

Mustard Green Manures for Potato Production



Farmers in Washington are using mustard green manures to suppress soil-borne pests and improve soil quality. In 2007 they planted 23,000 acres of these crops, up from 1,800 acres in 1999. Benefits include improved soil quality, reduction of wind erosion and suppression of soil-borne pests. WSU Extension has supported the adoption of this practice with on-farm research, field days, publications, and a website.

Benefits of Mustard Green Manures

Farmers are growing mustard green manure before potatoes for:

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- Suppression of *Verticillium* wilt. We have shown that it is possible to replace the fumigant metam sodium, normally applied for *Verticillium* control, with the less expensive mustard green manure.
- Reduction in other soil-borne pests, including root-knot nematodes, some fungal pathogens, and small-seeded weeds.
- Improved soil tilth, water infiltration, nutrient cycling, and control of wind erosion.

How They Are Grown

In the Columbia Basin of Washington, mustard green manures are usually grown after wheat. With adequate water and nutrients, the crop can produce up to 4 tons of dry matter per acre in about 70 days. They are then flail-chopped and incorporated into the soil. Potatoes are then planted as normal the following spring.

Both white (*Sinapis alba*) and oriental (*Brassica juncea*) mustards are being used.

How They Work

Mustard green manures change the soil's biological, chemical, and physical properties. Some of the potential mechanisms are:

- Crop rotation — mustards are non or poor hosts to the Columbia and Northern root-knot nematodes.
- Green manure effect — incorporation of the green manure stimulates beneficial microorganisms, which can suppress some soil-borne diseases. While the exact mechanism is unknown, competitive exclusion, interference of chemical signaling, predation, and parasitism could all be involved.
- Biofumigation — mustards, along with other Brassica plants, produce compounds called glucosinolates in their roots and shoots. When incorporated into the soil, enzymatic hydrolysis of these compounds can produce other compounds, including isothiocyanates, which are very similar to synthetic fumigants.

Research and Extension Program

In on-farm trials, we have investigated:

- fumigant replacement with mustard
- soil quality improvements
- increased wind erosion resistance
- varietal differences
- planting date effects and nitrogen response

Extension activities have included field days, workshops, publications, and a website.

Publications include:

- Using Green Manures in Potato Cropping Systems
- Cover Crops for the Columbia Basin: Mustards
- Green Manuring with Mustard: Improving an Old Technology

For More Information

On-line at <http://grant-adams.wsu.edu/>

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