The food web of Potter Cove (Isla 25 de Mayo/King George Is.): complexity, structure and function

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The study of food web structure and complexity is central to better understand ecosystem functioning. A food-web approach includes both species and energy flows among them, providing a natural framework for characterizing species' ecological roles and the mechanisms through which biodiversity influences ecosystem dynamics. Here we present for the first time a high-resolution food web for the Potter Cove marine ecosystem (Isla 25 de Mayo/King George Is.). We studied eleven food web properties to analyze network complexity, structure and topology. We found a linkage density of 3.4, a connectance of 0.04 and 45% of omnivory, as well as a path length of 1.8 and a clustering coefficient of 0.08. Comparison of food web properties with other marine food webs revealed a particular combination of characteristics for Potter Cove ecological network: middle size (S = 91), low linkage density and connectance (not being an artifact of resolution or assembly procedure), low omnivory percentage, short path length and low clustering coefficient. Furthermore, relating the structure of the web to its dynamics, we found that the degree distribution (in- and out-links) fit the best to an exponential model. For two of the three more connected functional groups, competition overlap graphs (only considering predator species) reflect high trophic interaction between demersal fish and niche specialization according to feeding strategies in amphipods. On the other hand, it can be inferred from the prey overlap graph (only considering prey species) that multiple energy pathways of carbon flux exist across benthic and pelagic habitats in Potter Cove ecosystem. Although alternative food sources might add robustness to the web, network properties results (low linkage density, connectance and omnivory, and short path length) points to fragility and potential trophic cascade effects. Our results suggest that species with a high number of links (e.g. *Notothenia coriiceps*, *Ophionotus victoriae*, *Gondogeneia antarctica*) could be considered keystones for the robustness of Potter Cove ecosystem.

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