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OXYGEN CONSUMPTION AND RATES OF DEHYDRATION OF GRASSHOPPER EGGS (ORTHOPTERA)

VINCENT THOMPSON AND JOSEPH HALL BODINE

The rate of water loss of *Melanoplus differentialis* eggs at different developmental stages has been determined. No qualitative difference in respect to rate was found between wet (hypertonic solutions) and dry (calcium chloride) dehydration. The resistance to desiccation decreases with morphological age of developing eggs. Diapause eggs are most resistant. The rate of desiccation does not seem to be closely associated with metabolic activity as represented by that fraction of the respiration which is dependent on structure, or which may be depressed by certain CO/O₂ mixtures. Isolated embryos do not show qualitatively the same dehydration rate difference as do intact eggs. The oxygen consumption of dehydrated eggs decreased during water loss. In no cases was an increase observed during dehydration. The vital limit of desiccation of post-diapause eggs was found to be about 46% of the initial water.

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THE EFFECT OF HYPERTONIC SOLUTIONS ON DEVELOPMENT

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Post-diapause eggs of *Melanoplus differentialis*, previously kept at 5° C. for two months (to break the diapause or blocked condition) were placed in aerated balanced salt solutions of varying concentrations (the NaCl content ranging from .9% to 18%). A constant temperature (28° C.) was maintained throughout the experiment. Some of these cold treated eggs were kept in an incubator at 28° C. as control. The results of this experiment were determined by periodically removing a number of embryos and noting development. Hatching occurred in the aerated isotonic solution within eleven days and within thirteen days in the control lot. No hatching occurred in the hypertonic solutions. The percentage of embryos undergoing blastokinesis was not entirely dependent upon the concentration. The highest percentage (nearly 100%) occurred in the control lot and in the aerated isotonic