

Abstract

The Araneoidea superfamily is a diverse clade of spiders with a great species diversity. The whole superfamily displays considerable conservativeness of observed karyotypes. Most likely ancestral karyotype in males is 24 acrocentric chromosomes with X_1X_2 sex determination system. The goal of this study is to explore the karyotype diversity of two araneoid families – Araneidae and Mimetidae. The majority of studied species exhibit the ancestral karyotype. In some species of the aforementioned families was observed sudden increase in chromosome numbers, up to $2n♂ = 52$ in Araneidae and up to $2n♂ = 57$ in Mimetidae. The latter number is the highest chromosome count observed in Entelegynae so far. Increase in $2n$ goes hand in hand with increase in sex chromosome numbers, leading up to $X_1X_2X_3X_40$ system in Araneidae and up to $X_1X_2X_3X_4X_5X_6X_70$ in Mimetidae. I suggest polyploidy as a possible mechanism of the increase. To test this hypothesis, I measured the size of the genome using flow cytometry and used fluorescence in situ hybridization for the detection of 18S rRNA and 5S rRNA genes. For one species, probe for U2 snRNA gene was also optimized as part of this thesis. In many species studied, these techniques were used for the first time ever. In the case of the family Mimetidae, the largest genomes in Entelegynae so far were measured. Even though all the measured parameters didn't reach the expected double values between the species with ancestral and increased chromosome number, some of them support the polyploid hypothesis. Sex chromosomes are sometimes seen as an obstacle to polyploid events, spiders with their unique sex chromosome systems are thus ideal group for studying the relationship between polyploidy and sex chromosomes. Polyploidy was recently confirmed in one of the spider families and it is quite possible it could get more support in other spider groups in the future.

Key words: sex chromosomes, karyotype evolution, fluorescent in situ hybridization, flow cytometry, polyploidy, spider