Ecomorphological Adaptations of Riparian Bembidiini species (Coleoptera: Carabidae)

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There is a close relationship between body shape and ecology of the species of the tribe Bembidiini. Dorso-ventrally flattened species with parallel-sided elytra tend to be lithophilous, i.e., they live under or between gravel and stones on banks and shores, whereas stout species with an oviform hindbody form hide among vegetation, under dead leaves or in crevices in the earth. Species occupying an intermediate position as regards morphology are either euryoecious or independent of cover (gravel/stones, vegetation etc). An examination of information given in taxonomic literature revealed that lithophilous beetle species, almost without exception, have a depressed and often parallel-sided body, suggesting that these features have strong adaptive value. There are indications that competition may have contributed to the evolution of the depressed body form of the lithophilous species.

1 Introduction

Thiele [1977] suggests that the most pronounced morphological adaptations of the Carabidae are associated with specialized modes of feeding. Erwin [1979], on the other hand, discusses observations indicating that there are probably close relationships between structure/morphology and ecology of carabid beetles.

River banks contain a great number of microhabitats differing in microclimate and edaphic conditions. Species of the tribe Bembidiini occupy most of these microhabitats [Andersen 1970, 1983a] and, if there are general relationships between morphology and ecology of Carabidae, it seems likely that they should be shown by the members of this tribe. Eco-morphological adaptations seem to exist in the structure of the pedes of psammophilous species of the genus Bembidion [Andersen 1978] and Kühnelt [1943] and Andersen [1979] suggest that a flat body shape is an adaptation to live under stones and gravel, but this was not supplemented with morpho-metric measurements.

The study presented in this paper seeks to compare the body form of Bembidiini species, from various microhabitats on river banks, by use of morpho-metric measurements.

2 Material and Methods

Specimens of the species studied were collected on river banks and lake shores in Sør-Trøndelag, Nordland, Troms and Finnmark counties in Norway.