

DEPENDENCE OF BODY TEMPERATURES AND EVAPORATIVE WATER LOSS ON ENVIRONMENTAL FACTORS IN BASKING LEOPARD FROGS (*RANA PIPIENS*). M.P. O'Connor* and C.R. Tracy. Colorado State Univ., Fort Collins.

Anesthetized leopard frogs (*Rana pipiens*) were exposed to artificial radiation in a wind tunnel to determine the responsiveness of body temperatures and rates of evaporation to radiation. The body temperatures attained by frogs were affected by wind speed, radiant intensity, and the nature of the substrate. Incident radiation (500 W/m²) raised frog body temperatures 3-5°C. Frogs under incident radiation came to higher equilibrium temperatures when they sat on highly conductive substrates (sand, 26°C) than on styrofoam (21°C).

Rates of evaporative water loss were lower at low radiant loads, at low wind speeds, and on wet sand substrates. High radiant loads (500 W/m²) resulted in 40-80% increases in rates of evaporative water loss.

Basking involves a trade-off between increases in body temperature attained and concomitant increases in evaporation possibly limiting the period of time which the frog can spend basking. The data suggest that basking for thermoregulation will be most thermally useful and least hydrically stressful for leopard frogs sheltered from the wind and in contact with warm, moist, highly thermally conductive soils.

HOT ROCKS AND NOT-SO-HOT ROCKS: THERMAL CONSEQUENCES OF RETREAT-SITE SELECTION BY GARTER SNAKES. R. B. Huey¹, C. R. Peterson², S. J. Arnold², and W. P. Porter³. Univ. Washington¹, Univ. Chicago², and Univ. Wisconsin³.

Most temperate-zone ectotherms spend much more time in retreats than active. Thus studies of thermoregulation that focus only on active animals may yield incomplete portraits of thermal biology. We document the patterns and thermal consequences of retreat site selection by garter snakes (*Thamnophis elegans*) during mid-summer at Eagle Lake, CA. Garter snakes usually retreat under rocks of intermediate thickness (20-30 cm). Snakes under such rocks should never overheat, should achieve preferred T_b for long periods, and can have either the highest net energy gains or the lowest overall metabolic expenditure, depending on the particular T_b they select. Snakes under thinner rocks would overheat at midday, whereas snakes under thicker rocks would not warm enough to reach their preferred T_b .

HIBERNATION IN ARCTIC GROUND SQUIRRELS: TEMPORAL PATTERNS AND FREEZE RESISTANCE. B.M. Barnes. Univ. Alaska Fairbanks.

Burrow temperatures, body temperatures, and activity patterns were measured continuously via telemetry in *Spermophilus parryii* hibernating under semi-natural conditions in self-dug burrows. On average animals sealed their hibernacula on 19 Oct and emerged on 14 Apr. Reproductive males emerged 16 days earlier than females and nonreproductive males. Timing of female emergence coincided with soil isothermy. Normothermic pre-emergence intervals varied from < 1 to 9 days; the data are too limited to discern sex differences in the length of this interval. Minimum burrow temperatures during winter reached -10°C in experimental burrows and -18°C in natural burrows. Core body temperatures of torpid squirrels averaged -1.9°C, range -1.1 to -2.9°C. Subzero transitions in body temperature were not accompanied by exotherms. Spontaneous arousals could be predicted several days ahead by slight (<0.5°C) increases in body temperature.

THE USE OF AMPEROMETRIC DETECTION FOR THE STUDY OF SUGAR UPTAKE FROM SEAWATER INTO MOLLUSCAN LARVAE. J.R. Welborn and D.T. Manahan. Dept. Biol. Sci., Univ. of Southern Calif., Los Angeles, CA.

High-performance liquid chromatography (HPLC) was used to identify and quantify individual sugars in seawater. The reducing ability of carbohydrates in an alkaline solution was coupled with the redox reaction of copper(II) bis(phenanthroline) in a post-column reaction. The copper complex, reduced by the sugars, was then re-oxidized by an amperometric detector producing a signal with a sensitivity of approximately 5 pmoles for a single sugar. This method was used to measure the simultaneous uptake of four sugars (1 μ M each) from seawater by veliger larvae of the bivalve *Crassostrea gigas* and the gastropod *Haliotis rufescens*. Both species showed a net uptake of glucose and the disaccharide maltose. The influx of glucose, determined by isotope techniques for *C. gigas*, equalled the net flux as measured by HPLC. The monosaccharide rhamnose, and the trisaccharide maltotriose, were not transported. Glucose and maltose were taken up at rates of 156 and 150 fmole/larva-hr by *C. gigas* larvae, and 356 and 339 fmole/larva-hr by *H. rufescens*. Larvae can remove these two sugars down to the limits of chemical detection.