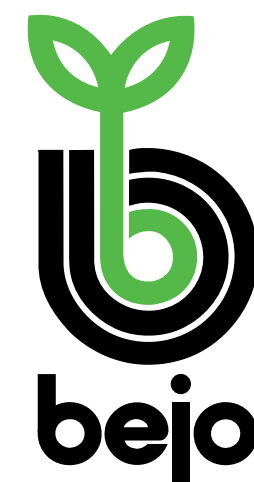


Major pests and diseases in onion

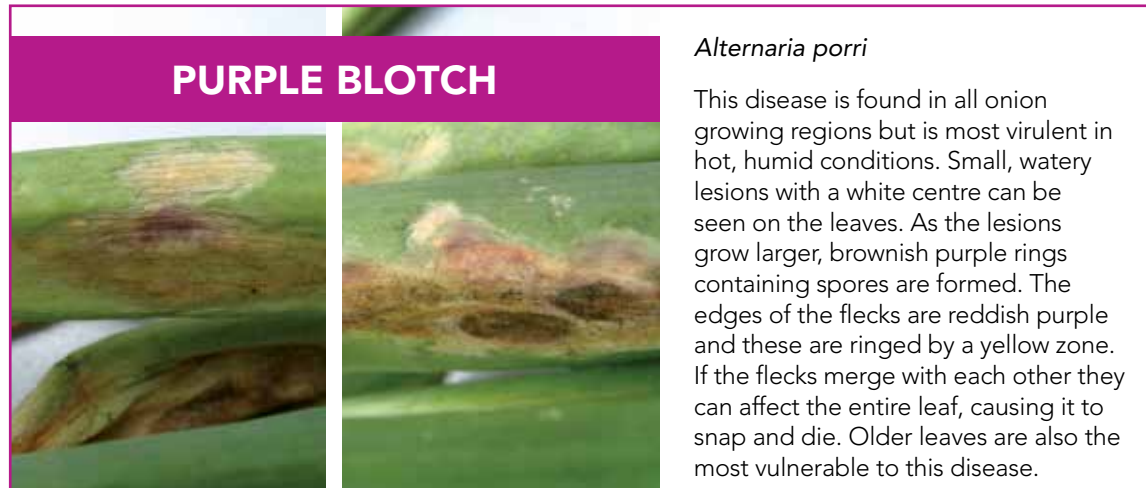


PARTNERS IN ALLIUM

PURPLE BLOTCH

Alternaria porri


This disease is found in all onion growing regions but is most virulent in hot, humid conditions. Small, watery lesions with a white centre can be seen on the leaves. As the lesions grow larger, brownish purple rings containing spores are formed. The edges of the flecks are reddish purple and these are ringed by a yellow zone. If the flecks merge with each other they can affect the entire leaf, causing it to snap and die. Older leaves are also the most vulnerable to this disease.



BLACK MOLD

Aspergillus niger

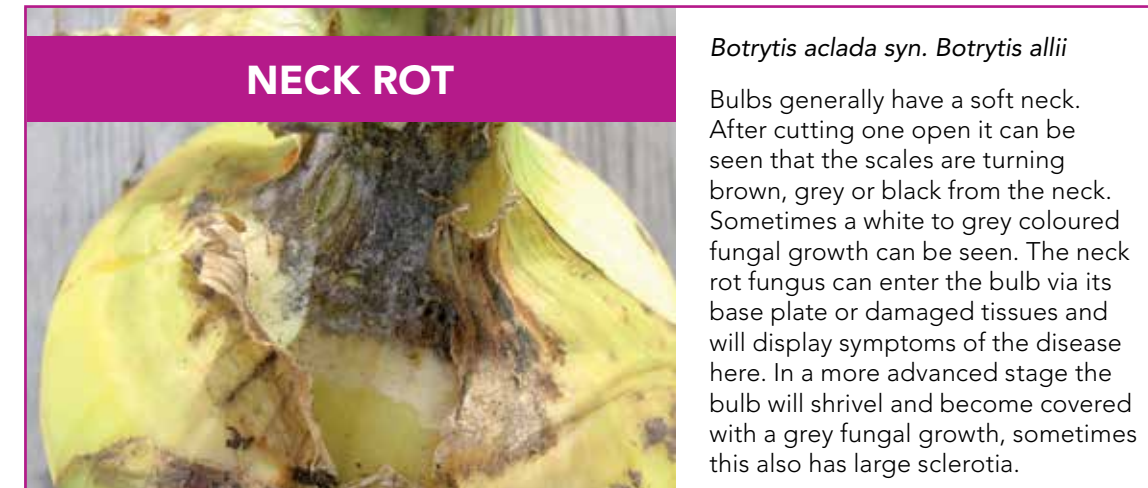
Black mold is mainly a problem during storage, processing and transport. Below the dried skin a powdery, black mass of spores forms which is often invisible on the outside. The spores can be present on each of the scales. Infected scales first appear watery, after which white, fluffy mycelium appears on which black spores quickly form. In advanced stages, the bulbs will start to shrivel. *Aspergillus* is a common fungus mainly found in warm, dry regions.



NECK ROT

Botrytis aclada syn. *Botrytis allii*

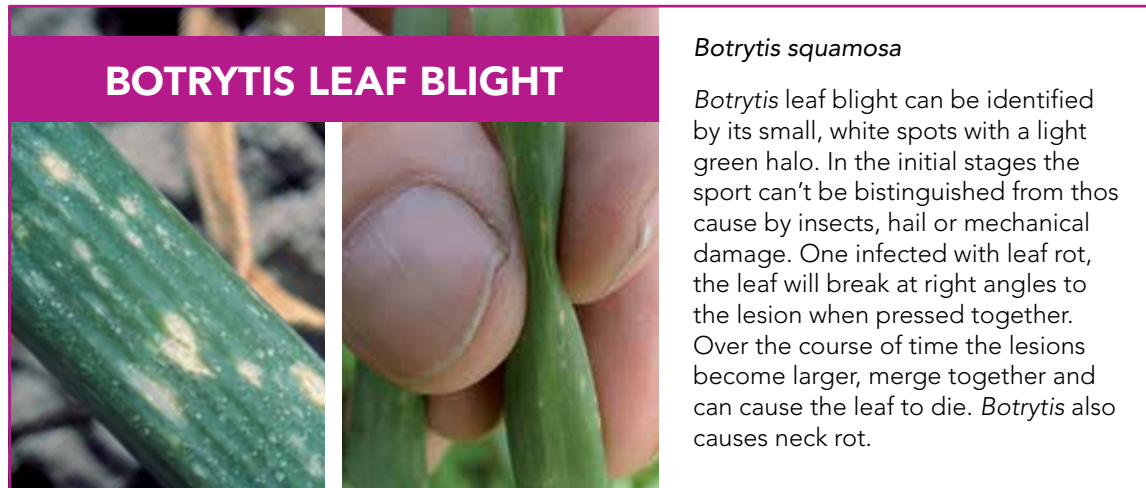
Bulbs generally have a soft neck. After cutting one open it can be seen that the scales are turning brown, grey or black from the neck. Sometimes a white to grey coloured fungal growth can be seen. The neck rot fungus can enter the bulb via its base plate or damaged tissues and will display symptoms of the disease here. In a more advanced stage the bulb will shrivel and become covered with a grey fungal growth, sometimes this also has large sclerotia.



BOTRYTIS LEAF BLIGHT

Botrytis squamosa


Botrytis leaf blight can be identified by its small, white spots with a light green halo. In the initial stages the spots can be distinguished from those caused by insects, hail or mechanical damage. One infected with leaf rot, the leaf will break at right angles to the lesion when pressed together. Over the course of time the lesions become larger, merge together and can cause the leaf to die. *Botrytis* also causes neck rot.



FUSARIUM BASAL ROT

Fusarium oxysporum f.sp. cepae

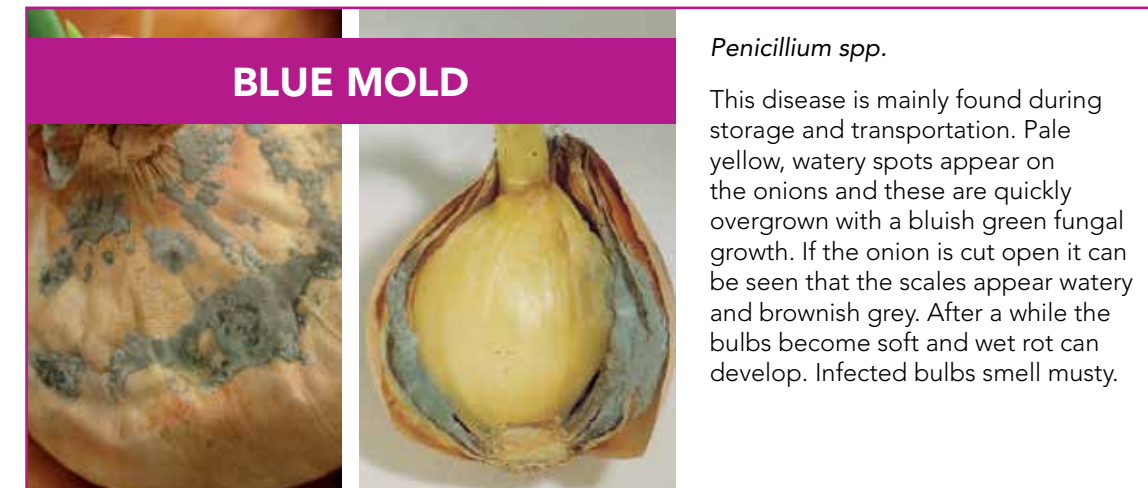
The first symptoms are the appearance of yellowing, twisted leaves. After this the leaves die off starting at the tip. The entire plant can wilt during the early stages of infection. Roots that have been infected turn dark brown and will rot. As the infection develops a white fungal growth will become visible at the basal plate of the bulb which does not contain sclerotia. If an infected bulb is cut lengthwise, the bottom of the bulb and the lowest part of the scales will appear to be watery and pale grey.



BLUE MOLD

Penicillium spp.


This disease is mainly found during storage and transportation. Pale yellow, watery spots appear on the onions and these are quickly overgrown with a bluish green fungal growth. If the onion is cut open it can be seen that the scales appear watery and brownish grey. After a while the bulbs become soft and wet rot can develop. Infected bulbs smell musty.



DOWNY MILDEW

Peronospora destructor

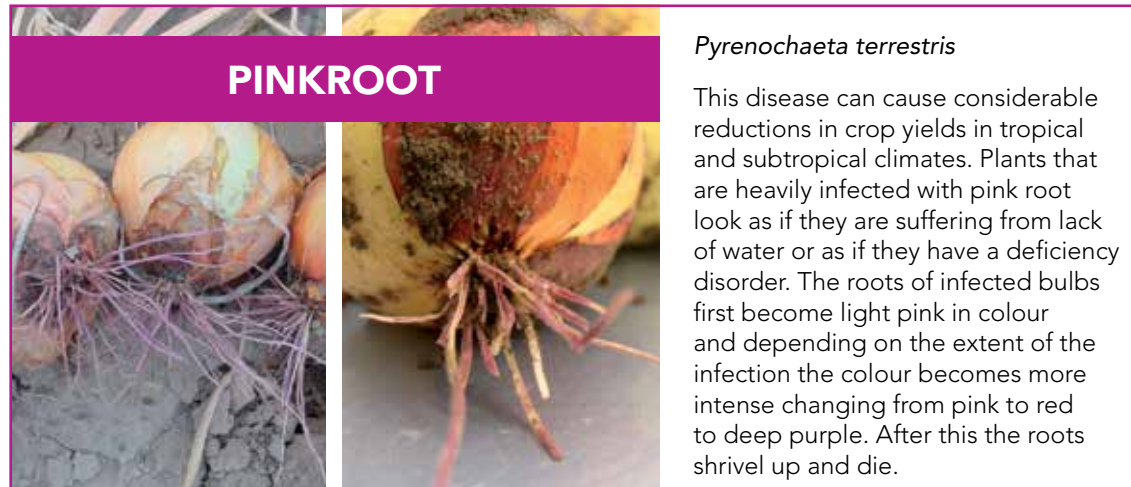
Downy mildew can be found in almost all the important onion growing regions. It occurs mainly during periods of cool, humid weather and affects the quality and quantity of harvests. The initial symptoms to appear are pale green oval patches which in a later stage become covered with violet grey spores. Foliage that has been affected becomes more susceptible to other fungi such as *Alternaria*, which turns the foliage black.



PINKROOT

Pyrenochaeta terrestris

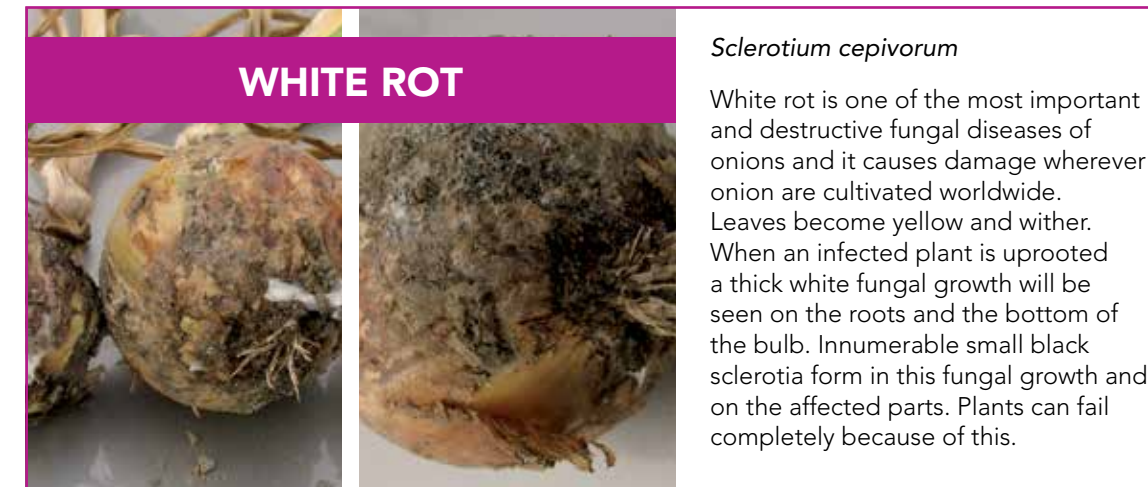
This disease can cause considerable reductions in crop yields in tropical and subtropical climates. Plants that are heavily infected with pink root look as if they are suffering from lack of water or as if they have a deficiency disorder. The roots of infected bulbs first become light pink in colour and depending on the extent of the infection the colour becomes more intense changing from pink to red to deep purple. After this the roots shrivel up and die.



WHITE ROT

Sclerotium cepivorum

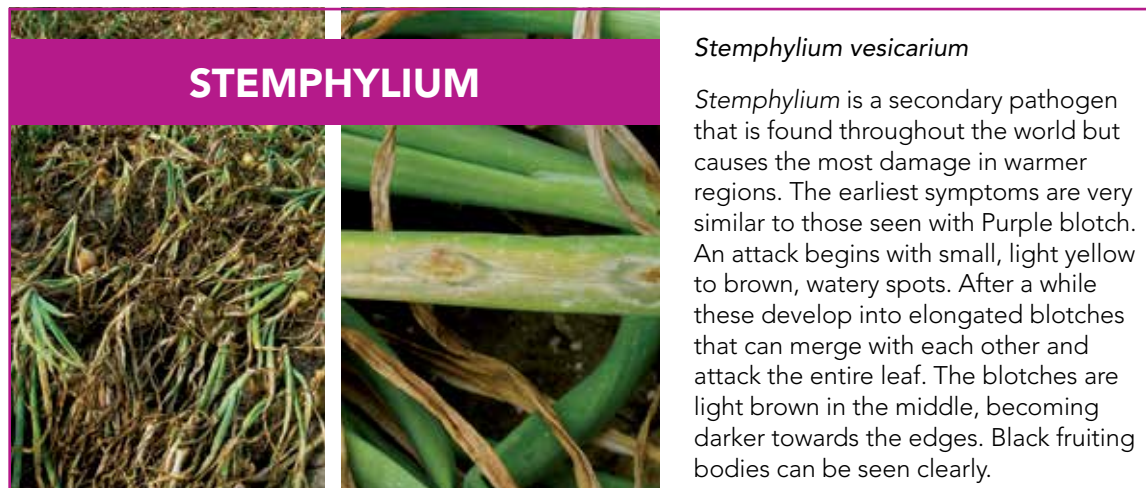
White rot is one of the most important and destructive fungal diseases of onions and it causes damage wherever onion are cultivated worldwide. Leaves become yellow and wither. When an infected plant is uprooted a thick white fungal growth will be seen on the roots and the bottom of the bulb. Innumerable small black sclerotia form in this fungal growth and on the affected parts. Plants can fail completely because of this.



STEMPHYLIUM

Stemphylium vesicarium

Stemphylium is a secondary pathogen that is found throughout the world but causes the most damage in warmer regions. The earliest symptoms are very similar to those seen with Purple blotch. An attack begins with small, light yellow to brown, watery spots. After a while these develop into elongated blotches that can merge with each other and attack the entire leaf. The blotches are light brown in the middle, becoming darker towards the edges. Black fruiting bodies can be seen clearly.



ONION SMUT

Urocystis cepulae

Black spots or bands that are often a little swollen, can be seen on the cotyledons and the first leaves. Later these tear open and a huge number of spores are released. Infected plants suffer from retarded growth and in cases of extreme infection will die off within a few weeks. The symptoms remain visible throughout the entire season and will ultimately infect the bulb as well. Lesions on the bulbs are often the point of entry for different secondary pathogens that cause rot.



BACTERIAL SOFT ROT

Erwinia carotovora subsp. *carotovora*

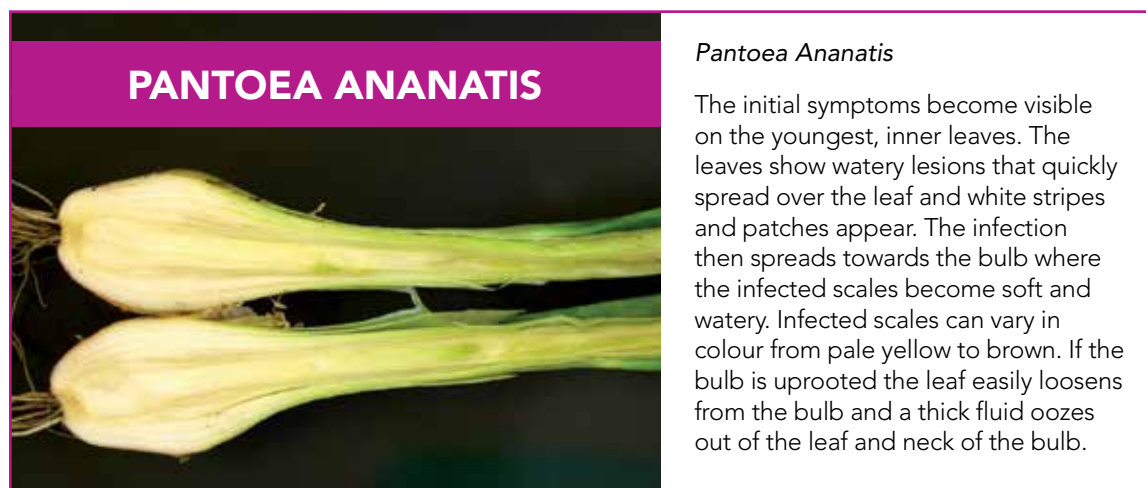
Erwinia can infect the plants in the field. The leaves wilt and will dry out at a later stage. If an infected plant is cut through, it can be seen that the middle of the new bulb is completely slimy and stinks. The scales are soft and appear watery. Later on a pale yellow to light brown slime will form. Affected bulbs are soft and watery. When squeezed, the bulb oozes stinking fluid or slime.



PANTOEA ANANATIS

Pantoea Ananatis


The initial symptoms become visible on the youngest, inner leaves. The leaves show watery lesions that quickly spread over the leaf and white stripes and patches appear. The infection then spreads towards the bulb where the infected scales become soft and watery. Infected scales can vary in colour from pale yellow to brown. If the bulb is uprooted the leaf easily loosens from the bulb and a thick fluid oozes out of the leaf and neck of the bulb.



SOUR SKIN

Pseudomonas cepacia

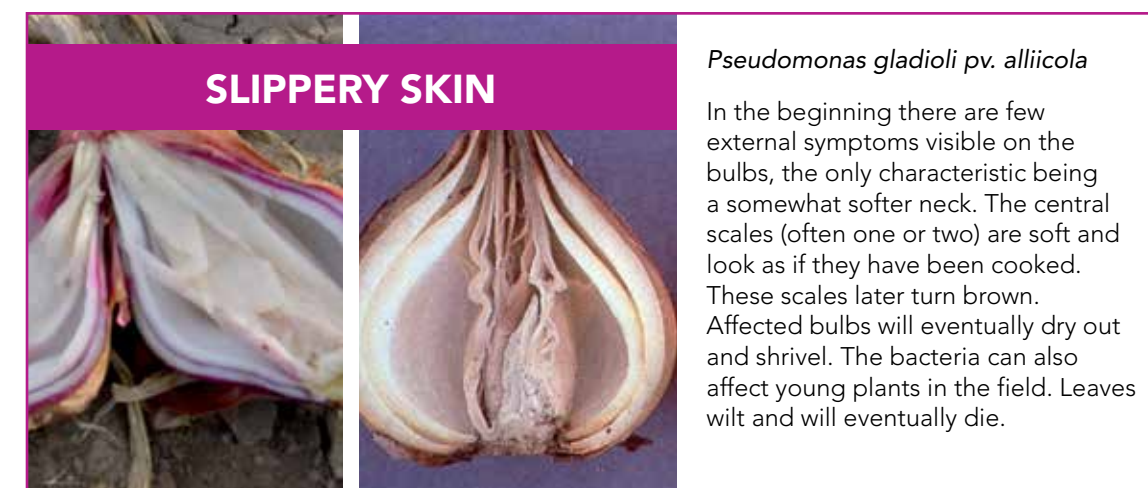
Young foliage is particularly susceptible to this disease. The young leaves are often attacked in their heart and turn light brown. Soft wet rot develops later. The first characteristic after harvesting is a soft neck. The outer scale within the bulb becomes watery and light yellow, later producing a yellowish brown slime. Bulbs that are infected with *Pseudomonas cepacia* give off a typically sour smell.



SLIPPERY SKIN

Pseudomonas gladioli pv. *alliiicola*

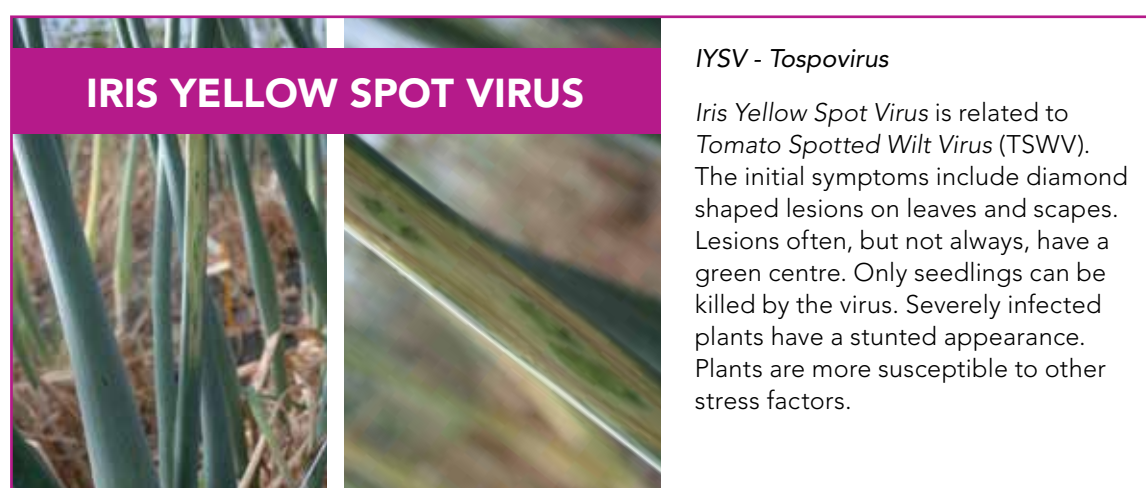
In the beginning there are few external symptoms visible on the bulbs, the only characteristic being a somewhat softer neck. The central scales (often one or two) are soft and look as if they have been cooked. These scales later turn brown. Affected bulbs will eventually dry out and shrivel. The bacteria can also affect young plants in the field. Leaves wilt and will eventually die.



IRIS YELLOW SPOT VIRUS

IYSV - *Tospovirus*

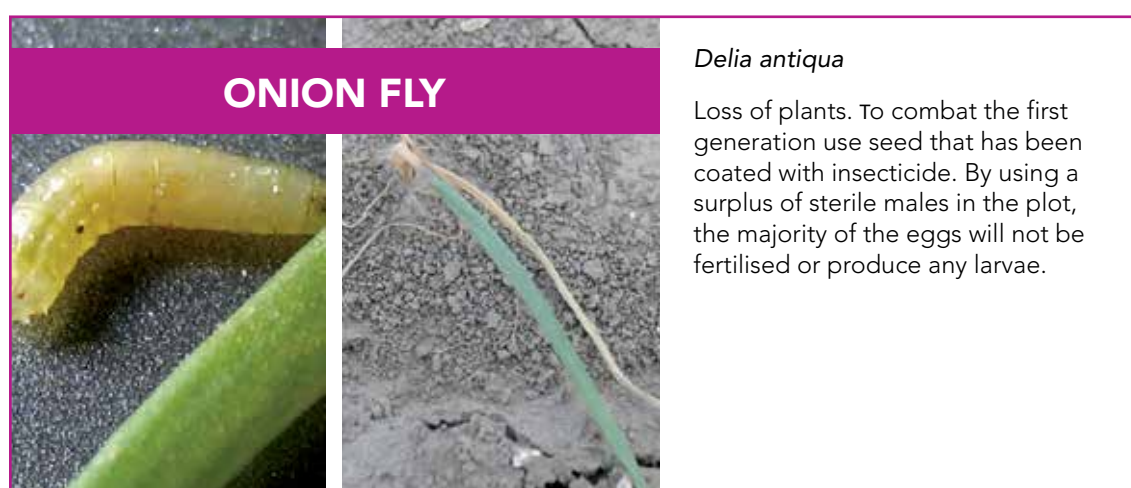
Iris Yellow Spot Virus is related to *Tomato Spotted Wilt Virus* (TSWV). The initial symptoms include diamond shaped lesions on leaves and scapes. Lesions often, but not always, have a green centre. Only seedlings can be killed by the virus. Severely infected plants have a stunted appearance. Plants are more susceptible to other stress factors.



ONION FLY

Delia antiqua

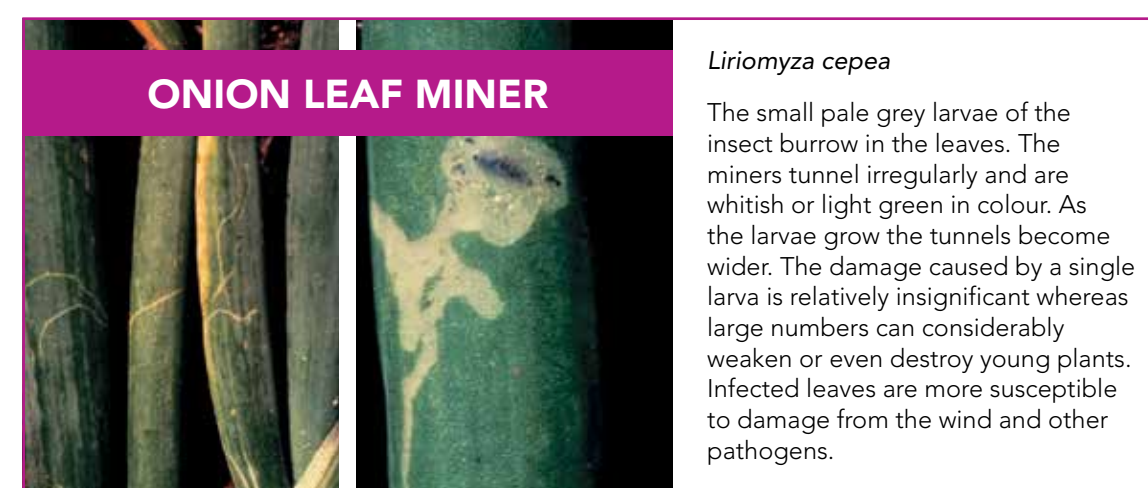
Loss of plants. To combat the first generation use seed that has been coated with insecticide. By using a surplus of sterile males in the plot, the majority of the eggs will not be fertilised or produce any larvae.



ONION LEAF MINER

Liriomyza cepae

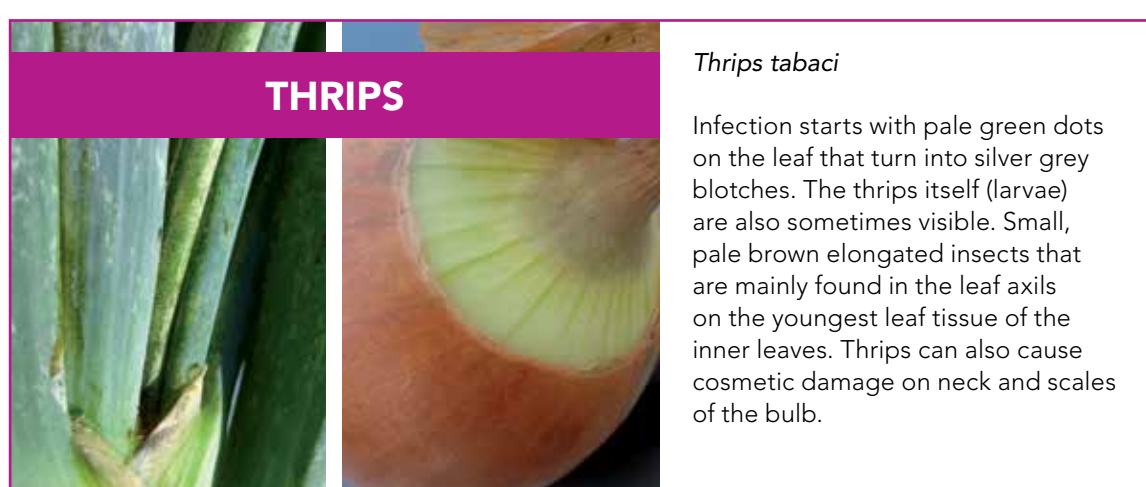
The small pale grey larvae of the insect burrow in the leaves. The miners tunnel irregularly and are whitish or light green in colour. As the larvae grow the tunnels become wider. The damage caused by a single larva is relatively insignificant whereas large numbers can considerably weaken or even destroy young plants. Infected leaves are more susceptible to damage from the wind and other pathogens.



THRIPS

Thrips tabaci

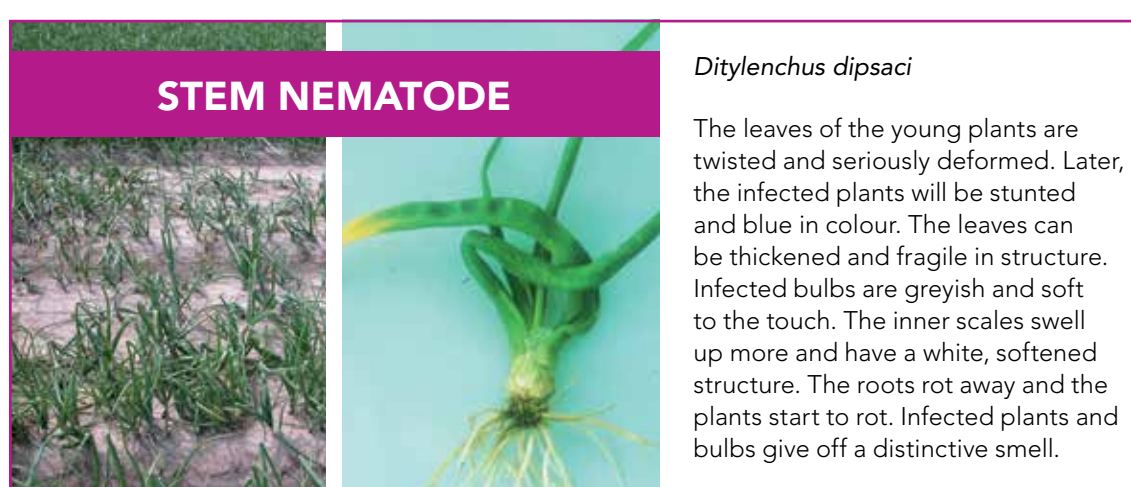
Infection starts with pale green dots on the leaf that turn into silver grey blotches. The thrips itself (larvae) are also sometimes visible. Small, pale brown elongated insects that are mainly found in the leaf axils on the youngest leaf tissue of the inner leaves. Thrips can also cause cosmetic damage on neck and scales of the bulb.



STEM NEMATODE

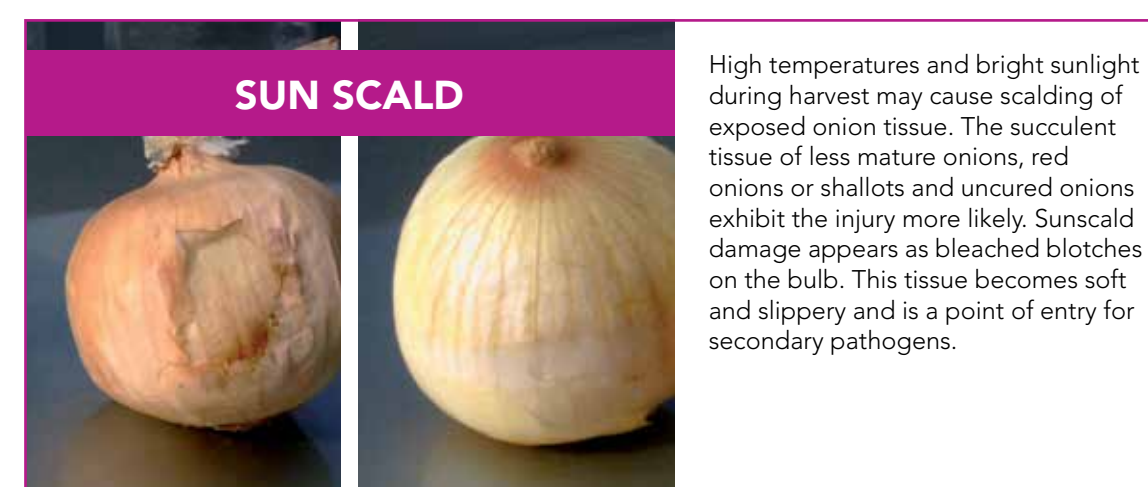
Ditylenchus dipsaci

The leaves of the young plants are twisted and seriously deformed. Later, the infected plants will be stunted and blue in colour. The leaves can be thickened and fragile in structure. Infected bulbs are greyish and soft to the touch. The inner scales swell up more and have a white, softened structure. The roots rot away and the plants start to rot. Infected plants and bulbs give off a distinctive smell.



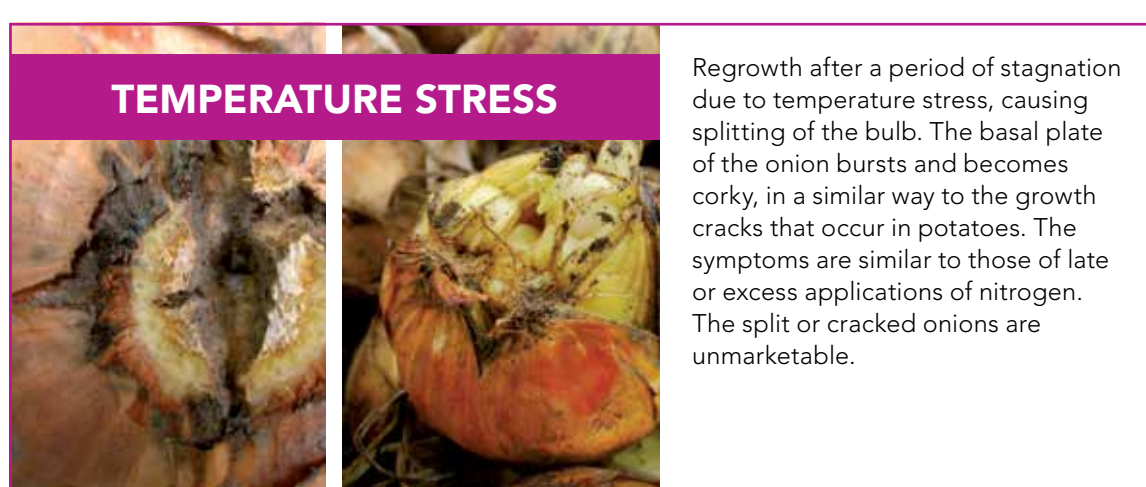
SUN SCALD

High temperatures and bright sunlight during harvest may cause scalding of exposed onion tissue. The succulent tissue of less mature onions, red onions or shallots and uncured onions exhibit the injury more likely. Sunscald damage appears as bleached blotches on the bulb. This tissue becomes soft and slippery and is a point of entry for secondary pathogens.



TEMPERATURE STRESS

Regrowth after a period of stagnation due to temperature stress, causing splitting of the bulb. The basal plate of the onion bursts and becomes corky, in a similar way to the growth cracks that occur in potatoes. The symptoms are similar to those of late or excess applications of nitrogen. The split or cracked onions are unmarketable.



TRANSLUCENT/LEATHER SCALE

Leathery, water soaked outer scales and skins occur in the field prior to harvest. If a period of heavy rainfall follows a period of drought during bulb development, these symptoms might occur. Mechanical bruising, frequent high temperatures and/or excessive relative humidity may increase leathery scale. Delays between harvest and storage may also help develop the symptoms.




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