





Diseases and quality defects found in Danish parsley root



Cylindrocarpon has no Danish name. In some countries it's called Rust in parsley root. Seen in both parsley root, parsnips, celery and carrot with rust-red dots, stains or spots. Often connected to lenticells, where in severe cases star-shaped craters or vertical crevices form as the root grows. The rust-red color is believed to be a defensive reaction from the plant, where aggressive isolates or weak plants develop secondary rot. After washing and drying, the rust-red color disappears, and the spots get a scab-like appearance. The wounds sometimes develop into deep dry rot where laboratories often find both *Fusarium*, *Rhizoctonia*, *Phytophthora* and/or *Pythium*. *Cylindrocarpon* is a crop rotation disease in which other factors (e.g. nematodes, water-suffering soil or stress) create pathways for *cylindrocarpon*.



Cutworm prefer parsley root and red beets over other root vegetables. Attack is seen as large deep larval holes close to ground level. Early larval holes heal and form cork skin or large open scab-like injuries. Pheromone traps for warning and

<p>Large open corked wounds at the top of the photo are typical for early attacks of the cutworm. At bottom of photo is a few deep fresh holes, often with the gray larva hiding inside.</p>	<p>targeted irrigation effectively combat the small larvae.</p>
	<p>Blue bruising occurs often in connection with machine harvesting in difficult conditions with water tense roots. Gentle harvesting helps. Alternatively leave the field for later harvest and choose another field. There might be differences between varieties in terms of their susceptibility to blue bruises.</p>
	<p>The larvae of the carrot rust fly makes superficial channels under the surface of the roots. Controlled by crop rotation or yellow sticky traps for warning. Can be confused with miner flies which in rare cases make channels in the root shoulders near the crown. Damage of carrot rust fly and miner fly is not often seen in parsley root.</p>
 <p>Soft rot is caused by a complex of several different plant diseases, where it can be difficult to determine the primary cause. Laboratory tests often find both sclerotinia, rhizoctonia and various erwinia bacteria. Soft rot is also called Leaf Drop because the crown of large well-developed plants of parsley root, rots and the green top collapses. After harvesting and washing diseased roots, it is almost impossible to determine the primary cause of soft rot.</p>	 <p>Soft rot possible causes by:</p> <ul style="list-style-type: none"> Water logging of soil Frost Sclerotinia Erwinia bacteria (e.g. <i>Erwinia persicina</i>) Pythium spp Phytophthora spp Violet root rot



Sclerotinia (*S. sclerotiorum*)

It is primarily the crown or leaf attachment that is attacked in late summer or autumn at the end of the growing period, when the top is very dense, and the humidity is high and where the oldest dead leaves facilitate a pathway for sclerotinia. Attacks of sclerotinia in the crown quickly develops into soft rot, with a pale gray to brown color or a slight pink color as a result of soft rot bacteria (*E. persicina*). With high humidity in the field or in the warehouse, white mycelium develops with hard black sclerotia resembling mouse drops, see photo. Typically, the entire crown rots away so that part of the root completely disappears when washed in the brush washer. Sclerotinia is a crop rotation disease where high nitrogen level and productive top growth creates good conditions for infection.



Rhizoctonia develops black sclerotia (resting bodies) and scab-like surface on parsley root. Often it is secondary following attacks by other pests and diseases such as scab, nematodes, cutworms, sclerotinia, soft rot, etc. Rhizoctonia is primarily important for the development of damp off, associated with slow germination in cold soil.

Branched and deformed parsley roots can be caused by soil structure, stones, damage with cultivators and nematodes. When nematodes are the cause, the roots will usually also be deformed, as well as short and thick.





Root knot nematodes (*M. hapla*) on roots of small parsley root. The infested roots do not develop pile root. Only the top piece forms a short thick root. It is more common with stubby roots than branched roots after root knot nematodes in parsley root. Avoid fields with root knot nematodes with the help of soil samples taken in early autumn.



Cavity Spot is seen as small open holes or cavities on the surface of the parsley roots. Cavity Spot is seen in carrots, parsnips and parsley root and is a crop rotation disease caused by various species of *Phytium*. The holes are attacked secondarily by bacteria and other pathogens that induce soft rot.



Warts with small side roots – are probably due to phytoplasma that induces similar symptoms on carrots. Cicadas are suspected of spreading the infection.

	<p>Violet root rot is usually seen in crop rotation with beets, red beets and carrots. The symptoms are seen in the field as centimetre thick layer of soil on the surface of the roots, because the violet mycelium holds on to the soil. After washing, a net of dark-colored brown mycelium appears on the surface of the roots, which quickly develops into soft rot. Mycelium does not get quite the same intense violet color as on carrots. Violet root rot is a crop rotation disease. The symptoms appear very late in the fall when parsley root is stored in the field. Early harvesting is required when symptoms appear.</p>
	<p>Wild types are usually seen in OP varieties or in fields poor quality seed. Often confused with nematodes. Wild types are not contagious and the loss is therefore to be overlooked.</p>