

# Northwest Science Notes

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## White-Footed Voles Living In Arboreal Nests

### Abstract

The white-footed vole (*Arborimus albipes*) is endemic to forests of western Oregon and the coastal mountains of northwestern California. Although it is thought to be at least partly arboreal, only a few nests have been found, and those have all been on the ground. We describe the first confirmed instances of white-footed voles nesting in trees. We suggest that use of arboreal nests by white-footed voles may be a seasonal response to the presence of the leaves of red alder (*Alnus rubra*), which are a primary food source during the spring and summer.

### Introduction

The white-footed vole (*Arborimus albipes*) is a resident of moist forests in western Oregon and extreme northwestern California. Although it is generally considered rare or uncommon, it is unclear if it really is rare or is simply difficult to capture using conventional trapping methods (Verts and Carraway 1995, 1998). Little is known about its natural history or abundance, but a number of authors have suggested that it may be semi-arboreal because its diet includes leaves and catkins that only could be consistently obtained by climbing trees (Voth et al. 1983, Manning et al. 2003). It is most commonly associated with streamside forests of red alder (*Alnus rubra*) and other deciduous trees with a dense layer of shrubs (Maser et al. 1981, Verts and Carraway 1995, Martin 1998, Manning et al. 2003). Although white-footed voles have been captured in terrestrial pitfall traps (Gomez 1992, Gomez and Anthony 1998, Martin 1998, Manning et al. 2003) and are thought to nest primarily on the ground, only a few nests have been located.

The only confirmed nests that we are aware of were found by R. Hoyer (personal communication) who found approximately 8 nests in the Oregon Coast Ranges between 1973–1994, all of which were under boards or sheets of metal roofing that were placed on the ground to attract snakes. He described these nests as consisting primarily of moss, often with leaves of salal (*Gaultheria shallon*), sword-fern (*Polystichum munitum*), or Himalayan blackberry (*Rubus discolor*) stored at the nest. He captured a female and 3 young at one of these nests and kept them in captivity. Herein, we describe the first confirmed instances of white-footed voles living in arboreal nests.

### Results and Discussion

On 12 June 2006 while searching for red tree voles (*Arborimus longicaudus*), we observed a nest 10 m up in a 49 cm dbh Sitka spruce tree (*Picea sitchensis*) at 620 m elevation on the Saddle Mountain State Park trail, 20 km E of Seaside, Clatsop Co., Oregon. The nest tree was just below the trail about 30 m from a small creek (Lat/Long = N 45° 57' 42" W 123° 40' 53"). The habitat was a riparian forest of Sitka spruce, red alder, western hemlock (*Tsuga heterophylla*),

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western redcedar (*Thuja plicata*), and Douglas-fir (*Pseudotsuga menziesii*), with a dense shrub layer of salmonberry (*Rubus spectabilis*), devils club (*Oplopanax horridus*), sword-fern, thimbleberry (*Rubus parviflorus*), Pacific dogwood (*Cornus nuttallii*), red huckleberry (*Vaccinium parvifolium*), and vine maple (*Acer circinatum*). EDF climbed to the nest and found that it was composed almost entirely of moss and had 9 freshly cut and 10 wilted red alder leaves piled on top of the nest, along with 2 freshly cut sprigs of Sitka spruce that were about 10 cm long. Some of the freshly cut alder leaves were pulled down into a small opening in the top of the nest. When EDF started to remove the alder leaves from the top of the nest, a brown vole with a grayish underside ran out of the nest and fell to the ground and escaped. We left the nest intact, and returned the next day at 0900 hrs and reentered the tree. During the night, the vole had harvested a new batch of 14 alder leaves that were piled on top of and just inside the entrance hole. The same two spruce clippings were still unmoved on top of the nest. When EDF started to remove the alder leaves, the vole jumped from the nest and fell about 2 m to a limb below the nest. EDF climbed down the tree to within 1 m of the vole and watched it as it huddled on a limb directly in front of him. He recognized it as a white-footed vole based on its uniformly rich brown dorsum, grayish venter, white feet, small dark eyes, sparsely furred tail that was slightly over half as long as the body, and fleshy ears that projected slightly above the fur. After observing the vole for several minutes EDF shook it out of the tree, hoping that JKS could capture it as it fell. However, it escaped before JKS could grab it. Examination of the alder leaves on the nest revealed that each one had been neatly clipped near the base of the leaf. Seven of the clippings consisted of a single leaf, 2 consisted of 2 leaves, and 1 included 3 leaves. The interior of the nest was mostly moss, with a small living chamber hollowed out in the moss just below the top of the nest. The chamber contained several pieces of alder petioles that the vole had removed while feeding on alder leaves. On one side of the entrance was a considerable accumulation of fresh fecal pellets from the vole. The limbs of the nest tree were in direct contact with the limbs of a small alder tree that was growing next to the spruce.

At 1700 hrs on the same day, EDF climbed to another nest that was 13.2 m up in a 45 cm dbh

Sitka spruce adjacent to a gravel road, 0.5 km N of Wheeler, Tillamook Co., Oregon (Lat/Long = N 45° 41' 44" W 123° 52' 36"). This nest was almost an exact replica of the previous nest in that it had a pile of 10 freshly cut alder leaves and 2 Sitka spruce sprigs piled on top of it, and was in the top of a bushy spruce tree that had limbs that were intertwined with the limbs of an adjacent alder tree. No vole was detected, but the nest contained two vole-size living chambers lined with moss, and a moderately large pile of fresh fecal pellets that were identical in size and shape to the fecal pellets in the nest at Saddle Mountain.

We located several other nests in young mixed stands of hemlock, spruce and alder on this two-day trip, including two old, unoccupied nests that looked like the previously described nests and that contained old vole fecal pellets. These old nests were in spruce or hemlock trees growing next to alder trees within a few hundred meters of the Lewis and Clark River about 1 km SW of Saddle Mountain.

To confirm the species of the voles using the nests at Saddle Mountain and Wheeler we collected fresh fecal pellets at both nests and sent them to the Forest and Rangeland Ecosystem Science Center (FRESC) genetics laboratory in Corvallis, Oregon, for analysis. DNA was extracted from the fecal pellets and analyzed using methods described by Bellinger et al. (2005). This analysis confirmed that the voles at both nests were white-footed voles.

Our observations indicate that white-footed voles are, indeed, somewhat arboreal, and may live for extended periods in arboreal nests during the spring and summer when alder leaves provide a ready source of food. It is unknown if they utilize arboreal nests during the winter when alder trees lose their leaves and the voles switch to other types of food (Voth et al. 1983). We do not know if use of arboreal nests by white-footed voles is limited to males and non-breeding females, but there was no evidence that any of the nests we found were being used as breeding sites. An obvious lesson regarding our observations is that observers need to be cautious about inferring species based on the presence of fecal pellets in arboreal nests. Until this experience, we had assumed that the presence of vole-sized fecal pellets in the >2,000 arboreal nests that we have examined in trees was indicative of prior occupancy by red tree voles, or, less commonly, deer mice (*Peromyscus maniculatus*;

Maser 1966) or red-backed voles (*Clethrionomys californicus*: Shaw 1924, Grant 1957, Getz and Ginsberg 1968, Swingle 2005). We now know that that assumption is unreliable, especially in instances where nests occur in riparian forest areas in the Coast Ranges of northwestern Oregon. In particular, any arboreal nest that contains vole-sized fecal pellets and stored leaves from alder trees should be considered a likely white-footed vole nest.

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