

Hibernation sites of riparian ground beetles (Coleoptera, Carabidae) in Central and Northern Norway

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In an attempt to detect the winter quarters of Scandinavian riparian carabid beetles, sites at various distances from some rivers and a lake in Central and Northern Norway were investigated with various sampling methods in early spring (April–primo May), in autumn (ultimo September–November) and during the summer (ultimo May–August). *Bembidion bipunctatum* (L., 1761) and species confined to gravelly/stony habitats (*Bembidion prasinum* (Duftschmid, 1812), *B. hyperboreaorum* (Münster, 1923), *B. virens* Gyllenhal, 1827, *B. hastii* (Sahlberg, 1826), *B. petrosum* (Gebler, 1833), *B. saxatile* Gyllenhal, 1827 and larvae of *B. mckinleyi* (Fall, 1926)) hibernate among gravel or under stones (often in grass tussocks) in the most elevated parts of the river banks. Some of these species cluster strongly under stones. Species of fine-grained substratum may hibernate in silty sites in elevated parts of open river banks (e.g. *B. difficile* (Motschulsky, 1844) and larvae as well as adults of *Cicindela maritima* Dejean in Latreille & Dejean, 1822), or close to or in fluvial forest (e.g. *Bembidion schuppelii* Dejean, 1831, *B. semipunctatum* Donovan, 1806 and *Agonum micans* (Nicolai, 1822)). The winter quarters of the subgenus *Bracteon* Bedel, 1879 is still undetected. There is no evidence that riparian beetles migrate far from river banks or lake shores by flight to hibernate. Many riparian beetles are red-listed. Threats to their habitats with special emphasis on their winter quarters are discussed.

Key words: Carabidae, hibernation sites, river banks, red-listed species, conservation value.

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Introduction

Numerous carabid species are confined to banks of running waters in the holarctic region (Lindroth 1961–69, 1985–86, Koch 1989, Lott 2003, Freude et al. 2004, Andersen & Hanssen 2005). The knowledge about the habitat selection of the Scandinavian riparian carabids in their active period (late spring–summer) is fairly comprehensive (e.g. Andersen 1970, 1982, 1983a, 1997, Lindroth 1985–86). However, although the hibernation stages of most of the Scandinavian riparian carabids are known, the published information about their hibernation conditions is fragmentary (Andersen 1968, 1970, 1982, 1983b, Lott 2003).

The purpose of the present study, which is based on studies made in Central and Northern Norway, is to increase the knowledge about the hibernation strategies of the riparian carabids in Scandinavia. Winter quarters were investigated in late autumn and in early spring. Data from these investigations were compared with data obtained during the summer. These latter results have partly been published elsewhere, but in another context (Andersen 1970, 1983a, 1997, 2000).

Material, methods and habitats

Based on the moisture requirements of plants, which were derived from Benum (1958), Lid &