In search of sustainable seed harvest: Seed removal and establishment of an endemic African rainforest tree

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Abstract

Background/Question/Methods Harvest of non-timber forest products such as seeds requires assessment to determine if it is sustainable. Allanblackia stuhlmannii (Clusiaceae) is a rainforest tree with seeds that are harvested for an emerging commercial market. Seeds that are not collected by humans are mostly scatterhoarded by giant pouched rats (Cricetomys gambianus). Two simultaneous experiments were conducted in twelve 50x50m plots within the Amani Nature Reserve: a seed tagging experiment that followed fates of 1152 seeds (in two rounds of 576 seeds each), and a seed planting experiment that followed fates (until disappearance) for 960 seeds (in two rounds). We recorded fruit abundance in each plot throughout the fruiting season and followed seed fate for approximately one year. This presentation will address the goal of determining how seed removal and fate vary with background seed abundance for experimentally planted seeds. We use generalized additive models to investigate the relationship between the persistence of seeds in their original locations and covariates such as fruit abundance, seed weight, and rodent activity. This allows us to estimate the persistence and germination probabilities of Allanblackia seeds under different conditions. Results/Conclusions We observed rapid removal of experimentally planted seeds within the first twelve days, followed by low levels of removal over several weeks. During the first five months of the experiment, fruit abundance within a plot affected the proportion of seeds that persisted in a non-linear way. Comparison between general additive models including seed weight and both logistic and lowess relationships with fruit abundance indicated that seed persistence was depressed at intermediate fruit abundances. A second intense period of seed removal occurred between the fifth and sixth months, after the Allanblackia fruiting season, after which all plots had similar

proportions of seeds remaining. Seed removal during this second event was unrelated to fruit abundance, and may correspond to a period of low resource availability for rodents. Interestingly, seed weight did not have consistent or significant effects on seed persistence over time. Ultimately, approximately 5% of the seeds germinated where they were planted in the first ten months of the experiment. Seeds removed from the planting experiment were likely either consumed or scatterhoarded and could have germinated elsewhere. Consequently, understanding the fates of removed seeds will depend on results from the seed tagging experiment.