**Western SARE Funding Application**

Drafted on May 1, 2017

**GW16-021 – Establishment and maintenance of disease-suppressive soils with green manures in the Pacific Northwest**

**Subject Matter Area: Sustainable Integrated Pest Management**

**Funding Total:**

1st Year: $ 2nd Year: $ 3rd Year: $ >>> Total: $

**Graduate Student:**

David Linnard Wheeler

Graduate Student

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**Project Participants:**

Dennis A. Johnson

Advisor and Professor,

Pullman, WA.

**Supporting Documents:**

Signature Pages

Graduate Student Vita

Advisor Vita

Current and Pending Support Forms

Animal Welfare Assurance Statement

**Required Documents:**

* 10-page narrative
  + Relevance to Sustainable Agriculture
  + Innovativeness
  + Impacts & Outcomes
  + Producer involvement
  + Objectives
  + Materials & Methods
  + Educational Outreach Plan
  + Scholarly Publications & Educational Materials
  + Evaluation and Producer Adoption
  + Timeline
  + Citations
* 1-page summary (300 words)
  + Justification
    - Potato production systems in PNW
    - Disease pressure and lack of efficacious treatments
    - Off-target effects of fumigation
    - Green manures
      * Contribute to soil and disease suppression
      * Efficacy is variable
    - Objectives:
      * Sample green manure crops in PNW, test for *Vd*
      * Compare populations from potato vs. green manure crops
      * Determine number of cycles required to attenuate *Vd*
    - Materials and methods
    - Expected results, outcomes, published manuscripts
* Budget Justification
* Supporting Documents

**Summary:**

**Relevance to Sustainable Agriculture:**

The Pacific Northwest (PNW) is a worldwide leader in processing, fresh market, and seed potato production. Washington produces the greatest yields/acre worldwide, Idaho supports the largest potato acreage in the United States, and Montana and Oregon contribute potato seed to neighboring states (NASS, 2016). Together PNW states generate $ and employ X farm workers annually (). The sustainability of potato cropping systems is jeopardized by Verticillium wilt, a plant disease caused by the long-lived fungal pathogen *Verticillium dahliae*, which compromises profits and can reduce yields up to 50% (). Additionally, the widespread use of soil fumigants to control *V. dahliae* compromises environmental quality and limits the potential for sustainable potato production in temperate regions worldwide. Green manures can be used for disease suppression () and to enhance soil quality (); however, the mechanisms by which disease suppression is established and maintained are not understood.

Potato production systems in the PNW satisfy most metrics of sustainability (Reganold and Wachter, 2016): namely (i) productivity- potato yields and quality () are greater in Washington state than in any other region (), (ii) economic viability- potato production systems in the PNW are profitable/ have sustained profitable financial performance (), and (iii) social well-being- XYZ ().

* Justification
* Identify literature/knowledge gap
* Hypothesis/objectives
* Preliminary evidence
* Outcomes
* Grants and summaries from:
  + SARE:
  + NAL
  + USDA-NIFA-CRIS
* Citations

**Innovativeness:**

**Impacts & Outcomes:**

**Producer involvement:**

**Objectives:**

**Materials & Methods:**

**Educational Outreach Plan:**

**Scholarly Publications & Educational Materials:**

**Evaluation and Producer Adoption:**

**Timeline:**

**Citations:**