MICE, MAST, AND GROUP-SELECTION HARVEST: 20 YEARS ON A MAINE PINE-OAK FOREST

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The white-footed mouse (*Peromyscus leucopus*) is a habitat generalist, a significant predator and distributor of acorns, and a competent reservoir host of Lyme disease spirochetes (*Borrelia burgdorferi*). It is the most abundant mammal species on the Holt Research Forest, Maine, a pine-oak forest within 125 km of the northern edge of this species' range. With 10 years of live-trapping and seed trap data, McKracken et al. (1999) showed *P. leucopus* summer abundance was positively correlated with previous autumn acorn crop. A new investigation recently opened with the benefit of 20 years of data (1983-2002). We recognized a 4-year periodicity in the *P. leucopus* abundance time series that was partly independent of acorn crop. Specifically, abundance always increased after a low population phase coupled with a large acorn crop, but in three summers population declines followed population peaks despite large acorn crops. A model that accounted for periodicity as well as acorn abundance had greater predictive value (r^2 = 0.69) than an acorns-only model (Elias et al. 2004). Causes of cycling are still unknown, but predator response could be one explanation. That *P. leucopus* abundance is not entirely tied to acorn mast has implications for oak regeneration and risk of Lyme disease exposure to humans.

Another research question was: What impact does group-selection harvest have on *P. leucopus* abundance? The harvest was conducted on 10 of 40 1-ha blocks in the winter of 1987-88. McKracken (1999) reported an association between the harvest and increased *P. leucopus* captures on harvest blocks in 2 of 4 years post-harvest. However, the tight post-harvest correlation between the harvested and non-harvested time series suggested no harvest-induced disruption in *P. leucopus* captures or periodicity.

These studies illustrate the advantage of long-term ecological research over the typical 2- or 3-year period of a graduate research project. If our study had been conducted 1986-88, with a study area-wide harvest between the peak *P. leucopus* phase of 1986 and the decline phase of 1987-88, one might conclude that the harvest suppressed numbers. Conversely, a harvest between the low year of 1993 and the increase year of 1994 and peak of 1995, might lead to the conclusion that *P. leucopus* increased as a result of the harvest.

Literature Cited

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