

## Evaluating the success of management in *Alliaria petiolata*: Role of stage-structure and intraspecific competition

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Management of invasive species often targets a particular life stage in structured populations. Evaluating the success of management requires measuring the survivorship and reproductive output of the targeted stage class as well as the possibility for increased fitness in the non-targeted stage class due to a release from intraspecific competition. The invasive plant, *Alliaria petiolata* (garlic mustard), is an obligate biennial that spends its first year as a rosette and then flowers and dies in its second year. One of the most reliable ways to remove garlic mustard is by pulling adult plants from the ground. In this study we examined the effects of stage-specific management (removing adults) on survival and fitness of these adults and co-occurring rosettes. We randomly applied six management treatments (unmanaged, pulled, and clipped at midheight or ground level, early or late in the season) to 300 adult *A. petiolata* individuals and quantified their survival and fecundity. We randomly applied three adult management treatments (unmanaged, pulled, clipped at ground-level) to 80 1m<sup>2</sup> quadrats and quantified rosette survival within the quadrats. Unmanaged plants produced significantly more and heavier seeds that had a higher germination rate than pulled or clipped plants. Rosette survival was significantly higher in plots where adult plants were pulled or clipped than in unmanaged plots. Clipping and pulling adult garlic mustard plants reduces their reproductive output. However, the management treatment that is most successful for targeting adults results in the highest rosette survivorship. Best management practices will include control of both rosettes and adults.