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LETTER TO THE EDITOR

Freshwater ecosystems in oceanic islands of Chile: Conservation of endemic microfauna and the role of exotic species in the biological control of tropical diseases

Ecosistemas acuáticos de islas oceánicas de Chile: Conservación de microfauna endémica y el rol de especies exóticas en el control biológico de enfermedades tropicales

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The presence of tropical diseases transmitted by mosquitoes mainly of the genus *Aedes* has been reported for Polynesia (Lardeaux 1992, Lardeaux et al. 1992), Eastern Island (Olea 2003), and also tropical latitudes of Latin America in the case of "dengue" (Laval 2003). Thus, some exotic species have been introduced to serve as biological controllers, such as the fish *Gambussia affinis* (Baird & Girard, 1853) in continental Chile (Dyer 2000, Iriarte et al. 2005), and *Mesocyclops aspericornis* (Daday, 1906) in French Polynesia (Lardeaux 1992, Lardeaux et al. 1992). The Chilean oceanic islands have numerous water bodies that may favor the presence of mosquitoes, such as small lakes in Eastern Island (Dumont & Martens, 1995), and small streams in Juan Fernandez islands (Brehm 1937). Recently, the presence of an isolated case of "dengue" in Eastern Island (Olea 2003) has motivated the use of biological control by introducing *Gambussia affinis* in small lakes (Dumont & Verschuren 1991, Magliulo-Cepriano et al. 2003). Although this species has been described as an active predator and an efficient biological controller of mosquitoes, its introduction conveys the risk of increased predation on zooplankton and littoral microinvertebrates (Leyse et al. 2005). In this context, the microfauna of Eastern Island includes particular microcrustacea such as the cladoceran *Alona weinecki* (Stüder, 1878) and the ostracod *Sarscypridopsis* sp., restricted to Eastern Island and the subAntarctic islands Southern Georgia, Falkland, South Orkneys, Kerguelen, Heard Islands, Marion and Macquarie Islands, and also relatively cosmopolitan species such as the copepod *Paracyclops fimbriatus* (Fisher, 1853) and the ostracods *Heterocypris incongruens* (Ramdohr, 1808) and *Cypretta seurati* (Gauthier, 1829) (see Dumont & Martens 1996). Biological control may thus generate a conservation problem affecting these microinvertebrate species, considering the case of continental Chile where *G. affinis* occurs between 23° and 33° S (Iriarte et al. 2005), and its predatory behavior could reduce the abundance of microinvertebrates, as observed in zones of the Loa river such as Quillagua (21°39' S; 69°32' W), where crustaceans do not occur in zones with abundant *G. affinis* populations (De los Ríos et al. 2010). In this regard, the absence or low abundance of microinvertebrates in the presence of *G. affinis* was also noted in recent field surveys in the lake located at the Rano Kau crater volcano (De los Ríos, personal observation June 5, 2010). Such observations would be in conflict with a previous study of small lakes and ponds in Eastern Island by Dumont & Martens (1995), who did not record the presence of the fish.

A different situation would occur in Juan Fernandez islands, where there are no reports of tropical diseases transmitted by mosquitoes, and the scarce studies on freshwater ecosystems document the presence of native species such as the cyclopoid *Paracyclops fimbriatus chiltoni* (Brehm, 1936) and the amphipod *Orchestia selkirki* (Schellenberg, 1935) (González et al. 2008). Thus, these islands might not face the risk of extinction of

endemic species due to exotic fish introduction, although unfortunately we lack studies about their microinvertebrate communities. Therefore, community studies would be needed to determine if these island have endemic species or similar species to their freshwater counterparts in continental Chile.

In this scenario, we need to assess the species diversity of freshwater ecosystems in Chilean oceanic islands with the aim to determine their ecological role as food resources for aquatic birds or consumers of particulate organic matter (Fernández & Domínguez 2001). The introduction of exotic fish might suceed in eliminating insects that transmit tropical diseases, but in turn might change the structure and function of ecosystems, as observed in the Loa river (De los Ríos et al. 2010) and central Chilean wetlands (Figueroa et al. 2009). In this regard, the available information on the introduction of the genus *Mesocyclops* in Costa Rica (Soto et al. 1999) and French Polynesia (Lardeaux 1992, Lardeaux et al. 1992) reveals that this species is an effective biological controller of mosquitoes. Unfortunately, *G. affinis* is already widespread in continental Chile (Iriarte et al. 2005), although no information is available on its impacts. Thus, it would be interesting and important to compare the long-term effects of *G. affinis* and *Mesocyclops* on freshwater ecosystems.

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