Observations on growth rates and maturity in an introduced population of the Roman snail (Helix pomatia Linnaeus, 1758) at a semi-natural site with no natural population

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Introduction

Helix pomatia Linnaeus, 1758, the Roman snail, is widely exploited for food in Europe. Over-exploitation has led to protective measures laid down in the European Union Habitats Directive (European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC). In Poland, the implementation of this directive has involved passive protection by means of closed seasons for collecting, minimum size limits and annual rotation of areas in which collecting is permitted (Dyduch-Falniowska et al., 2001). The size limit (minimum shell diameter of 30 mm) has not changed for several decades.

Helix pomatia has relatively slow reproductive and maturation rates (Ligaszewski et al., 2014). Efforts have been made to improve these under controlled conditions (Jeppensen, 1976; Gomot, 1990; Chmielewski, 2005). In experiments at the National Research Institute of Animal Production in Balice, Poland, mature H. pomatia taken from the wild and kept in greenhouses reproduced successfully, producing large numbers of hatchlings both in autumn and after the winter hibernation (Ligaszewski et al., 2007). While rearing snails in such conditions over the whole of their life cycle (eggs to harvested adults) is expensive, the release of juveniles into apparently suitable habitats might increase the number of natural populations and serve to secure the snail’s future in the face of exploitation.

This study thus set out to determine the fate of juveniles reared in greenhouses and released into a semi-natural, synanthropic site in which the snail was absent. A target area was modified to provide good starting conditions, and the growth rate and dispersal of the introduced juveniles studied over the period 2011–2015. In particular, the study aimed to determine the time taken to reach the legally harvestable size and the extent to which the release site was able to sustain a breeding population.

Material and Methods

The Site

In the early spring of 2011, a release site was established on the edge of the Będkowska valley near Kraków. No natural populations of the Roman snail had been found in the years preceding the study. The site (Fig. 1), previously subject to farming activities, lies on calcareous soil. A portion of the site was ploughed and reseeded with a mixture of fodder plants composed predominantly of white clover (Trifolium repens), red clover (Trifolium pratense), winter bird rape (Brassica rapa x Brassica rapa subsp. Chinensis), radish (Raphanus sativus) and carrot (Daucus carota). These crops were sown to improve trophic conditions on the site, enabling the newly created, naturalized experimental population to survive during the first years of the experiment. This part of the site, where the snails were to be released, was then supplied with stone and wooden hiding places for the snails.

Although the vegetation in this portion of the site changed in subsequent years, the balance of grasses, legumes and other dicotyledons did not vary much over the period of study. Over the course of the study many snails moved out of the release area into other parts of the site (Fig. 1). An adjacent area containing black currant (Ribes nigrum) and hazelnut shrubs (Corylus avellana) proved attractive for adult snails seeking shelter and egg laying sites. Other areas were reseeded with clover.

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