

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: Evaluating *Mahonia* species and cultivars for landscape use in the Pacific Northwest

Project Leader: Randall Hitchin, Outreach Manager, Washington Park Arboretum

Institution (if any): South Seattle College

Mailing Address: 2300 Arboretum Drive East, Seattle, WA 98112-2300

Email: rhitchin@arboretumfoundation.org Project Phone Number: (206) 577-1147 Cell Number: (206) 405-0287

Note: Project leader or his/her designee must be available at above project phone number on February 27, 2016 between the hours of 10:00-12:00 and 1:00-3:00.

(Check One) New Project Continuing

Start Date: July 1, 2015 Completion Date: June 30, 2016

Amount Requested for (FY16) July 1, 2015 to June 30, 2016: \$ 26,834

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	\$ 11,000	\$ 11,000	\$ 11,000	\$ 11,000	\$ 13,000

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

*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

Total Amount Needed to Fund Project (Include all sources) \$ 26,834

If total amount from all sources is not granted, will you be able to complete the project? No

Explain: The requested funding is the basic amount necessary to obtain and propagate the evaluation materials and to establish and maintain the field evaluation plot during FY2016.

Please indicate which sector(s) of the nursery industry stand to benefit from the results of your research:

Nursery growers, retail nurseries, and large scale retail nurseries.



Evaluating *Mahonia* species and cultivars for landscape use in the Pacific Northwest

Purpose of this research

Mahonia is a large and highly varied genus, distributed throughout much of the northern hemisphere, with two centers of diversity: one in eastern Asia and another in Mexico and the western region of the United States. Members of the east Asian group typically inhabit moist, shaded forest environments while species of the North American group are generally found in drier and more open habitats, including forest edge, chaparral and desert. In all, the genus numbers around 100 species.

All species of *Mahonia* have compound, evergreen foliage, but beyond this common theme, the genus exhibits remarkable diversity. Plants range from low ground covers to shrubs to small trees. Throughout the genus, foliage color ranges from gray to bluish to deep green, while foliage texture and pattern seem almost limitless. *Mahonia* species have the added advantage of producing very attractive floral displays and there is a *Mahonia* that blooms in almost any month of the year. Additionally, the genus is known for its tolerance to a wide range of environmental conditions and is subject to very few pests and diseases. In short, we feel that the genus *Mahonia* holds great potential for horticulture in the Pacific Northwest because of the rich variety of ornamental characteristics the species and cultivars possess and their adaptability to cultivation in this region.

With such potential for Pacific Northwest landscapes, it is surprising how few *Mahonia* species and cultivars are commonly cultivated. While some are well known and frequently grown, a large fraction of this highly ornamental genus is unavailable in the region. Probably the single most significant barrier to the commercialization of new species and cultivars, and the reason relatively few *Mahonia* are grown in the Pacific Northwest, is due to the fact that some *Mahonia* are known alternate hosts for black stem rust (*Puccinia graminis*). Consequently, Washington State Department of Agriculture (WSDA) prohibits the sale of any *Mahonia* species or cultivar that is not certified as resistant to black stem rust by USDA-APHIS.

While the commitment of time necessary to obtain a USDA-APHIS certification for black stem rust resistance would present a very significant hurdle for an individual grower wishing to introduce a new crop, it is perfectly complementary with the aims of this research proposal. In fact, by establishing the proposed research plot, it will be possible to evaluate the horticultural potential of a large number of *Mahonia* species and cultivars while simultaneously screening these same subjects for resistance to black stem rust.

This approach offers significant benefits to the landscape industry and greatly shortens the timeline needed to make the most promising varieties available to local nurseries, landscapers and the gardening public.

Methods of Research

General

This research will be conducted on the campus of the South Seattle College (SSC), located in Seattle, Washington. In coordination with WSDA, a perimeter fence will be installed and other measures will be taken to ensure the security of the research subjects. The site will be equipped with a weather monitoring station to provide highly accurate site specific environmental data. During 2015, cuttings will be obtained from botanic gardens, arboreta, nurseries and private collectors across the United States. All cuttings will be rooted in the SSC propagation facility. The resulting plants will be grown on through the spring and summer of 2016 and planted out in the trial field at SSC during the autumn of 2016. All subjects will be planted in a Completely Randomized Design with a minimum of three replicates per accession where ever possible.

Evaluation Parameters and Data Collection

This common garden trial will evaluate the following categories of plant performance:

1. Propagation information
2. Plant size & growth (collected annually in spring)
3. Flowering data (collected weekly as needed in season)
4. Pest and disease information
5. Invasiveness potential
6. Winter injury data (collected each spring or as required)

Observations will begin in the greenhouse and continue through the container production cycle. In this research phase, emphasis is placed on practical and economic aspects of new crop development through an improved understanding of the relative ease and unique production challenges of each taxon under evaluation. Data collection will be focused on metrics related to propagation and container growth. Early in the first field season, measurements will be taken to establish a plant growth index or baseline. This index, consisting of two canopy width measurements and one canopy height measurement, will serve as the basis for evaluating the growth and vigor of each field subject. The field trial subjects will be surveyed throughout the year for a range of ornamental attributes, including floral parameters such as flower presence, color and truss size as well as vegetative parameters like foliage color, shape and substance. Trial subjects will also be observed for pests and diseases. Invasiveness indicators will be recorded and this data will inform a decision making mechanism resulting in a

potential invasiveness rating. Finally, cold hardiness will be evaluated on a 6-point scale based on the extent of tissue damage subsequent to significant freeze events.

Analysis of the field data will stratify the project subjects and identify the most promising *Mahonia* forms for horticulture in the Pacific Northwest. Any members of this 'high promise' category that are not certified as black stem rust resistant by USDA-APHIS will receive a final evaluation. Cuttings will be gathered from each non-certified taxon and 6 to 10 of the resulting plants from each taxon will be shipped to the USDA Cereal Disease Laboratory in Saint Paul, Minnesota. This laboratory analysis will provide a definitive determination of the black stem rust susceptibility or resistance for each taxon examined.

Plot Management & Community Involvement

In addition to significant involvement by the principal investigators, an SSC horticulture student will be hired to supervise volunteers and coordinate data collection. Much of the work associated with the management of the trial site will be conducted by the King County Master Gardeners. They will provide significant support for plant propagation, trial establishment, plot maintenance, and data collection. This organization has adopted this evaluation as a core project and is committed to its success as part of their mission to provide volunteer support for public education.

Estimated Duration of the Study

We plan to evaluate the specimens in this plot for six years. An observation period of this length is typical for the evaluation of woody ornament plants in order to expand the range of exposure to environmental extremes and to allow for the full and mature expression of each taxon under evaluation.

WSDA Grant Request - FY 2016
Expenditure Breakdown

Salaries and Wages		
South Seattle College		
0.25 FTE Student Intern	\$6,864	
Sub-Total		\$6,864
Services		
Research field rental	\$3,820	
Field preparation	1,500	
WSDA site certification	1,000	
Domestic shipping/postage	1,400	
Sub-Total		\$7,720
Supplies and Equipment		
Site Fencing	6,700	
Propagation/potting supplies	825	
Environmental monitoring equipment	1,800	
Irrigation supplies	650	
Tools & equipment storage	1,400	
Photographic supplies	425	
Signage	450	
Sub-Total		\$12,250
WSDA Request Total FY 2016		\$26,834

SIGNATURES

PROPOSAL TITLE: Evaluating *Mahonia* species and cultivars for landscape use in the Pacific Northwest

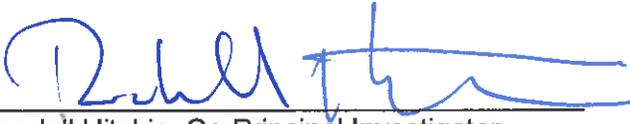
SUBMITTED TO: Washington State Department of Agriculture

SUBMITTED BY:



Date: 6-24-15

Van Bobbitt, Co-Principal Investigator
Horticulture Instructor & Arboretum Coordinator, South Seattle College



Date: 6/24/15

Randall Hitchin, Co-Principal Investigator
Outreach Manager, Arboretum Foundation, Washington Park Arboretum



FOR
GARY OERTLI

Date: 6/24/15

Gary Oertli
President, South Seattle College