

## **Oilseed Rape** (*Brassica napus L. ssp. napus*)

French: Colza; Spanish: Colza; Italian: Ravizzone, colza; German: Raps

### **5.4.1 Winter oilseed rape - Example: Europe**

Varieties in Europe have been changed completely to improve quality. All present cultivars are "00", which means without erucic acid in the oil and with low glucosinolate in the seeds.

#### **Crop data**

Annual. Harvested part, seeds (contained in pods).

Sowing date: winter type, late August- mid-October.

The cycle of winter oilseed rape lasts about 320 days, comprising:

- The autumnal stage from sowing to early winter. This stage conditions to a great extent the implantation of the crop and its root system; leaf and flower initiation, which are critical for leaf development and yield potential, also take place at this time.
- The vegetative rest period, lasting about 2-3 months according to region and ending when the daily average temperature is regularly  $>5^{\circ}\text{C}$ .
- Vegetation regrowth to flowering, lasting about 2 months and defined by a very active accumulation of dry matter. This is the essential period for the absorption of mineral elements. Leaf development and leaf area per unit of soil area are key factors in determining yield.
- Flowering (about 220 days after sowing) to knotting. This stage can last for about 3 weeks and is marked by high competition for C supply between different types of organs (flowers on the main stem, newly forming young pods and seeds in pods).
- The pod-filling period, when the 1 000-seed weight is determined. At maturity the total biomass produced can reach 12-14 t/ha, of which about 30 % is in the seeds, 40 % in pod walls and peduncles, 20 % in stems and 10 % in roots.

Plant density: 350 000 - 700 000/ha (the risk of lodging increases considerably with plant density  $> 800\ 000/\text{ha}$ ).

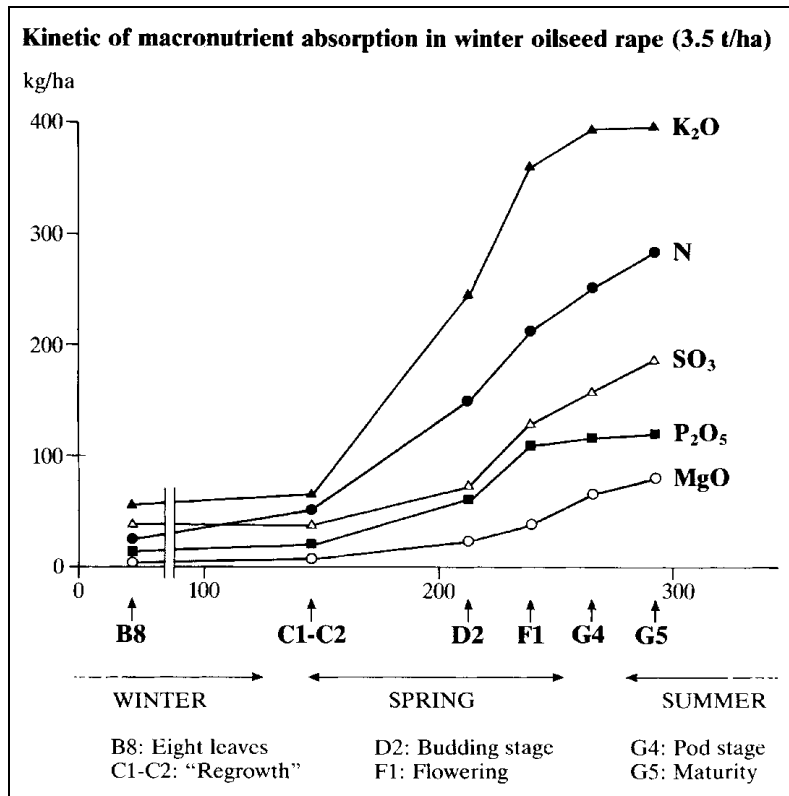
The yield is unaffected by row spacing within the range 17 cm (small grain drill) to 35 cm (high-precision drill).

The crop can be grown on a wide range of soils of varying pH.

Winter types require sufficiently low temperatures in early winter for flower initiation. Farmers in the South of France and in Spain, for example, need to pay particular attention to this point; where the winter is not cold enough, better results are generally obtained with alternative or spring cultivars, which unfortunately do not have such a high yield potential. In some areas in Southern Europe, or on light soils, farmers need to watch out for drought during the podfilling period.

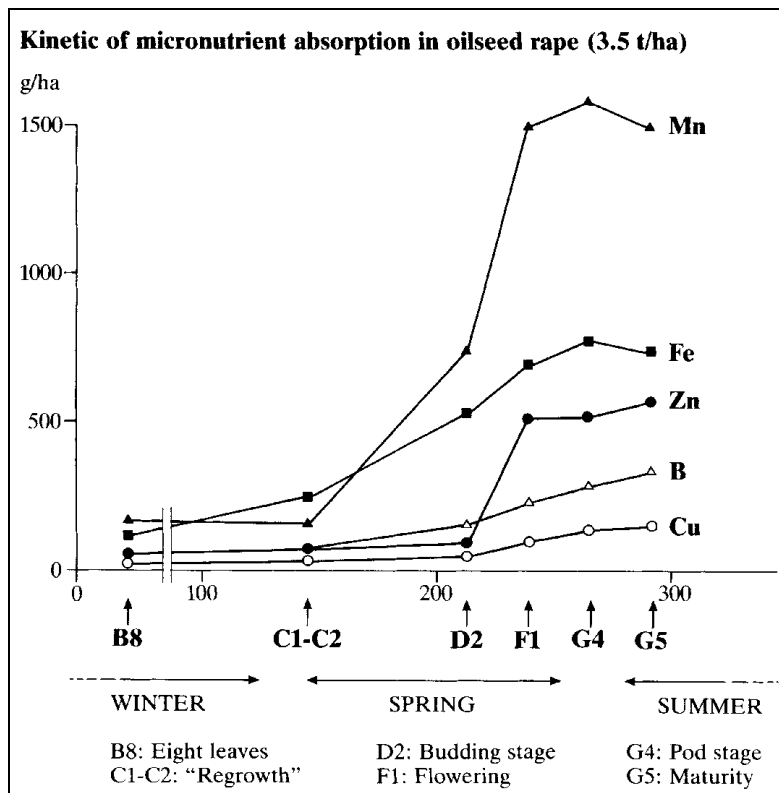
#### **Nutrient demand/uptake/removal**

Figure 1:



The two figures show the important uptake of some 400 kg/ha K<sub>2</sub>O, particularly between vegetation regrowth and flowering, the steady uptake of N up to 280-300 kg/ha N at maturity and, among the micronutrients, the large uptake of Mn.

Figure: 2



## Plant analysis data

Optimum concentrations (fully expanded lobate leaf on the main stem at the beginning of elongation) - Macronutrients						
Source	% of dry matter					
	N	P	K	Mg	Ca	S
CETIOM	5.5	0.58	2.5	0.12	1.1	0.53
Literature	4-4.7	0.35-0.5	3-4.4	0.12-0.1	1-2.2	0.68-0.7

Optimum concentrations (fully expanded lobate leaf on the main stem at the beginning of elongation) - Micronutrients						
Source	ppm dry matter					
	Fe	Cu	Zn	Mn	B	Mo
CETIOM	125	4.5	37.5	41	23	0.6
Literature	60-80	4-6.2	30-38	30-140	16-28	0.5-0.7

## Fertilizer recommendations

### N -

- Winter application can be advised only if: either there is a low N balance in the soil at sowing, in which case 30-50 kg/ha N may be applied, or sowing has been delayed and there is a need to stimulate growth in order to reach the optimum stage (8 leaves) for frost resistance, in which case 30-40 kg/ha N may be given.
- Spring application: the total requirement is about 200 kg/ha N, best divided into 2 applications, the first (50-70 % of the total) at the onset of regrowth (which, in France, could be at the end of January), and the second (30-50 % of the total) 2-3 weeks later. Where a high yield is expected, a third application, of 20-30 kg/ha N, may be worth giving about 10 days before the flowers are likely to be in full bloom.
- N is best applied as ammonium nitrate or in a solution containing 26-30 % N, but care must be taken when using fertilizer materials containing sulphur (see below).

### P -

- Where soil pH is between 5.5 and 7.5, 60 kg/ha P<sub>2</sub>O<sub>5</sub>; or;  
on calcareous soils with pH >7.5, 70- 90 kg/ha P<sub>2</sub>O<sub>5</sub>; or,  
on acid soils with pH <5.5, 140-160 kg/ha P<sub>2</sub>O<sub>5</sub>.

### K -

- On soils with high K availability, 60- 80 kg/ha K<sub>2</sub>O; or,  
on soils with medium K availability, 120-150 kg/ha K<sub>2</sub>O; or,  
on soils with poor K availability, 200-250 kg/ha K<sub>2</sub>O.

### S -

- This element is very important; on the one hand it increases yield (in France 75 kg/ha SO<sub>3</sub> in spring resulted in 8 cases out of 10 in an increase of 340 kg/ha in yield), but on the other hand it can increase the glucosinolate content of the harvested seeds. The best results, in increasing yield while maintaining quality, are to be expected from an application of 70-80 kg/ha SO<sub>3</sub> with the second application of N in spring.

## Further reading

MERRIEN, A.; PALLEAU, J.P.; MAISONNEUVE, C.: Mineral requirements of rapeseed cultivated in France. Info. Tech. CETIOM N° 103, 34-46, France (1988)

STOLTENBERG, J.; HENNING, K.: Oilseed rape fertilisation in Schleswig-Holstein. DLG Mitteilungen 99(3), 3-8, Germany (1984)

SCHNUG, E.; PISSAREK, H.P.: Nutrition of Oilseed rape in Germany. Schriftenreihe d. Agrarwiss. Fakultät d. Universität Kiel 62, 91-100, Germany (1981)

*Author: A. Merrien, CETIOM, Département Etudes et Recherches - Section Physiologie-Nutrition, Paris, France*

## 5.4.2 Spring oilseed rape (*Canola*) - Example: Canada

In Canada, oilseed rape cultivars are primarily Canola types, with low erucic acid and low glucosinolate content; there is a limited production of high erucic acid rapeseed cultivars but only on a contract basis.

### Crop data

Annual. Harvested part: seeds.

Sown early spring: Argentine type (*B. napus*), 5-30 May; Polish type (*B. campestris*), 5 May-15 June.

Seeding rate: *B. napus* 6-8 kg/ha, *B. campestris* 5-7 kg/ha.

Flowers: *B. napus* approx. 48 days after sowing, *B. campestris* approx. 39 days after sowing.

Harvested: *B. napus* approx. 100 days after sowing, *B. campestris* approx. 88 days after sowing.

Preferably grown on loamy soils with good drainage and moisture-holding capacity, low salt concentration and pH 6.0-7.8.

The crop is adapted to cool, moist regions. It does not tolerate drought.

### Nutrient demand/uptake/removal

Nutrient removal - Macronutrients					
Yield kg/ha		kg/ha			
		N	P2O5	K2O	S
1 960	Seed	74	36	18	13
	Straw	44	16	75	10
	Total	118	52	93	23

### Plant analysis data

Whole above-ground part of plant of flowering stage:

Range	% of dry matter			
	N	P	K	S
Normal	3.2	0.40	2.5	0.5
Deficiency	2.0	<0.15	<1.2	<0.2

## Recommendations for placement and timing of fertilizers

Good quality Canola oilseed contains 40-44 % oil and the meal contains 43-48 % protein, the lower figures generally relating to *B. campestris*. To produce seeds of good quality, special attention must be given to rate, placement and timing of fertilizer application. Excessive N application increases lodging, reduces oil content and results in green seeds that increase the chlorophyll content of the oil. Banding of P 2.5 cm below and 2.5 cm to the side of the seed is required for maximum yield, efficient use of P and increased oil content. The best responses in yield and seed quality are obtained when all the required nutrients are applied early in spring, at or immediately before sowing. The crop needs more S than either wheat or barley.

The generally recommended practice is to place N at rates greater than 7 kg/ha N, P at rates greater than 20 kg/ha P<sub>2</sub>O<sub>5</sub>, and all K and S, away from the seed to avoid seed injury. N should be applied in spring. P should be applied at sowing. K may be banded or broadcast and cultivated into the soil before sowing.

Fall fertilizer applications are generally less efficient than spring applications but are often preferred in order to spread the workload and to avoid drying and loosening the seedbed in spring. Band placement of fall applications will minimize loss. Elemental and other non-oxidized forms of S should be broadcast in the fall preceding sowing, to allow conversion to the plant-available sulphate form.

## Preferred nutrient forms

For the soil and climatic conditions in which Canola is grown, all nutrients should be in easily plant-available form. If properly applied, N is equally effective as urea, anhydrous ammonia, nitrate and ammonium sources. P should be in water-soluble form, K as chloride or sulphate, and S as sulphate.

## Present fertilizer practice in Canada

(for yields ranging from 1 000 to 2 000 kg/ha depending on available moisture)

Note that all Provinces recommend soil analysis and, when possible, plant analysis, for specific recommendations.

### Manitoba (all soils):

Land	kg/ha			
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	S
Fallow or legume break	0- 35	30-45*	**	***
Grass and grass-legume break	35- 80	30-45*	**	***
Stubble	80-100	30-45*	**	***

\* Not more than 20 kg/ha to be placed with the seed. \*\* Sands, sandy loams and organic soils use 35-70 kg/ha \*\*\* Grey luvisol and well drained soils deficient in S use 20 kg/ha.

### Saskatchewan:

Soil zone	kg/ha				
	N		P2O5	K2O	S
	Stubble	Fallow			
Brown	10- 40	0-10	15-40*	-	-
Dark brown	26- 65	0-15	15-40*	-	-
Black	55-100	20-65	15-40*	-	-
Dark grey	60-105	25-70	15-40*	0-40	0-30
Grey	60-110	25-70	15-40*	0-40	10-30
Irrigation	85-130	55-90	15-40*	-	-

\* Up to 30 kg/ha may be placed with the seed.

### Alberta and British Columbia (Peace River Region):

Soil zone	kg/ha					
	N	P2O5	K2O	N	P2O5	K2O
	Fallow			Stubble		
Brown	5-15	10-20*	-	20- 55	10-15	-
Dark brown	5-30	15-20	-	35- 70	15-20	-
Thin black	5-35	15-25	-	30- 80	15-25	-
Black & Grey wooded	5-45	15-35	0-10	40-100	15-35	0-20
Irrigation				35-140	35-60	-

\* Not more than 20 kg/ha to be placed with the seed.

### Further reading

GRANT, C.A.; BAILEY, L.D.: Fertility management in canola production. In: Proceed. International Canola Conference, April 1990, Atlanta, GA, USA . Potash & Phosphate Institute, Atlanta, GA, USA (1990)

THOMAS, P.: Canola Growers Manual. Canola Council of Canada, Winnipeg, MB, Canada (1984)

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*Authors: L.D. Bailey, C.A. Grant, Research Scientists, Agriculture Canada, Brandon Research Station, Brandon Manitoba, Canada*