{rokbox title=|Mytilus galloprovincialis :: Image: Montserrat Ramón (COB-IEO)| thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-biomarkers-mytilus-galloprovincialis-cultured-montserrat-ramon-jarque-et-al-2014-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-biomarkers-mytilus-galloprovincialis-cultured-montserrat-ramon-jarque-et-al-2014.jpg{/rokbox}

Sergio Jarque, Eva Prats, Alba Olivares, Marta Casado, **Montserrat Ramón**, Benjamin Piña, 2014. **Seasonal variations of gene expression biomarkers in Mytilus galloprovincialis cultured populations: Temperature, oxidative stress and reproductive cycle as major modulators**. Science of The Total Environment. Volume 499, 15 November 2014, Pages 363–372

Abstract: The blue mussel *Mytilus galloprovincialis* has been used as monitoring organism in many biomonitoring programs because of its broad distribution in South European sea waters and its physiological characteristics. Different pollution-stress biomarkers, including gene expression biomarkers, have been developed to determine its physiological response to the presence of different pollutants. However, the existing information about basal expression profiles is very limited, as very few biomarker-based studies were designed to reflect the natural seasonal variations. In the present study, we analyzed the natural expression patterns of several genes commonly used in biomonitoring, namely ferritin, metallothionein, cytochrome P450, glutathione S-transferase, heat shock protein and the kinase responsive to stress KRS, during an annual life cycle. Analysis of mantle-gonad samples of cultured populations of *M. galloprovincialis* from the Delta del Ebro (North East Spain) showed natural seasonal variability of these biomarkers, pointing to temperature and oxidative stress as major abiotic modulators. In turn, the reproductive cycle, a process that can be tracked by VCLM7 expression, and known to be influenced by temperature, seems to be the major biotic factor involved in seasonality. Our results illustrate the influence of environmental factors in the physiology of mussels through their annual cycle, a crucial information for the correct interpretation of responses under stress conditions.

Keywords: *Mytilus galloprovincialis*, qRT-PCR, Seasonal variations, Gene expression, Biomonitoring