



4. Rhizoctonia infection of stems below soil surface. (Photo S&C)

crop. Lesions are reddish-brown to grey and are distinctly sunken. Many dark brown, long hyphae can be seen on the lesions with the aid of a magnifying glass and, to a lesser extent, on non-infected tissue of underground plant parts. Lesions may girdle the young sprout completely, causing the part above the lesion to die. Secondary sprouts are often formed below the affected area. If these secondary sprouts also become infected, tertiary sprouts may be formed

5. Poor stand due to non-emergence of plants caused by *R. solani*. (Photo HLB)



6. Plant affected by *R. solani*: slightly yellowed, stunted, pinched and rosetted top leaves. (Photo CWE)

from non-affected lower buds, which process may be repeated several times. In the event of repeated infections, sprouts will fail to emerge or wilt after emergence. Such infection causes uneven and irregular emergence and, in severe cases, may lead to a poor stand (Photo 5). These symptoms can easily be confused with those of calcium deficiency. However calcium deficiency causes lesions directly below the top, which are not sunken (see photo 1 on page 200). An additional problem is that plants with calcium deficiency are more susceptible to Rhizoctonia infection.

Stems and stolons

Stem basis and stolons of growing plants may also be affected. Infection of the stem causes stunting and rosetting of plant tops (Photo 6), which sometimes turn red or yellow. Sometimes it causes the stem to die early. If lesions are formed all around the stem base the transport of hydrocarbons to stolons is hampered, which leads to the formation of aerial tubers. These are green to reddish-purple round to bottle-shaped transformations of lateral shoots in the axils, with a few small leaves at the top. Infection of young stolons causes their tips to die. One of the

consequences of this may be a drop in the number of tubers. Another is multiple branching of the stolons, which may lead to tuber formation near the stem, resulting in nests of small, deformed tubers at or just above soil surface (Photo 7). These symptoms are often confused with those caused by pink rot and phytoplasmas (see page 40 photo 3 and page 119 photo 1). In case of Rhizoctonia, however, these symptoms are accompanied by underground stem infection.

A well-known symptom is the formation of a fungus sheet at the base of the stem and on the parts of the plant that are in contact with soil (Photo 8). These cuffs consist of a thin layer of a greyish-white, felt-like mycelium, on which the sexual spores of the fungus are formed. It is believed that this mycelium and the spores do not cause any economic damage to the crop. Occasionally, and more generally in sub-tropical climates, these spores can cause large leaf spots on the foliage resembling early blight or Botrytis-like spots. The sheet symptom of Rhizoctonia

may be confused with an attack by *Rosellinia necatrix*. The Rhizoctonia sheets, however, are mostly on and just above soil surface, while those of *Rosellinia* are found from just above to deep below soil surface.

Tubers

On growing tubers large, scab-like lesions may develop (Photo 9). The fungus growing on the tuber surface retards the growth of the underlying tissues, which may result in deformed tubers. The pattern of the branching hyphae of the fungus can still be recognized in the pattern of the lesions on the skin. Some of these hyphae may still be present (Photo 9). When circumstances lead to it, growth cracks may develop long this pattern (Photo 11). Moreover, the 'dry core' symptom (a small lesion with a relatively deep, dry core) is broadly ascribed to Rhizoctonia (Photo 10). The lesion is characterised by the presence of a hole in the centre of the affected skin. Infection of the initiating sprouts on the young tuber will result in eyeless or blind tubers (Photo 11), which do not sprout.

7. Plant with nest of small-sized tubers caused by *R. solani*. (Photo S&C)

