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AN EXAMPLE OF PASSIVE DISPERSAL OF LAND SNAILS BY BIRDS – SHORT NOTE

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ABSTRACT: A fully developed, intact shell of *Cochlicopa lubrica* (O. F. Müll.) was found in the nest of the lesser spotted eagle (*Aquila pomarina*). It was most probably brought accidentally with the nest-building or nest-lining material. This is a new way of dispersal by birds, besides the well-known cases of carrying snail individuals on birds' legs or feathers.

KEY WORDS: *Cochlicopa lubrica*, lesser spotted eagle, *Aquila pomarina*, dispersal, species distribution, vector

Land snails can cover rather limited distances during their life time, so that their active dispersal is not very effective (FALNIOWSKI 2001). Sometimes small barriers, either natural or anthropogenic, can pose an obstacle which is impossible for a snail to overcome (CLARKE et al. 1978), and even in the absence of barriers active dispersal into new areas with adequate habitats is rare (KLEEWEIN 1999). Various possible methods of random passive dispersal of snails have been suggested: wind (KOBELT 1897, VAGVOLGYI 1975, KIRCHNER at al. 1997, DÖRGE et al. 1999), water (CARLQUIST 1981, BOAG 1986, DÖRGE et al. 1999, PFENNINGER & POSADA 2002, HORNUNG et al. 2003, TROTTMANN 2004, KAPPES & HAASE in press) and animals, among them insects (REES 1965), mammals (GROH & FUSCHS 1988, FISHER et al. 1996, FALNIOWSKI 2001, BEINLICH & PLACHTER 2010), and birds (DUNDEE et al. 1967, VAGVOLGYI 1978, KAWAKAMI et al. 2008). Obviously, humans have also became a very important agent in random passive dispersal of gastropods (KOZŁOWSKI 2000).

During our field research we found a fresh, fully developed shell of *Cochlicopa lubrica* (O. F. Müller, 1774) in a nest of the lesser spotted eagle (*Aquila pomarina*). The described nesting site had been known since 1993 and was located in a forest belonging to the Rajgród Forest Inspectorate (Podlaskie province) (53°58'53''N, 22°61'57''E) in eastern Poland (MACIOROWSKI et al. 2005). The shell of *C. lubrica* was discovered in 2010, during an examination of the nest-lining contents of the eagles' nests, coupled with biometrical tests and ringing of the chicks. Human interference should not influence the nesting success, therefore such nest controls are routinely held in the third decade of July each year.

The nest was located typically on a white birch (*Betula pubescens*) in a bog birch forest *Salici-Betuletum*, composed of white birch trees, aged about 45, with the undergrowth consisting of scattered common buckthorn (*Rhamnus catharticus*) and alder buckthorn (*Rhamnus frangula*) shrubs. On the forest edge there were patches of dwarf birch (*Betula humilis*). The nest was made of birch twigs and the inside was lined with fresh-leaved twigs of white birch, mistletoe and single blades of sedges, which constitute a typical nest lining for the lesser spotted eagle.

C. lubrica shows a wide ecological amplitude; it usually occurs in moderately humid habitats, and can tolerate non-calcareous soils. The species is found in both valley meadows and forests. It never climbs tree trunks. The shell found in the nest was whole, intact, still attached with dried mucus to a sedge (*Carex* L.) blade with which the snail had probably been transported into the nest alive. The insolation, high temperature and lack of moisture were the most likely direct causes of its death.

The transfer of the snail into the eagle's nest is strictly correlated with the eagle's preferred habitats.

Most of the surrounding area is covered by vast hay meadows which are favoured by *C. lubrica*. The territory size of the lesser spotted eagle, which does not exceed 10 ha, strongly suggests that *C. lubrica* came from the defended area (maximum 3 km), from which the bird obtained material for nest-building and nest-lining. Considering the size of the territory and the distance to the source of the nest-lining material, the snail could be brought by the bird from the distance of at most 3 km.

Recording a shell in a bird's nest confirms the few accounts of possible aerial dispersal of snails. Such "coincidences" can lead to permanent colonisation of new territories only very rarely. In the case of birds, especially those inhabiting wetlands, there are literature records of snails hiding in the feathers or attaching themselves to the legs (SPENCER & PATCHETT 1997, GREEN & FIGUEROLA 2005). Bigger snail species are sometimes caught and transported in beaks or claws, usually in order to break their hard shells in a suitable place; for example thrush or rook deal with snails in this way (ALLEN 2004, KISS et al. 1993, OŻGO 2008). Due to the observed case the list of bird-mediated dispersal methods can be expanded by adding a new one: carrying snails with nest-building or nest-lining material.

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