

4.2.1 Plant diseases

Plant diseases are divided into four types: physiological, fungal, bacterial and viral.

4.2.1.1 Physiological diseases

Many of the diseases suffered by ornamental herbaceous plants are the result of poor care: excessive or insufficient watering, excessive temperature fluctuations, draughts, damage due to solar radiation, lack of light, etc. The most common cause of plant disease is related to watering. If not cared for properly, the roots begin to rot because the substrate contains too much water and lacks air. Various fungi and bacteria develop, which cause diseases to develop. Temperature fluctuations cause the leaves to shed. A strong rise in temperature causes some plants, such as violets, to discard their flower buds. Therefore, high levels of humidity must be ensured during periods of high temperatures. Draughts cause the leaves of many plants to darken or even fall off. If a plant lacks light, its growth will stagnate and its flower buds will be shed. Coloured leaves will turn green. A lack of humidity causes leaf tips to dry and the edges of the leaves to turn brown. There are various ways in which this can be prevented by raising the humidity levels. A lack of certain macro- and micronutrients causes physiological disorders such as sallowness and retarded growth.

4.2.1.2 Fungal diseases

Good drainage should be provided and excessive watering avoided. In the event of damage, the affected parts of the plant should be removed with care so as not cause any further damage, and burnt. Fungal infections can be treated with biological fungicides administered through the irrigation system. The main fungal diseases are grey mould, mildew, rust and root rot.

a) Grey mould

Grey mould is the most common plant disease, and all herbaceous species are particularly susceptible. It is caused by *Botrytis cinerea*, whose spores are spread by rain or wind. A grey fungal coating appears on the leaves, causing them to grow poorly and change in colour. The plant may wither quickly. The fungus develops rapidly in humid conditions and poor air circulation. Plants which are already damaged are the first to get infected.

b) Powdery mildew

Powdery mildew is caused by various fungi, mostly *Sphaerotheca*, *Uncinula* and *Oidium*, whose spores are spread by the wind and rain. Mildew also occurs in dry conditions. Fungal growth appears on the leaves in the form of a white powder. At first, it emerges on the upper sides of the leaves before

spreading over the entire plant. After some time, violet staining develops, the leaves turn yellow and they fall off. Both the buds and the flowers are affected.

c) Rust

Rust appears on the surface of plants. It is most commonly caused by *Puccinia* and *Melampsora* fungi, whose spores are spread by the rain and wind. The stems develop small corns which contain pale and dark brown spores. In cases involving leaf infection, spores develop on the underside of the leaves and the upper side turns yellow. The leaves fall off quickly, and the plants wither with major infections. Rust can also occur on the flowers. The outer petals turn brown and major infections cause the flower head to fully collapse.

d) Root rot

Root rot is caused by a number of soil fungi. The roots darken and begin to rot. Since the roots are unable to draw water, the plant shows signs of withering. The main cause of this disease is excessive watering.



Figure 1: Root rot
Source: Sabina Šegula

4.2.1.3 Bacterial diseases

Infected plants need to be removed and destroyed. The substrate around a diseased plant also needs to be removed, as do any pests (especially slugs and snails) which may damage the plants or enable the infection to spread. The main bacterial diseases are leafy gall and crown gall.

a) Leafy gall

Leafy gall is caused by the phytopathogen *Rhodococcus fascians* that lives in the substrate. Small disfigured sprouts and leaves appear on the stems of the plants in contact with the substrate. The bacterium spreads rapidly and infects damaged plants. The plants wither away.

b) Crown gall

Crown gall is caused by the soil bacterium *Agrobacterium tumefaciens* which lives in moist substrate. The bacterium enters the plant through damaged areas. It causes changes in the roots, where irregular round swelling develops. Changes may also be seen in the stem. The plants' growth stagnates but they survive.

4.2.1.4 Viral diseases

Viruses can affect all plants. They cause their leaves to curl and become smaller, accompanied by the appearance of a mosaic discolouration, various miscellaneous rings, patches, etc. Viral diseases may also be spread by pests (e.g. lice) which transmit sub-microscopic virus cells by sucking plant sap from infected plants. Plants with a viral disease need to be removed and destroyed.

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