

## **Development of HOLL winter rapeseed genotypes accompanied by MAS**

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High oleic and low linolenic (HOLL) lines of rapeseed (*Brassica napus* L.) are of increasing economic value due to their possible application for deep frying and also as a raw material for biofuel production. In Poland, winter rapeseed is the main oil crop and an important source of protein for animal feeding. In 2015, the acreage of winter rapeseed was over 880 000 ha, constituting about 96% of arable land used for oil crops. High oleic and low linolenic mutant lines were obtained through chemical mutagenesis using ethyl methylsulfonate (EMS), as described earlier. Moreover, allele-specific functional markers were developed for precise monitoring of the low-linolenic genotypes. Characterized by poor agronomic value and some morphological and phenological abnormalities, the mutant lines were improved by recombining with high-yielding canola varieties and following backcrosses and inbreeding. As a result, one of the world's first non-GM high oleic winter rapeseed cultivar, 'Polka', was registered in Poland last year. It is characterized by its content of about 80% of oleic acid in seed oil in addition to a zero erucic acid content, as well as about 15 – 20  $\mu\text{mol g}^{-1}$  of glucosinolates in seed meal. Furthermore, an analysis of the main effects in field trials revealed a strong influence of environmental conditions on the linolenic acid content in seed oil of low-linolenic mutant lines and their recombinants. Hence, a marker-assisted selection was necessary for an effective selection of low-linolenic mutant genotypes. The improved HO and LL mutant lines were crossed to obtain stable canola-type inbred HOLL recombinants, with a content of about 78% of oleic acid and less than 3% of linolenic acid in seed oil. In order to significantly reduce the glucosinolates content in seed meal, HOLL lines were crossed with selected domestic lines of good agronomic value and a high oleic acid content and an extremely low glucosinolates content, and also with canola varieties with a high seed oil content. The obtained HOLL lines make a starting material for the development of a new cultivar. The new breeding forms are evaluated in field trials, in addition to the assessment of genetic similarities based on SSR marker analyses and association studies among a population of winter rapeseed genotypes collected at PBAI-NRI in Poznań, Poland.

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