



Journal of Shellfish Research, Vol. 32, No. 2, 369–376, 2013.

ENVIRONMENTAL HYPOXIA REDUCES THE ESCAPE RESPONSE CAPACITY OF JUVENILE AND ADULT SCALLOPS *ARGOPECTEN PURPURATUS*

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ABSTRACT Natural beds and cultures of the scallop *Argopecten purpuratus* are exposed to hypoxia periodically because they are located near upwelling zones. We evaluated the effects of environmental hypoxia on juvenile and adult scallops' escape responses and recovery capacities using 3 different hypoxic cycle (i.e., a gradual decrease and increase of dissolved oxygen) trials. Trials 1 and 2 consisted of single (1-day) hypoxic cycles; trial 3 included exposure to several consecutive daily hypoxic cycles over 7 days, which occurs in the natural environment. Trial 1 evaluated the combined effects of energy demands from escape responses and metabolism on escape responses during environmental hypoxia. Trial 2 evaluated only the effect of environmental hypoxia on the escape responses. Before and after the hypoxic cycles, the scallops were exposed to their main predator, the sea star *Meyenaster gelatinosus*. We evaluated 6 indicators of the scallops' escape response: reaction time, the total number of claps, duration of the clapping response until exhaustion, clapping speed, the proportion of claps, and recovery clapping rate after a recuperation of 5 min or 10 min (for juveniles and adults, respectively). The combined effect of functional and environmental hypoxia (trial 1) affected both juvenile and adult escape responses, with a reduction in their number of claps (15% and 25%, respectively), the clapping rate in juveniles (17%), and the clapping time in adults (19%). However, environmental hypoxia alone (trial 2) affected juvenile escape responses only, with a reduction in their number of claps (18%) and clapping rate (17%). After hypoxic exposure in trial 3, adults only showed a reduced escape capacity (clap number and clapping time of 16% and 17%, respectively), although both adult and juvenile scallops had a reduced capacity to recuperate their initial clap number (18% and 23%, respectively) and clapping rate (21% and 17%, respectively). Recovery capacity was associated with a strong reduction in phasic muscle carbohydrates during this period. Overall, hypoxia reduced the escape capacity of *A. purpuratus*, which may implicate a higher vulnerability to predation (for natural populations) and a decreased physiological status to support other stress factors (for cultured or natural populations).

KEY WORDS: hypoxia, scallops, escape response, *Argopecten purpuratus*