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2014 Crucifer survey findings

• Black leg (*Phoma lingam*) occurs across USA

• White leaf spot (*Pseudocercosporella capsellae*) reported as problem in SE USA
• Light leaf spot (*Cylindrosporium concentricum*) problem in Europe, Australia, Asia


Winter oilseed rape losses due to disease (£Million)

Based on Defra-funded Winter Oilseed Rape Pest and Disease Survey Data delivered through CropMonitor (www.cropmonitor.co.uk). Data calculated with oilseed rape at a price of £380/t.
Found in crucifer survey during 2014:
43 different locations had Black leg (out of 61 examined)
24 sites -- Light leaf spot
17 sites -- White leaf spot

*Trio of diseases were found in Benton, Linn, Marion, Polk, Washington and Yamhill county*
Plants found infected with *Phoma lingam* in western Oregon; fall-planted seed fields unless otherwise noted.

<table>
<thead>
<tr>
<th>County</th>
<th>Crop/plant</th>
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<th>Crop/plant</th>
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<tbody>
<tr>
<td>Benton</td>
<td>Fall-planted canola</td>
<td>Marion</td>
<td>Kale</td>
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<tr>
<td>Benton</td>
<td>W. Russian Kale</td>
<td>Marion</td>
<td>Cabbage or collards</td>
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<tr>
<td>Benton</td>
<td>Mizuna (organic)</td>
<td>Marion</td>
<td>Russian Kale</td>
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<tr>
<td>Benton</td>
<td>Kale</td>
<td>Marion</td>
<td>Fall-planted canola</td>
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<td>Benton</td>
<td>Collards</td>
<td>Marion</td>
<td>Fall-planted canola</td>
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<td>Benton</td>
<td>Kale</td>
<td>Marion</td>
<td>Fall-planted canola</td>
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<tr>
<td>Benton</td>
<td>Volunteer mustard in wheat</td>
<td>Marion</td>
<td>Forage <em>Brassica</em></td>
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<tr>
<td>Benton</td>
<td>Fresh market cabbage (spring sown)</td>
<td>Marion</td>
<td>Forage <em>Brassica</em></td>
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<tr>
<td>Lane</td>
<td>Processing broccoli (spring sown)</td>
<td>Marion</td>
<td>Western yellow cress (weed)</td>
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<td>Linn</td>
<td>Volunteer mustard in turnip</td>
<td>Polk</td>
<td>Cabbage</td>
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<tr>
<td>Linn</td>
<td>Chinese cabbage (spring sown)</td>
<td>Polk</td>
<td>Fall-planted canola</td>
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<td>Linn</td>
<td>Chinese mustard (spring sown)</td>
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<td>Fall-planted canola</td>
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<td>Linn</td>
<td>Pak choi (spring sown)</td>
<td>Polk</td>
<td>Fall-planted canola</td>
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<td>Linn</td>
<td>Turnip</td>
<td>Polk</td>
<td>Turnip</td>
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<tr>
<td>Linn</td>
<td>Western yellow cress (weed)</td>
<td>Polk</td>
<td>Turnip</td>
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<tr>
<td>Linn</td>
<td>Chinese cabbage (spring sown)</td>
<td>Polk</td>
<td>Forage <em>Brassica</em></td>
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<tr>
<td>Linn</td>
<td>Chinese cabbage (spring sown)</td>
<td>Yamhill</td>
<td>Volunteer turnip in wheat</td>
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<tr>
<td>Marion</td>
<td>Forage turnip</td>
<td>Yamhill</td>
<td>Volunteer turnip</td>
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<tr>
<td>Marion</td>
<td>Black mustard (weed)</td>
<td>Yamhill</td>
<td>Fall-planted canola</td>
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<tr>
<td>Marion</td>
<td>Bird's rape (weed)</td>
<td>Yamhill</td>
<td>Turnip</td>
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</table>
Black leg (*Phoma lingam*)
Light leaf spot *Cylindrosporium concentricum*
Light leaf spot *Cylindrosporium concentricum*
White leaf spot
Pseudocercosporella capsellae
Brassica for seed planted in April

White leaf spot

Phoma leaf spot (Black leg)
Black leg lifecycle

Pseudothecia produce and release ascospores

Seedlings are infected by airborne ascospores. Some infections result from infected or infested seed.

Ash-gray lesions develop on young leaves. Pycnidia can be seen in the lesions. Pathogen grows to the stem base.

Pyecnidia produce and exude pycnidiospores during moist conditions.

Inoculum build-up followed by secondary pathogen spread.

Pathogen overwinters in stubble, primarily as mycelium and pseudothecia.

Seed pod infection may lead to low levels of infected or infested seed.

Flowering stage of bolted plant.

Stem cankers can result in lodging.

Rosette stage of plant. Pycnidiospores (conidia) are splashed onto adjacent leaves or plants.
Black leg, Light leaf spot, White Leaf spot

- Ascospores develop on infected plant residues
- Asexual spores (conidia) spread relatively short distances by rain
- Cool, moist conditions promote disease
- Can be seedborne
Cultural control of black leg, light leaf spot and white leaf spot is critical for all crucifer growers in the valley to avoid having these diseases become established.

**Fall**
- Black leg & LLS & WLS ascospore release from debris
- LLS & WLS conidia develop and disperse by rain

**Winter**
- Black leg ascospore release
- LLS & WLS conidia
- optimum for disease intermittent rains & 46 to 59°F

**Spring**
- LLS & WLS & Black leg conidia
- Black leg & LLS ascospore release, WLS?

**Summer**
- LLS & WLS conidia develop
- Black leg & LLS & WLS sexual stage develops
It is imperative that each grower, regardless of whether growing a seed, oilseed, vegetable, forage or cover crop:

- Incorporate or remove residues as soon as possible after harvest (flailing, shallow or deeper plowing). Residues on soil surface are infectious until decomposed.
- Rotate fields out of crucifers for at least three years.
- Avoid planting adjacent to a field infected the previous seasons.
It is imperative that each grower, regardless of whether growing a seed, oilseed, vegetable, forage or cover crop:

• Eradicate susceptible weeds and control volunteer crucifers.

• Plant only seed that has been certified to be free of *Phoma* and has been treated with a fungicide or hot water.

• **Coronet fungicide seed treatment** (FRAC Group 7+11). **Not registered for use on radish.** Studies at WSU showed Coronet is very effective for seedborne *P. lingam* & other fungi.

• **Dynasty** (FRAC Group 11) at 0.1 to 0.38 fl oz/100 lb seed (0.1 to 3.75 fl oz /100 lb seed for canola). Not effective on seedborne *P. lingam*.

• **Maxim 4FS** (FRAC Group 12) at 0.08 to 0.16 fl oz/100 lb seed. Not registered for use on canola. Not effective on seedborne *P. lingam*.

• **Thiram 50WP** (Group M3) at 8 oz/100 lb seed (not labeled for Oregon) or **42-S Thiram** (FRAC Group M3) at 8 fl oz/100 lb seed (6.4 fl oz for canola). Not effective on seedborne *P. lingam*. 
Foliar fungicides for fall-planted seed fields to protect from black leg:

- **Cabrio EG** (FRAC Group 11) for black leg of crucifers. Not for use on canola or rapeseed.
- **Quadris Flowable** (FRAC Group 11) is labeled for other fungal diseases on crucifers and will help control black leg.
- **Priaxor Xemium Brand** (FRAC Group 7+11) is labeled for other fungal diseases on crucifers and will help control black leg of canola and leafy brassicas only.
- **Rovral 4F** (FRAC Group 2) for Brassica and Raphanus seed crops (SLN OR-130001, SLN WA-960027). Not for use in canola/rapeseed.

To protect from light leaf spot:

- **Proline 480 SC** (FRAC Group 3) at 4.3 to 5.7 fl oz/A for canola only. Most efficacious fungicide group for light leaf spot control in UK studies.
Limited Section 3 labels for light leaf spot in crucifer seed crops

• SLNs are now registered in Oregon for seed trt
• SLN applications underway for foliar trt

PNW Plant Disease Handbook website
http://pnwhandbooks.org/plantdisease/

Black leg (*Phoma*)

Light leaf spot (*Cylindrosporium*)

White leaf spot (*Pseudocercosporella*)
Finding symptomatic plants? Please feel free to contact me:
ocambc@science.oregonstate.edu
office phone:  541-737-4020

Black leg (*Phoma*)

Light leaf spot (*Cylindrosporum*)

White leaf spot (*Pseudocercosporella*)