

The discovery or development of genotypes with very low erucic acid content in seed oil or with very low glucosinolate content in seeds allowed for the breeding of new double low varieties. The genetic source very low glucosinolate content was 'Bronowski', the Polish variety of spring *B. napus* (licensed in 1956, low glucosinolate levels estimated in 1967) (Krzymanski 1968, 1970, Finlayson *et al.* 1973, Stefansson and Downey 1995). The sources of low erucic acid content in seed oil of spring *Brassica napus* were zero erucic lines selected from the variety 'Liho' (Stefansson *et al.* 1961, Stefansson, and Hougen 1964, Stefansson and Downey 1995). Zero erucic turnip rape *B. rapa* was selected from interspecific crosses with *B. napus* (Downey 1964). Zero erucic brown mustard *B. juncea* was obtained in a similar manner (Love *et al.* 1991). New double low varieties should comply with the requirements of the canola standard. The official definition of canola is: "An oil that must contain less than 2% erucic acid, and less than 30 micromoles of glucosinolates per gram of air-dried oil-free meal" -- (canola standard of Canola Council).

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Development of new varieties with canola like quality has made these species important sources of oil for edible and technological purposes and of protein for fodder purposes. 'Tower', the first low erucic acid and low glucosinolate spring variety of oilseed rape was developed at the University of Manitoba in 1974 (Stefansson and Kondra 1975). The first variety of turnip rape with double low quality was 'Candle' developed by AAFC (Agriculture and Agri-Food Canada, Saskatoon, Canada) in 1977. Canola quality *B. juncea* varieties 'Avid' and 'Amulet' were also developed in Canada in 2002 (www.canolacouncil.org). The first double low quality winter oilseed rape variety 'Jantar' was developed in Poland and licensed in 1985 (Krzymanski *et al.* 1987).

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White mustard is another species adapted for temperate climate, characterized by high oil and potein content in seeds, but in order to be acceptable in the market it needs to meet the canola standards. In Poland, to be considered as double low quality, the seeds of winter or spring oilseed rape (*B. napus*) should contain less than 2% erucic acid in its fatty acid profile and the total alkenyl- and indolyl glucosinolates should be less than 15 $\mu\text{M g}^{-1}$ of seeds. Development of this kind of white mustard variety was the aim of the presented study. This work was made possible by the research works and breeding programs carried out at the Poznan Branch of the Plant Breeding and Acclimatization Institute since the last 30 years.

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The main oilseed crop in Poland is winter oilseed rape. This plant produces the highest seed and oil yields in the agronomic and climatic conditions of Poland. However, during acute winters, which occurred during some years in Poland, there are the substantial losses of winter oilseed rape plantations. Farmers try to compensate for these winter losses through the sowing of spring oilseed rape. The spring form yields are much lower than winter rapeseed. In addition, the yield is highly variable because of periodic droughts.

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White mustard, as compared with spring rapeseed, is characterized by a more stable yield and especially by its better resistance to temporary droughts frequent in climatic conditions in Poland (Muśnicki *et al.* 1997, Tobola and Musnicki 1999, Jankowski and Budzynski 2003). Its economic importance is continuously increasing due to many possible uses (Sawicka and Kotiuk 2007) such as seed production, for sowing as after crop, as plant important for nematode control in crop rotation and also as plant suitable for bees to collect the honey. White mustard cultivated as an after crop works as a phytosanitary treatment. The green mass of white mustard produced as after crop can be used as pasture or ploughed as manure.

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Seeds of white mustard are pale yellow which is connected with lower fiber and higher protein contents as compared with seeds of rapeseed. High glucosinolate content (about 180 $\mu\text{M g}^{-1}$ of seeds), favorable for the spices and table mustard production, does not permit the use of white mustard seeds, meal or expeller-cake as a protein source in the feed or food