

## ABSTRACT OF THE THESIS

### Estimated Energy Budget of the Red-backed Salamander, Flethodon cinereus

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Under controlled conditions in the laboratory, the rates of ingestion, egestion, production, and respiration were monitored for the red-backed salamander, Flethodon cinereus, at 5°, 10°, 15°, 20°, and 25° C.. Ingestion at 10° and 15° C., 17.09 and 17.62 cal./gm./day, respectively was significantly greater than at 5°, 20°, and 25° C., 2.57, 5.44, and 1.63 cal./gm./day, respectively. Egestion was significantly less at 5° C., 0.52 cal./gm./day than at 10°, 15°, 20°, and 25° C., 2.44, 4.06, 2.87, and 3.74 cal./gm./day respectively. The calories expended in respiration increased with temperature from 2.32 cal./gm./day at 5° C. to 14.25 cal./gm./day at 25° C.. The production of shed skins increased with temperature from 0.06 cal./gm./day at 5° C. to 0.59 cal./gm./day at 25° C.. The net balance between these components differed with temperature, being positive at 10° and 15° C. and negative at 5°, 20°, and 25° C.. The net balances (cal./gm./day) were: 5°, -0.07; 10°, 10.71; 15°, 4.95; 20°, -7.32; 25°, -16.95. The proportion of ingestion that was retained (ingestion minus egestion) followed a pattern with temperature similar to that of ingestion; the proportion of ingestion that was assimilated decreased with temperature; the proportion of ingestion that was resecreted increased with temperature. The caloric cost of movement increased with temperature but became proportionally less at higher temperatures due to the

increase in metabolic demand at these temperatures.

The estimates obtained in the laboratory were verified in the field by monitoring the budget for caged individuals in the field, and by evaluating the influence of the cages upon the behavior and energy budget of the salamanders. There were no significant differences between the laboratory and field estimates.