

PROJECTION MATRICES AS A FOREST MANAGEMENT TOOL: AN INVASIVE TREE CASE STUDY

Ian J. Renne, Benjamin F. Tracy, and Timothy P. Spira¹

ABSTRACT.—Life history parameters of many forest-dwelling species are affected by native and non-native pests. In turn, these pests alter forest processes and cost the United States billions of dollars annually. Population projection matrices can aid ecologists and managers in evaluating the impact of pests on forest species as well as devising effective strategies for pest control. As a case study, we use stage-classified projection matrices to assess the annual growth of five Chinese tallow tree (*Sapium sebiferum* (L.) Roxb.) populations and to evaluate the population growth consequences of simulated mortality among different stage classes. Four of five populations had positive annual growth over a 3-year interval and the growth average of all population-by-year matrices was $+12 \pm 5$ percent. The effectiveness of management strategies differed such that the same strategy applied to all populations often resulted in differential local control. However, two of the same strategies were most effective in every population. It is thus important to know the demography of pest populations when control efforts are considered. We conclude by discussing how these adaptable models can be applied to common management issues. Examples include what should be done when immediate intervention is needed but life histories are not known, and how to achieve control objectives by using multiple management strategies.

¹ Graduate Assistant (IJR) and Associate Professor of Agroecology (BFT), Department of Crop Sciences, University of Illinois, Urbana, IL 61801 and Associate Professor (TPS), Department of Biological Sciences, Clemson University, Clemson, SC 29634-0326. IJR is corresponding author: to contact, call (217) 244-3977 or e-mail at irenne@staff.uiuc.edu.

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