**FY16 Application for Nursery Research Funding**
**Washington State Department of Agriculture - Nursery License Surcharge**
**(Please use one application packet, including the Progress Report page for each proposal.**
**You must use our form - *failure to do so may result in not funding your project*.)**

**Project Title:** **Steam treatment for sanitation of used pots and potting media**

**Project Leaders:** Gary Chastagner and Marianne Elliott

**Institution (if any):** Washington State University

**Mailing Address**: 2606 West Pioneer, Puyallup, WA 98371

**Email:** chastag@wsu.edu, melliott2@wsu.edu
**Project Phone Number:** (253) 445-4528 **Cell Number:** (253) 882-6856
**Note:** Project leader or his/her designee must be available at above project phone number on **February 27, 2015** between the hours of 10:00-12:00 and 1:00-3:00.

***(Check One) New Project X*** _____ ***Continuing*** _____

**Start Date: July 1 2015** _____ **Completion Date: June 30 2016** _____

**Amount Requested for (FY16) July 1, 2015 to June 30, 2016:** 14,628.00

If this is a multiple year project, please estimate and list the following information for each future July 1 - June 30 period listed below through project completion:

| Fiscal Years (FY) | July 1, 2016 to June 30, 2017 | July 1, 2017 to June 30, 2018 | July 1, 2018 to June 30, 2019 | July 1, 2019 to June 30, 2020 | July 1, 2020 to June 30, 2021 |
|---|---|---|---|---|---|
| $ Amount Needed | $8,879 | | | | |

If you are increasing the above amounts since your last application, please explain why:

*Please list **all** other sources and amounts of funding for this project for the current year only: **(Please notify us by February 15 if other funding has been approved and from where.)**

| Source | $ Amount Applied For | Approved | Pending Date of Notification |
|---|---|---|---|
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**Total Amount Needed to Fund Project (include all sources*)** $14,628.00

If total amount from all sources is not granted, will you be able to complete the project? Yes
Explain: If needed we will reduce the number of nursery site visits and/or demonstrations

Please indicate which sector(s) of the nursery industry stand to benefit from the results of your research: (Letters of support from the industry are encouraged.)

Ornamental nurseries who wish to recycle used pots and media and are concerned about reducing the impacts of soilborne diseases, pests, and weeds.

**Submit 16 copies of this proposal to: Tom Wessels, Plant Services Program Manager, P.O. Box 42560, Olympia, WA 98504-2560, twessels@agr.wa.gov, or fax (360) 902-2094**
**All applications must be postmarked by December 31, 2014.**

**Please summarize the purpose of this research: (you may attach additional sheets if necessary or submit this summary in your own format)**

*Project description*

Recycling used containers and media are critical control points where weeds and diseases may infest nursery crops (Parke and Grünwald 2012). Disinfestation of these items is often overlooked or compromised in nursery production because of the labor and time involved. A recommended method for disinfesting containers before re-use is treatment with a disinfectant solution. Commonly used chemical disinfectants such as chlorine bleach or quaternary ammonium compounds are inactivated by organic matter, so clinging soil and other material needs to be removed by scrubbing or power washing prior to disinfectant treatment. Heat treatments such as hot water dip or steaming do not require that the pots be cleaned first, thereby eliminating one step in the process. Steaming may prove to be more labor-saving and less costly than chemical disinfectants or hot water dip tanks for disinfecting containers that will be re-used. Composting has the potential to effectively eliminate weed seeds and pathogens in recycled media, but most nurseries do not have the facilities to properly compost media so that all of the media reaches the required temperatures. Steaming of used media is another approach that growers have expressed interest in.

As a result of this project, nurseries will be able to determine whether steaming used pots and media is a viable option in WA State. Options for growers will be investigated and estimates that include costs for purchase and operation of steaming equipment and other steaming costs will be developed. Steaming events will be held at nurseries and/or at WSU-Puyallup where growers can bring their pots to be treated in advance of the planting season.

*Goals and objectives*

Demonstrate various steaming techniques and assess their utility for nurseries. These include use of a shipping container modified for use as a steam chamber, using pallets with pots and fruit bins for media to facilitate movement with a forklift, or steaming materials in place using a tarp anchored with sandbags as is done for soil. Best Management Practices for preventing infestation of pots and media holding areas will be demonstrated as well. An extension publication will be developed on this subject.

Test steaming equipment (different sizes of steaming units) for efficacy on used pots and media. A Sioux SF-20 steamer (steam output 680 lb/hr) that was purchased with funds from WSDA and APHIS in 2013 for mitigation of *P. ramorum* in soil at nurseries will be used in this project. This steamer is mounted on a trailer and can be moved to a nursery site, or used onsite at WSU Puyallup. In addition, funding is requested to purchase a smaller steaming unit (Siebring SG10, steam output 300 lb/hr) for comparative and demonstration purposes. This unit is of a size that may be more affordable for an individual nursery.

Determine the costs of steaming used potting media and pots vs costs of replacement or other methods of sanitation (ie washing, disinfectants). An analysis of relative costs of each method will be performed.

*Impact and benefit*

Growers will be able to determine whether steaming used pots and media is a viable option, both economically and in terms of space/time.

**Methods:**

Regional steaming events will be held and will be a combination of steaming pots and media at nursery sites and steaming at a location such as the WSU county extension office or Research and Extension Center, where growers can bring their used pots to be steamed. We estimate holding these events in four locations: Puget Sound, Northwest, Southwest, and Eastside. We plan to hold one three-day event outside of the Puget Sound area in FY2015 and at least two events in the Puget Sound region. The location, number of events, and duration may change according to the level of grower interest. If there is substantial interest, more funds will be requested to hold additional steaming events in 2016-2017.

At WSU-Puyallup a steam chamber will be constructed from a shipping container fitted with temperature sensors and data loggers to monitor temperature profiles during steaming, and an access port for a steam delivery hose. Used pots will be placed in the steam chamber. Temperature sensors will be placed at various

locations within the pile. Steam will be delivered to the container and monitored until the temperature of the coolest sensor reaches the target temperature.

For media steaming, piles of potting media will be covered with a tarp, or placed in bins inside the steam chamber, and steamed until the temperature of the coolest sensor reaches the target temperature.

The two steam generators will be compared to determine the relative costs for steam treatments and to demonstrate different options for growers. Differences in time to reach the target temperatures and fuel usage will be assessed and used to develop cost estimates for the use of steaming to disinfest pots and media..

References:

Parke, J.L. and Grünwald, N.J. 2012. A systems approach for management of pests and pathogens of nursery crops. Plant Disease 96:1236-1244.

van Loenen, M.C.A., Turbett, Y., Mullins, C.E., Feilden, N.E.H., Wilson, M.J., Leifert, C., and Seel, W.E. 2003. Low temperature-short duration steaming of soil kills soil-borne pathogens, nematode pests, and weeds. European Journal of Plant Pathology 109:993-1002.

**Expenditure Breakdown:**
**(Please include salaries, supplies, travel, etc.)**

Wages and Benefits: $3,953

Supplies: $4,600

Equipment: $5,175

Travel: $900

Total: $14,628