# Protect Oregon's Brassica Crops: ODA's black leg rules aim to control a disease outbreak

By: Nick Andrews, Oregon State University Small Farms Program

Black leg is a serious disease of *Brassica* crops that has recently appeared in outbreaks in western Oregon. It threatens *Brassica* production in the Pacific Northwest. In an effort to manage the disease and get it back to low incident levels, the ODA developed black leg rules in 2014, and have revised them since. The current ODA rules are here. Cindy Ocamb from OSU has published a *Clinic Close-up* with detailed biological and management information which is online here. This article briefly summarizes the ODA black leg rules and the OSU Clinic close-up publication.

If cover crop brassica, forage brassica, and vegetable and specialty seed brassica growers follow the ODA black leg rules and manage the disease well, we may be able to return black leg to historic low endemic levels in western Oregon.

*Highlights of the ODA Black Leg Rules:*

1. All *Brassica*, radish, and mustard seed intended for planting in Oregon must test negative for black leg. Previous rules allowed small seed packets (0.5 oz or smaller) to be untested. Encourage your seed supplier to test any non-tested seed lots for black leg. Normally in canola and processing *Brassica* production, stock seed is tested by the seed companies; it is much cheaper to test parent lots than for individual farmers to test each *Brassica* seed lot purchased.
2. Seed treatment is not required by the current ODA black leg rules, but seed treatment is recommended as a good management practice (see management information).
3. Crops should be monitored for black leg, and any disease outbreaks found should be managed. Farms with poorly-managed infections are subject to the Public Nuisance Abatement process.

*Biology:*

Black leg is seedborne but also survives and reproduces on infected crop residues. Clean seed and crop residue management are the most critical management strategies for black leg. Infected plants and crop residues left on the soil surface produce pseudothecia. During the fall, winter and spring in western Oregon, the pseudothecia release sexual ascospores into the air during dry periods in between rain showers. Ascospores are carried on the wind, and can cause new infections of *Brassica* plants. When an ascospore lands on a *Brassica* leaf, they will germinate and infect the leaf when conditions are cool and moist. New infections are small, indistinct light-green areas that are very difficult to recognize. These spots will enlarge and turn ashy gray with small black dots (Figure 1). **Look for these leaf spots on Brassicas in your field!**

These little black dots in the center of leaf spots are pycnidia, which produce asexual spores (conidia) that can spread with water. If you suspect black leg, you can collect infected leaves, put them in a ziplock

Figure 1: Leaf spots caused by black leg. *Photos by Cindy Ocamb (OSU Department of Botany and Plant Pathology)*

Figure 2. Pycnidia oozing conidia (rain-splashed asexual spores).
*Photos by Cindy Ocamb (OSU Department of Botany and Plant Pathology)*

bag with a moist paper towel and place in the fridge. After a few days, look at the pycnidia to see if they are exuding a pinkish to purplish ooze of conidia (figure 2) – this is diagnostic for black leg.

These infections become systemic. The fungus can grow from a leaf spot down the stem of the plant, causing the classic black leg symptom, stem cankers (figure 3); conidia can also splash on to stems and then infect. These stem cankers result in the next generation of pseudothecia and ascospores via infected plant residues (figure 4).

Figure 3. Black leg on a broccoli stem (l) and the base of a kale plant (r).
*Photos by Cindy Ocamb (OSU Department of Botany and Plant Pathology)*

*Management practices:*

1. Use tested seed (ODA Black leg rules requirement).

2. Treat seed with effective fungicides or hot water. Hot water seed treatment tips from Wild Garden Seed and High Mowing Organic Seeds are here. High Mowing Organic Seeds is offering steam seed treatment services for vegetable growers. Contact Tom Stearns directly for more information: Tom@highmowingseeds.com; cell: 802-224-6301; office: 802-472-6174 ext. 114.

3. Avoid fall and winter brassicas near fields with black leg-infected residues (figure 4) the previous year. Wait until woody residues from infected crops have decomposed.

4. Avoid *Brassica, Raphanus* or *Sinapis* species for cover crops or forages near vegetable or specialty seed crops.

5. Delay spring planting to avoid ascospores.

6. Use relatively wide crop spacing so that good airflow will dry the crop canopy quickly after rain or dew.

7. Control *Brassica* weeds (birdsrape mustard, field/hedge mustard, wild radish, wild turnip) in and around your field.

8. Monitor your crop with a hand lens. Leaf infections are easier to recognize when the crop is dry.

    a. Look for black leg leaf spots (figure 1).

    b. Look for black leg stem cankers (figure 3).

9. When infections are found, trim leaf spots and rogue plants, and/or use recommended fungicides. See the PNW Disease Management Guide for your crop for fungicide recommendations, the radish page is here. Efficacy of organically-approved fungicides has not been confirmed yet.

Figure 4. Black leg on plant residues. *Photos by Cindy Ocamb (OSU Department of Botany and Plant Pathology)*

10. Chop and incorporate *Brassica* crop residues as soon as possible after harvest. This will help residue decompose quickly, and minimize ascospore release. During the epidemic, this is a reasonable precaution even if you don't identify black leg in your crop. Walk the field after cultivation to make sure tough plant stems and crowns aren't left on the soil surface.

**Use tested seed, scout your field and prevent ascospore release.** If you suspect black leg, samples can be sent to the OSU Plant Clinic. This is a destructive disease that especially threatens high value *Brassica* crops in Oregon. Please support the farmers who are trying to manage black leg.

Contact nick.andrews@oregonstate.edu or ocambc@science.oregonstate.edu if you have questions or comments about black leg management.

OSU, WSU, the University of Manitoba (Canada), and Rothamsted Experimental Station (UK) are collaborating on a USDA grant proposal that will hopefully fund new biological and management research in the PNW.