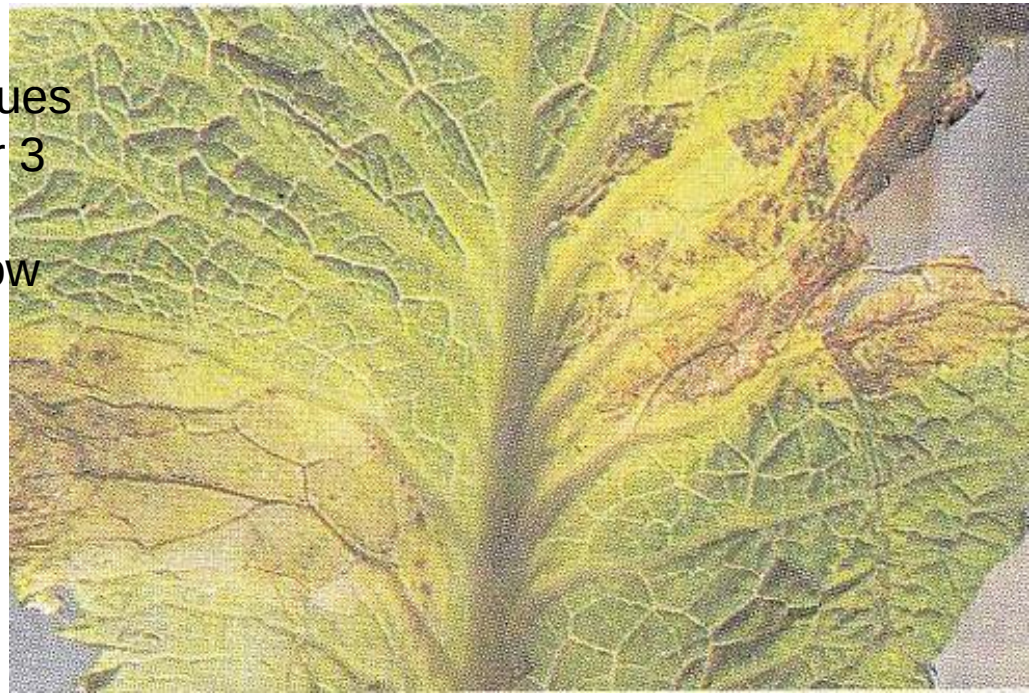
All Cole Crops
Crucifer brown rot Xanthomonas campestris

- The bacteria are transmitted on seeds and block conducting tissues; young plants die, in older plants, necrosis spreads from leaf margins, forming a V-shape area
- Nervation in infected areas turns black, vascular bundles are black in cross section
- Perform seed dressing (Warm water of 50oC for 20 min. will suffice)
- Dispose of post-harvest residues
- Do not cultivate cole crops for 3 years
- Low storage temperatures slow down the course of the disease
- The disease is not frequent



Leaf edges are infested first

Brown rot in white cabbage

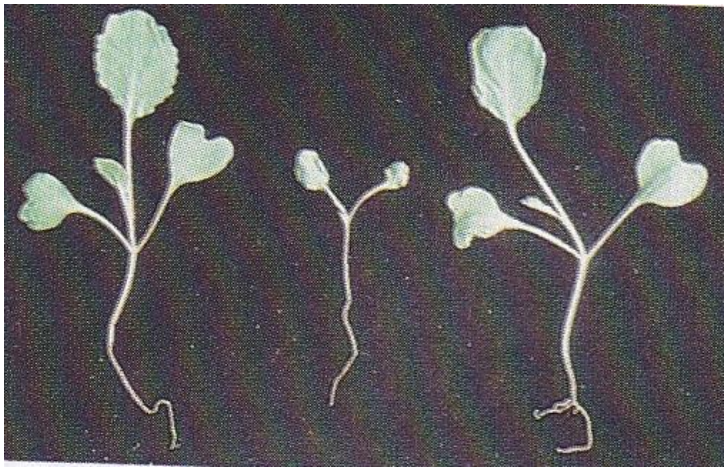
Damping off

Rhizoctonia solani, Olpidium brassicae

- At the time of seedling pre-cultivation

– Stem bases of all cole crops constrict and turn black and seedlings collapse

- Transmitted in the soil
- Perform seed dressing
- Steam (sterilise) the substrate
- Maintain optimum moisture of substrate
- Sow at a larger spacing
- Prevent soil crust
- Water with fungicide as soon as infestation occurs
- The occurrence of the disease is not frequent



All Cole Crops Especially Head Cabbage, Late Kohlrabi

Grey mould Botritis cinerea

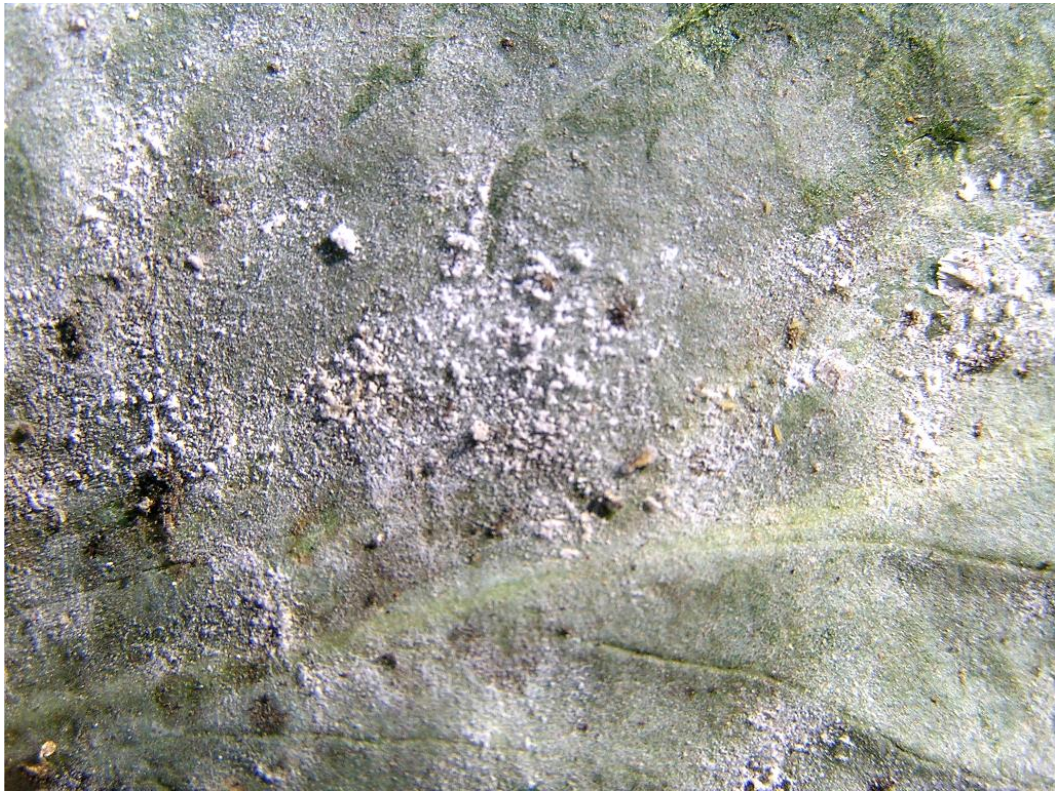
- Heads are covered with grey-white mould growth and rot
- Losses at storage
- The disease need not occur
- The disease appears in many plant species
- A wet season + mechanical harvesting

– It is adequate to use a chemical spray

- Do not overfertilise with nitrogen
- Harvest carefully to avoid damage on heads (breaking, bruising)
- Store only healthy heads

Brussels Sprouts, Beijing Cabbage
Pea mildew Erysiphe polygoni

- White, farinose growth on older leaves and bottom sprouts, grey-black patches at a later stage; the disease occurs in dry, warm weather after the end of July
- Grow resistant cultivars
- The disease is not frequent and is of no big significance
- Chemical protection is not necessary



Brussels Sprouts, Cabbage
Cabbage root fly Delia radicum

- The fly of 6 mm in size, the larva of 8 mm in size; the chrysalis overwinters in soil; 2-3 generations
- The fly does not infest old plants, lays eggs on young plants (5-6 leaves), and larvae eat the growing point and the head which distorts, fails to grow fully, and is not storable or marketable; plants die or grow slowly; there are tiny corridors in the roots occupied by yellow-white larvae living in the soil
- The most critical in late cole crops and Peking cabbage, the second generation at the end of July and the beginning of August – the best protection is non-woven fabric
- Cover with non-woven fabric
- When eggs emerge, conduct preventive watering (Diazinon)

Cabbage root fly

All Cole Crops, Peking cabbage, and Chinese cabbage
Flea beetles Phyllotreta spp.

- 1-3 mm holes on the leaves of plants that are coming up, dangerous damage in young plants, the beetles are skipping when you go through the stand
- The beetles breed excessively in dry, warm weather
- The greatest risk in medium late and late cole crops:

Cabbage – planting between the second half of June and the beginning of July – it is the time of the rape harvest and millions of beetles migrate and cause damage to young plants

- Non-woven fabric is absolutely vital as protection, also regular watering – higher humidity – smaller risk of damage – Meligethes and flea beetles do not migrate when it is raining
- Spraying is not effective – beetles get killed, but other millions of beetles will come again
- If Peking cabbage is not immediately covered with fabric, beetles eat the growing point of young plants – no head forms
- Intensive watering considerably reduces the number of beetles
- Sprays – Decis, Ekalux
- Discard post-harvest residues
- Separate cole crops from rape

Cabbage, Cauliflower, Broccoli Swede midge Contarinia nasturtii

- Similar to mosquitoes; the larva overwinter in a cocoon in the soil
- Adults hatch in May and do not feed, females lay eggs on leaves and petioles
- Yellow-white larvae 3 mm in size attack petioles on the upper side of leaves, petioles are thickened, leaves curl, hearts die off, and new side shoots develop, the growing point is a green compact part without any inflorescence

- 3-5 generations per year, the highest number in the spring – early cauliflower and broccoli
- The swede midge is a threat to early cole crops; the fly lays eggs, the larva prevents the growing point from forming – whiptail; mainly cauliflower and broccoli – protection with non-woven fabric
- The midge marks the plant with a scent, never lays more than one egg on the plant, and the plant is damaged
- Perform seed dressing for early cole crops against the first generation, the substance penetrates the tissues and keeps pests away
- Use non-woven fabric
- Sprays – Decis, Ekalux (has no effect on eggs)
- Discard post-harvest residues

All Cole Crops

Turnip gall weevil Ceutorrhynchus pleurostigma

- Beetles 2-3 mm in size occur in 2 generations:

1. Spring generation eggs May–June : the larva in a gall for one month
2. Summer generation eggs August–September : the larva in a gall for 3-7 months

- The weevil harms roots and kohlrabi tubers
- Where an egg has been laid, there are round galls with a larva inside
- The hole through which the larva has left the gall

– Secondary infection

- Sprays – Decis, Ekalux
- Apply granules
- Perform seed dressing
- Discard post-harvest residues
- The occurrence of this weevil is not frequent

Root galls

Larva of the turnip gall weevil

All Cole Crops

Cabbage stem weevil Ceutorrhynchus pallidactylus

- This beetle 3 mm in size lays eggs from March to April
- Its larvae cause damage to the growing point and eat holes and corridors in stems and leaf stalks
- Plants curl and die back
- The cabbage stem weevil occurs more frequently than the turnip gall weevil
- The cabbage stem weevil does not cause large damage

All Cole Crops
Especially Cabbage, Cauliflower, Broccoli, and Early Kale Cabbage
Aphid Brevicoryne brassicae

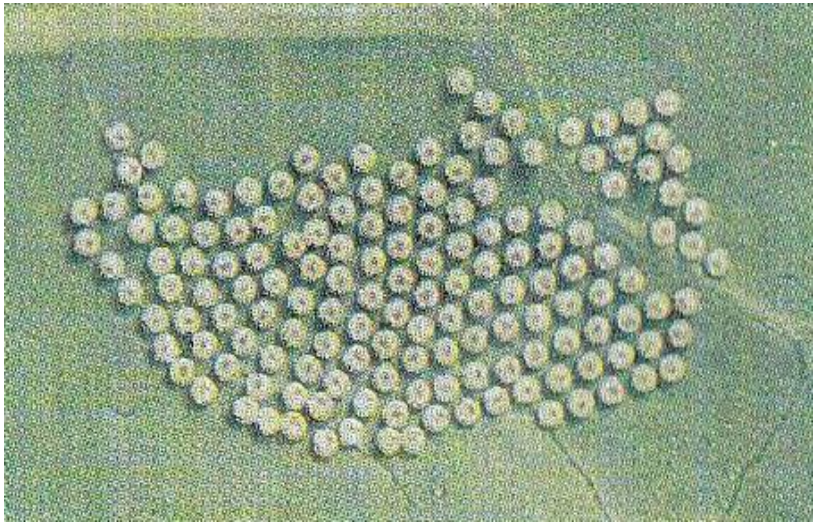
- Greenish, white dusted aphids
- On the upper side of the leaf first, then on the lower side
- From May on, the aphids, winged, infest other cole crops
- The aphid sucks out of leaves and the growing point, and leaves turn yellow and dry out
- A more frequent occurrence during dry, warm years
- Up to 20 generations during a growing period
- Sooty moulds grow over honeydew; virus diseases

- Of biggest threat to young plants – the aphid needs sweet sap – young leaves
- Very effective treatment of seedlings to aphids
- It suffices to spray an area of a few m2 in a hotbed – no need to spray over a hectare of land
- Sprays – Cronethon, Pirimor, Hostaquick, Reldan, Perfektion, Sumialpha
- Remove post-harvest residues from the land

All Cole Crops

Cabbage moth Mamestra brassicae

- The moth lays eggs in clusters on the bottom of leaves
- Green, grey, brown caterpillars up to 5 cm long
- Feeding on leaves, only at night, later, they drill in heads and contaminate them with black-green secretion
- A regular occurrence starting in June, the most serious damage is caused by the second generation of caterpillars in July and August
- The moth is grey-brown, inconspicuous, and small



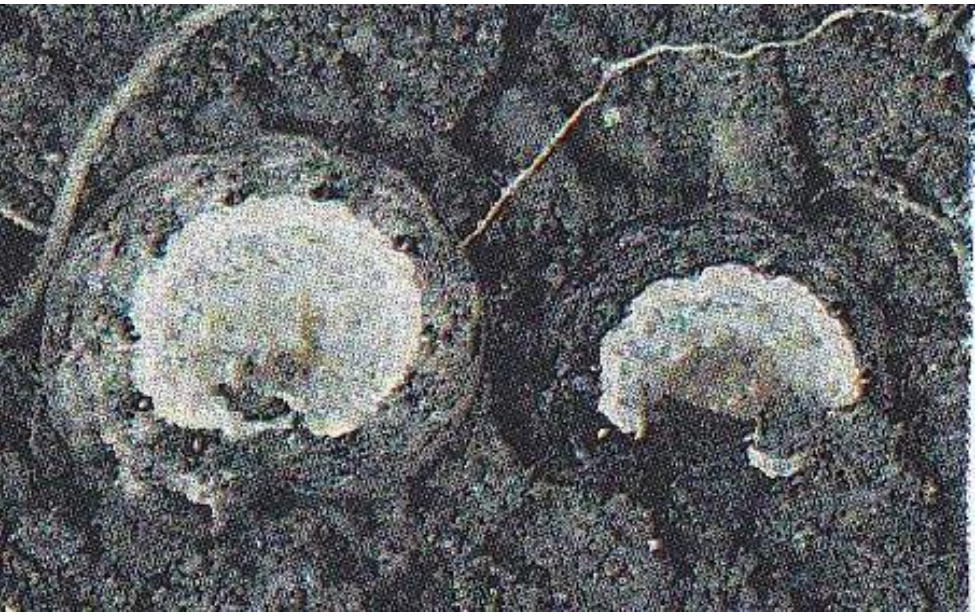
Cluster of eggs

Caterpillars

- Occurrence not very frequent
- Sprays intended for young caterpillars

– Ambush, Cymbush, Decis, Karate, Dragon, Vaztak

- Young caterpillars are eaten by birds
- Caterpillars inside heads in older instars are difficult to hit



Disturbed caterpillars

Damaged cauliflower

All Cole Crops

Turnip moth Agrotis spp.

- Dirty white caterpillars feed on the area between the leaf nervation first
- In the third instar, caterpillars become lucifugous and then harm roots and stem bases
- Plants wilt, die back, the root neck is drilled, and there are holes in leaves and dark green small heaps of secretion on leaves
- Sprays intended for young caterpillars

– Ambush, Cymbush, Decis, Karate, Dragon, Vaztak • Birds, beetles, moles, parasitic insects

- A reduction in during a wet season – bacteria and fungi

All Cole Crops

Cabbage butterfly Pieris brassicae

- Round, green-yellow eggs laid in clusters on the lower surface of leaves
- Yellow-green, 4-cm long caterpillars feed on leaves
- At their overpopulation, the butterflies can induce clear-eating
- The butterfly appears in two generations, the second one is more harmful

(July–September)

- Overpopulation within 4-5 years – It can be discerned by a large number of cabbage butterflies flying around

- If there are a lot of butterflies flying around and eggs are discovered to have been laid – wait for the first caterpillars to appear and conduct a single spraying aimed at the young caterpillars: Ambush, Cymbush, Decis, Karate, Dragon, Vaztak
- The caterpillars also consume kale and, in short, everything
- Targeted protection with the parasitic Bacillus thuringiensis

All Cole Crops

Turnip white butterfly Pieris brassicae

- Finely hairy, light green caterpillars with longitudinal yellow lines
- The caterpillar feeds on outer leaves and later on, it eats its way into the head
- The butterfly appears in two generations, the first one occurring in June, the second one between August and September
- The butterfly is light yellow
- Sprays intended for young caterpillars

– Ambush, Cymbush, Decis, Karate, Dragon, Vaztak

- Employ Bacillus thuringiensis
- Not very common

All Cole Crops

Diamond-back moth Plutella xylostella

- Yellow-grey caterpillars with dark spots over the whole body
- The caterpillars feed on heart leaves first and later on, they eat holes in outer leaves
- The moth appears in two to three generations
- The butterfly is small and brownish-coloured
- The protection is the same as that against the turnip white and cabbage butterflies
- Not very common

Brussels Sprouts, Cauliflower, Broccoli, (Less Frequently Savoy Cabbage)
Cabbage whitefly Aleurodes proletella

- White flies of around 1.5 mm in size fly up in flocks when their plant is touched
- The flies occur in many generations, especially in dry and warm weather in the summer and in the autumn
- Damage is caused by larvae that excrete honeydew which is grown over by sooty moulds• The whiteflies used to emerge only in greenhouses, nowadays, they are common in the stand
- The whitefly does not cause any serious damage
- At the first occurrence of adults, spray with insecticides and respray

All Cole Crops (Especially Cabbage)
Thrips Thrips angusticeps

- During warm, dry weather between July and September, yellowish larvae 1 mm in length occur
- By sucking, they incur silvery patches and leaf distortion
- In storage cabbage, injury is brought about by discharged crystals of calcium
- At the first occurrence of adults, spray with insecticides
- Thrips are only harmful in dry weather – they need dry and warm conditions
- At regular irrigation, thrips are not dangerous pests

Tumours caused by thrips

HERBICIDES

CURRENT KEY PRINCIPLES:

- On early cole crops, do not use herbicides and maintain clear soil
- With late and medium late cole crops, it is necessary to use herbicides, clear stand is needed for mechanical harvesting
- Choose herbicides with respect to what weeds occurred last year
- Not all cole crops stand all herbicides – this information is in reference manuals!

See reference manuals for plant protection

Kohlrabi and cauliflower– some herbicides must not be used – these crops are more sensitive