



Apr 19, 2019

Working

Data for manuscript: Estimation of seed yield in oilseed rape to identify the potential of semi-resynthesized parents for the development of new hybrid cultivars [↗](#)

PLOS One

Laurencja Szała¹, Zygmunt Kaczmarek², Wiesława Popławska¹, Alina Liersch¹, Marek Wójtowicz¹, Marcin Matuszczak¹, Zdzisław R. Biliński³, Katarzyna Sosnowska¹, Michał Stefanowicz⁴, Teresa Cegielska-Taras¹

¹Plant Breeding and Acclimatization Institute - National Research Institute, Department of Genetics and Breeding of Oilseed Crops, Poznań, Poland, ²Institute of Plant Genetics, Polish Academy of Sciences, Department of Biometry and Bioinformatics, Poznań, Poland, ³Plant Breeding Company Smolice Ltd., Group IHAR, Division Bąków, Poland, ⁴Plant Breeding Company Strzelce Ltd., Group IHAR, Division Małyszyn, Poland

[dx.doi.org/10.17504/protocols.io.x9wfr7e](https://doi.org/10.17504/protocols.io.x9wfr7e)

Laurencja Szała

ABSTRACT

Resynthesized (RS) *Brassica napus* can be used to increase the genetic diversity of this important crop plant and to develop the heterotic gene pool required for successful hybrid breeding programmes. The level of heterosis in F₁ hybrids depends on the individual performance of the parents and on the degree of genetic difference between them. However, RS forms obtained from crosses of *B. rapa* ssp. with *B. oleracea* ssp. possess many undesirable agronomic traits, such as low quality of seeds, low yield and seed oil content, high erucic acid level in the oil and high glucosinolate content in seed meal. Therefore, RS oilseed rape needs to be improved by crossing with natural double-low oilseed rape, leading to selected double-low quality semi-RS lines that can be used for breeding. In this study, we evaluated the seed yield potential of F₁ hybrids derived from crosses between Ogura cytoplasmic male-sterility (CMS) lines and doubled haploid (DH) semi-RS restorer lines in three locations in Poland. The genotype by environment interaction (GE interaction) and general combining ability (GCA) of the restorer and CMS line effects, as well as the effects of heterosis, were also assessed. The results of the study provide the first insights into the use of semi-RS lines as components for the development of new hybrid cultivars. Even the introduction of 50% of the RS oilseed rape genotype to natural restorer lines resulted in a marked heterosis effect, with seed yield ranging from 4.56% to 90.17% more than that of the better parent. The yield of the best hybrid amounted to 108.6% of the seed yield of the open-pollinated cultivar Monolit and 94.4% of that of the hybrid cultivar Arsenal. The best DH semi-RS line, S1, which had a significantly positive GCA for seed yield, can be recommended as a possible parent for inclusion in breeding programmes aimed at developing new hybrid cultivars.

EXTERNAL LINK

<https://doi.org/10.1371/journal.pone.0215661>

THIS PROTOCOL ACCOMPANIES THE FOLLOWING PUBLICATION

Szała L, Kaczmarek Z, Popławska W, Liersch A, Wójtowicz M, Matuszczak M, Biliński ZR, Sosnowska K, Stefanowicz M, Cegielska-Taras T (2019) Estimation of seed yield in oilseed rape to identify the potential of semi-resynthesized parents for the development of new hybrid cultivars. PLoS ONE 14(4): e0215661. doi: [10.1371/journal.pone.0215661](https://doi.org/10.1371/journal.pone.0215661)



Data Review.docx



This is an open access protocol distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited

