Biological data of mussel larvae treated with fluorescent dyes and grown in two pH treatments.

Website: https://www.bco-dmo.org/dataset/751258
Data Type: experimental
Version: 1
Version Date: 2018-12-20

Project
» OCE PRF: Track 2 (International) Indirect effects in a changing ocean: a case study of seagrass photosynthesis and mussel physiology (pHVAR)

Contributors	Affiliation	Role
Kapsenberg, Lydia	Université Pierre et Marie Curie (Paris 6) (UPMC)	Principal Investigator, Contact
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Abstract
Mussel larvae of Mytilus galloprovincialis were grown in two pH treatments (pH 8.1 and 7.4). Larvae were collected for biological measurements of shell field development and calcification at 35 hours post-fertilization (hpf, trochophore stage). Calcein dye was added to the cultures prior to the start of calcification. Calcofluor is live dye and so was added to sampled larvae at 35 hpf for immediate imaging. Confocal microscopy was used for 3D imaging of larvae. Images were processed in ImageJ. Shell field area was determined as the area stained by calcofluor, on one valve. Calcification area was determined as the area stained by calcein, on one valve.

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Dataset Description

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Data Processing Description

BCO-DMO Processing Notes:

- added conventional header with dataset name, PI name, version date

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Data Files

File
fluorescent_staining.csv (Comma Separated Values (.csv), 4.82 KB) MD5:7a0146defb1a94f9178303d8a0922b78 Primary data file for dataset ID 751258

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Related Publications

Kapsenberg, L., Miglioli, A., Bitter, M. C., Tambutté, E., Dumollard, R., & Gattuso, J.-P. (2018). Ocean pH fluctuations affect mussel larvae at key developmental transitions. Proceedings of the Royal Society B: Biological Sciences, 285(1893), 20182381. doi:10.1098/rspb.2018.2381
Methods

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Parameters

Parameter	Description	Units
experiment	experiment number	unitless
treatment	pH treatment conditions	unitless
bucket	bucket identification number of the larval culture	unitless
age_hpf	age of mussel larvae	hours post-fertilization (hpf)
family_pairID	family or pair identification number	unitless
larva_ID	identification number of larva corresponding to the size measurement	unitless
Calcofluor_AREA_um_sq	areas of the larval body stained by calcofluor	microns squared
Calcein_AREA_um_sq	areas of the larval body stained by calcein	microns squared

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Project Information

OCE PRF: Track 2 (International) Indirect effects in a changing ocean: a case study of seagrass photosynthesis and mussel physiology (pHVAR)

Coverage: NW Mediterranean Sea

NSF abstract:

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One of the major goals of ocean acidification research is to understand how ecosystem functioning and services will change in the future. In this project, the fellow will assess the influence of pH variability on an ecologically and economically important mussel species, under future ocean pH and temperature conditions. The research will be conducted at Laboratoire d'Océanographie de Villefranche-sur-Mer, France in collaboration with international host scientist Dr. Jean-Pierre Gattuso and sponsoring scientist Dr. Todd Martz (Scripps Institution of Oceanography, USA). By hosting a workshop, the fellow will introduce pH sensors to European students and scientists and promote the use of field data in the design of biological experiments. The project supports the training of a postdoctoral fellow and two undergraduate student interns. Results and data from this project will be disseminated at conferences and through open-access publications and data repositories.

Experiments investigating the effects of ocean acidification on marine organisms often ignore the spatio-temporal variability in seawater pH that is present in coastal marine ecosystems. Such heterogeneity in pH may provide temporal refuge from corrosive seawater under future levels of acidification. Utilizing a combination of field and lab experiments, this project will evaluate the influence of pH variability and interactive effects of warming and acidification on mussel physiology through several levels of biological organization. Should variability in pH provide beneficial effects on mussel development and growth, results of the project provide an avenue for local management of ocean acidification in coastal regions and aquaculture practices.

This project produced the following publications:

Kapsenberg, L., Miglioli, A., Bitter, M. C., Tambutté, E., Dumollard, R., and Gattuso, J. P. (2018) Ocean pH fluctuations affect mussel larvae at key developmental transitions, Proceedings of the Royal Society B: Biological Sciences, 285, 20182381, doi: 10.1098/rspb.2018.2381.

Kapsenberg, L, EE Bockmon, PJ Bresnahan, KJ Kroeker, J-P Gattuso, and TR Martz (2017) Advancing ocean acidification biology using Durafet® pH electrodes. Frontiers in Marine Science 4: 321. doi:10.3389/fmars.2017.00321

Kapsenberg, L, S Alliouane, F Gazeau, L Mousseau, and JP Gattuso (2017) Coastal ocean acidification and increasing total alkalinity in the northwestern Mediterranean Sea. Ocean Science 13: 411-426. doi:10.5194/os-13-411-2017

Kapsenberg, L, DK Okamoto, J Dutton, and GE Hofmann (2017) Sensitivity of sea urchin fertilization to pH varies across a natural pH mosaic. Ecology and Evolution 7: 1737-1750. doi:10.1002/ece3.2776

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1521597

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