

Mycophagy of red-backed voles in Oregon and Washington

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We analyzed stomach contents from two subspecies of *Clethrionomys californicus* and three subspecies of *C. gapperi* from coniferous forests of Oregon and western Washington. Seasonal diets were determined for each subspecies of *C. californicus*. Major foods eaten were the fruiting bodies of hypogeous ectomycorrhizal fungi, predominantly Gasteromycetes, and fruticose lichens, regardless of season. Fungus consumption partially depended on availability. When fungi became scarce, lichens were substituted. Other foods were important only during winter in Cascade Range. *Clethrionomys gapperi* from Washington consumed large quantities of conifer seed and green plant parts in midautumn. These materials were a small part of the diets of Oregon red-backed voles in midautumn, but this may relate to localized small seed crops. Dependence on ectomycorrhizal fungi by western red-backed voles probably accounts for the latter's disappearance from deforested sites.

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Les contenus stomacaux ont été analysés chez deux sous-espèces de *Clethrionomys californicus* et trois sous-espèces de *C. gapperi* des forêts de conifères de l'Oregon et de l'Ouest du Washington. Les variations saisonnières de la diète chez les deux sous-espèces de *C. californicus* ont été déterminées. La diète est surtout composée, en toutes saisons, d'organes reproducteurs de champignons à ectomycorhizes hypogées, surtout des gastéromycètes, et de lichens arbustifs. La consommation des champignons est liée en partie à leur disponibilité. Quand les champignons se font rares, il y a substitution de lichens dans la diète. Les autres éléments de la diète n'ont d'importance qu'en hiver dans la chaîne des Cascades. À la mi-automne, les *Clethrionomys gapperi* de Washington consomment de grandes quantités de graines de conifères et de morceaux de plantes vertes. En Oregon, ces éléments ne représentent qu'une faible partie de la diète à la même saison, mais cela s'explique probablement par des productions locales faibles de graines. L'importance des champignons dans la diète des campagnols à dos roux de l'Ouest explique probablement leur absence dans les régions déboisées.

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Introduction

Mycophagy (fungus eating) is a widespread phenomenon in small mammals (Fogel and Trappe 1978). Except for fungi that are easily identified by their distinctive spores, e.g., the phycomyete family Endogonaceae (Whitaker 1962; Williams and Finney 1964; Schloyer 1976, 1977; and others), most reports have simply stated that "fungi" were a dietary component. It is possible, however, for a mycologist to differentiate between genera, and even ecological habit, of consumed fungi by identification of spores in digestive tracts and feces. It is now apparent that references to "fungi" frequently referred to hypogeous (belowground fruiting) Ascomycetes (truffles), Basidiomycetes (false truffles), and Phycomyetes (Endogonaceae) (Maser et al. 1978).

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Coniferous forests of western North America harbor one of the world's more diverse assemblages of mycorrhizal fungi (root symbionts with vascular plants) (Smith 1969), many of which are hypogeous species. Tevis (1952, 1953) commented on the potential of hypogeous fungi as food for small mammals. He reported truffles and false truffles to be a large component of the diets of mantled ground squirrels (*Spermophilus lateralis*) and chipmunks (*Eutamias* spp.) during certain seasons in northern California. In years of conifer seed crop failure, these animals depended totally on fungi. Stienecker and Browning (1970) and Stienecker (1977) found the western gray squirrel (*Sciurus griseus*) to consume some fungi year round. It was nearly totally dependent on hypogeous fungi during the fungal fruiting seasons. Maser et al. (1978) examined stomach contents from a number of small mammal species, primarily from the Pacific Northwest. They found a diversity of fungus-use