

# Level of Susceptibility to the Black Rot Pathogen of Commercially Available Cabbage Varieties

Chris Smart and Holly Lange

Plant Pathology and Plant-Microbe Biology Section, Cornell University, Geneva

Caused by the bacterium *Xanthomonas campestris* pv. *campestris* (Xcc), black rot is a significant disease of cabbage, and other crucifer crops world-wide and is an annual problem here in NY. Currently the options for controlling the bacterial pathogen that causes black rot remain limited primarily to copper-based products. The goal of this project was to test cabbage varieties in a replicated and inoculated trial, for susceptibility to Xcc. These data will enable growers to evaluate the risk of using extremely susceptible varieties, and determine if there is a horticulturally similar variety available with some black rot tolerance.

Thirty five commercially available cabbage varieties were seeded in 72 cell flats in a greenhouse at Cornell's NY State Ag Experiment Station. At 6 weeks of age plants were moved to a cold frame and hardened off for a week. They were then be planted into a research plot with 5 plants per plot and 4 replicate plots per treatment, in a randomized complete block design. Plants were fertilized and maintained according to standard grower practices, and the entire field was inoculated with a NY isolate of Xcc 2 weeks after transplanting. Plots were rated weekly for both disease incidence and severity beginning July 6, 2017. Two cabbage heads were harvested per plot for early, mid and late season cabbage (a total of 8 heads per variety). Each head was cut at the stump and visually rated for blackening of the veins on the core, and then each head was cut in half to check for ingress of the pathogen into the cabbage head.

## Results

All 35 cabbage varieties included in the study showed black rot symptoms following inoculation with the bacterial pathogen Xcc. Typical V-shaped lesions were seen on all plants, and no varieties were completely resistant to the pathogen. Following disease progress over time (shown on next page) varieties Thunderhead, Excalibur, Viceroy and Capture had the least disease at the end of the study, while Korsuma and Surprise were most susceptible. These results are similar to those observed in 2016.

Results from harvesting mature heads show that mid and late season varieties have a greater chance of black rot inside the head than early season varieties (shown on next page). This is not surprising as all plants were inoculated at the same time and varieties with a longer date to harvest would enable the pathogen more time to move into the head. Additional results from cabbage harvest (also shown on next page):

- Three cultivars showed black rot inside every head (all mid or late season varieties)
- Five cultivars had 50%-87.5% infected heads (all mid or late season)
- 15 cultivars had 12.5%-33% infected heads
- 12 cultivars had no black rot inside the head even though they all had black rot symptoms on the leaves

By identifying the most black rot tolerant cabbage varieties available growers will have a guide as to the level of susceptibility of commonly grown cabbage varieties. This could be an economic benefit by either reducing copper sprays if a variety is known to be less susceptible, or starting copper sprays earlier if a variety is known to be highly susceptible. Of course, we would recommend that growers not plant those varieties that are highly susceptible.

