

# Pest control system for field vegetable crops in August

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## TOMATOES AND PEPPERS

**Pest – Late blight** *Phytophthora infestans*

### **Damage**

On the stem the disease manifests itself as large black spots that penetrate deeply. The spots are dry and hard. They interrupt the sap flow and the part above them dries out. The disease attacks the green fruits. Large, dark brown, rough spots appear on them. Ripening and ripe fruits are not attacked by the disease.

## Control

Under conditions of persistently high temperatures above 25°C the development of the disease is limited; when such conditions are maintained, treatments should be carried out with contact fungicides.

The quarantine periods of the plant protection products used, in accordance with the harvest time of the fruits, must be strictly observed.

**Pest – Powdery mildew** *Leveillula taurica*

## Damage

It attacks only the leaves. On their upper side chlorotic spots are formed, and on the lower side a sparse white coating. The spots are delimited by the venation and in case of severe attack the leaves scorch.

## Control

After establishing spots of the disease, treatments should be carried out at intervals of 10-12 days with one of the registered fungicides with systemic action. A high relative air humidity should be maintained by misting the plants.

**Pest – Stolbur** *Phytoplasma solani*

## Damage

At first sight the diseased plants appear well developed. The new branches are anthocyanin-coloured. The leaves are strongly reduced, and the veins on the underside are violet-coloured. The sepals grow vigorously. The petals, stamens and pistil atrophy. The flowers are not fertilized.

## Control

The flight of the pest *Hyalestes obsoletus*, vector of the disease, continues. Depending on meteorological conditions, its flight duration is from 50 to 70 days. This determines the number of treatments. Economic threshold:

- 2 adults/10 sweeps with an entomological net;

## **Pest – *Pepper blight* *Phytophthora capsici***

### **Damage**

Favourable conditions for the development of the pathogen are moist soil with a temperature above 18°C and prolonged rainfall with a temperature of 24-29°C. The leaves of diseased plants wilt without changing their green colour and after a few days the plants die.

### **Control**

Upon establishing symptoms, diseased plants should be pulled out together with the soil around the root and destroyed. The neighbouring healthy plants on both sides of the row should also be removed. The healthy ones should be sprayed with systemic fungicides.

## **Pest – *Bacterial spot* *Xanthomonas campestris* pv. *vesicatoria***

### **Damage**

On all aboveground parts of the plants small, watery, dark spots of various shape and size appear. The spots are often delimited by a yellowish halo. In case of severe attack the leaves turn yellow and fall off.

### **Control**

At the appearance of the first symptoms, copper-containing fungicides should be used. Control of the disease includes: observance of a three-year crop rotation, sowing of disinfected seeds, surface irrigation, regular destruction of weeds.

## **Pest – *Spider mites* *Tetranychus* sp.**

### **Damage**

The warm weather in July contributes to the rapid multiplication of mites. They suck sap from the underside of leaves that have completed their growth. At the feeding sites the tissues pale and are entwined with webbing. Severely damaged leaves dry out completely, and the plants lag behind in their growth and produce low and poor-quality yields.

### **Control**

Regular monitoring of mite density should continue. Economic threshold:

- *tomatoes – 10% infested plants;*
- *peppers – 5-6 individuals per leaf;*
- *eggplants – 5 individuals per leaf or 10-15% infested plants;*

*cucumbers – 5% infested plants;*

**Pest – Aphids** *fam. Aphididae*

## **Damage**

Persistently high temperatures and low air humidity in summer reduced the aphid density. Nevertheless, they should not be underestimated because they are vectors of viral diseases.

## **Control**

Spraying should be carried out at the following economic thresholds:

- *tomatoes – 10% infested plants and formation of the first colonies;*
- *peppers – 5% infested plants with single colonies;*

**Pest – Thrips** *Thrips tabaci, Franklinella occidentalis*

## **Damage**

With the increase in temperatures during the summer months, the density of thrips also increased. They suck sap from the leaves, the growing point and the buds. Besides the direct damage, thrips are also vectors of tomato spotted wilt virus (tomato bronzing).

## **Control**

Control of these pests requires regular destruction of weed vegetation, field inspections and spraying with authorised plant protection products at the approved doses.

**Pest – Greenhouse whitefly** *Trialeurodes vaporariorum*

## **Damage**

Initially, light specks appear on the leaves, which merge over time. In case of severe attack the fruits grow unevenly and ripen unevenly.

## **Control**

Timely treatments with authorised insecticides should be carried out, alternating products with different modes of action and spraying the underside of the leaves.

**Pest – Tomato leaf miner** *Tuta absoluta*

## **Damage**

The caterpillars feed on all aboveground parts. They bore into the young shoots and terminal buds, eating out their core, whereby the plants become deformed. Mature caterpillars also enter the fruits, where rough wounds with excrement around the entrance are observed.

## **Control**

Before undertaking spraying, the predominant developmental stage of the pest (adults, eggs or larvae) must be known in order to make the correct choice of insecticide. Treatments directed against the earlier larval stages are more effective.

**Pest – Cotton bollworm** *Helicoverpa armigera*

## **Damage**

The caterpillars prefer the generative organs of the plants. On tomato fruits they gnaw holes of various size and depth. In pepper fruits they gnaw an entrance hole and penetrate inside, where they feed on the seeds.

## **Control**

The greatest damage is caused by the caterpillars of the second generation. **Economic threshold:**

**5% damaged fruits – at growth stage “fruit formation”.** When crops are at harvest maturity, plant protection products with a shorter quarantine period should be used.

## CUCUMBERS

**Pest – Angular leaf spot (Bacterial blight)** *Pseudomonas syringae* pv. *lacrymans*

### **Damage**

In case of severe attack the leaves scorch completely. On the fruits the spots are small, watery, with whitish exudate on them. The damage spreads inward into the fruit in the form of wet rot.

### **Control**

At the appearance of disease symptoms, spraying with copper-containing plant protection products should be carried out. In areas affected by hailstorms, treatment is mandatory.

**Pest – Downy mildew of cucurbits (Cucurbit downy mildew)** *Pseudoperonospora cubensis*

### **Damage**

On the upper leaf surface chlorotic spots appear, diffuse or delimited by the venation. In case of severe attack the leaves and entire plants dry out.

### **Control**

Regular irrigation of cucumbers creates a constant risk of the disease. When spraying, the lower leaf surface should be well covered.

**Pest – Powdery mildew** *Sphaerotheca fuliginea*

### **Damage**

On the leaves small round spots appear, covered with a white powdery coating. In case of severe attack the leaves turn yellow and dry out, and the fruit set dies. Under favourable climatic conditions, spots covered with powdery coating are observed on young fruits as well.

### **Control**

To limit the disease, treatments should be carried out at intervals of 10-12 days with one of the registered fungicides with systemic action. The quarantine periods of the fungicides used must be strictly observed.

**Pest – Aphids** fam. *Aphididae*

## **Damage**

Monitoring of aphids should continue.

## **Control**

Treatment should be carried out at the following economic threshold:

- cucumbers – 20-25% infested plants – during July-August;

## **CABBAGE**

**Pest – Downy mildew of cabbage** *Peronospora parasitica*

## **Damage**

On the outer leaves pale yellow spots with a coating on the underside are formed. The infection from them may pass to the inner leaves, on which dry spots appear or wet rot develops. Gradually the infection penetrates deeper into the heads.

## **Control**

Infested heads cannot be stored and rot quickly.

Regular inspections should be carried out and, upon confirmed attack, treatment with systemic plant protection products should be applied.

**Pest – Cabbage flea beetles** *Phyllotreta* sp.

## **Damage**

When feeding, cabbage flea beetles prefer young and tender leaves, but along with them they can also damage older ones.

## **Control**

Economic threshold:

- after transplanting – 10 beetles/sq. m; during vegetation – 10% destroyed leaf mass

**Pest – Cabbage butterflies** *Pieris sp.*

### **Damage**

Young caterpillars gnaw the lower epidermis and parenchyma tissue without affecting the upper epidermis. Adult caterpillars eat large areas of the leaves, and can destroy almost the entire leaf blade, leaving only the thick veins unaffected.

They do not penetrate into the cabbage heads.

### **Control**

Treatment should be carried out against II-III instar caterpillars at the following economic thresholds:

- after transplanting – over 1% heavily infested plants; 2-3 caterpillars/plant;
- during vegetation – egg clusters on 5% of the plants or 25% damaged leaves.

**Pest – Cabbage moth** *Mamestra brassicae*

### **Damage**

The development of the second generation of cabbage moth caterpillars should be monitored. The caterpillars bore tunnels into the cabbage heads and fill them with excrement.

### **Control**

Treatment should be carried out against the caterpillars at the following economic threshold:

- 15-18 caterpillars per 100 plants.

**Pest – Diamondback moth** *Plutella maculipennis*

### **Damage**



Newly hatched caterpillars mine the leaves, later they gnaw the lower epidermis and parenchyma without affecting the upper epidermis. In case of mass attack they destroy a large part of the leaf blade and the leaves dry out.

## Control

The diamondback moth is particularly dangerous for late cabbage. Spraying should be carried out against the caterpillars at the following economic threshold

- 10% damaged leaf mass after head formation.

**When treating cabbage crops, a wetting agent/adjuvant should be added!**

## LEEEKS

*Pest – Leek leaf miner fly* *Napomyza gymnostoma*

### Damage

The larvae make tunnels in the leek stems. Its sheath leaves split at the damage site and later pathogens penetrate through the cracks. The larvae complete their development in the leek, pupate and overwinter in it.

## Control

In August, the flight of the third generation of the pest is expected. Chemical control against the larvae is difficult because of their hidden way of life. Treatment should be directed against the flies during their flight, before egg laying.

**When treating onion crops, a wetting agent/adjuvant should be added!**

## POTATOES

*Pest – Late blight of potato* *Phytophthora infestans*

### Damage

The development and spread of the disease throughout the country continues. In heavily infested crops, damage to the tubers is also recorded. Lead-grey, sunken spots are formed on them. The damage expands, the

flesh under them necrotizes and acquires a rusty-brown colour.

### **Control**

In unstable weather, high air humidity, moderate average daily temperatures and established infection on the plants, systemic fungicides should be used. Within one vegetation period, one product or a group of products with the same mode of action should not be applied more than three times.

**Pest – Early blight (*Alternaria leaf spot*) *Alternaria solani***

### **Damage**

On the leaves the spots are irregular and concentrically zoned. On the stems they are black and slightly elongated, and on the tubers they are slightly sunken, dark brown with a black coating on them.

### **Control**

Treatments against early blight should be continued every 7-10 days with registered plant protection products.

**Pest – Colorado potato beetle *Leptinotarsa decemlineata***

### **Damage**

The recorded attack by the pest is at a traditionally high density for all potato-growing regions in the country. Adults and larvae feed by eating the entire leaf mass and only stems and thicker petioles may remain from the plant.

### **Control**

Chemical control should be carried out at the following economic threshold for larvae – 20% infested plants;

for seed potato crops:

- 20% infested plants by larvae and adults;
- 5-10 larvae and adults per 100 plants;

**Pest – Potato tuber moth *Phthorimaea operculella***

## ***Damage***

Mainly tubers are attacked, where the caterpillars gnaw galleries filled with excrement, frass and webbing.

Above the damage site the tuber skin dries out and sinks. Damaged potatoes are unfit for consumption and processing.

## **Control**

Timely harvesting of the crop and destruction of plant residues reduces the pest density. At confirmed high density, before mowing the foliage, treatment with a contact product with a short quarantine period should be carried out.