Oregon Department of Agriculture and Oregon Association of Nurseries

Nursery Research Project Proposal 2026

DATE: September 1, 2025

TITLE: New cultivars of nursery plants with novel ornamental traits and disease resistance

Ryan Contreras, Professor
Department of Horticulture
Oregon State University
ryan.contreras@oregonstate.edu
4017 Ag. and Life Sciences Bldg.
Corvallis, OR 97331-7304
Voice: 541-737-5462
https://horticulture.oregonstate.edu/users/ryan-contreras

BACKGROUND:

The Ornamental Plant Breeding Program at Oregon State University is noted for its connection to industry. I have released 13 cultivars since 2014 including 6 in 2025, which illustrates the momentum the program is gaining. Cultivars exhibit a range of improvements including better production efficiency, disease resistance, novel ornamental traits, and reduced seedling production. To reach greater market potential, we are balancing non-exclusive release with plant branding companies and nurseries including Plant Haven, Briggs Nursery, Monrovia, and others. We have cultivars released using both models and are in continual discussion the industry at-large, the Ornamental Plant Breeding Crop Advisory Committee (OPCAC), and the OAN Research Committee. There are eight (8) projects briefly outlined below for which I am requesting continued funding.

Lilacs. Growers want an alternative to Bloomerang® that grows better in production and has a more prolific second flush of flowers. We have been breeding with many related cultivars (e.g 'Miss Kim', 'Palabin', 'Josee') that are reliable growers. Many of the resulting progeny are without disease symptoms, have strong rebloom, and are vigorous. We identified and published research involved in the first step to develop useful markers for reblooming in lilac. Control of reblooming is a two-gene model (Chen et al., 2020) and are working with Kelly Vining (bioinformatics) to convert these into markers we will use to screen future populations. We sequenced Bloomerang that will serve as our reference genome onto which we will arrange our other DNA markers and advance the marker assisted selection (MAS) process. During 2020 I developed additional populations that were field planted in spring 2023 and began phenotyping during 2024. These plants will be used to validate our markers along with more sequencing of these genotypes. Using the resulting markers will greatly improve efficiency of lilac breeding and I believe will allow us to be more strategic, not only in the *Pubescentes* group, but in common lilacs. I am not aware of anyone else using similar modern genetic and genomic tools in lilac breeding.

In common lilacs, we have focused on floral traits (e.g. picotee, double, intense color), foliar traits (purple leaves from 'Old Glory'), and blight resistance. We initially planted 68 hybrid selections from our various crosses that had shown no symptoms of blight and had good form for three years in containers, but I was disappointed to see the relatively high incidence of *Pseudomonas* in the field planted material during 2022. This highlights the need for long-term evaluation and the impact of environment. However, there remains several promising selections that were flagged for propagation and continued observation. We are continuing to grow our first F_2 generation by collecting open-pollinated seed from our first hybrid crop. Additionally, we made additional crosses with 'Sensation' in combination with 'Old Glory', 'Prairie Petite', and others in continued efforts to produce more phenotypic variation. This project is slow, as plants often take several years to flower and disease symptoms can be delayed. There were 4 accessions initially selected in 2023 that were once again identified as superior in 2025. I hope to get these four into micropropagation during 2026.

Cotoneasters. Based on industry guidance I have reduced efforts on this project but maintain a small project. An exciting new hybrid between 'Emerald Sprite' x *C. apiculatus* (H2017-03-01) was propagated and tested for fire blight during spring/summer 2021 and was symptom free. We increased numbers and produced a good crop of #3 in 2024. These plants have flowered and set some fruit. If we can combine

disease resistance, flowering, fruiting, and superior habit I believe we could improve marketability of *C. apiculatus.* We will propagate again in 2025 pending interest.

Styrax japonicus. To combine the weeping habit of Marley's Pink (MP) and Fragrant Fountains (FF) with the purple foliage of Evening Light (EL), we made crosses in 2016 and have 15 hybrids between EL and MPP as well as 8 hybrids of EL and FF. This is an exciting population that impresses more as it matures and there may be 3-4 viable cultivars among them including glossier and vigorous weepers, better purple-upright forms, but most notably there are two purple weeping selections. Plants flowered in 2019, including a remarkable purple, weeping selection with pink flowers that was released in 2023 ('ORSTSTYx1'). With the support of the OAN Research Committee in 2021, this selection was licensed with Proven Winners in 2024, and they marketed under the name Swan Song™. We have grown out a large population of seedlings from varying crosses of purple x weeping. These F2 seedlings are being observed for segregation of color and weeping habit to determine how these traits are inherited and the genotypes of Evening Light, Marley's Pink, and Fragrant Fountains – in addition to newly developed selections from OSU. This will allow future targeted breeding for these traits by us and other programs. During 2025 this population began to mature and displayed some impressive phenotypes including the darkest pink flower I have seen to date. There may be selections ready for propagation in 2026.

Cercidiphyllum japonicum. Like the styrax project, we are combining the weeping habit of Amazing Grace (AG) and Morioka Weeping (MW) with the red foliage of Red Fox. Additionally, we would like to select a new red foliage form that is a better performer than Red Fox, as many growers have shared that they are dropping it due to poor performance. From the 102 F_1 hybrids field planted at the Lewis Brown we had two females and 8 males flower in 2020, from which we collected 1,800 seedlings and ultimately field planted 1,500 F2 plants. As expected, we are seeing a wide range of phenotypes from slow and shrubby to vigorous and upright. Many are showing signs of varying degrees of weeping and range from emerald-green to deep purple – bordering on black. In 2024 we phenotyped the 1,093 F2s remaining and there were 507 upright and green, 186 upright and purple, 249 semi-weeping and green, 15 semi-weeping and purple, 128 weeping and green, and 8 weeping and purple. This deviates significantly from the 9:2:2:1 model that is expected for two independent genes controlling these traits. We will conduct further analysis, but it appears these traits are linked in repulsion. Regardless of the genetic control, I made 10 selections during 2025 that were sent for propagation during August. These included 5 purple weeping and 5 upright purple.

Philadelphus. There is great opportunity for improvement in this genus. Many available cultivars lack fragrance, are rangy, or both. We have been combining traits from taxa such as *P. madrensis* and *P. mexicanus* with 'Snow White', 'Blizzard', 'Miniature Snowflake', and others. Our unique combinations of fragrance, form, and leaf traits set our selections apart from what I have observed. In a side-by-side comparison, OSU selections are markedly better in production than Blizzard based on the lack of branching and overall poor growth of the latter. OSU selections exhibit finer texture, dense branching, and vigorous growth when treated the same. 'ORSTPHILx1' was released and is marketed by Monrovia as Swan Lake®. Future directions will include using a new release from Garden Genetics that reportedly is reblooming. Incorporating that trait would raise our cultivars to a higher level and improve marketability beyond "3 weeks of flowering". Another recent release Petite Perfume Pink provides another opportunity to improve color in the genus beyond the 'Belle Etoile'. I believe ploidy manipulation could be used to further darken pigments and will pursue this in 2026 and beyond.

New cultivars of street trees: Celtis, Cercis, Phellodendron, Quercus, Tilia, and Zelkova. We need more options for street trees to replace ash and compliment maples and other staples. Starting in 2018, we treated thousands of seeds of *Quercus robur*, *Phellodendron amurense, Celtis occidentalis, Celtis koraiensis,* and *Zelkova serrata* with various mutagens and eventually field planted 75 that we continue to

observe. Of note are selections derived from fastigiate English oak that had good form (without pruning) and no powdery mildew, good forms of amur corktree (varied in size), dramatic color on hackberry, good form and color on zelkova. Fastigiate English oaks remain free of powdery mildew whereas the stump sprouts of susceptible sister seedlings are infested. However, recent industry input indicated that adoption of a new fastigiate English oak simply based on lack of powdery mildew may be poor. In 2022, I interplanted superior forms of Oregon white oak (*Q. garryana*) within the row to attempt hybridization in hopes of recovering novel and superior hybrids. Other street trees of interest that I plan to move toward include silver linden and I have a superior clone from which I am collecting seed in 2025. Of interest would be to develop a high performing clone that lacks pollen, thus would be less attractive to bees and lessen the controversy related to pollinators. We are working to identify the best tree-forms of *Celtis reticulata* that I will cross with a superior *C. koraiensis*. The goal is more heat, drought, and "western climate" tolerance from *C. reticulata*. However, in the meantime, the superior clone of Korean hackberry was sent for budding in August 2025. I have taken a similar approach with *Cercis*, by treating *C. occidentalis* with EMS we have produced tree-forms that we are crossing with *C. canadensis* that have desirable phenotypes but are less adapted to the dry summers of the PNW. 2025 crosses appeared fruitful but pods aborted about 6 weeks post pollination. We will repeat these crosses in 2026 in greater numbers, as it is expected that percent success will be low.

***Pyracantha*.** Pyracantha are durable, drought resistant shrubs but they tend to be large, rangy and require extensive pruning in production and landscapes. I initiated a mutation program to develop more compact forms. We treated 12,000 seeds collected from 'Teton' with a chemical mutagen, potted 1,430 plants into #1 containers and collected height data. Our data confirmed that increasing concentration reduced plant height. We propagated 5 selections but discarded three based on growth observations during 2021. In 2021 we tested both selections for fire blight, and they were symptom free. One selection has been superior in container cultivation, and we have repeated our propagation and production tests during 2023-25. It appears to be on track for 2026 release (field location 81.09); however, flowering has been slow and thus it is difficult to get a sense of possible fruit set. I also have learned of a new introduction from Plantipp that is reportedly fire blight resistant and completely thornless. I have not grown it yet, but Peter Van Riessen has indicated it is a large shrub and I suspect needs to be improved for form. When I receive this plant, I will hybridize with 81.09 to develop additional improved selections, as I have not seen similar growth form to 81.09 on existing cultivars.

***Spiraea*.** *Spiraea thunbergii, S.* x*arguta*, and *S. prunifolia* 'Plena' are "old timey" shrubs that are less popular due to their rangy, unkempt habits. However, they are exceedingly hardy and work in low-input landscapes. I believe with improvement and marketing they could be strong performers. We have been using gamma radiation of rooted cuttings to induce mutations and measuring the impact. Thus far, we have not achieved the goal of a truly compact form, but radiation treatments were repeated in 2024 on cuttings collected from 2023 mutation plants. I have observed during 2025 and decided we will grow these plants in larger containers to collect seed. By allowing them to undergo a sexual generation we can uncover recessive mutations that otherwise are masked.

Budget Summary

Salary	
FRA support (6 months)	$25,002
Other payroll expenses	$15,751
Undergraduate student labor	$4,000
Field plot and greenhouse fees	$8,000
Supplies	$7,000
Total	**$59,753**