

Growth and Space-use of Eastern Red-backed Salamanders (*Plethodon cinereus*) in Mature and Regenerating Forests

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Abstract

Movement and demographic rates are critical to the persistence of populations in space and time. Despite their importance, estimates of these processes are often derived from a limited number of populations spanning broad habitat or environmental gradients. With increasing appreciation of the role fine-scale environmental variation in microgeographic adaptation, there is need and value to assessing within-site variation in movement, growth, and demographic rates. In this study, we analyze three years of spatial capture-recapture data collected from a mixed-use deciduous forest site in central Ohio, USA. Study plots were situated in mature forest on a slope and in successional forest on a ridge but were separated by less than 100-m distance. Our data showed that the density of salamanders was less on ridges, which corresponded with greater distance between nearest neighbors, less overlap in core use areas, greater space-use, and greater shifts in activity centers when compared to salamander occupying the slope habitat. However, these differences were moderate. In contrast, we estimated growth rates of salamanders occupying the ridge to be significantly greater than salamander on the slope. These differences result in ridge salamanders reaching maturity more than one year earlier than slope salamanders, increasing their lifetime fecundity by as much as 43%. The patterns we observed in space use and growth are likely the result of density-dependent processes, reflecting differences in resource availability or quality. Our study highlights how fine-scale, within-site, variation can shape population demographics. As research into the demographic and population consequences of climate change and habitat loss and alteration continue, future research should take care to acknowledge the role that fine-scale variation may play, especially for organisms with small home ranges or limited vagility.

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