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Juvenile salamander dispersal and use of terrestrial microhabitat cues

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The effects of deforestation are profound on amphibian populations. In order to balance land use practices with amphibian conservation, biologists and land managers must understand the habitat requirements of amphibians at all life stages. Ambystomatid salamanders have an aquatic larval stage followed by metamorphosis and dispersal into terrestrial habitats. In our study, we were interested in understanding the olfactory cues juvenile salamanders perceive from the microhabitat surrounding their natal pond that can lead them to a moist, cool environment. In particular, we wanted to know if forest–associated salamanders receive an olfactory cue from forest leaf litter that they do not receive from grassland litter. Further, if they are getting the cue from leaf litter, is it present in both decomposing and freshly fallen leaves? We hypothesized that forest-associated salamanders would respond positively to cues in forest leaf litter, and that because decomposing leaf litter contains fungi and other decomposing organisms, it would provide a better cue than fresh leaves. To test our hypothesis, we conducted experimental choice tests with two salamander species (n=72). Each salamander was presented with two substrate options. First we tested grassland versus forest litter, followed by decomposing versus freshly fallen leaves. An individual's substrate location ,recorded at 3- minute intervals for 60 minutes determined preference. Ambystoma maculatum, a forest dependent species, showed a preference for forest leaf litter, suggesting they use an olfactory cue found in forest litter to select favorable microhabitats. The second experiment demonstrated a preference for decomposing rather than fresh leaves by both species, suggesting the cue is from forest-associated fungi and decomposers. Immediately fallowing timber harvesting, there is likely a lag period in which the substrate retains the forest olfactory cues. The result is an ecological trap for dispersing juvenile salamanders, which may select clearcuts while the litter maintains the favorable cue.