

Cost of living in free-ranging degus (*Octodon degus*): seasonal dynamics of energy expenditure

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Abstract

Animals process and allocate energy at different seasons at variable rates, depending on their breeding season and changes in environmental conditions and resulting physiological demands. Overall total energy expenditure, in turn, should either increase in some seasons due to special added demands (e.g. reproduction) or it could simply remain at about the same level, in which case the animals must show compensatory rebalancing of other expenditures that can be reduced. To test for the alternative hypotheses of seasonal variability or compensation, we measured total daily energy expenditure (DEE) in free-living degus (*Octodon degus*) at four seasons and followed this with determinations of basal metabolic rate (BMR) in the laboratory in the same individuals. DEE varied seasonally but was only significantly different (lower) in summer (non-breeding season), with a DEE:BMR ratio of only 1.6, whereas autumn, winter and spring DEE values were statistically indistinguishable from one another and showed DEE:BMR ratios ranging from 1.9 to 2.2. Our values of DEE in the field fall within the broad range of allometric expectation for herbivorous mammals in general, but the ratios of DEE:BMR are lower than expected. This, together with the lack of strong major shifts in total levels of DEE, suggests that degus are showing compensatory shifts among various categories of energy expenditure that allow them to manage their overall energy balance by minimizing total expenditure.