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## The Effect of Hypertonic Solutions on Development

Arthur L. Schipper  
*State University of Iowa*

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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/O<sub>2</sub> 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.

DEPARTMENT OF ZOOLOGY,  
STATE UNIVERSITY OF IOWA,  
IOWA CITY, IOWA.

## THE EFFECT OF HYPERTONIC SOLUTIONS ON DEVELOPMENT

ARTHUR L. SCHIPPER

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

solution. This was followed by a decrease (50%) and this, in turn, was followed by an increase (ranging from 75% to 90%). A rapid decrease ensued which dropped to 2% in the highest concentration used. The explanation for this increase in percentage, with increasing concentration, may be supplied by other experiments. It has been found that when eggs, which have previously been allowed to develop for ten days in wet sand (also true for diapause eggs), were placed in hypertonic solutions, a number of the embryos tend to simulate blastokinesis even though they may not have reached that stage morphologically.

DEPARTMENT OF ZOOLOGY,  
STATE UNIVERSITY OF IOWA,  
IOWA CITY, IOWA.

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### THE EFFECT OF VITAMINS ON A COCCIDIAN INFECTION

ELERY R. BECKER AND NEAL F. MOREHOUSE

The writers have shown in previous publications that a diet deficient in both vitamins B and G has a limiting effect on the number of oocysts eliminated during the process of immunization. Later they proved that this limiting effect is due either wholly or in part to the absence of the thermostable growth factor present in yeast. This factor was called vitamin G, but in view of the general belief of workers in nutrition that vitamin G is a composite, that designation should be construed only in the general sense. The factor has now been shown to be present in wheat germ, grain mixtures, and certain other materials.

DEPARTMENT OF ZOOLOGY,  
IOWA STATE COLLEGE,  
AMES, IOWA.

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### EFFECTS OF EXPOSURE TO LOW TEMPERATURES ON DEVELOPMENTAL TIME OF EMBRYOS OF THE GRASSHOPPER, MELANOPLUS DIF- FERENTIALIS (ORTHOPTERA)

HAROLD C. BURDICK

Experiments have been designed to study the effects of four temperatures below developmental zero (hatching) on the hatching