

Seasonal changes in adenylate energy metabolism in the muscle and liver of the redear sunfish,



Levels of muscle and liver adenylates, phosphocreatine (PCr), total adenylates (TA) and the adenylate energy charge (AEC) exhibited significant seasonal changes. Fish size and condition factors were significantly different throughout this study; however there were no correlations between fish size or condition factor and metabolite levels. Muscle adenosine triphosphate (ATP), TA and AEC were lowest in winter and positively correlated with temperature; while adenosine diphosphate (ADP) and adenosine monophosphate (AMP) levels were high in winter and negatively correlated with temperature. Muscle AEC's dropped into the stressed range (0.5–0.75) during winter months. ATP/ADP ratios were lowest while PCr/ATP ratios were highest in winter months; indicating that a capacity for phosphate buffering existed and could not account for these low muscle AEC's. Liver ATP, TA, PCr, AEC, and adenylate ratios were lowest in the spring and were not correlated with temperature, but rather coincided with reproduction. Liver AEC's dropped into the lethal range (<0.5) in April; although no fish mortalities were observed. Liver AEC's were lower than

muscle AEC's throughout the study. The AEC appears to have some validity as a long-term indicator of physiological status and may have application in monitoring/predictive programs due to its predictable response to seasonal change. However, cautious use is suggested until temperature effects on adenylate metabolism and seasonal effects on metabolic recovery following capture stress can be established.

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