Spinach Seed Production in the Skagit Valley

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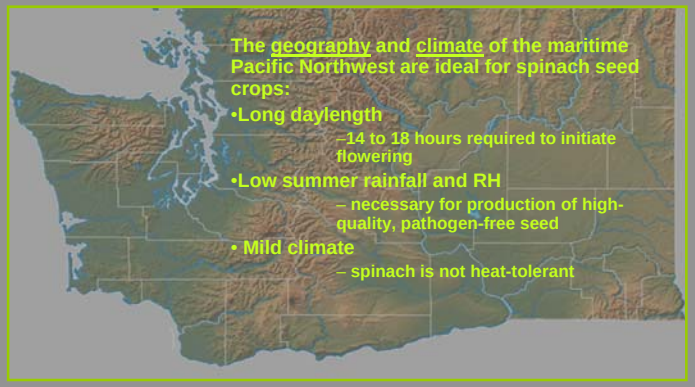
Background:

Spinach seed crops have been an important component of cropping systems in the Skagit Valley since the early 1900s. The Pacific Northwest produces up to 50% of the US spinach seed supply and 25% of the global supply, on approximately 3,000 acres annually. Spinach seed production is thus considered minor acreage, but the high value of spinach seed crops makes them an important rotational crop for farmers in the Skagit Valley, who have seen a gradual decline in the regional vegetable production and processing industry over the years.

Spinach seed crop in Skagit Valley

Different rates of limestone applied to 2009 field trial



Research Objectives:

1. Investigate soil properties that affect host-pathogen interactions
2. Develop a greenhouse bioassay to assist farmers in selecting fields with reduced risk for Fusarium wilt
3. Assess the potential for disease suppression using annual applications of limestone and other non-pesticidal cultural practices

Long-term Goal:

To increase the capacity for spinach seed production in the Skagit Valley through sustainable, integrated management of soilborne wilt diseases.

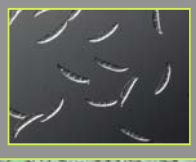
Challenges:

Aboveground:

- Spinach is wind-pollinated and dioecious (separate male and female plants)
  - Spinach seed crops of different cultivars must be isolated by up to 5 miles to prevent cross-pollination

Belowground:

- Fusarium Wilt (*Fusarium oxysporum* f. sp. *spinaciae*)
  - Causes devastating vascular wilt disease in seed crops
  - Prefers acid soils
  - Forms long-lived chlamydospores in soil that necessitate 6 to 15 year rotations between seed crops
  - Is the primary limiting factor to spinach seed production in the Pacific Northwest
- Verticillium Wilt
  - An emerging problem, can be seedborne on spinach
  - Prefers alkaline soils
  - Minor threat to spinach seed crops, but major concern for crops grown in rotation with spinach, such as lettuce
  - Spinach seed as potential vector?



Fusarium chlamydospores, macroconidia, and diseased plants (top to bottom)

2006 Limestone Field Trial Results: