

Development of hexaploid Brassica (AABBCC) from hybrids (ABC) of Brassica carinata (BBCC) × B. rapa (AA)

ABSTRACT

The aim of this research was to develop Brassica hexaploids from triploid hybrids using colchicine and to study the performances of the developed hexaploids. Triploid hybrids (genome, ABC) developed from crosses between Brassica carinata (genome, BBCC) and B. rapa (genome, AA) were used as source materials for chromosome doubling through colchicine treatment to develop Brassica hexaploids (genome, AABBCC). Modified injection method was found to be more effective than cotton plug method for doubling the chromosome numbers. On an average, the use of 0.10, 0.15 and 0.20% colchicine gave 36.4, 56.0 and 71.8% success in chromosome doubling by modified injection method compared to 27.4, 38.0 and 39.1% success by cotton plug method. First generation (H1) hexaploids produced larger buds and flowers than those of both parents and triploid hybrids. The untreated triploid hybrids did not produce seeds due to having sterile pollens only while hexaploids produced fertile pollens and seeds. On an average, 59% of second generation (H2) hexaploid seeds were euploid, where the rest of 41% seeds were aneuploid. Among the H2 hexaploid lines, four were selected as they produced significantly higher seed yield/plant (11.57-12.4 g) compared to their parental genotypes (8.13-9.93 g). These four H2 hexaploid lines can be used for family line development in the subsequent generations to select stable and desirable Brassica hexaploids.

Keyword: Brassica; Chromosome doubling; Fertility; Hexaploid; Yield attributes