

Abstract

The aim of this work is to review our knowledge on the evolutionary significance of triploid plants, modes of their origin and mechanisms preventing triploid formation, and to answer the question of whether triploids act rather as mediators or barriers in gene flow between populations possessing different numbers of chromosome sets (diploid and tetraploid). The production of unreduced gametes is considered to be the major pathway of triploid formation in otherwise diploid populations, following the merger of haploid and diploid gamete. In contrast, in mixed di-tetraploid populations, triploids are usually formed by interploidy hybridization. The frequency of formation and fitness of triploids is reduced by a number of reproductive barriers, both pre- and postzygotic, the most important of which is the so-called triploid block caused by an unbalanced ratio of originally maternal and paternal genes in the nourishing tissue endosperm. Although the formation of triploids is accompanied by many barriers, which also further translate to their reduced viability, followed by additional reduction in fertility due to meiotic problems, triploids play a more important role in populations than might be expected solely on the basis of their rare occurrence in nature. Triploids act as mediators of gene flow between individuals of even ploidy through the so-called triploid bridge. On the contrary, the rates of their formation and subsequent fertility determines to a large extent the strength of the barrier in crossing between ploidy, and thus the degree to which polyploid speciation has advanced in a given system.