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A comparison of the effects of a moss diet and a varied diet on the growth of juvenile Wood lemmings, *Myopus schisticolor* (Lilljeb.)

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Animals that include mosses in their diet tend to live in cold environments. Prins (1981) argued that moss could be an important component in the diet of these animals because it contains arachidonic acid, which is an anti-frost agent. The consumption of mosses may be particularly important for animals such as the wood lemming, *Myopus schisticolor*, which reproduce during winter (Mysterud et al. 1972; Kratochvil et al. 1979; Bondrup-Nielsen et al. 1991).

Very few animals consume mosses; however, the wood lemming has an extreme preference for them. In 518 wood lemmings caught during the summer, over 90 % of the stomach contents consisted of mosses (Bondrup-Nielsen 1991), and in a food-preference experiment wood lemmings showed a distinct preference for mosses. Wood lemmings consume mosses mainly during the winter (Kalela et al. 1963). Bondrup-Nielsen (1991), however, found that wood lemmings also eat a small amount of grass and dwarf-shrubs. Here, we tested the importance of plant species other than mosses for the growth of juvenile wood lemmings.

The study took place in Varaldskogen, SE Norway in the summer of 1988. Sixteen juvenile (12–18 g) wood lemmings were captured between 1 June and 15 July. Seven animals were kept alone in small cages (30 × 30 × 20 cm), and 9 animals in groups of 2 to 4 individuals in large cages (70 × 70 × 20 cm). Eight animals received only mosses, 70–100 % of which were *Dicranum* spp., which constitutes a major part of the wood lemming diet (Bondrup-Nielsen 1991). The remaining 8 animals received a varied diet consisting of mosses, grass, blueberry bushes and rolled oats. The lemmings were weighed upon capture, and again at the end of a test period, which lasted from 4 to 8 days. There was no relationship between the time spent in the test and the criteria of diet (Mann-Whitney U = 24.5, p = .41). The growth rate (g/day) during the test period was calculated for each individual. During the test, there was always excess food available, and the moss was kept moist by spraying.

To test if there was any difference in the growth rate we performed a two-way analysis of covariance (ANCOVA), where the growth rate was the dependent variable, and weight at capture the covariate. The experimental treatments (factors) that could influence growth were the food regime (mosses or varied diet), and the social environment of the animal (alone or with other individuals together in the cage).

The ANCOVA showed a significant effect of weight at capture (Table), but when this effect of the covariate was removed the diet had an even more significant effect on juvenile growth rates (p = .0031). The mean growth rate was higher for animals receiving the varied diet. Whether the animals were kept alone or together in a cage had no significant effect on the growth rate.

This study therefore suggests that the inclusion of plant material other than mosses in the diet of wood lemmings enhances their growth, although Bondrup-Nielsen (unpubl.

Growth rate ($\bar{X}$ ± S.E.) and sample sizes of the different treatment groups tested
Statistics presented from ANCOVA with weight at capture as the covariate

	g/day (± S.E.)	n	F-ratio	p
Covariate				
Weight at capture			5.305	0.042
Diet				
Only mosses	0.06 (± 0.07)	8	14.181	0.003
Varied	0.51 (± 0.13)	8		
Social environment				
Alone	0.25 (± 0.09)	7	3.114	0.105
Together	0.31 (± 0.15)	9		

data) found that wood lemmings survive and grow to maturity on a diet consisting solely of mosses.

Recent studies of rodents on low-quality diets have revealed the existence of special mechanisms in the intestinal system and feeding behaviour of several species that assure a maximum absorption of nutrients (Batzli 1989; Björnhaug 1989; Erkinaro 1989). Nevertheless, our study suggests that low quality food is not necessarily optimal, not even for species that are partially adapted to such low quality food as mosses.

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