

Karyotype Analysis and C-banding Pattern in Two Species of Carabid (Coleoptera, Carabidae)

Maria ROŻEK and Zofia RUDEK

Accepted March 31, 1992

M. ROŻEK, Z. RUDEK, 1992. Karyotype analysis and C-banding pattern in two species of carabid (Coleoptera, Carabidae). *Folia biol. (Kraków)*, 40: 47-52.

The C-banding karyotype as well as the meiotic process of *Acupalpus elegans* and *Bembidion minimum* were studied. *A. elegans* had an asymmetrical karyotype with meta- and submetacentric chromosomes: its meioformula was $n=20+XY$. In spermatogenesis, chiasmatic meiosis with diffuse diplotene was observed. C-banding showed the existence of heterochromatin in the paracentric regions of almost all chromosomes. In *B. minimum*, the diploid number was 24 ($n=11+XY$). The species had a symmetrical karyotype with all metacentric chromosomes. Female chiasmatic meiosis and very low chiasma frequency in the male were observed. The C-band positive segments were located in the terminal regions of chromosomes.

Key-words: carabid chromosomes, C-banding, achiasmatic meiosis.

Maria ROŻEK, Zofia Rudek, Department of Experimental Zoology, Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Stawkowska 17, PL-31-016 Kraków, Poland.

According to the results of cytogenetic studies, the tribe Bembidiini is regarded as an intermediate stage between "ancient" and "modern" carabids. The representatives of Bembidiini are characterized by a constant karyotype $2n=24$, and XO or XY sex determination type. The chromosomes have about the same length and a medially or submedially localized centromere.

Achiasmatic meiosis was observed in the course of spermatogenesis (SERRANO 1981; MADDISON 1985; ROŻEK & WARCHAŁOWSKA-ŚLIWA 1987; ROŻEK 1989).

The carabids belonging to the tribe Harpalini possess a more differentiated karyotype with $2n=37$ as the basic number, but there are species with more or fewer chromosomes. Moreover, the chromosomes also show variability in their morphology (SERRANO & YADAV 1984; SERRANO *et al.* 1986; SERRANO 1986).

The results of karyotype studies in Carabidae reported so far have been, however, mostly based

modern approach to karyotype analysis providing data concerned with G, C-banding and NOR (ANGUS 1982, 1983, 1986; HSIAO & HSIAO 1984; VIRKKI & DENTON 1987; JUAN & PETITPIERRE 1989). This apparently poor advancement of such studies on Coleoptera could be explained by technical obstacles in the differential chromosome staining.

The present study was an attempt to analyse the karyotype including C-bands in two halophilic Carabidae species, *Acupalpus elegans* Dej. (Harpalini) and *Bembidion minimum* Fabr. (Bembidiini).

Material and Methods

The beetles were collected from halophyte habitats in Borek Fałęcki, Cracow, located in the vicinity of the River Wilga and chloride settling ponds of the Solvay chemical plant.

The reproductive organs were obtained from 20