The pattern of dioecy in terrestrial, temperate plant succession

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ABSTRACT

Hypothesis: Inbreeding avoidance theory suggests that dioecious plant species (those with separate-sexed individuals) should have high fitness because they result from obligate outcrossing. Thus, these species should be more competitive than those that engage in some form of inbreeding. Competitive ability increases with successional stage in many successional series studies. Accordingly, we expect dioecious species to be disproportionately represented in late successional stages.

Data: Species presence/absence and importance (number of individuals) taken from eight studies of open land and forest succession in North America.

Analysis methods: Presence/absence: We assessed the proportion of dioecious species at each successional stage. We then compared these proportions to a random model. Importance: We compared the importance of dioecious species at each successional stage. We then tested these importance values against a random model.

Conclusions: Presence/absence: Dioecious species were not more prevalent in late successional stages. There was no significant increase in dioecious species and in most cases the number of dioecious species declined with successional stage, although this trend was not significant. Importance: Dioecious species were significantly less important in late successional stages compared with early or mid successional stages. Finally, dioecious species were rarely present in climax communities.

Keywords: dioecy, dispersal, inbreeding avoidance, plant mating systems, succession.

INTRODUCTION

Dioecious plants have separate-sexed individuals whereas over 90% of all angiosperm species combine male and female parts in a single individual (Renner and Ricklefs, 1995, and references cited therein). Yet dioecious plants are disproportionately common among woody plants, wind-pollinated (or generalist-pollinator) plants, and plants with animal-dispersed fruits/seeds (Freeman et al., 1980; Thomson and Brunet, 1990; Renner and Ricklefs, 1995; Vamosi et al., 2003). Moreover, dioecy
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