

Ecological Predictors of Range Areas and Use of Burrow Systems in the Diurnal Rodent, *Octodon degus*

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Abstract

Variation in animal space use patterns may be linked to numerous ecological factors affecting survival and reproduction. We examined the relationship between ecology and above- and below-ground components of space use by *Octodon degus*, a semi-fossorial rodent in Chile. We monitored the daytime minimum convex polygon and adaptive kernel range areas of 26 individuals and determined the number of burrow systems used by degus during night-time radiotelemetry and trapping of burrow systems on two study grids at Rinconada de Maipú, a semi-arid Matorral in central Chile. We quantified food biomass, soil hardness, distance to overhead vegetative cover, and density of burrow openings at putative nest burrows. Degus living on the grid with more shrub cover had larger range areas than degus living on the grid with less cover. The range areas of degus decreased with increasing distance from overhead vegetative cover. There was a weak (but statistically significant) negative relationship between the number of burrow systems used by degus and the distance to vegetative cover and density of burrow openings at burrow systems. Male and female degus had similar range areas. Our results suggest that overhead cover decreases the risk of predation to male and female degus. Degus probably balance the benefits of numerous burrow openings (reduced predation risk) with time and energy requirements of burrow construction and maintenance. Models of space use that consider the effect of multiple ecological variables should measure different dimensions of space use.