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TITLE: Too cold for invasions? Contrasting patterns of native and introduced ascidians in subantarctic and temperate Chile

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ABSTRACT:

We analysed the biodiversity of ascidians in two areas located in southern and northern Chile: Punta Arenas in the Strait of Magellan (53° latitude, subantarctic) and Coquimbo (29° latitude, temperate). The oceanographic features of the two zones are markedly different, with influence of the Humboldt Current in the north, and the Cape Horn Current System, together with freshwater influxes, in the Magellanic zone. Both regions were surveyed twice during 2013 by SCUBA diving and pulling ropes and aquaculture cages. Both artificial structures and natural communities were sampled. A total of 22 species were identified, three of them reported for the first time in Chilean waters: *Lissoclinum perforatum*, *Synoicum georgianum*, and *Polyzoa minor*. The first is an introduced species found here for the first time in the Pacific. No species occurred in both regions, highlighting the very different environmental conditions of subantarctic vs. temperate waters. In spite of exhaustive searches in aquaculture facilities and on artificial structures such as harbour docks and piers, no introduced species were found in the Punta Arenas area. Conversely, 5 out of 11 (45%) species found in northern Chile were introduced. The Coquimbo area has a history of ship traffic dating back at least 150 years, and cultures of native (e.g. scallop) as well as exotic species (e.g. abalone) have been deployed for ca. 35 years. Some of the introduced species, such as *Ciona robusta* (formerly *C. intestinalis* sp. A), constitute pests for scallop culture facilities in the area, causing serious losses to local farmers. It is surprising that the Punta Arenas zone, with a history of ship traffic dating back ca. 500 years and over 25 years of sustained mussel and salmon aquaculture activity, is apparently free from introduced species. The ascidian cover on artificial structures is high, but it is made up of native species such as *Paramolgula* sp., *Cnemidocarpa verrucosa*, or *Polyzoa opuntia*. It is hypothesized that cold waters (5 to 11°C) are the determining factor hindering the development of introduced ascidians, which tend to be temperate-warm water species. The ongoing warming in the Southern Cone may change this picture and continued monitoring is strongly advised.

SOURCE: Management of Biological Invasions

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