Plant Pathology Seminar Series

"LIGHT LEAF SPOT AND WHITE LEAF SPOT OF BRASSICACEAE IN WASHINGTON STATE"

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Brassica crops of different species are grown in the Pacific Northwest USA for many markets and purposes, including conventional and organic fresh market and processing crops, cover crops, seed crops, and oilseed and biofuel crops (Inglis et al. 2013). *Pyrenopeziza brassicae*, cause of light leaf spot of brassicas (Rawlinson et al. 1978), was first found in the USA in 2014 in the Willamette Valley of Oregon (Farr and Rossman 2017; Ocamb 2014a). *Neopseudocercosporella capsellae*, cause of white leaf spot of brassicas (Boyle 1945; Crossan 1954), occurred rarely in the Pacific Northwest USA prior to being found across the Willamette Valley in 2014 (Ocamb 2014b).

An investigation was conducted into the potential seedborne phase of these pathogens to understand the risk of moving the pathogens into new areas on infected seed (Crossan 1954; Hickman et al. 1955; Staunton 1967; Maddock and Ingram 1981; Cheah and Hartill 1985). *P. brassicae*, but not *N. capsellae*, was demonstrated to be seedborne and seed transmitted on cabbage and mustard. Incubating infested seed on NP-10 agar medium (International Seed Health Initiative-Veg 2015) at 4°C, followed by microscopic examination of the seed, revealed *P. brassicae* to be present on 12.5 to 19.75% of a mustard seed lot and <0.50% of a cabbage seed lot. Planting the infested mustard seed in a greenhouse resulted in a seed transmission rate of 0.1 to 5.3%.

A 2016 survey in northwestern Washington, an important region of biennial brassica vegetable seed production that is in close proximity to the Willamette Valley, OR, revealed both pathogens to be present in mustard (*Brassica juncea*) cover crops and on bird's rape mustard (*B. rapa*) weeds, but not in cabbage (*B. oleracea* var. *capitata*) seed crops in Skagit, Snohomish, and Whatcom Counties. To provide growers with management tools for seedborne *P. brassicae*, different types of seed treatments were evaluated. Chlorine (1.2% NaOCl for 10, 20, 30, and 40 minutes), hot water (50°C for 15 and 30 minutes), steam (62.8, 65.6, 68.3, and 71.1°C for 90 seconds), and 10 fungicide seed treatments currently registered for use in various kinds of brassica crops in the USA all reduced the incidence of mustard seed infested with *P. brassicae* to <5%, and reduced the rate of seed transmission of *P. brassicae* from 3.4% for non-treated seed to <1%. Hot water and most of the steam treatments eradicated the pathogen from seed, but the hottest steam treatment was phytotoxic. The most efficacious fungicide seed treatments contained benzimidazole, demethylation inhibitor, and/or strobilurin active ingredients. Seed transmission was not observed for seed treated with six fungicide treatments: azoxystrobin, fludioxonil, iprodione, thiabendazole, pyracostrobin + boscalid, and difenoconazole + fludioxonil + mefenoxam + sedaxane + thiamethoxam.

Isolates of *P. brassicae* from the Pacific Northwest USA differed genetically and in terms of symptoms caused on turnip from that of isolates collected in the European Union, United Kingdom, and New Zealand. Furthermore, sexual crossing tests (Ilott 1984); pathogenicity tests (Fitt et al. 1998); phylogenetic analyses of the internal transcribed spacer region of ribosomal DNA, β tubulin gene, translation elongation factor 1-α gene, and mating type genes (MAT1-1 and MAT1-2); and multi-locus sequence analysis of the former three DNA sequences (Crous et al. 2015) revealed that the USA isolates of *P. brassicae* differ from European Union, New Zealand, and United Kingdom isolates, and likely represent a new species of *Pyrenopeziza* associated with light leaf spot of brassicas.

10:00 am | Wednesday, June 14, 2017 | Johnson Hall 343

MS Exit Seminar

College of Agricultural, Human, & Natural Resource Sciences
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