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NOTES ON CARROT DISEASES IN THE COACHELLA VALLEY

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Cottony Soft Rot of Carrots

Cottony soft rot is caused by *Sclerotinia sclerotiorum. S. Sclerotiorum* is also called white mold on many other vegetable crops. Cottony soft rot is common wherever umbelliferous crops are grown and it can infect celery, anise, caraway, chervil, dill, parsley and parsnips. *S. Sclerotiorum* can be a problem in field production when soil temperatures are 55° to 86°F. This pathogen can also be a postharvest problem.

Cottony soft rot can be confused with crater rot, caused by *Rhizoctonia carotae*. The white, fluffy mycelia fungal mats of cottony rot are absent in crater rot. On carrots, the cottony soft rot begins as small water soaked lesions on the crowns and roots. The mycelial fungal mat will develop on the affected tissue leading to a softening and decaying of the tissue. Sclerotia will develop in these areas.

Cultural practices can contribute to control the development of cottony soft rot of carrots. Sprinkler irrigation is the common method for irrigating carrot fields in the Coachella Valley. However, when the weather cools, the soil stays damp for extended periods creating conditions favorable for disease development. After the carrot crop is harvested, deep plowing should be practiced in soils with *Sclerotinia* diseases. Rotations to non-host crops such as small grains would also help. *Sclerotinia* spp, resistance is not available in carrots.

Figure 1. *Sclerotinia sclerotiorum*; cottony soft rot on carrots.

Figure 2. Cottony soft rot on carrots leading to tissue decay.

Bacterial Leaf Blight of Carrots

Bacterial leaf blight of carrots is caused by *Xanthomonas campestris pv carotae*. This bacterial disease can be a problem in densely planted fields that have high levels of rainfall or where sprinkler irrigation is used to grow the crop. Given the usually dry conditions in the desert, bacterial leaf blight is a rare problem in the Coachella Valley. This disease begins on the leaves as small, yellow spots that in a few days expand, turn brown and become water-soaked lesions. These lesions are surrounded by a yellowish halo. Severe outbreaks of bacterial leaf blight can result in yield losses.

Bacterial leaf blight of carrots can be seed borne. There is a seed treatment for this disease. This disease can also be spread in the field by splashing water, via insects, animals and farm machinery. This pathogen can also persist in carrot debris in the soil. Frequent rain and sprinkler irrigation, as well as high humidity and dew favor this disease. Optimum temperature for disease development is 77° and 86°F. There are materials registered for foliar applications for the control of this disease. But only rarely does this disease warrant control measures. The use of furrow or drip irrigation can help reduce the incidence of bacterial leaf blight.

Figure 3. Bacterial Leaf Blight of Carrots.

Figure 4. Bacterial Leaf Blight causing brown discoloration of the foliage.

Thanatephorus cucumeris On Carrots

Rhizoctonia solani is a fungus that causes diseases on a wide variety of crops. This pathogen persists in crop residue in the soil for a long period of time as sclerotia or mycelium. Cultivation of fields can aid the fungus by pushing the contaminated soil onto the plant foliage and in the plant crown. On celery and parsley this pathogen causes crater spot.

Scientists classify fungi based on the structures produced by sexual reproduction. Fungi that did not have a known sexual stage were classified as Fungi Imperfecti. However, many fungi reproduce asexually and some produce both sexually and asexually creating some confusion in the classification system. Part of the life cycle of *Rhizoctonia solani* is referred to as teleomorph. This is a reference to fungi in the phyla Ascomycota and Basidiomycota. A teleomorph is the sexual reproductive stage (morph) of fungi, which is typically a fruiting body. Also complicating the identification/classification of fungi is the fact that even among fungi that reproduce sexually and asexually (anamorph), usually only one method of reproduction can be observed at one point in time and under very specific conditions. Below are two examples of *Thanatephorus cucumeris* on carrot fields in the

Coachella Valley. *T. cucumeris* is favored by periods of high humidity and cool temperatures. *T. cucumeris* appears as a white mycelia mat that grows on carrot stems near the base. According to plant pathologists, T. cucumeris is the perfect stage of Rhizoctonia *solani* and does not cause infections on carrots. The damage caused by these fungi is mostly cosmetic.

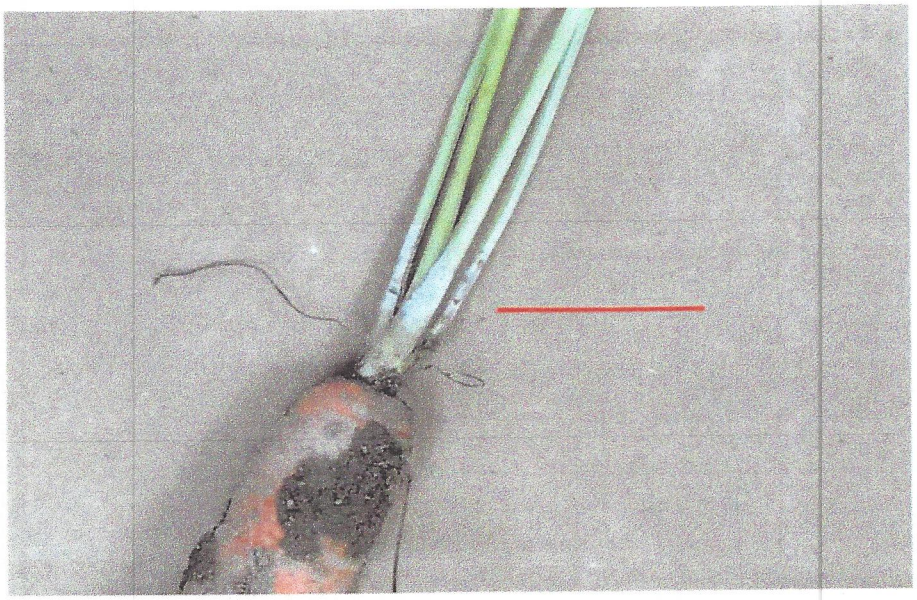

Figure 5. *Thanatephorus cucumeris* on carrots.

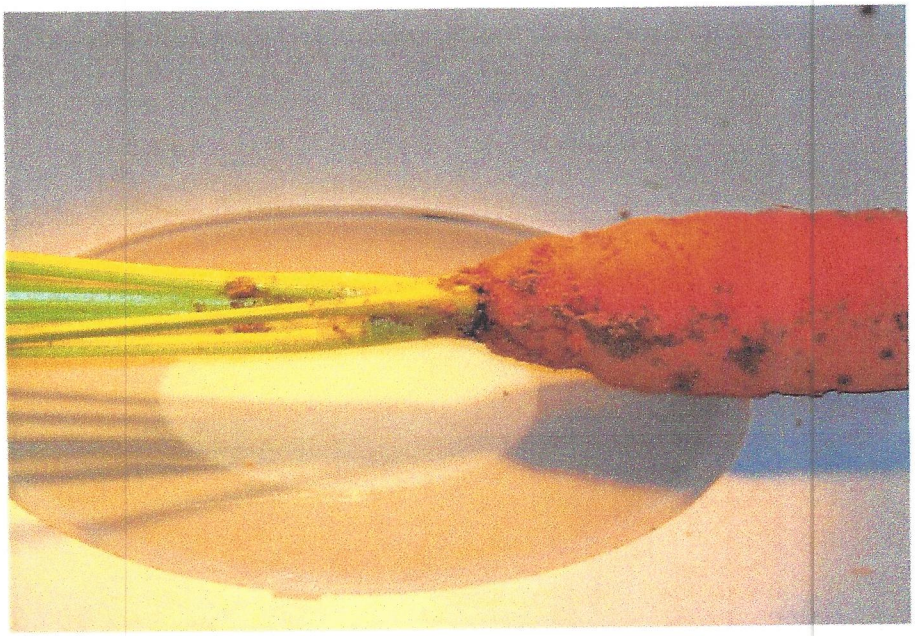

Figure 6. *Thanatephorus cucumeris* causing cosmetic damage on the foliage.

Figure 7. Sprinkler irrigation is a common irrigation practice for carrot production.

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