palps in an oscillatory “rocking” manner. Particle capture efficiency and stress components were calculated and used to assess changes to the spionids' immediate environment and the energy gained by oscillating. The oscillation also generated a lateral flow component that removed vortex-trapped particles, being beneficial to the spionid and increasing metabolic activity of associated thiotrophic bacteria. The ability of these bacteria to detoxify sulfide and provide additional nutrition may contribute to the success of the spionids. These bacteria may represent keystone species in the euxinic patches.

Only by utilizing eyes and hands in the patchy nonuniform Deep Mediterranean, one can create a science based tool for managing the EEZ.