



**NORTHWEST CENTER  
FOR  
SMALL FRUITS RESEARCH**

*A Consortium of University of Idaho, Washington State University and Oregon State University Ag Experiment Stations, USDA-ARS, and the Small Fruits Industry*

**Small Fruits Initiative  
Plant Improvement  
8<sup>th</sup> Year Funding Request  
FY 2011  
\$1,350,000**

- PLANT HEALTH/PATHOLOGY PROGRAM ..... \$500,000
- COMPETITIVE RESEARCH GRANTS ..... \$500,000
- SITE FEASIBILITY STUDY AND PHASE I DESIGN FOR RESEARCH FACILITIES ..... \$350,000

Northwest Center for Small Fruits Research  
4845 B SW Dresden Ave.  
Corvallis, OR 97333  
541-758-4043 • pnwa@comcast.net

**Presented to the United States Congress: March 2010**

---

## Small Fruits Initiative Plant Improvement – Summary Page

The Small Fruits Initiative-Plant Improvement builds upon the strengths of existing cooperative research programs aligned through the Northwest Center for Small Fruits Research. The strategy was developed following careful analysis of both the strengths and the gaps that exist in current small fruit research. It strengthens existing programs throughout the region and adds key programs to fill in critical gaps that are not met by the existing infrastructure associated with the Center. Strong emphasis is given to research supporting human health, food safety, economic impact and environmental safety.

- ***Wine Grape***

Research funded by the initiative will identify clones, varieties and rootstocks that are well adapted to growing conditions in the region and meet the industry's primary goal to produce superior quality grapes for a premium wine market.

- ***Red Raspberry (summer fruiting)***

Research funded by the initiative will develop summer fruiting varieties with superior fruit quality, suitable for machine harvesting and/or hand harvesting for fresh market. Additional traits to be incorporated into varieties include high yields, root rot and virus resistance.

- ***Blackberry***

Research funded by the initiative will develop varieties that have excellent intense flavor with improved yield, better winter tolerance, firmer fruit, and no thorns. Selections should be adapted to mechanical harvesting, and be suitable for the fresh and processed market.

- ***Strawberry***

Research funded by the initiative will develop processing and fresh-market varieties with excellent flavor and color, that are economical to produce, adapted to the region and resistant to pests and diseases.

- ***Blueberry***

Research funded by the initiative will develop varieties that are high yielding and disease resistant, have excellent flavor and processing characteristics, can be mechanically harvested for the fresh and processed markets, and maintain high fruit quality.

- ***Black Raspberry and Fall Fruiting Red Raspberry***

Research funded by the initiative will:

- 1) Develop varieties of black raspberry with high fruit quality and horticultural traits, such as disease resistance, that improve the economics of production in the Pacific Northwest.
- 2) Develop fall fruiting varieties of red raspberry for the fresh market with high fruit quality that also are high yielding, root rot resistant, machine harvestable, and resistant to viruses.

- ***New Crops and Minor Crops (Huckleberry, Cranberry, Table Grapes, etc.)***

Research funded through the initiative will obtain varieties from breeding programs outside of the region and identify those best adapted to growing conditions in the Pacific Northwest. Native plant species, plants being preserved in germplasm collections, or minor crops popular elsewhere will also be evaluated for their adaptation to growth conditions and market potential in the Pacific Northwest. A regional huckleberry breeding program will be strengthened.

---

## **The Small Fruit Industries in the Pacific Northwest**

Small fruit crops - blueberries, blackberries, red and black raspberries, grapes, cranberries and strawberries - are important to U.S. agriculture. According to the USDA-National Agricultural Statistics Service, the estimated value of small fruit production for 2006 was \$6 billion, more than the combined value (\$1.3 billion) of apples, pears, peaches, and sweet cherries.

The Northwest is a major producer of small fruit crops. There are thousands of growers producing small fruit crops, dozens of processing/packing companies, and over 900 wineries in the region. The farm value of Northwest small fruit crops represents about 50% of U.S. production, excluding the value of California grape and strawberry production. Combined small fruit acreage for the three states is greater than 100,000 acres.

The Northwest has a unique climate for the production of high-quality small fruit crops. This is primarily because of long growing seasons that are characterized by cool nights, long sunny warm days, and mild winters. The region has a national and international reputation for fruit quality, due to the excellent flavor, color, and nutritional value of fruit grown in this climate. The chemicals that contribute to color are the same ones that provide the powerful antioxidants touted by the medical community as important for human health.

The Northwest has the available land, water, labor and capital needed to meet the demands of domestic and foreign markets for its small fruit products. The opportunity for exports, particularly for the Pacific Rim countries, is expanding rapidly. The 24,000 acre increase in small fruit production during the past 15 years is a testament to the industry's success in meeting these market opportunities.

## **The Northwest Center for Small Fruits Research**

In 1990, the small fruit industries in the Pacific Northwest came together to form the Northwest Center for Small Fruits Research. The mission of the center is:

To enhance profitability and sustainability of the small fruits industries in the Pacific Northwest through research in genetics, pest management, berry and grape processing, and production/physiology.

The Center is a consortium among the small fruits industries, the USDA-Agricultural Research Service, and the Agricultural Experiment Stations of Idaho, Oregon, and Washington. During the past decade, The Northwest Center for Small Fruits Research has established a strong history of successful interdisciplinary and multi-institutional collaborations that have contributed to the strength and growth of the industries in the region. From this decade of experience, the Center has identified variety development and evaluation as central research objectives underpinning the growth of small fruit industries in Idaho, Washington and Oregon. The Small Fruits Initiative-Plant Improvement was borne from the recognition that the industries require superior small fruit varieties to sustain their competitive growth in the world market during the years to come.

---

## Small Fruits Initiative-Plant Improvement: The Need

Superior varieties of small fruit crops that meet consumer and industry needs are fundamental to the strength of the industry in the region. Varieties with the qualities that meet industry's needs can only be developed through long-term, multi-disciplinary research programs sustained through stable sources of funding. At the present time, however, adequate long-term funding is not available to support the breeding and genotype evaluation programs that are needed to secure the future of the small fruit industries in the Pacific Northwest. The goal of the Small Fruits Initiative-Plant Improvement is to build upon the interdisciplinary and multi-institutional strengths of the Northwest Center for Small Fruits Research to develop and evaluate the varieties needed by the various small fruit industries in the region.

Development or evaluation of new varieties of small fruit crops requires collaborative research that draws from aligned disciplines of agricultural sciences including plant breeding, food science, horticulture, plant pathology, and entomology. The Small Fruits Initiative-Plant Improvement encompasses each of these disciplines in research components that together compose the research program.

- Plant Health Component **FY2010 Request: \$500,000**

The Pacific Northwest is a major producer of small fruit crops including strawberry, raspberry, blackberry, blueberry, black raspberry, table grapes and wine grapes. These crops are in increasing demand due to enhanced public recognition of the nutritional and health benefits of consuming these fruits. Berries are very perishable due to their physical structure and their susceptibility to pre- and post-harvest infection by fungal and bacterial diseases. Botrytis is a disease common to all of these crops. In addition, each crop has other diseases that significantly impact fruit quality. In order to develop effective methods to disrupt the development of fruit diseases, there is a need to better understand the biology of these pathogens. Since pre-harvest infection often leads to post harvest disease development, management practices can dramatically impact the susceptibility and disease development in fruit.

Funding will be used for:

- New ARS small fruit pathologist to develop sustainable methods to control fungal diseases in these crops with an emphasis on diseases that impact fruit quality and shelf-life perishability or post-harvest quality.
- Specific cooperative agreement with Washington State University for a technical support position in Mt. Vernon, Washington for the validation of control methods for fruit pathogens in different environments, under multiple management systems and in multiple cropping systems.

---

- Site Feasibility Study and Phase I Design for Additional or New Research Facilities  
**FY2010 Request: \$350,000**

The current facilities are over crowded, with approximately half of the space per research program as recommended by the USDA-ARS. In addition some of the current facilities built in the 1950's are in need of replacement and the facilities built in the early 1970's are in need of an upgrade. To build research capacity in the area of small fruit crops the Northwest Center for Small Fruits Research Unit in Corvallis, Oregon needs to be expanded. The entire research effort in the Unit is focused on Specialty Crops. The feasibility study is needed to determine the best approach to move forward, either upgrade and expand existing facilities or to build a new research facility. With increased interest by the public in healthier foods and an increased emphasis in the Farm Bill on Specialty Crops, expansion of the Horticultural Crops Research Laboratory to increase research capacity on Small Fruits and Nursery Crops is very timely. The industries continue to support research on fruit breeding, horticulture, viticulture, entomology, pathology, and food science on small fruit crops. The Pacific Northwest is a major producer of small fruit crops including strawberry, raspberry, blackberry, blueberry, black raspberry, table grapes and wine grapes. These crops are in increasing demand due to enhanced public recognition of the nutritional and health benefits of consuming these fruits. Increasing the research capacity to improve the yield and quality of these crops would be beneficial to American consumers.

- Plant Breeding Component

For many small fruit crops, germplasm evaluation and breeding form the fundamental core of research providing varieties needed to secure the industries' futures. A second group of small fruit industries have not been supported by regional plant breeding research programs in the past, but now need the support of such programs to meet future challenges or grow into major components of the agricultural economy. For a third group of small fruit crops, there is every expectation that the industry will continue to thrive using varieties that have been developed outside of the region, but these varieties need to be tested for their adaptation to conditions and markets in the Pacific Northwest. The diverse needs of the small fruit industries for regional plant breeding programs are reflected in the strategy for the Small Fruits Initiative-Plant Improvement.

- Food Science and Post-Harvest Evaluation Component

New varieties must be evaluated for their processing characteristics to ensure that they can be quickly adopted by fruit processors. As the fresh market sector of the Northwest industries increases, there will be an increased need for evaluation of varieties for fresh market and post-harvest characteristics, including flavor, texture, nutritional quality, storability, and response to mechanized post-harvest handling. Economic production of some small fruit crops requires mechanical harvesting, and new varieties must be evaluated for their resilience to these practices.

---

- Horticulture Component

No two varieties have the same growth and fruiting characteristics. For new varieties to be moved seamlessly into commercial growers' fields they must be evaluated for their adaptation to current cultural practices or new cultural practices must be developed.

- Virus Elimination Component

"Clean" propagation stock is essential for the sustained strength of the small fruit industries. Viruses that cause diseases of these crops must be eliminated from new varieties, and virus/disease-free propagation stock must be continually monitored to ensure that it has not become re-infected. With increased emphasis on a National Clean Plant Network, the Northwest Center for Small Fruit Research needs to expand its' capabilities in this area to meet national needs.

- Field Evaluation Component

New varieties must be grown and evaluated in fields located throughout the region to ensure that they will perform well in the diverse growing environments of the Pacific Northwest. Field testing is also needed to evaluate the resistance or susceptibility of new varieties to diseases and pests that they are likely to encounter in commercial fields. Similarly, varieties, clones, and rootstocks that are new to the region must be tested for adaptation to microclimates in the Pacific Northwest before they are widely planted in commercial fields.

- Competitive Research **FY2010 Request an additional \$500,000**

The competitive grants program funds peer reviewed small fruits research projects that foster collaboration between research groups working on small fruit crops to enhance profitability and sustainability of the small fruits industry. Projects are reviewed by a panel that has equal industry and academic representation. This ensures that quality science based projects that meet the needs of the industry are being funded.

The Small Fruits Initiative-Plant Improvement builds upon the strengths of existing cooperative research programs aligned through the Northwest Center for Small Fruits Research. The strategy was developed following careful analysis of both the strengths and the gaps that exist in current small fruit research. It strengthens existing programs throughout the region and adds key programs to fill in critical gaps that are not met by the existing infrastructure associated with the Center.

---

## Small Fruits Initiative-Plant Improvement: Commodity Outline

- Blueberry

The Pacific Northwest is a major producer of blueberries and production is increasing throughout the region. Enhanced public recognition of nutritional and health-promoting values of blueberries has increased market opportunities for this industry. The industry has been built on varieties developed outside of the region but it now requires varieties to meet new market opportunities and production challenges, especially those posed by emerging diseases in the region.

Objective: Research funded by the initiative will develop varieties that are high yielding and disease resistant, have excellent flavor and processing characteristics, can be mechanically harvested, and maintain high fruit quality.

Funding will be used for:

- New ARS breeding program;
- Cooperative research between ARS and OSU, WSU, or UI for the food science, horticulture and field testing components; and
- An ARS virus elimination program.

- Wine Grape

The wine grape industry is well established and growing rapidly throughout the region. Washington is second only to California in production of wine grapes in the United States. Value-added products, associated businesses, and tourism make viticulture a strong contributor to the regional economy. The industry throughout the region is focused on the premium wine market.

Objective: Research funded by the initiative will identify clones, varieties and rootstocks that are well adapted to growing conditions in the region and meet the industry's primary goal to produce superior quality grapes for a premium wine market.

Funding will be used for competitive funding program providing long-term funding to scientists working towards established goals of the initiative.

- Red Raspberry (floricane-fruiting)

The Pacific Northwest ranks first in the country's production of red raspberries. The primary focus of the industry continues to be high quality fruit for the processing market. A second goal is to expand the fresh market sector of the industry with the development of varieties suited to this market.

Objective: Research funded by the initiative will develop floricane (summer fruiting) varieties with superior fruit quality, suitable for machine harvesting and/or hand harvesting for fresh market. Additional traits to be incorporated into varieties include high yields, root rot and virus resistance.

---

Funding will be used for:

- Strengthening a highly-successful but under-funded breeding program in the region;
- Cooperative research between ARS and OSU, WSU or UI for the food science, horticulture and field testing components; and
- An ARS virus elimination program.

- Blackberry

The Pacific Northwest leads the world in blackberry production. While production is currently focused in Oregon, it is expanding in Washington as growers seek ways to diversify their operations.

Objective: Research funded by the initiative will develop varieties with improved yield, better winter tolerance, firmer fruit, and no thorns. Selections should be adapted to mechanical harvesting, have intense flavor, and be suitable for processing.

Funding will be used for:

- Strengthening an ARS breeding program;
- Cooperative research between ARS and OSU, WSU, or UI for the food science, horticulture and field testing components; and
- An ARS virus elimination program.

- Strawberry

The Pacific Northwest is the country's second largest production area for processed strawberries. Industry goals include growth in the processing market and expansion in the fresh market sector to facilitate the diversification of farming operations in the Northwest.

Objective: Research funded by the initiative will develop processing and fresh-market varieties that are economical to produce, adapted to the region, resistant to pests, and produce high quality fruit.

Funding will be used for:

- Strengthening two complementary breeding programs in the region;
- Cooperative research between ARS and OSU, WSU, or UI for the food science, horticulture and field testing components; and
- An ARS virus elimination program.

- Black Raspberry and Red Raspberry (primocane-fruiting)

The Pacific Northwest leads the world in black raspberry production, but fruit from the single variety that now serves as the mainstay of the industry is expensive to produce due to pest and disease problems. To build the economic strength of the industry, varieties with pest and disease resistance are needed.

---

Primocane (fall fruiting) red raspberries are a mainstay of much of the fresh market industry in the region and worldwide. Primocane-fruiting red raspberries are important to the industry because they allow growers to expand their markets beyond the typical, short summer season of the florican (summer fruiting) raspberries. The industry requires new varieties that retain the intense flavor of current Northwest varieties and have new horticultural characteristics that improve the economics of production.

Objectives: Research funded by the initiative will:

- 1) Develop varieties of black raspberry with high fruit quality and horticultural traits, such as disease resistance, that improve the economics of production in the Pacific Northwest.
- 2) Develop primocane (fall fruiting) varieties of red raspberry with high fruit quality that also are high yielding, root rot resistant, machine harvestable, and resistant to viruses.

Funding will be used for:

- New ARS breeding effort;
  - Cooperative research between ARS and OSU, WSU, or UI for the plant breeding, food science, horticulture and field testing components; and
  - An ARS virus elimination program.
- New Crops and Minor Crops (Huckleberry, Cranberry, Table Grapes, etc.)

In addition to small fruit crops listed above, other small fruits can fill specialty market niches, adding diversity to the agricultural economy in the region and interest to consumers' diets. To thrive in the future, these industries require varieties adapted to regional environments.

Objective: Research funded through the initiative will obtain varieties from breeding programs outside of the region and identify those best adapted to growing conditions in the Pacific Northwest. Native plant species, plants being preserved in germplasm collections, or minor crops popular elsewhere will also be evaluated for their adaptation to growth conditions and market potential in the Pacific Northwest. A regional huckleberry breeding program will be strengthened.

Funding will be used for:

- New ARS support scientist to investigate new crops; and
- Cooperative research between ARS and OSU, WSU, or UI for the plant breeding, food science, horticulture and field testing components.