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“Bridging the gap between increasing knowledge and decreasing resources”

## Effective Techniques for Resynthesized Rapeseed Production of Contrasting Components via Ovule Culture and Flow Cytometry

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### Abstract

Resynthesis of *Brassica napus* is an important tool for broadening the genetic diversity in oilseed rape and crop cultivar improvement since sources of genetic variation from natural populations cannot be used. In addition to other untraditional approaches to introgress traits from allied species, the use of current crop cultivars different from the first parental components give rise to resynthesized oilseed rapes with new desired characteristics. Crossability and embryogenic potential were evaluated by means of ovule culture in different one-sided crosses between accessions of turnip (*Brassica rapa* L. ssp. *rapa*), winter and spring turnip rape (*Brassica rapa* ssp. *oleifera* f. *biennis* and f. *praecox*) – female components and accessions of cabbage and winter curly kale (*Brassica oleracea* L. em. DC. var. *capitata* L. and *Brassica oleracea* convar. *acephalla* var. *sabellica*) – male components. Successful regeneration of embryos was achieved in 42 combinations; It was possible to identify the most productive crosses. The pollination efficiency (i.e. the setting of siliquae) and the number of embryos per silique was studied. Results of this method in the majority of crosses were better than in similar, already published experiments and provided a simplified and less laborious method. Due to highly significant differences in relative DNA content between all hybrid combinations and their respective parental components it was possible to reliably assess the hybrid nature of all regenerants via flow cytometry. As the occurrence of the self-pollinated and/or somatic-tissue regenerated female parent was not detected, the hybridity of all regenerants was reliably verified. Morphological assessment of regenerated plants showed typical characteristics originating from both parental components, and further corroborated the results of flow cytometric analysis. It can be concluded, that the method used is sufficient enough to be applicable in breeding programmes, aimed at diversity expansion of winter oilseed rape gene pool.

**Keywords:** *Brassica napus*, *Brassica oleracea*, *Brassica rapa*, flowcytometric analysis, interspecific hybridisation, oilseed rape resynthesis, ovule culture