



IV ROSS SEA CONFERENCE 2023

Università degli Studi di Napoli "Parthenope"

Via Amm. F. Acton, 38 - 80133 Napoli, ITALY

3-7 July 2023, Via Acton 38, Naples-Italy

Topic: Marine biology and ecology



Miles Lamare

ABSTRACT Subject :

Antarctic cushion star *Odontaster validus* larval performance is negatively impacted by long-term parental acclimation to elevated temperature

Abstract 07/12/2022 18:57:53



Cross generational responses (i.e. transgeneration plasticity and carryover effects), when the environment of the parents influences their offspring (i.e. larval stages), may determine species responses to climate change. To examine this, adult *O. validus* acclimated to two temperature treatments (ambient (0°C) and warming (+3°C)) for two years were spawned and the response of their larvae to four temperatures (0°C, 1°C, 2°C, 3°C, and 4°C) was examined over 145 days. Adults acclimated to 3°C had less gonad material and produced significantly smaller eggs compared with those from 0°C acclimated adults. Following fertilisation, performance (larval size and survival) was initially better in offspring from the 3°C conditioned compared with those from the 0°C adults. At 34 days development, while survival was greater in larvae from 3°C adults, reduced average larval size emerged in these larvae, a time that coincided with the transition from the gastrula the bipinnaria larval. This was reflected in larval morphometric analysis at day 65, with rearing temperature having a positive effect on larval size across all larval treatment, but adult origin explaining 63% of the variation in larval morphology. After around 50 days, survival in larvae from 3°C acclimated adults became greater than from 0°C adults. By the end of the experiment (145 days) greater survival (17.6% to 34.3%) and growth (697 to 773 µm) was evident larvae from 0°C acclimated adults, compared to survival (7.0% to 19.3%) and growth (380 to 624 µm) in larvae from the 3°C acclimated adults. Our results suggest that acclimation of adults to warmer temperatures resulted in negative carryover effects in terms of offspring performance, a pattern that emerged over time. This indicates that while *O. validus* adults may survive exposure to moderate warming and produce viable gametes, their larvae offspring may be less able to complete development. The downstream effects of poor recruitment of a key species such as *O. validus* would have important outcomes for coastal Antarctica ecosystems.