



# Horticulture Crops Research Unit, Corvallis, Oregon

The mission of the Horticultural Crops Research Unit is to solve problems confronted by the nursery and small fruit industries through research on these horticultural crops. Our research focuses on (1) biology and management of plant diseases and insect pests; (2) plant growth and physiology, especially as influenced by mycorrhizal fungi; (3) germplasm evaluation and genetic improvement; and (4) production horticulture



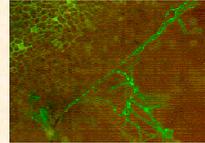
**Bob Martin, Research Plant Pathologist; Subject Area: Characterization, identification and control of viruses in small fruit crops; Contact: (541) 738-4041; [martinr@science.oregonstate.edu](mailto:martinr@science.oregonstate.edu)**

Bob's research focus is on the characterization, detection and control of virus diseases of small fruit crops. Many viruses of these crops are only known as graft or vector transmitted agents. Areas of emphasis are the characterization and identification of these unknown pathogens, development of detection methods to improve certification programs, the study of their epidemiology and development of control strategies. Controls strategies include production of virus-free nuclear stock materials, identification and management of vectors, and genetic engineering virus resistance.



**Walter Mahaffee, Research Plant Pathologist  
Subject Area: Biology and control of foliar and fruit diseases of horticultural crops;  
Contact: (541) 738-4036; [mahaffew@science.oregonstate.edu](mailto:mahaffew@science.oregonstate.edu)**

The foliar pathology group is developing innovative methods for the management of foliar and fruit disease of small fruit and nursery crops that increase the economic return for managers. Projects include the development of quantitative methods for monitoring spore dispersal and correlating aerial spore concentrations to disease levels in the field, disease forecasting of powdery mildews, role of biofilm formation in the survival and efficacy of biological control agents on leaf surfaces, and the role of epiphytic growth of *Botrytis cinerea* in Botrytis blight and fruit rot.



**Robert Linderman, Research Plant Pathologist; Subject Area: Biology and control of soilborne fungal pathogens;  
Contact: (541) 738-4062; [lindermr@science.oregonstate.edu](mailto:lindermr@science.oregonstate.edu)**

Bob's goal is to develop cultural and biological control strategies for root diseases of greenhouse and nursery crops through research on mycorrhizal fungi and other rhizosphere microorganisms. Recently, he has been evaluating the relative susceptibility of different nursery crops to *Phytophthora ramorum*, the sudden oak death (SOD) pathogen, evaluating efficacy of fungicides and biological agents, determining the survival of the pathogen in potting mixes, and determining the efficacy of aerated steam to sanitize potting mix and contaminated containers infested with soilborne pathogens, including *P. ramorum*.



**Chad Finn, Research Geneticist; Subject Area: Cultivar development and germplasm research in blackberry, red and black raspberry, blueberry and strawberry; Contact: (541) 738-4037; [finnc@science.oregonstate.edu](mailto:finnc@science.oregonstate.edu)**

Chad's research program has two broad, overlapping goals. First is to develop new cultivars of blackberry, raspberry, blueberry and strawberry, primarily for the Pacific Northwest commercial berry industry. The second goal is to collect and evaluate *Rubus*, *Vaccinium* and *Fragaria* germplasm from around the world. Then, as appropriate, this germplasm is incorporated into breeding material for our program as well as other breeding programs.



**Niklaus Grunwald, Research Plant Pathologist; Subject Area: Biology and control of Phytophthora pathogens in nursery and small fruit crops;  
Contact: (541) 738-4049; [grunwald@onid.orst.edu](mailto:grunwald@onid.orst.edu)**

Nik's research focus is on the biology and control of *Phytophthora* diseases affecting horticultural crops with particular emphasis on the Sudden Oak Death pathogen, *Phytophthora ramorum*. *P. ramorum* is a devastating exotic pathogen of many forest and nursery crops. Specific research objectives include: 1. Evaluation of the etiology, epidemiology and genetics of *Phytophthora* spp. affecting nursery crops; 2. Functional genomics of *P. ramorum*; and 3. Cultural, biological, and chemical controls for management of *Phytophthora* diseases.



**Robert Doss, Research Plant Physiologist; Subject Area: Bruchin physiology and biochemistry;  
Contact: (541) 738-4056; [dossr@science.oregonstate.edu](mailto:dossr@science.oregonstate.edu)**

The bruchins, which were discovered in our lab, are chemical compounds derived from pea weevils and other insects that are potent regulators of plant growth. Bruchins associated with insect eggs can induce cell division and tumor formation when applied to the surface of certain plants. Our lab is focused on gaining an understanding of how bruchins act at the biochemical level, and on how plant genes influence their action.



**Jack Pinkerton, Research Plant Pathologist; Subject Area: Biology and management of plant-parasitic nematodes in small fruit and nursery crops; Contact: (541) 738-4076; [pinkertj@science.oregonstate.edu](mailto:pinkertj@science.oregonstate.edu)**

Jack's research program is focused on the development of economic thresholds and management strategies for plant-parasitic nematodes and soilborne plant pathogens affecting grape, strawberry, raspberry, and *Vaccinium* species. Development of non-chemical and sustainable management options is a goal of this research. Management strategies being investigated include modified cultural practices (crop rotation, green manures and soil amendments, and soil solarization), the use of biological control organisms and compounds, and the identification of genotypes with host plant resistance.



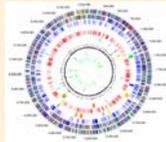
**David Bryla, Research Horticulturist; Subject Area: Physiology and production of small fruit crops; Contact: (541) 738-4094; [brylad@onid.orst.edu](mailto:brylad@onid.orst.edu)**

David's overall research objectives are to develop and evaluate horticultural practices for growing berry crops in the Pacific Northwest. Specific areas of study include: irrigation, fertilization, and soil management; pruning and cropping practices; pest, disease and weed management; cultivar selection; and identification of new small fruit crops. Results of this research will be the basis for modifications and improvements in production strategies used by growers of berry crops, and will clarify the impact of specific production factors on yield and quality of these crops.



**Joyce Loper, Research Plant Pathologist; Subject Area: Molecular Mechanisms of Biological Control of Plant Disease Contact: (541) 738-4057; [loperj@science.oregonstate.edu](mailto:loperj@science.oregonstate.edu)**

The goal of Joyce's research is to develop knowledge of mechanisms by which bacterial biological control agents protect plants from infection by bacterial or fungal plant pathogens. She uses molecular approaches to identify the characteristics, genes and gene products of biocontrol agents that are involved in disease suppression. Working with The Institute for Genomic Research, she recently completed the genomic sequence of the biological control agent *Pseudomonas fluorescens* Pf-5, which suppresses many soilborne diseases when applied to crops as a seed inoculant. Current studies are focused on identifying factors influencing gene expression by Pf-5 using microarrays.



**Carolyn Scagel, Research Plant Physiologist;  
Subject Area: Physiology; Contact: (541) 738-4063; [scagelc@onid.orst.edu](mailto:scagelc@onid.orst.edu)**

Carolyn's program investigates the influence of nutrition, hormone status, and root-associated organisms on root growth, productivity, and quality of small fruit crops. This research has three primary objectives: 1) Characterize changes in plant metabolism (nitrogen, hormones) associated with adventitious root formation, 2) Describe critical environmental aspects influencing regulation of fertilizer use and nutrition of woody ornamentals, and 3) Investigate physiological roles of beneficial root-associated organisms on root initiation and growth, and nutrient use efficiency.



**Krista Shellie, Research Horticulturist; Subject Area: Viticulture (Wine Grapes); Contact: (208) 722-6701; [kshellie@uidaho.edu](mailto:kshellie@uidaho.edu)**

Krista is a remotely located member of the HCRU. She relocated from the ARS Kika de la Garza Research Center in Weslaco, TX in 2001 to initiate a new wine grape research program and establish new ARS research facilities at the University of Idaho Research and Extension Center in Parma, Idaho. The goal of Krista's research is to investigate the influence of irrigation in cool, semi-arid production regions on wine grape quality and to promote sustainable production of high quality wine grapes. She is investigating the influence of cultural practices and cultivar selection on vine health and components of grape quality. Current projects include: Genotype evaluation and impact of vine water stress on berry temperature and berry quality components.



**Paul Schreiner, Research Plant Physiologist; Subject Area: Below-Ground Physiology of grapevines and small fruit crops; Contact: (541) 738-4084; [schreimr@science.oregonstate.edu](mailto:schreimr@science.oregonstate.edu)**

Paul's research focus is on the nutritional requirements of grapevines and the factors that control root and mycorrhizal function (growth, nutrient and water uptake, nutrient storage) in small fruit production systems. An improved understanding of the nutrient requirements needed to produce high quality fruit, and the factors that affect the ability of roots to supply those needs will lead to more sustainable production systems.



**Julie Tarara, Research Horticulturist; Subject Area: Microclimate and grapevine biology; Vineyard production systems; Contact: (509) 786-9392; [jtara@wsu.edu](mailto:jtara@wsu.edu)**

Julie's research focuses on grapevines (juice and wine grapes) and their response to the abiotic environment (temperature, radiation, humidity, wind). As in many horticultural crops, microclimate modification results from routine cultural practices continually pursued by growers to achieve the highest quality fruit, rather than the highest yields per se. By collaborating with vine physiologists, Julie's goal is to extend our understanding of the effect of the physical environment on vine biology directly in the field, then to transfer this knowledge to more effective and efficient farming practices.



**Jim Fisher, Research Entomologist; Subject Area: Biology and control of insect pests;  
Contact: (541) 738-4032; [fisherj@science.oregonstate.edu](mailto:fisherj@science.oregonstate.edu)**

The goal of Jim's research is to develop new, effective pest management strategies for garden symphytan (GS) and black vine weevil (BVW) in small fruit and nursery situations. Presently the GS project concerns population size and the effects of cover crops on damage to seedling (in-the-ground) deciduous trees, population monitoring and prediction in small fruits and tree crops. There are several BVW projects: use of acoustical devices for larval detection, interaction of soil media mixes with chemicals for larval control, plant components that may act as attractants or repellents to adults, larval and adult nutrition as is applicable to host plant preference.



**Jungmin Lee, Research Food Technologist; Subject Area: Characterization, identification, and application of factors to improve wine quality;  
Contact: (208-722-6701 ext 282); [jlee@uidaho.edu](mailto:jlee@uidaho.edu)**

Jungmin is new to HCRU, having joined in October 2004. Her research will focus on identification and quantification of compounds related to improving wine-making processes and wine quality. The goal is to identify and apply factors that improve the color, aroma, and flavor of wine, from the starting material to the final end product.



**Denny Bruck, Research Entomologist  
Subject Area: Biology and control of insect pests;  
Contact: (541) 738-4026; [bruckd@onid.orst.edu](mailto:bruckd@onid.orst.edu)**

The long-term objectives of our group are to develop new concepts fundamental to understanding the biology of diseases of arthropod pests of nursery crops. Research is focused on understanding how microbial communities form and interact to achieve biological control, developing techniques for establishing, conserving, augmenting and manipulating microbial communities, and understanding entomopathogen etiology and how it relates to insect management.

