Abstract

Neo-sex chromosomes arise due to rearrangements between ancestral gonosomes and autosomes. Neo-sex chromosomes are valuable systems for the study of sex chromosome evolution. It is possible to use them for analysis of processes driving the formation of differentiated sex chromosomes, especially suppression of recombinations and alosome degeneration. The most important rearrangements forming neo-sex chromosomes are Robertsonian and reciprocal translocations. Speciation events are important consequences of birth of neo-sex chromosomes. The presented study is focused on the evolution of neo-sex chromosomes in drosophilids, muntjacs, and monotremes. Neo-sex chromosomes emerged in many *Drosophila* species. The genome of *D. albomicans* carries the youngest known neo-sex chromosome system, which arised only one hundred thousand years ago. Information from research into *Drosophila* neo-sex chromosomes underlines the importance of Muller´s ratchet and background selection at the beginning of sex chromosome differentiation and hitchhiking and deleterious mutations at the end of this process. Genomes of muntjacs carry young and fast evolving neo-sex chromosomes. In several muntjac species, neo-sex chromosomes form a considerable part of the genome. The neo-sex chromosome systems of monotremes consist of many gonosomes. Monotremes show a male heterogamety (the so-called *Drosophila* type of sex chromosome determination). Platypus sex determination could arise by evolutionary shift from *Abaraxas* determination (female heterogamety).