

Suitability of three stains to mark shells of *Concholepas concholepas* (Gastropoda) and *Mesodesma donacium* (Bivalvia)

José M. Riascos*, Nury Guzman**, Jürgen Laudien***, Olaf Heilmayer*** & Marcelo Oliva*

* Universidad de Antofagasta, Laboratorio CENSOR. Avenida Angamos 601, Antofagasta-Chile [e-mail: josemar.rv@gmail.com], ** Institut de Recherche pour le Développement, Paléoenvironnements tropicaux et variabilité climatique, Bondy Cedex, France, ***Alfred Wegener Institute for Polar and Marine Research, Am Handelshafen 12, 27568 Bremerhaven, Germany

Keywords: Alizarin red, calcein, Chilean abalone, growth rate, strontium chloride, surf clam

Different stains are recently being used to internally mark calcified structures of mollusk shells in growth studies (e.g. Thébault et al. 2005, Heilmayer et al. 2005). Due to interspecific variations in marking success, an assessment of suitability for each species is necessary (Bashey 2004). The potential of calcein, alizarin red and strontium chloride hexahydrate (strontium chloride) was investigated for the Chilean abalone *Concholepas concholepas* and the surf clam *Mesodesma donacium*, two mollusks of commercial importance in Chile. Wild specimens from Northern Chile were marked using different concentrations and immersion periods of the three stains. Animals were reared for 20 days to allow growth, mortality, body condition index (BCI) and growth rate were measured to assess the effects of the treatments. To detect marks, individuals were culled and shell sections analyzed using scanning electron microscopy for strontium chloride and fluorescence microscopy for calcein and alizarin red, respectively. Strontium chloride produced narrow bright bands only at concentrations of 2880 mg·l⁻¹ and 24 h exposure. Calcein markings produced fluorescent bands detectable in all treatments (50 and 100 mg·l⁻¹, 3 and 6 h) whereas alizarin red only yielded irregular bands with 50-100 mg·l⁻¹ and 6 h exposure. Our results show that growth rates of *C. concholepas* are significantly affected by the stains factor: Strontium chloride showed the lowest growth rates whereas that of alizarin red and calcein was similar to the control group. High concentrations of strontium chloride negatively affected ($P < 0.05$) the body condition of the gastropod. Although no statistical differences were found, BCI of *M. donacium* followed the same trend as observed for *C. concholepas*. In conclusion, calcein was the best growth marker for both species as it produced bright, long-lasting bands even at low concentrations and immersion times without detectable lethal or sub-lethal effects.

References

- Bashey, F., 2004. A comparison of the suitability of alizarin red S and calcein for inducing a nonlethally detectable mark in juvenile guppies. *Trans. Am. Fish. Soc.* 133(6):1516-1523.
- Heilmayer, O., Honnen, C., Jacob, U., Chiantore, M., Cattaneo-Vietti, R. Brey, T., 2005. Temperature effects on summer growth rates in the Antarctic scallop, *Adamussium colbecki*. *Polar Biology* 28:523-527.
- Thébault, J., Chauvaud, L., Clavier, J., 2005. Evidence of a 2-day periodicity of striae formation in the tropical scallop *Comptopallium radula* using calcein marking. *Marine Biology* 149:257-267

Riascos J.M., Guzman Nury, Laudien J., Heilmayer O., Oliva M.
(2006)

Suitability of three stains to marks shells of *Concholepas concholepas* (Gastropoda) and *Mesodesma donacium* (Bivalvia)

In : Heilmayer O. (ed.), Steinhoff D. (ed.), Thatje S. (ed.),
Laudien J. (ed.) Censor midterm symposium : book of
abstracts. Concepcion (CHL) ; Bremerhaven : COPAS ; Alfred
Wegener Institute for Polar and Marine Research, 85

Censor Midterm Symposium, Concepcion (CHL), 2006/09/04-
08.