



Karyotypes of Tettigoniidae (Orthoptera: Tettigonioidea) in Northeast China

NA LI & BING-ZHONG REN¹

Department of Biology, Northeast Normal University, Changchun, 130024, China.

¹Corresponding author: E-mail renbz279@nenu.edu.cn or bzren@163.com

Abstract

This study focuses on chromosomes and karyotypes of eight species of Tettigoniidae, which selected in Northeast China. And clustering analysis of these eight species was studied based on their chromosomal relative lengths for the first time. In the males, chromosome numbers vary from $2n = 31$ (σ) to $2n = 25$ (σ) and Fundamental Numbers (FN) from 32 to 28. All the species have the basic Orthopteran sex determining mechanism $XX^{\circ}/X0^{\sigma}$. The results of clustering analysis showed that the eight Tettigoniidae species form three well-supported groups when Rescaled Distance is 15, which include (1) the genus *Gampsocleis* and *Metrioptera*, (2) the genus *Tettigonia* and (3) the genus *Paratlanticus*. In particular, the morphology close species of *G. sedakovii obscura* and *G. sedakovii sedkovii* is strongly supported. The relationships among the eight species is as follows, (((*G. sedakovii obscura*, *G. sedakovii sedkovii*), *G. ussuriensis*), *M. bonneti*), (*T. cantans*, *T. ussuriana*), *T. caudata*), *P. tsushimensis*.

Key words: Orthoptera, Tettigoniidae, Chromosome, karyotype

Introduction

Tettigoniidae belongs to Orthoptera, Ensifera, Tettigonioidea. There are more than 6000 nomenclative Tettigonioidea species in the world. Hitherto, the total number of karyotypes studied is no less than 7% (Hewitt 1979; Warchalowska-Sliwa 1984, 1998; Warchalowska-Sliwa *et al.* 1992; Warchalowska-Sliwa & Maryanska-Nadachowska 1995; Turkoglu S & Koca S 2002; Warchalowska-Sliwa E *et al.* 2005). It is recorded that the Tettigonioidea are more than 300 species in China, and the Tettigoniidae are more than 50 species (Liu & Jin 1993). Until recently, there is only one article that referred to the research of Tettigoniidae chromosome (Chang & Lian 2002) in China, and there is no reports about Tettigoniidae which distributes in Northeast China. Hitherto, no new advance about phylogenetic relationships of Tettigoniidae using chromosomal characteristics has been acquired.

In this study, we analyzed and compared karyotypes of eight Tettigoniidae species that all distribute in Northeast China, and further study in clustering analysis among them based on their chromosomal relative lengths.

Material and methods

We use testes as our experiment materials. The collection date, location and total number of adult males are listed in Table 1. We classified these species by their configuration, and recorded them carefully.

The male samples were pre-treated with 0.05% colchicine solution 5–8 μ l. After 6–8 hours, the testes were dissected out and put in distilled water for 5–10 min, then fixed in a mixture of methanol and glacial acetic acid (3:1 v/v) about 8–12 hours. At last, the tissues were transferred to 70% ethanol and stored in the deep-