

Black rot disease in Brassicas (cruciferous vegetables)

What is it?

Black rot is a bacterial infection that affects the vascular system of members of the Brassica (broccoli) family. It is caused by the bacterium *Xanthomonas campestris* pv. *campestris*.

Which plants are affected?

All cruciferous crops are susceptible including arugula, bok choy, broccoli, Brussels sprouts, cabbage (including Chinese cabbage), cauliflower, collards, garden cress, kale, kohlrabi, mustard (including mizuna), radish, rutabaga, and turnip. NOT AFFECTED seems to be nasturtium (it must be far enough away on the family tree).

Where did it come from?

We don't know the origin of our current outbreak. The bacterium infects all parts of host plants, including seeds, so it could have come in on a seed or on a commercial transplant. There are also some Brassica family weeds that can harbor it in the wild.

Why is it such a problem now?

We have had the perfect warm, humid weather for it to spread and multiple these past few months – temperature has been between 50-75, it has been breezy and wet. It wasn't until Wayne saw the same pattern on several of his plants that he brought it to Ray's attention. We've probably been living with it for months without realizing it, which allowed it to spread widely.

How is it spread?

- (1) This disease spreads readily from water splash, especially in the early morning with the plant is “breathing” at the edges of its leaves (hence the damage first appearing on the leaf margins). When watering plants, avoid spraying the leaves; water the soil around the plants only until wet – do not flood it (which carries the bacteria to other sections of your bed!).
- (2) Tools (harvesting knives, shovels, hands, etc.) can carry bacteria from an infected plant to a non-infected plant. Clean tools with a 10% bleach solution: 1 part chlorine bleach (Clorox regular unscented) to 9 parts water. Dry thoroughly, then apply mineral oil to prevent rust on non-aluminum metal tools.

What do we do about it?

- (1) Carefully remove all infected leaves to a trash bag at your bed and deposit in the dumpster. Please do not lay leaves or plants in beds or aisles, even temporarily! Be sure to get all of the roots of the plants, too, as they are also infected. DO NOT PUT ANY PART OF ANY BRASSICA IN ANY COMPOST PILE!
- (2) Take unaffected portion of plant home to cook and eat.
- (3) Note where you planted brassica family plants and do not plant brassicas there for at least a full 12 months after total removal of all roots, plants, and detritus

- (fallen leaves in the bed). Do not grow brassica family plants during the summer! Have at minimum 3 months of no brassicas anywhere in your bed.
- (4) Devise a rotation plan for your bed(s) and keep good records of where each plant family was grown each year. At least a 4-year rotation is the professional consensus among land-grant universities. This is a good horticultural practice regardless, but absolutely critical in controlling spread of disease.
 - (5) Mulch your plants to help prevent soil splashing up and infecting your plants.

How to recognize it

Two symptoms are dead giveaways:

- (1) V- or wedge-shaped yellow/brown lesions at the leaf margins (outer edges of the leaves)



- (2) Black (dark) veins in leaves that otherwise have white veins (harder to see in purple/red/dark leafed varieties, but still possible to detect)



Further reading

Cornell University Dept of Plant Pathology

http://vegetablemdonline.ppath.cornell.edu/factsheets/Crucifers_BR.htm

Cornell University "Managing Black Rot of Cabbage and other Crucifer Crops in Organic Farming Systems"

<http://www.extension.org/pages/29925/managing-black-rot-of-cabbage-and-other-crucifer-crops-in-organic-farming-systems>

University of Florida

http://nfrec.ifas.ufl.edu/paret/u-scout/Brassica/Pages/Black_rot.html

Alabama A&M and Auburn

<http://www.aces.edu/pubs/docs/A/ANR-0937/ANR-0937.pdf>

North Carolina State

<http://www.ces.ncsu.edu/depts/pp/notes/oldnotes/vg16.htm>

Semi-technical description, but written mostly in layman's language

https://microbewiki.kenyon.edu/index.php/Xanthomonas_campestris