Zootaxa 1611: 63–68 (2007)
www.mapress.com/zootaxa/

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

The study on karyotypes of five Grylloidea species (Orthoptera: Grylloidea) in Northeast China

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Abstract

The karyotypes of five Grylloidea species from Jilin province in northeast China were studied. A clustering analysis of their chromosomal relative lengths was studied for the first. In the males, chromosome numbers vary from 2n = 27 (♂) to 2n = 19 (♂) and Fundamental Numbers (FN) from 30 to 19. All the species have the basic Orthopteran sex determining mechanism XX♀/X0♂. The results of clustering analysis showed that the five species form two well-supported groups with a Rescaled Distance of 15: (1) the genus *Gryllodes* and *Teleogryllus* and (2) the genus *Oecanthus*. In particular, the morphologically close species of *G. supplicans* and *G. sigillatus*, *T. emma* and *T. occipitalis* are strongly supported. The relationships among the five species are as follows: (((*G. supplicans, G. sigillatus*), (*T. emma, T. occipitalis*)), *O. longicauda*).

Key words: Orthoptera, Grylloidea, Chromosome, karyotype

Introduction

Grylloidea belongs to Orthoptera, Ensifera. There are more than 3100 named species of Grylloidea in the world (Yin & Liu 1995). Hitherto, the karyotypes of Grylloidea have been studied for no less than 150 species (You & Zheng 1997). It is recorded that there are more than 200 species of Grylloidea in China. Until recently, there are only a few articles that referred to the research of Grylloidea chromosomes (Li *et al*. 1997; You *et al*. 1997; You & Zheng 1998, 2001; You & Xie 2003), and none of these deal with Grylloidea of Northeast China. Hitherto, no new advance about the relationships of Grylloidea using chromosomal characteristics has been acquired.

In this study, we analyzed and compared karyotypes of five Grylloidea species that all distribute in Northeast China. We also study the relationships among them using clustering analysis of 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% colchincine solution 5–8μl. 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) for about 8–12 hours. At last, the tissues were transferred to 70% ethanol and stored in the deep-freeze for up to several months until use. Subsequently they were squashed in 60% glacial acetic acid. Coverslips were removed by the liquid nitrogen method.

Accepted by D. Rentz: 6 Aug. 2007; published: 10 Oct. 2007