

Plankton food for benthic fish: *de visu* evidence of trophic interaction between rainbow wrasse (*Coris julis*) and pelagic tunicates (*Pegea confoederata*)

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ABSTRACT

Salps (pelagic tunicates) are rarely observed in nature and trophic interactions involving them mainly rely on the inspection of stomach contents of their potential predators. Moreover, salps have soft bodies that are hardly identified in potential consumers. We involved recreational SCUBA-divers and photographers in collecting *de visu* evidence of i) massive occurrence of salps and ii) trophic interactions involving salps as preys and benthic animals as consumers. Direct evidence of trophic interactions between salps and benthic fish was documented by photographic frames. We detected a long colony of the salp *Pegea confoederata* being transported by currents close to the substrate on top of Banco di Santa Croce, an underwater rocky outcrop in the Gulf of Naples (Italy). An individual of the rainbow wrasse *Coris julis* attacked the above-mentioned salp colony by selectively detaching individuals and biting their stomach. Our report of a trophic interaction between labrids and salps is the second in fifty years and the previous one was only indirect. In this study, citizen science allowed detecting both neglected marine animals like salps and trophic interactions involving them. Visual, direct evidence of predation on salps by benthic fish adds further knowledge about patterns of living-matter fluxes between plankton and benthos, opening new questions on the potential of global change in modifying the efficient circulation of organic matter in marine systems.

Key words: Plankton; benthos; labrids; salps; marine food-webs; coastal systems; citizen science.

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INTRODUCTION

Plankton and benthos are traditionally considered as distinct communities: the first living suspended in the water column, the second in strict association with the sea-bottom. However, despite the formal distinction, plankton and benthos are strongly interconnected in coastal marine ecosystems (Boero *et al.*, 1996; Griffiths *et al.*, 2017), in virtue of: i) continuous downward fluxes of organic detritus produced by plankton and consumed at the sea bottom; ii) intermittent upward fluxes of inorganic nutrients released by benthic bacteria; and iii) periodic formation of benthic resting stages in planktonic protists and metazoans and release of planktonic larval stages by benthic animals.

A further, but less investigated route for plankton-benthos coupling is represented by trophic interactions. These are based on fluxes of living matter among organisms set at different trophic levels and can be roughly categorized as either nonselective or selective feeding. Nonselective feeding, involving plankton unicellular producers as food source and benthic organisms as consumers, is the most renowned of such interrelationships – *e.g.*, the remarkably strong suspension-feeding carried out by benthic organisms in shallow coastal regions (Gili and Coma, 1998; Lucas *et al.*, 2016). Yet, selective feeding (*i.e.*, the active

catching of living preys) is seldom reported among trophic interactions involving plankton and benthos (Hoeksema and Waheed, 2012).

In this paper, we report direct, *de visu* evidence that the benthic Mediterranean rainbow wrasse *Coris julis* (Linnaeus, 1758, Labridae) selectively feeds on the colonial salp *Pegea confoederata* (Forskål, 1775, Thaliacea). This trophic relationship was documented in the Gulf of Naples (GoN, Tyrrhenian Sea, Mediterranean Sea, Italy) in the course of a citizen science investigation employing recreational SCUBA-diving and carried out at the top side of Banco di Santa Croce, an underwater rocky outcrop whose higher pinnacles set at the boundary between the benthic and pelagic realms. We present and describe photographic frames documenting the above-mentioned trophic relation, we discuss plankton-benthos coupling in light of the existence of trophic routes connecting pelagic tunicates and benthic fish and we eventually analyse conceptually some possible perturbations to this route induced by global change.

METHODS

The Banco di Santa Croce (BSC) is a submerged rocky outcrop located 700 m off the coast of Vico