

NOVEL CO-OCCURRENCE OF FUNCTIONALLY REDUNDANT CONSUMERS INDUCED BY RANGE EXPANSION ALTERS COMMUNITY STRUCTURE

Moisés A. Aguilera , Nelson Valdivia, Bernardo R. Broitman , Stuart R. Jenkins, and Sergio A. Navarrete

Study Description

Climate change is shifting species distributions, imposing rapid changes in community structure and ecosystem functioning. We examined whether poleward range expansion of the intertidal grazer limpet *Scurria viridula* along the coast of Chile has altered the role of resident congeneric *S. zebrina*, and whether the collective impacts of the herbivore guild have been modified by the introduction of this new member. Adding *S. viridula* to the guild complements and intensifies their role in reducing green algal cover and species richness and increasing bare space. Our study highlights that range expansion of an herbivore can modify resource composition and functional guild structure in the recipient community.



Photo I. The mid-intertidal zone habitat mosaic where the limpets *Scurria viridula* and *S. zebrina* (depicted in the small insert from left to right, respectively) co-occur in the range overlap of both species (30°–32°S). Intense grazing by both herbivores complements with other herbivores of the poleward guild, resulting in large patches of bare rock. Patches of the corticated foliose algae *Mazzaella laminarioides* are also shown. Photo credit: Moisés A. Aguilera.



Photo 2. The mid-intertidal rocky shore of central Chile (33°S) where *Scurria viridula* (small insert) has recently expanded its range. High densities of *S. viridula* with high cover of bare rock are present in the rocky platform, interspersed with patches of the mussel *Perumytilus purpuratus*. Photo credit: Moisés A. Aguilera.



Photo 3. The limpet *Scurria viridula* co-occurring during grazing with other benthic herbivores in the mid-intertidal level at 33°S, corresponding to its novel range. Benthic herbivores like the congeneric limpet *S. zebrina*, *S. ceciliana*, and the clingfish *Sicyases sanguineus* are also shown in the middle of ample bare rock substrata with small patches of the algae *Ulva* spp. (green) and *Mazzaella laminarioides* (yellowish). Photo credit: Moisés A. Aguilera.



Photo 4. Experimental setup (grazer enclosures, exclusion, and control areas) at three locations spanning the overlap zone (Carrizal 28°S, left; Las Cruces 33°S, top right, and Punta Talca; 30°S, lower right) was critical to test the role of *S. viridula* range expansion and *Scurria* co-occurrences in the intensification of the herbivore guild effects and modification of community composition. The picture depicts steel fences (35 × 35 cm) used to enclose/exclude benthic herbivores. Photo credit: Moisés A. Aguilera.

These photographs illustrate the article, “Novel co-occurrence of functionally redundant consumers induced by range expansion alters community structure” by Moisés A. Aguilera, Nelson Valdivia, Bernardo R. Broitman, Stuart Jenkins, and Sergio A. Navarrete published in *Ecology*. <https://doi.org/10.1002/ecy.3150>.