
МАТЕРИАЛЫ КОНФЕРЕНЦИИ
И ШКОЛЫ

TISSUE ENERGY METABOLISM OF TWO FROG SPECIES
WITH DIFFERENT COLD RESISTANCE

© 2020 г. S. N. Gorodilova^{1,*} and E. I. Elsukova¹

¹ Federal State Budgetary Educational Institution
of Higher Education “Krasnoyarsk State Pedagogical University named after V.P. Astafiev”, Krasnoyarsk, Russia
*e-mail: svetochka_gorodilova@mail.ru

DOI: 10.31857/S0044452920071821

The physiological mechanisms of species adaptation in amphibians are poorly understood. Species with a wide range, including regions unfavorable for this class of animals, are especially interesting. A Moor frog (*Rana arvalis* Nilsson, 1842) is distributed from the semi-deserts of Northern Kazakhstan to the Arctic. *R. arvalis* is the most resistant to low temperatures among the Eurasian brown frogs. Since any adaptation is accompanied by intensification of energy metabolism, these indicators are informative for assessing adaptation potential. The purpose of the study was to compare the tissue energy metabolism in the moor frog and marsh frog (*Pelophylax ridibunda* Pallas, 1771). Both species were captured in June 2018 in Berezh River (Nazarovskaya forest-steppe) and kept at +12°C, which corresponds to the natural range of summer temperatures in this region.

Tissue energy metabolism was assessed by the O₂ consumption rate (OCR) by suspensions of finely cut brain, liver, and muscle tissues. Interspecific differences of OCR were not detected for liver and muscle tissues. The brain OCR in moor frog was higher in comparison with the marsh frog by 39% ($p < 0.05$). Brain OCR of both frog species was decreased but interspecific differences of this parameter retained immediately after 15 min cooling of animals in a chamber with 0°C. A higher brain energy metabolism of *R. arvalis* are proposed to contribute to maintaining high sensory sensitivity, reactivity, and effective locomotion management in the conditions of temporary cold spells in spring, early and late summer.