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Aerial dispersal of freshwater gastropods by dragonflies (Odonata)

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At a ditch near Tribsees in northeastern Germany a young individual of the freshwater snail *Lymnaea stagnalis* was photographed while attached to the dorsum of the abdomen of a female *Aeshna viridis*, after the odonate took off after oviposition in *Stratiotes aloides*. This is the first known case for odonate-born dispersal of freshwater gastropods.

Keywords: Odonata; dragonfly; *Aeshna*; *Lymnaea*; Gastropoda; Pulmonata; dispersal

Introduction

For the aerial dispersal of freshwater gastropods, birds are well known as transporting agencies (Boag, 1986; Rees, 1965). Records of the transport of freshwater gastropods by insects have been confined to the gastropod family of Ancyclidae and aquatic Coleoptera and Hemiptera as vectors (Rees, 1965).

The known biotic interactions between Odonata and freshwater Gastropoda include predation of odonate larvae on gastropod eggs (Pfau, 1967) and snails (e.g. Blois, 1985; Pritchard, 1964), and there are observations of freshwater snails being epizootic on odonate larvae (e.g. Kuijper, 2005). So far, there is no record of an epizootic or a phoretic role of odonate adults for gastropods, Corbet (1999, p. 640) lists no gastropods. Here we report on the first known case of a snail being transported by a dragonfly adult.

Observations

On 28 July 2012 at a ditch with the water soldier *Stratiotes aloides* near Tribsees, northeastern Germany (54.0963° N, 12.7407° E; –1 m asl). H-JR made a series of photos of a female *Aeshna viridis* Eversmann at water. One of the photos, taken after the female took off after a long period

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Figure 1. Young individual of the freshwater snail *Lymnaea stagnalis* attached to the dorsum of a female *Aeshna viridis* just in take-off after oviposition in *Stratiotes aloides* (photo: H.-J. Roland).

of submerged oviposition in *S. aloides*, with most of its body submerged, clearly shows a small gastropod of about 3.5 mm in length attached to the dorsum of abdominal segment 2 (Figure 1). A closer examination of the gastropod fauna of the ditch showed that only young specimens of *Lymnaea stagnalis* (L.) fit the characters of the snail visible on the photo.

Discussion

Lymnaea stagnalis is one of the largest pulmonate snails of the Holarctic (Greenhalgh & Ovenden, 2007). It is well known as a pioneer species in new habitats (Boag, 1986; Kappes & Haase, 2012). Its high dispersal ability is mainly based on birds as vectors for young snails and eggs (Boag, 1986). However, besides birds there might be other animals acting as aerial vectors.

In Anisoptera, females of the Aeshnidae are the best candidates for a dispersal of freshwater gastropods. The Aeshnidae as well as the Zygoptera deposit their egg endophytically (Corbet, 1999). Species that submerge their abdomen for endophytic oviposition in floating and underwater substrates are suitable candidates, especially when they live in eutrophic habitats that are rich in dense floating vegetation and freshwater gastropods.

We hope that this report encourages other odonatologists to have a closer look for this phenomenon. The most promising method is the use of digital photography and careful checking of photographs with ovipositing females.

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