Cover Cropping Panel: Challenges

Lindsey du Toit
Washington State University Mount Vernon NWREC
Small-Seeded Vegetable Seed Crops in WA

Northwestern WA (since late 1800s)
Table beet, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, Chinese mustard, collard, cress, kale, kohlrabi, radish, rutabaga, spinach, Swiss chard, turnip, ...

Columbia Basin of central WA (since irrigation in 1950s)
Carrot, coriander, dill, kale, mustard, onion, parsley, parsnip, radish, turnip, ...

~35 species, many annual & biennial crucifers
10,000-15,000 total acres/year, $1,000-$8,000/acre
>$65 million annually
50-100% of U.S. seed supply; 10-50% of world seed supply

Other crucifers in WA: Canola, cover crops, forage crops, fresh market & processing brassica vegetables, ...
Biodiesel “will be the biggest issue that the Legislature will be focusing on.”

Clifford Traisman, a lobbyist for Washington Conservation Voters and the Washington Environmental Council

Environmentalists make strides in legislative session

By RACHEL LA CORTE
Associated Press Writer

OLYMPIA — Washington state’s environmental community

Biodiesel demand grows

Demand for biodiesel ethanol has grown with the price of gasoline and other fuels. Biodiesel is

Skagit Valley Herald, 2 January 2006
Seedborne Crucifer Pathogens of Economic Concern

= Zero Tolerance on Vegetable Seed

Black leg (fungal disease)

*Phoma lingam*

Black rot (bacterial disease)

*Xanthomonas campestris* pv. *campestris*
Dormant Crucifer Seed
Crucifer Quarantine for Western Washington: Why? How?

Puget Sound Seed Growers Association & Western WA Seed Advisory Committee petitioned WSDA (2004)

1. Establish crucifer quarantine for western WA
2. Add black mustard (Brassica nigra) & wild radish (Raphanus raphanistrum) to list of restricted noxious weed seeds
3. Delete “in rapeseed only” from black mustard & wild radish references in WAC 16-301-105 (Seed Certification – Objectionable Weeds).

WSDA Seed Program reviewed request, rule-making proceeded with input from WSU specialists & relevant industries:

PSSGA, CBVSA, WA Canola Commission, researchers, growers, seed co.’s

Counties E of Cascades: growers perceived lower risks, exclude from quarantine

Economic impact survey: sent to 189 stakeholders (2005)
Public hearings: 6 Dec. (Mount Vernon) & 9 Dec. 2005 (Moses Lake)
WSDA Director Loveland signed rule: 21 Dec. 2005
Crucifer Quarantine Rule (WAC 16-301): effective 20 Jan. 2006
Chapter 16.301-490-580 WAC
General Seed Regulations

WAC Sections
16-301-490  Why is the department establishing a crucifer seed quarantine?
16-301-495  What definitions are important to understanding this chapter?
16-301-500  What crucifer articles are regulated by this chapter?
16-301-505  What diseases are regulated by this chapter?
16-301-510  What seed must undergo dormancy testing?
16-301-515  What is the quarantined area for this crucifer seed quarantine?
16-301-520  What is the regulated area for this crucifer seed quarantine?
16-301-525  What are the exemptions to the crucifer seed quarantine that apply within the regulated area?
16-301-530  What requirements apply to planting crucifer seed in the regulated area?
16-301-535  What requirements apply to boxes & racks used to ship crucifer seedlings?

• Regulated counties in northwestern WA:
  - Clallam, Island, Lewis, Skagit, Snohomish, & Whatcom Co.’s

• Crucifer materials regulated:
  - Seed, seedlings, roots, or transplants for seed, oil, or commercial vegetable production; & crucifer crop residues

• Notice of Intent/Quarantine Compliance Form:
  - Must be filed with WSDA Seed Program before shipping, moving, or transporting crucifer seed into regulated area
    • - Lab analysis or phytosanitary certificate for 2 regulated diseases
    • - Seed analysis certificate for dormant seed (WAC 16-301-510)

• Seed lots that test positive:
  - Must be treated
  - Treated seed can only be planted if free of pathogens when re-tested

• Exemptions in regulated counties:
  - USDA & University research trial grounds
  - Pre-packaged crucifer seed <0.5 oz, if free of diseases
  - Seedlings for home garden use, if free of diseases
  - Crucifers produced in greenhouses or indoors (solely)
2014 Epidemic of Black Leg in Crucifer Crops Across the Willamette Valley of OR
2014 Survey of Crucifer Crops in Willamette Valley, after Finding Black Leg in an Overwintered Seed Crop

Cindy Ocamb, OSU Plant Pathologist, ocambc@science.oregonstate.edu

43/61 sites examined by 9/2014 = Black leg
24/61 sites = Light leaf spot
17/61 sites = White leaf spot

Black leg
*Phoma lingam*

- Occurs across the US

Light leaf spot
*Cylindrosporium concentricum*

- Never found in US before

White leaf spot
*Pseudocercosporella capsellae*

- Never found in PNW before, only southeastern US
<table>
<thead>
<tr>
<th>County</th>
<th>Crop/plant</th>
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<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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<td>Kale</td>
<td>Marion</td>
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<td>Volunteer mustard in wheat</td>
<td>Marion</td>
<td>Forage Brassica</td>
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<td>Fresh market cabbage (spring sown)</td>
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<tr>
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<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>
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<td>Yamhill</td>
<td>Volunteer turnip in wheat</td>
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<td>Marion</td>
<td>Forage turnip</td>
<td>Yamhill</td>
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<tr>
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<td>Black mustard (weed)</td>
<td>Yamhill</td>
<td>Fall-planted canola</td>
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<tr>
<td>Marion</td>
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Light Leaf Spot (*Cylindrosporium concentricum*) in Europe, Australia, & Asia

Winter oilseed rape losses due to diseases (£ million)

Based on Defra-funded winter oilseed rape pest and disease survey data delivered through CropMonitor (www.cropmonitor.co.uk), for oilseed rape price of £380/t.

Black Leg of Crucifers

- *Phoma lingam*: asexual, pycnidia with conidia, splash dispersed
- *Leptosphaeria maculans*: sexual, pseudothecia with ascospores, aerially dispersed
Black Leg of Crucifers

- Most crucifer crops & weeds
- Survival:
  - 4+ years on seed
  - 3+ years on crop residues
- Spread:
  - splashing water (conidia)
  - running surface water
  - airborne ascospores
  - seed, transplants
  - machinery, tools, workers
- Optimum conditions: wet & cool
Management of Black Leg

- 4+ year crop rotation
- Avoid wetting transplants
- Separation of crucifer crops
- Site selection
- Some resistant cultivars
- Control crucifer weeds
- Avoid working in wet fields
- Inspection & rogueing
- Sanitation
- Foliar fungicide applications, e.g., strobilurins, triazoles, ...
- Incorporate residues soon after harvest:
  - Do not leave crop residues on soil surface after harvest
- Purchase & plant only certified &/or treated seed
  - hot water (122°F for 25-30 mins)
  - fungicides – benomyl was industry standard, newly registered fungicides
- Region-wide adoption of management practices!
Prior to HB2427: OR rapeseed production districts set in 1990 to minimize black leg, cross-pollination, & volunteers

- Crucifer/brassica seed lots:
  - Must be tested for *P. lingam*, treated for *P. lingam* prior to planting
- Field locations must be pinned
- May not be grown in same field more than 2 out of 5 years
  - Producers must control volunteers within 1/4 mile of fields
  - Seed transported in a manner that prevents escape
  - Equipment cleaned before leaving field and unloading
- *Raphanus* spp.: same rules except for seed and equipment cleaning
- HB2427: based on interest in canola production in Willamette Valley; focused on cross-pollination only, no other requirements
• Emergency/temporary ODA rule proposed at meeting on 18 June 2014
• Advisory group formed, met on 25 June 2014
• Proposed rules sent for legal review
• Signed into law on 7 July
• In effect for 180 days
Commodities covered:

- *Brassica*, *Raphanus*, and *Sinapis* seed and plants
- Exemption: prepackaged seed lots or transplants for home use

Stock seed must be:

- Accompanied by certificate showing seed is black leg-free OR
- Be treated in an approved manner for black leg

All transplants must originate from tested &/or treated seed
Temporary ODA Rule in Response to Crucifer Diseases Found in Willamette Valley in 2013-14

(Nancy Osterbauer, ODA, nosterbauer@oda.state.or.us, (503) 986-4666)

• Management practices to **minimize disease increase**
  – Covered commodities not grown on same land more than 2 consecutive years, and not more than 2 in every 5 years
  – Volunteer or uncontrolled Brassicaceae in and near production fields must be rogued/eliminated
  – Planting, harvest, and transportation equipment shall be cleaned to prevent inadvertent spread from fields
  – Unbagged loads transported within the Valley must be enclosed in bins or covered containers to prevent seed loss

• **Seed dealers** must keep copies of all pertinent records for testing and seed treatment, and make these **records available to the ODA upon request**
Development of Permanent ODA Rule

• Reconvene advisory committee
  – Examine information
  – Compare districts
  – Add new members

• Prepare amendments for permanent rule

November
• 13th - Rulemaking notice to Legislature
• 15th - Rulemaking notice to OR Bulletin
• 23rd - Rulemaking notice to stakeholders

December
• 1st - Notice in OR Bulletin
• 15th - First possible hearing
• 21st - Last day for timely hearing request

January
• 13th Jan. 2015 – Permanent ODA rule implemented
  • *Leptosphaeria maculans & L. biglobosa*
  • Mandatory biennial review of rules

*Leptosphaeria maculans & L. biglobosa*
WSDA Crucifer Quarantine: Does the Rule Suffice?

- Current rule protects parts of 5 counties in NW WA
- Risks for black leg/black rot in central/eastern WA?
  - Black leg established in Bonner’s Ferry, ID (2011)
  - Rapeseed seed crop residues infected in Lewiston, ID (2014)
  - WSDA survey of co.’s selling brassica seed east of Cascades: Most, but not all, seed lots are tested/treated
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- Columbia Basin? Vegetable & canola seed crops, cover crops
- Dryland areas of WA? Canola, camelina, other brassicas
- Modify current rules for other regions of WA?

*Production of Brassica Seed Crops in Washington State: A Case Study on the Complexities of Coexistence. Inglis, Miller, & du Toit, 2013. WSU EM062E.*

- PNW Black Leg Interest Group: dutoit@wsu.edu or 360-848-6140
- WSDA Seed Program: Victor Shaul at Vshaul@agr.wa.gov or 509-249-6950
Play With Your Food
Application of a pesticide to a crop or site that is not on the label is a violation of pesticide law and may subject the applicator to civil penalties up to $7,500.

Such an application may also result in illegal residues that could subject the crop to seizure or embargo action by WSDA and/or the U.S. Food and Drug Administration.

It is your responsibility to check the label before using the product to ensure lawful use and obtain all necessary permits in advance.
Chapter 16.326 WAC
Brassica Seed Production Districts

WAC Sections

16-326-010  What are the boundaries of the regulated areas, also called the Brassica seed production districts?

16-326-020  What are the general requirements for growing, transporting or processing Brassica seed within any Brassica seed production district?

16-326-030  What are the requirements to grow Brassica seed in Brassica seed production district 1?

16-326-040  What are the requirements for growing Brassica seed in all of Brassica seed production district 2, which is composed of two subdistricts designated districts 2A and 2B?

16-326-050  What are the differences between restrictions on Brassica seed production in Brassica seed production districts 2A and 2B?

16-326-060  What is the Brassica work group and how often does it meet?