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The Effect of Food Provisioning on the  
Nutrient Intake of Wild and Captive  
Primates - Implications for the  
Conservation Management of Wild and  
Captive Populations

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# Abstract

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Many non-human primate populations worldwide are threatened with extinction. Various measures are taken to save these species. Amongst these efforts are habitat protection, restoration, and public education, including wildlife tourism. To efficiently protect and restore wildlife habitats, ecological knowledge, such as the nutritional ecology of target species, is essential. Information on the foraging behaviour and nutritional requirements of a species will be useful for the protection and restoration of foods that are important components of a species' diet. Furthermore, knowledge on animal nutritional ecology is required in circumstances where animals are fed by humans, as can occur in wildlife tourism settings. With such information, efforts can be made to provide diets which are nutritionally balanced, reducing the likelihood of negatively impacting the health and welfare of target animals. This study was undertaken to investigate food and nutrient intake under three levels of human dietary interference using primates as models: no interference, partial provisioning, and full provisioning.

A wild golden snub-nosed monkey (*Rhinopithecus roxellana*) troop was investigated to determine their food and nutrient intake in a natural setting. A positive correlation between food availability and food choice was not found. On the nutrient level, the troop's proportional consumption of crude protein, lipids, and non-structural carbohydrates varied with the seasonal availability of these nutrients while the consumption of neutral detergent fibre increased

relative to its availability and that of lignin decreased. Differences in the foraging behaviour between different seasons and between monkeys of different age, sex, or reproductive status were not detected. However, age and sex based differences in proportional nutrient intake patterns were found. Juveniles had a greater proportional intake of all nutrients than adults (per kg of metabolic body mass) and females had a greater proportional intake of nearly all nutrients than males (per kg of metabolic body mass).

To investigate the effects of food provisioning at a wildlife tourism centre in China, the proportional nutrient intake of a semi-wild golden snub-nosed monkey troop was determined and compared with that of the wild troop. The provisioned troop's foods had a greater proportional contribution of non-structural carbohydrates and lipids and a smaller proportional contribution of neutral detergent fibre and lignin than foods consumed by the wild troop. The proportional nutrient intake of the provisioned troop, compared with that of the wild troop, was greater in non-structural carbohydrates and lower in crude protein, neutral detergent fibre, and lignin. Proportional lipid intake by the provisioned troop was lower than the wild troop in summer but greater in autumn.

To investigate the nutritional ecology of a completely captive, and hence nutritionally dependent, troop of primates, the Auckland Zoo's black-handed spider monkey (*Ateles*

*geoffroyi*) troop was studied. The group's daily macronutrient intake pattern was investigated as was the daily food and nutrient intake of monkeys based on age, sex, and social rank. The troop maintained a relatively stable non-protein energy to protein energy ratio intake across multiple days suggesting they were not facing dietary constraints. Juveniles had a greater daily food and nutrient intake (per kg of metabolic body mass) than adults and a greater intake of food and all nutrients except for non-structural carbohydrates than geriatric monkeys. Daily food and nutrient intake differences between monkeys based on sex and social rank were not detected.

The findings of this study advance our understanding of the effect of human provisioning on the foraging and nutrient intake patterns of wildlife populations. This information can be used in the development of habitat protection and restoration plans for golden snub-nosed monkeys to ensure that important foods remain available in their habitat. Furthermore, findings on the potential impacts of an unnatural diet on the nutrient intake of provisioned animals can be used to improve the conservation management of primate populations used for wildlife tourism.

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