

## BACTERIAL BLIGHT OF CARROT

**Pathogen:** *Xanthomonas campestris*  
*pv. carotae* (*Xccar*)

**Important Hosts:** Carrot (*Daucus carota*)

**Other hosts:** Wild carrot, Queen Anne's lace

**Disease Information:** Bacterial blight of carrot is found wherever carrots are grown. Water is an essential ingredient needed for symptoms to develop with disease spread occurring most rapidly under warm (25-30°C), wet conditions. Therefore sprinkler irrigated carrot crops and areas with high rainfall seem to have more disease outbreaks. Bacterial leaf spot symptoms can be easily confused with other leaf spot diseases caused by *Alternaria* and *Cercospora* fungi. Bacterial blight symptoms start with small water-soaked areas that are also yellow and angular. These areas become brown (necrotic), irregular in shape, with a yellow halo. Lesions are common on leaflet margins and lobe junctions. Severe infections may result in large black blighted areas that extend down the petioles, under flower umbels and peduncles.

*The primary source of inoculum for plant infection is seed borne Xccar.* Even under conditions that are not optimum for development, it has been shown that seed infected at only  $10^4$ - $10^5$  can cause severe disease. Other sources of inoculum include infected



plant debris and the bacteria can survive in the field for up to a year. Spread of the bacteria from plant to plant can occur by splashing water (rain, overhead irrigation), equipment, tools, and insects.



Bacterial blight caused by *Xanthomonas campestris* *pv. carotae*

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**Seed Assay:** STA utilizes a seed wash/liquid plating procedure for bacterial blight seed health testing in carrots. The seed is soaked overnight in a buffer. The seed extract is then diluted and plated onto agar based media semi-selective for the *Xccar* pathogen. A proportion of the extract is also concentrated in a centrifuge to assist in detecting low levels of contamination that may be present. STA routinely uses two different types of semi-selective media to detect *Xccar* in seed samples. The semi-selective media is evaluated 6-9 days after it was plated for the presence of *Xccar* "like" bacteria. To confirm if suspect bacterial colonies are indeed *Xccar*, STA also uses real-time PCR to positively identify *Xccar* isolates obtained from the seed extracts. Due to the reliability of PCR technology, pathogenicity testing is no longer required, except if requested by our clients.

*STA is a National Seed Health Accredited Laboratory for bacterial blight testing. Positive controls are routinely used to assure that procedures and materials are meeting STA Quality Standards.*

**Recommended Sample Size:** The minimum recommended sample size for the bacterial blight assay of commercial seed lots is 10,000 seeds. The sample should be representative of the seed lot being tested. STA can also test carrot seed samples for **Alternaria leaf spot** and **Alternaria black rot**. Smaller seed samples may be tested for breeders' seed, stock seed and research material. Call STA for testing recommendations for small seed lots.

Samples should be submitted before any seed treatment is applied. Samples that have been treated or disinfected must be labeled as such. Treatment and disinfectants may interfere with the sensitivity of the seed assay.

**Turnaround:** The seed health test for *Xccar* takes a minimum of 7 days for a no evidence result. Because many seed samples contain bacteria that resemble *Xccar* and additional testing is performed, the test usually takes about 10 days. We may RUSH this testing at an additional charge of 20 percent. This ensures that testing will be started within 3 days after receipt of samples.