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Zoo foraging ecology: development and assessment of a welfare tool for captive animals

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Abstract

*Foraging ecology and food patch studies are commonly used to elucidate the environmental perceptions of wild, free-ranging animals. Their application to captive animals, however, especially those in zoos, is still in its infancy. To illustrate some specific applications of zoo foraging ecology, we provide a study that evaluated: (i) whether patch use and giving-up densities (GUDs) can reveal areas of preference within an exhibit for zoo species; (ii) if food patches provide an effective form of behavioural enrichment; and (iii) if visitor interest and behaviour is affected by food patch presence. A combination of behavioural observations, and experimental food patches and giving-up densities were used to address these objectives in Parma wallabies (*Macropus parma*) and Patagonian cavies (*Dolichotis patagonum*) at Lincoln Park Zoo, Chicago, Illinois USA. GUDs revealed distinct areas of preference and aversion within the exhibit for cavies, but not so for the wallabies. For both species, presence of food patches increased foraging behaviours, decreased inactive behaviours, and increased within-exhibit movement, demonstrating that food patches serve as an effective behavioural enrichment technique. The use of food patches also revealed striking differences between individuals, particularly for the pair of cavies. There were encouraging trends toward increased visitor number and stay-time when food patches were present in each exhibit, but the effect was not statistically significant. These results suggest that utilising patch use, GUDs, and foraging theory in zoo populations may enhance animal welfare, and can inform improvements to exhibit design directly from the animal's perspective. We conclude with a broader discussion of zoo foraging ecology as an emerging field, with suggestions for future avenues of research.*

Keywords: *animal welfare, environmental enrichment, exhibit preferences, giving-up densities, Parma wallaby, Patagonian cavy*