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Studies on the ecological physiology of *Saduria entomon*

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Anoxia and hypoxia tolerance of *Saduria entomon* (Isopoda) in natural brackish water.

S. entomon compensates its oxygen debt by producing lactic acid. Compared with other crustacean species it tolerates anoxia exceptionally well; LT_{50}=11 days (8°C, salinity 6.8‰). During 48 hour anoxia experiments lactic acid accumulated in the haemolymph. Also, the hyperosmotic balanced gradient against brackish water typical of *S. entomon* alters during anoxia, which is evident in the concentrations of ions in the haemolymph. Na^+ and Cl^- ions leak to the hypotonic environment. Total Ca^{2+} in the haemolymph increases. When transferred to oxygen saturated water, the normal ionic balance is resumed and lactic acid that has accumulated in the haemolymph disappears within two days.

Hypoxia tolerance was tested in a flow-through apparatus (10°C, 6.8‰) at O_2 concentrations of 3, 2 and 1 mg/l. The maximum duration of a test was 96 hours. By analyzing the main ions and lactic acid concentration it was observed that *S. entomon* could fulfill its oxygen need in 3 mg O_2/l (no changes in parameters analyzed). An oxygen concentration of 1 mg/l was clearly insufficient for the species, as lactic acid accumulates in the haemolymph. A concentration of 2 mg/l was considered sufficient but critical: at the beginning of the test the increase in lactic acid concentration in the haemolymph was significant, but after 96 hours the concentration was almost normal as a result of adaptation.

Hypoxia tolerance was also tested at low salinity. The salinity was adjusted to 1.7‰, as long-term salinity tests had shown that at this salinity the ionic balance of the haemolymph remains unchanged. At low salinity an O_2 concentration of 2 mg/l was clearly insufficient: lactic acid accumulated in the haemolymph. The pattern of lactic acid accumulation at 3 mg/l O_2 was very similar to that at 2 mg/l O_2 in conditions of natural salinity (6.8‰): lactic acid accumulated at the beginning of the test, but after about 48 h adaptation took place. An oxygen concentration of 5 mg/l did not increase lactic acid concentration significantly.