

Travelling to a former sea-floor: colonization of forests by understory plant species

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“God created the world, but the Dutch created the Netherlands”. A Dutch saying referring to the land the Dutch reclaimed from the sea. The most recent land reclamation in 1942 created a unique area to study colonization processes. The ability of species to colonize new habitats is one of the most important factors determining community assembly and is an important issue in the face of climatic change. The ability of species to colonize new areas depends on their characteristics and the suitability and spatial configuration of the new habitats. We surveyed the understory of 55 planted, patchy distributed forests which can be considered habitat islands for forest understory species, surrounded by an inhospitable matrix. Using redundancy analysis and mixed models we determined the importance of forest age, area, path density and spatial configuration on 1) species richness and composition, 2) abundance of different dispersal groups and 3) the distribution of individual species. Surprisingly, age, area and to a lesser extent path density of the forests are the important factors determining species composition and species richness and not the distance to the main land (as a proxy for distance to the main seed source) and isolation. Habitat quality and variation are embedded in forest age and area, therefore accounting for a large part of the variation in species distribution. In addition, the early successional stage of the forests can be an additional explanation for the fact that age is the most important factor at the three different levels. However, distance to the mainland was important at the more detailed scale, especially for species without specific dispersal adaptations. Similarly, isolation was only important for particular species. These results show that a large part of the species community in these young forests is still determined by early, easily dispersed colonizers which respond particularly to age and area, but simultaneously that spatial configuration does matter for species without specific dispersal adaptations.