Nest-Site Fidelity, Body Weight and Population Size of the Red Mason Bee, Osmia rufa (Hymenoptera: Megachilidae), Evaluated by Mark-Recapture Experiments

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Mark-recapture experiments were used to examine nest-site fidelity, natural local population size and effects of body weight on dispersal strategies in the solitary bee Osmia rufa Linnaeus 1758. A total of 974 hibernated ♀ ♀ was individually marked and weighed inside their cocoons and then released in five orchard meadows for emergence. In May 2002, colonisation of three spatially separated trap nest locations on each study site (mean distance 52 m) by marked and unmarked ♀ ♀ of O. rufa was monitored. Only 222 (22.8 %) of all marked ♀ ♀ (3–108 per site) were re-observed. Mortality rates varied between 2.2 and 26.4 % between study sites. Thus estimated 74 % of emerged ♀ ♀ left the parental nest-site. The number of observed unmarked ♀ ♀ varied between 9 and 16 per site resulting in an estimated natural population size between 48 and 258 individuals or 15 ♀ ♀ per 1000 m² on average. The mean body weight of marked recaptured ♀ ♀ (113.0 ± 14.9 mg) was significantly higher than the body weight of marked but not recaptured ♀ ♀ (107.3 ± 19.0 mg). The results give new insights into the possible densities of natural populations of a solitary bee species, its nest-site fidelity and the potential role of body weight for dispersal strategies.

Key words: Osmia rufa Linnaeus 1758 – dispersal – orchard meadows – population dynamics – trap nests

1 Introduction

Native bees are key pollinators in most terrestrial ecosystems, and therefore a better understanding of their ecology is essential for future conservation of suitable habitats and ecological interactions [KEARNS et al 1998]. Up to now, only a few studies deal with spatial population dynamics in European bees [STEFFAN-DEWENTER 2003].

A key parameter is the size of a population that is affected by local reproductive success and mortality and the proportion of immigrating or emigrating individuals between regional populations [HANSKI 1998].

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