Investigating the effects of silvicultural practices on individual and population parameters in small mammals: from personality to seed predation

1. Determine whether or not individuals with different personality types have differential fitness across forest management areas.

2. Explore whether or not personality affects the key processes of seed predation and dispersal.

To investigate the effects of silvicultural practices on both individual and population-level parameters in small mammal communities, we are implementing a large-scale capture-mark recapture study. We will measure individual-level parameters such as body condition, survival, and personality. Population-level parameters that we will measure include density and population growth rates. The data that we collect will allow us to investigate whether or not forest management and forest disturbance give advantage to certain individuals based on personality type by using personality as a predictor of survival in capture-mark recapture models.

Small, scatter-hoarding mammals play a critical role in forest ecosystems through the key processes of seed predation and dispersal. There is extensive evidence that small mammal communities play a significant role in shaping forest composition by selecting the seeds of certain species over others. The decision to predate or disperse a seed is affected by multiple parameters such as vegetation cover, predation risk, seed abundance, and population density. These parameters are likely to be affected by silvicultural practices. Thus far, no previous studies have investigated the role that individual personality may play in the seed decision making process. We will address this key question through a series of seed predation experiments.

June-October of 2017 was the second and primary field season for this project. We continued our large-scale capture-mark recapture study in the Penobscot Experimental Forest in Bradley, ME. We processed over 2,000 captures and marked over 1,000 individuals with PIT tags and small mammal ear tags. We measured body condition (weight, body length, tail length, and reproductive status) and personality (using three different standardized tests) for each individual.

Along with trapping, we performed a seed experiment which will allow us to investigate the response of individual small mammals to seeds of different sizes. We presented seeds of varied size in the field. PIT reading technology identified individual animals and trail cameras recorded decisions made. We recovered dispersed seeds and measured dispersal distance, direction, seed fate, and location of cache. We will extract behavioral data from these videos and investigate these data for effects of personality on preference and dispersal behavior.

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