

C3. PHYSIOLOGICAL ECOLOGY OF MARINE ORGANISMS

Instructors: Inna Sokolova

Course outline-lectures

1) Principles of marine ecophysiology

- The life in the water.
- Dissolved oxygen and CO₂ and physiology of marine organisms
- · Energy demand and growth-Bioenergetics

2) Ecophysiology of marine organisms in the 21th century

- Why ecophysiology is so important?
- Understating the correlation between habitat and physiological traits

3) Environmental stress and physiological adaptability

- Stress physiology of marine organisms
- The role of ecophysiology in detecting vulnerabilities to environmental change
- Pollution and physiological responses of marine organisms
- Physiological responses to simultaneous shifts in multiple environmental stressors:
 Relevance in a changing world

4) Fundamentals of physiological ecology related to climate change

- Climate change drivers and environmental stress
- Global warming and physiological responses of marine organisms
- Ocean acidification and physiological responses of marine organisms

5) Ecophysiology, Management and Policy

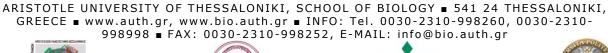
- From the physiology to coastal areas
- The role of ecophysiology in biomonitoring programs
- Contribution of physiological ecology to risk assessment
- The role of physiological processes in the management of farmed organisms

Readings

Hochachka P. W. and Somero G. N. (eds) (2002). Biochemical Adaptation: Mechanism and process in physiological evolution. Oxford University Press

Bayne L. B. (ed) (2009). Marine mussels: their ecology and physiology. Cambridge University Press.

Lars Tomanek and Brian Helmuth (2002). Physiological Ecology of Rocky Intertidal Organisms: A Synergy of Concepts. Integr. Comp. Biol42 (4): 771-775.













Hans-O. Pörtner (2012). Integrating climate-related stressor effects on marine organisms: unifying principles linking molecule to ecosystem-level changes. Mar Ecol Prog Ser, Vol. 470: 273–290.

Pörtner HO, Farrell AP (2008). Physiology and climate change. Science 322: 690–692.

Sokolova Inna M. and Lannig Gisela (2008). Interactive effects of metal pollution and temperature on metabolism in aquatic ectotherms: implications of global climate change. Climate Research, Volume: 37, Issue: 2-3, Pages: 181-201.

Sokolova, I.M. et al. (2012) Energy homeostasis as an integrative tool for assessing limits of environmental stress tolerance in aquatic invertebrates. Marine environmental research Volume: 79, Pages: 1-15.

Elizabeth P. Dahlhoff (2004). Biochemical Indicators of Stress and Metabolism: Applications for Marine Ecological Studies. Annual Review of Physiology, Vol. 66: 183-207.

Helmuth Brian (2009). From cells to coastlines: how can we use physiology to forecast the impacts of climate change? Journal of experimental biology Volume: 212, Issue: 6, Pages: 753-760.

