



ELSEVIER

Journal of Experimental Marine Biology and Ecology 329 (2006) 11–19

**Journal of
EXPERIMENTAL
MARINE BIOLOGY
AND ECOLOGY**

www.elsevier.com/locate/jembe

Domestication reduces the capacity to escape from predators

Katherina B. Brokordt ^{a,*}, Miriam Fernández ^b, Carlos F. Gaymer ^a

^a Center for Advanced Studies in Arid Zones (CEAZA), Departamento de Biología Marina, Universidad Católica del Norte, Larrondo 1281, Coquimbo, Chile

^b Center for Advanced Studies in Ecology and Biodiversity (CASEB), Estación Costera de Investigaciones Marinas, Departamento de Ecología, Pontificia Universidad Católica de Chile, Chile

Received 2 May 2005; received in revised form 23 May 2005; accepted 8 August 2005

Abstract

Phenotypic plasticity in response to variations in predatory pressure frequently occurs in wild populations, but it may be more evident and critical in species subjected to high exploitation rates and aquaculture. The Chilean scallop *Argopecten purpuratus* is becoming a domesticated species and the production of hatchery-reared scallops (closed environment), has implied the development of successive generations of individuals deprived of several stimuli normally present in their natural habitats (e.g. predators). We compared the escape capacities between wild and cultured *A. purpuratus* and also evaluated the effect of reproductive investment on the escape response capacities. Wild and cultured scallops, at different reproductive stages (maturing, mature and spawned), were stimulated to escape with the predatory sea star *Meyenaster gelatinosus*. We recorded: (1) the time to reaction, (2) the total number of claps, the duration of the clapping response and the clapping rate until exhaustion, (3) the time they spent closed after exhaustion, and (4) the proportion of claps recovered, the duration of the clapping response and the clapping rate after 20 min of recuperation. We found that wild *A. purpuratus* (1) reacted earlier when contacted by their natural predator, (2) escaped faster (greater clapping rates), (3) spent less time with their valves closed when exhausted, and (4) most of their escape capacities (i.e. claps number; clapping time; capacity of recuperation) were less affected by the energetic requirements imposed by gonad maturation and/or spawning than in cultured scallops. We considered that all these aspects of the escape response would make wild scallops less vulnerable to predation than cultured scallops, thus decreasing predation risk. Given the reduction of escape performance in cultured scallops, we suggest that this aspect should be considered for the success of culture-based restocking programs.

© 2005 Elsevier B.V. All rights reserved.

Keywords: *Argopecten purpuratus*; Cultured scallops; Escape response; Reproductive cost; Restocking; Wild scallops