

## Breeding of turnip rape in Finland

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Oilseed crops are bred at two institutes in Finland: the Hankkija Plant Breeding Institute (Hja), a private company, and the Institute of Plant Breeding of the state-owned Finnish Agricultural Research Centre in Jokioinen (Jo).

The main oil crop is spring turnip rape (Brassica rapa), covering an area of 59 300 hectares in 1991, 3.3% of the total cultivated area. Spring rape (Brassica napus) is grown on 1 700 hectares in the most southern parts of the country. In 1991, the turnip rape and rape yields averaged 1550 kg/ha and 1890 kg/ha, respectively.

The northernmost conditions for commercial cultivation of oilseed crops are found in Finland. A short growing season with only some hours of darkness during nighttime are the most exceptional features of the Finnish nature. Finnish breeders aim thus at cultivars with rapid life cycles and high yielding capacity together with a desired seed quality.

The life cycles of cultivated spring turnip rape varieties are already short enough, but an increase in productivity is still one of the chief goals. The specific aims of quality breeding are to further decrease the seed glucosinolate content of 00-cultivars and to develop new cultivars with specific fatty acid compositions to meet the needs of the industry.

Some of the most recent Jo-lines have a glucosinolate content (measured by HPLC) less than 5 micromoles per gram of seed. Several breeding programs aim at varieties with increased palmitic (>10%) or oleic (>70%) acid content or lower linolenic acid (<5%) content.

The new spring turnip rape variety KULTA from Jokioinen, put on the market in 1991, is a 00-cultivar with high yielding capacity (Table 1.)

**Table 1.** The spring turnip rape varieties cultivated in 1991 and their performance in the official field trials of the Agricultural Research Centre in 1983-1990.

Variety	Number of trials	Seed yield kg/ha	Growing time days	Lodging %	Protein yield kg/ha	Oil yield kg/ha
KOVA (Sv) standard	54	1988= 100	104	20	391	803
KULTA (Jo)	25	109	103	24	430	891
VALTTI (Hja)	50	98	103	27	380	805
EMMA (WW)	54	101	102	41	399	801
KELTA (Hja)	25	104	103	32	405	844

Biennial turnip rape used to be the main oil crop in Finland in the middle of the 1970s. The old varieties with high erucic acid and glucosinolate content are very winter hardy. A new breeding program has been started at Jokioinen to combine 0- or 00-quality with the winter hardiness of the old finnish winter turnip rape lines.

One research program at the Institute of Plant Breeding in Jokioinen aims at the use of molecular genetics in Brassica breeding programs. RAPD (Random Amplified Polymorphic DNA) technique is used for the identification of individuals and germplasm analysis. Both RFLP and RAPD mapping of loci for various important traits is underway. Special emphasis is focused on finding co-dominant RAPD (or other PCR-based) markers tightly linked to trait loci to be used in marker-assisted selection.