

# Agrotechnical and plant protection measures in rapeseed

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## Weed control

## Crop rotation

The best preceding crops are cereal grains, legumes and row crops, which free the area early and allow sufficient time for soil preparation for sowing rapeseed. Sunflower is an unsuitable preceding crop, as both crops are hosts of economically important diseases. It is best to sow the crop in the same place every 3–4 years. Rapeseed is a good preceding crop for cereals, as it cleans the soil from pathogens and suppresses the development of certain weeds, such as johnsongrass and couch grass.

## **Soil tillage**

It is necessary to ensure a loose and soft surface layer, without clods and weeds, and without plant residues from the previous crop. Rapeseed seeds are very small and require a firm seedbed. Rolling before and during sowing promotes uniform emergence and preservation of soil moisture.

## **Good soil moisture reserve**

In case of prolonged drought, it is recommended to wait for rainfall so that sowing can be carried out when the soil has a good moisture reserve – about 70% of field capacity.

## **Suitable soil type**

The most suitable soils for rapeseed are those with medium to heavy mechanical composition, neutral reaction – pH 6–7, rich in humus and calcium, with good water-retention properties and not prone to crust formation.

## **Sowing**

The optimal period for sowing rapeseed is from the end of August to around 20–25 September. By the onset of winter frosts, plants should have formed a rosette with 6–8 leaves and a well-developed root system. For uniform emergence, the optimal sowing depth is 2–4 cm.

## **Fertilization**

The soil nutrient status and the fertilizer rates required for the crop are most accurately determined after soil analysis for each specific field. Phosphorus and potassium fertilizers are applied with the primary tillage, and nitrogen – as top dressing. For forming a good seed yield, the following fertilizer rates are recommended:

- on poorly supplied soils: nitrogen 18–20 kg/da, phosphorus 8–10 kg/da, potassium 10–12 kg/da;
- on well supplied and highly fertile soils: nitrogen 14–16 kg/da, phosphorus 6–8 kg/da, potassium 9–10 kg/da.

## **Weed control**

Heavy weed infestation in rapeseed significantly reduces yield and may be a reason for ploughing in the crop as early as autumn. Early destruction of weeds reduces competition with the crop for water, light and nutrients. When selecting areas for sowing rapeseed, heavily infested fields with wild mustard and wild radish should be avoided due to the risk of cross-pollination and the difficulty of controlling weeds from the same family. Priority should be given to weed control in

autumn with soil-applied herbicides, applied before sowing or after sowing, before crop emergence, or in early growth stages of rapeseed and weeds.

### **Pest control**

In autumn, rapeseed is attacked by pests which, at a certain density, can cause major economic losses. The purpose of autumn treatment of rapeseed with insecticides is to preserve the integrity of the leaf mass of the plants as much as possible for their successful overwintering. Priority should be given to sowing insecticide-treated seed and regularly surveying the crops to determine pest density.

#### **Turnip sawfly – *Anthalia rosae***

In autumn, the third generation of the pest develops. The adult sawflies fly until the end of October and lay their eggs on the cotyledons and the first true leaves. Young larvae feed on the underside of the leaves, gnawing them in the form of small pits. As they grow, they make holes in the leaf blades, which gradually enlarge, cause peripheral gnawing, and later they eat the entire leaf blade, leaving only the main veins. After completing their development, the larvae burrow into the soil and remain there to overwinter.

Control:

Control against the turnip sawfly is carried out at an economic threshold of 2–3 larvae/m<sup>2</sup> or 2–3 damaged plants/m<sup>2</sup>.

Registered insecticides for control:

Karate Zeon 5 CS – 15 ml/da; Cytrin Max – 5 ml/da, Decis 100 EC – 6.3 ml/da, Dukat 25 EC – 20 ml/da, Pirinex Supreme 3W – 60 ml/da

#### **Rape stem flea beetle – *Psylliodes chrysocephala***

The rape stem flea beetle is widespread and at high density causes enormous damage. The pest develops one generation per year. It overwinters as egg, larva and adult. In September, adults begin to feed intensively and from the end of September to mid-December lay eggs. The hatched larvae initially bore into the epidermis of the stems, and later into the petioles and central veins of the leaves. Part of the larvae hatch in spring.

A related species to the rape stem flea beetle is the **Small rape stem flea beetle**. Other harmful flea beetle species on rapeseed are black, light-legged, wavy-striped, flax, hemp and other ground flea beetles.

Control:

Chemical control is carried out at a threshold of: 2 adults/sq.m at emergence; 4 adults/sq.m after appearance of the 3rd leaf; 3–5 larvae per plant.

Registered insecticides for control:

Mavrik 2 F – 30 ml/da; Cytrin Max – 5 ml/da; Deka EC – 30 ml/da; Decis 100 EC – 5 ml/da; Dukat 25 EC – 30 ml/da; Mageos – 5 g/da; Nurelle D – 60 ml/da; Pirinex Supreme 3W – 60 ml/da; Sherpa 100 EW – 25 ml/da.

#### **Rape leaf beetle – *Entomoscelis adonidis***

The beetles attack early-sown rapeseed and feed on the leaves. At high density they can thin the stand. In a long and warm autumn with little rainfall, the larvae are harmful. They feed on the leaf mass of rapeseed, destroying it completely and leaving only the veins.

Control:

Threshold of harmfulness: 2–3 beetles/sq.m at emergence.

#### **Rape stem weevil – *Ceuthorrhynchus picitarsis***

The larvae of the pest are harmful, making galleries in the leaf petioles and then moving into the stem. In weak plants with thin and short leaf petioles, they reach the central part of the stem and bore into the growing point as early as autumn. Such plants die or do not form central stems, but only lateral ones.

Control:

Chemical control should be carried out at a density of 2–4 beetles/sq.m.

Registered insecticides for control: Mavrik 2 F – 30 ml/da;

Cytrin Max – 5 ml/da.

#### **Disease control**

##### **Phoma stem canker (Phomosis)**

Pathogen: *Leptosphaeria maculans* – fungus. The disease in rapeseed manifests itself from plant emergence to the “6th leaf” growth stage. On the lowest leaves, irregular rounded, grey-greenish spots with small black dots (pycnidia of the pathogen) are formed. The spots gradually become necrotic and cover the leaf petioles and stem. Infection of the stem occurs directly at or above the soil surface. Phoma also attacks the root neck, causing dark spots that lead to drying out and death of the plants. The disease develops in patches in the field and under favourable conditions

very quickly covers the entire field. The pathogen survives in plant residues and partly in rapeseed seeds. Development of phoma is favoured by rainy and humid weather and an optimal daily temperature of 22–24 degrees.

#### Control:

To control the disease, balanced fertilization should be applied and pests on rapeseed should be controlled, as their damage serves as an entry point for infection. For successful disease control, autumn application of fungicides should be undertaken, which will significantly reduce the frequency and severity of infection, as well as the risk of plant winterkill.

#### Registered fungicides for control:

Caramba 60 EC – 120 ml/da; Orius 25 EW/Dynasty 25 EW/Tebu-max 25 EW – 50 ml/da; Pictor SC – 50 ml/da; Folicur 250 EW/Horizon – 50–100 ml/da; Amistar Gold – 100 ml/da; Caryx 240 SL – 70 ml/da; Mirador Forte 160 EC – 100 ml/da; Propulse 250 SE – 100 ml/da; Tilmor 240 EC – 100 ml/da; Toprex 375 SC – 30 ml/da (autumn), 50 ml/da (spring).