

AGRICULTURAL RESEARCH FOUNDATION

1600 SW Western Blvd, Suite 320 Corvallis, Oregon 97333 P 541-737-3228

The Agricultural Research Foundation is a nonprofit 501(c)3 corporation. Gifts and charitable bequests to the Foundation are deductible and can help accrue tax benefits.

http://agresearchfoundation.oregonstate.edu





President's Message 2017-2018 ARF Annual Report

Greetings from the Agricultural Research Foundation. This annual report is a reflection of the Foundation's activities from July 1, 2017 through June 30, 2018. We faced many changes on our board this year as evidenced by articles in this report. We are grateful for those that have given of their time for many years and for their service to agriculture and the Foundation.

I would like to focus on the future and welcome our new Dean of the College of Agricultural Sciences at Oregon State University (OSU), Dr. Alan Sams. Dr. Sams comes to us from Texas A&M University where he served as Executive Associate Dean of the College of Agriculture and Life Science. The Foundation looks forward to working with Dr. Sams as he begins his tenure at OSU.

The Foundation hired Meredith Wade as our new Manager of Finance and Research. Ms. Wade began her work with the Foundation in May 2018. She had been working in the OSU University Administrative Business Center.

She holds a MBA in business administration from UC-Davis and had worked with another non-profit foundation in California.

Dr. Russ Karow is our Executive Director and Charlene Wilkinson is our Office Manager.

Yanli Zhang, our Manager of Finance and Research for seven years, is now working in the Agricultural and Marine Sciences Business Center. We thank her and all our staff for their service to the Foundation. Every month or so, I receive an update on the activities of the College of Agricultural Sciences. It has been very encouraging to see the list of new hires. This list includes teachers, researchers and extension agents. These new faculty will lead programs that help solve the problems and challenges faced by our agricultural and natural resource industries. The new hires

will rely on our state budget and commodity groups to provide funding to get this work done.

Lastly, in February of 2019, the Oregon Legislature will convene to develop the state budget for the next two years. I am grateful for the work and cooperation that all natural resource industries have done in the past to secure adequate funding for OSU. It will be a

challenge again in 2019 but I am confident that our industries will meet this challenge to fund OSU and our agricultural research and extension needs.

Till next year. GO BEAVS!

Ralph Fisher, President



2017-18 Agricultural Research Foundation **Directors**

Today's ARF Directors and Officers, like the founders of the organization, are volunteers. They are chosen to represent the diversity of Oregon's agricultural and natural resource industries. They give generously of their time and expertise in setting policy and monitoring results from Foundation projects. The directors meet bi-annually to review budgets, analyze Foundation activities of the past year, and plan programs for the next.

Officers

President

Phil Walker (through April 6) Salem, Hazelnuts & Cherries

Ralph Fisher (starting April 7) *Sublimity, Grass Seed*

Vice Presidents

Lance Lyon *Aurora, Nursery Industry*

Ralph Fisher (through April 6) *Sublimity, Grass Seed*

Treasurer / Secretary

Josh Kvidt Philomath, Banking

Directors

Arnold Appleby Corvallis, Professor Emeritus Crop & Soil Science, OSU

Robert Bailey *The Dalles, Tree Fruits*

David Beck *Amity, Wine Industry*

Barbara Bond Amity, Professor Emeritus Forest Ecosystems & Society, OSU Stella Coakley

Corvallis, Assoc. Dean Emeritus College of Agricultural Sciences, OSU

Ron Hathaway

Klamath Falls, Professor Emeritus Extension - Animal Science, OSU

Mike Hessel Shedd, Fresh Market Vegetables and Melons

Tami Kerr Corvallis, Dairy Industry

Elizabeth Levi *Portland, Attorney*

Dan LoFaro
Farm Service Agency, Portland

Mike Macnab
Portland, VP of Gift Planning
Community Foundation for

Pat Malone
Philomath, Christmas Trees

Southwest Washington

Jean McKinney Wasco, Wheat Rancher

Bryan Ostlund Salem, Commodity Commissions Administration Fred Postlewait Newport, Banking

Brenda Powell Corvallis, Retail Nursery & Garden Center

Shelly Sorem *Corvallis, CPA*

Edwin Stastny, Jr. *Malin, Irrigated Crops*

Bud Weiser Corvallis, Dean Emeritus College of Agricultural Sciences, OSU

Committees

Audit

Brenda Powell, Chair Ralph Fisher Josh Kvidt Dan LoFaro Shelly Sorem Phil Walker, Ex-officio

Competitive Grants

Ron Hathaway

Jean McKinney, Chair Arnold Appleby Bob Bailey David Beck Barabara Bond Stella Coakley Ralph Fisher Mike Hessel Josh Kvidt Elizabeth Levi Lance Lyon Bryan Ostlund Ed Stastny Phil Walker, Ex-officio

Executive

Phil Walker, Chair Ralph Fisher Josh Kvidt Elizabeth Levi Lance Lyon Bud Weiser

Finance

Ron Hathaway, Chair Ralph Fisher Josh Kvidt Dan LoFaro Mike Macnab Pat Malone Brenda Powell Phil Walker, Ex-officio

Nominations

Bud Weiser, Chair Stella Coakley Ralph Fisher Phil Walker

Personnel

Lance Lyon, Chair

Ralph Fisher Josh Kvidt Elizabeth Levi Phil Walker Bud Weiser

Honorary Directors

Dan Arp, Dean
College of Agricultural Sciences
Bill Boggess, Exec. Assoc. Dean
College of Agricultural Sciences
Ed Ray, President
Oregon State University

Emeritus Directors

Roy Arnold Lane Borg Ron Cameron Ellen Egan Larry Kaseberg Ken Messerle Sam Wade

Foundation Staff

Russ Karow
Executive Director

Yanli Zhang (through May 31)

Manager of Finance & Research

Meredith Wade (starting May 23)

Manager of Finance & Research

Charlene Wilkinson
Office Manager

The Agricultural Research Foundation

The Agricultural Research Foundation was established in October of 1934 to encourage and facilitate research in all branches of agriculture and related fields for the benefit of Oregon's agricultural and natural resource industries. The Foundation is the custodian of privately and publicly donated research funds as well as grant funds from commodity commissions and other producer associations. These funds are used to support work conducted in Oregon State University (OSU) facilities in the Corvallis area and throughout the state as well as some cooperative projects with university scientists in other states.

During the 84 years since its inception, the Foundation has provided leadership, incentive, and moral support to a vigorous research program across agricultural and natural resource programs at OSU. To date, the Foundation has received and managed over \$200.7 million in donor gifts and grants to support research on a wide range of topics. In addition, the Foundation itself has provided over \$8.5 million of its own funds, via its Competitive Grants Program, to initiate innovative research studies proposed by agricultural and natural resource scientists at OSU.

The founders of the Foundation envisioned a strong, collaborative partnership between OSU and Oregon's diverse agricultural and natural resource industries. The Foundation has achieved that goal and works toward enhancements each year.

ARF Honor Roll—In Memoriam Phillip J. Walker

Phillip J. Walker (Phil) died unexpectedly on April 6, 2018. This annual report is dedicated to Phil.

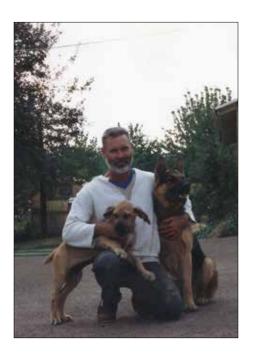
Phil became a member of the Agricultural Research Foundation Board (ARF) in 1991. He was elected vice-president in 1998 and became president in 2009. His insights and leadership have been invaluable to the Foundation. He led the organization through several major staff transitions and into a new mode of operation in terms of handling invested funds. Guideposts for ARF were his historical memory and his personal goal of always doing what was best for the commodity commissions and other grower groups that invested their dollars in OSU research.

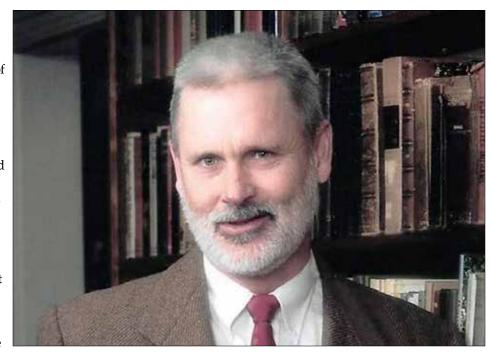
The Walker family agricultural legacy dates back six generations. Michael Henry Walker traveled the Oregon Trail from Iowa and settled in the Philomath area in the mid-1850s. The Walker family moved to Rickreall in 1873 and then to Independence in 1890. Walkdale Farms, just west of Salem, was established by the family in 1963. It is one of the Willamette Valleys largest producers of sweet cherries. The farm also produces sour cherries, filberts and prunes. Phil

was born in 1953 and grew up working the family's orchards. He took over management of Walkdale Farms from his father in the mid-1980s.

Phil attended college at the University of Oregon and obtained a degree in political science in 1975. Phil was a lifelong learner. He continued to take community college classes in chemistry, biology and business. He knew this knowledge would be of benefit to the family farming operation and to the industries of which he was a part. He was a modern day renaissance man. In addition to his peer-recognized farming knowledge, he had interests and talents in music, sports, and journalism.

Phil was a member of the Oregon Sweet Cherry Commission, Oregon Tart Cherry Commission, Oregon Hazelnut Commission, and Nut Grower's Society of Oregon. He served in leadership positions with many of these





organizations. Phil received the Nut Grower of the Year Award in 1997. He served as Polk County Commissioner in 1998 and again in 2003-05. He was on the Polk County Budget Committee and Citizens Advisory Board for Corrections Facilities.

Phil played in different bands throughout his youth. He put away his guitar as he raised his family but picked it back up in the last decade. He was the founder of the group that is now known as Little Hickory. He could play almost any instrument put in front of him and sang with a loud, gravelly voice.

Phil was active as a football, basketball, and baseball coach while his three sons were in school and continued involvement in sports for many years thereafter. He was a member of the West Salem Little League Board of Directors. He found that shoelessness had benefits in sports and other activities in life.

Phil was a community representative on the Salem Statesman-Journal Editorial Board and wrote editorials for the Journal on issues where government and business intersected. He often referred to himself as "the token redneck" in the editorial group.

Phil was not the first Walker to serve ARF. His father Gordon was on the board from 1958 to 1987. Gordon served on several committees and as vice president. Together the Walkers provided over 55 years of service to ARF.

Phil's death is a great loss for ARF, Oregon agriculture, and the many other communities he served.





2017-18 Agricultural Research Foundation **Financial Summary**

The Agricultural Research Foundation continues to stand on solid ground. Project revenue increased 2% from the previous year to \$8,588,062. Project expenses were \$9,085,715. Total assets increased by \$1.5 M to \$29,492,954 and total liabilities increased by \$1.6 M. The Foundation's general fund provided support for the Competitive Grants Program in the amount of \$397,285 and also supported undergraduate student research at \$12,000. General fund support for other special projects totaled \$28,450 - College of Agricultural Sciences (CAS)

faculty and staff awards, financial support of the CAS Diamond Pioneer recognition program, and support of Oregon's Agricultural Progress Magazine.

The Foundation generates it's operational and special programs support funds through investments. To balance risk and return in recent years, the Foundation's investment policy has allowed investment in dividend paying equities up to 25% of assets (20% goal with 5% allowed flexibility to account for trade timing differences). The net rate of return on

investment was 3.10%, slightly less than the previous year. At the June 30 year end, our investment portfolio had an unrealized gain of \$932,804, reflected in net assets as market value above the cost of investments.

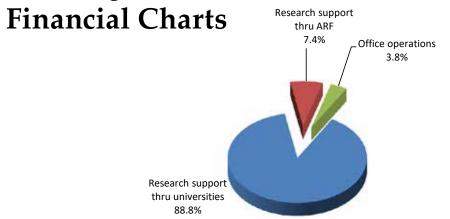
The financial statements and related financial information in this Annual Report are the responsibility of the Foundation management and have been audited by Jones & Roth, P.C. independent public accountants.

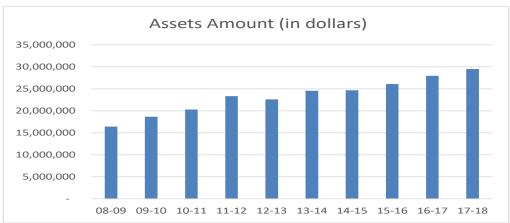
Meredith Wade

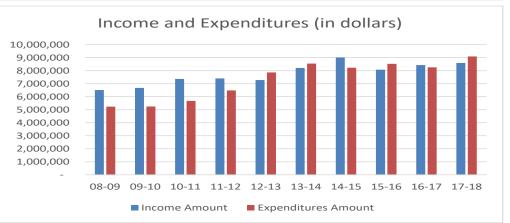
Manager of Finance and Research



2017-18 Agricultural Research Foundation







Income (All funds contributed for research projects excluding general fund investment income)

Expenditures (All funds spent for research projects excluding office operations)

AGRICULTURAL RESEARCH FOUNDATION

AUDITED STATEMENTS OF FINANCIAL POSITION* YEAR ENDING JUNE 30, 2018 - ACCRUAL BASIS

2018 ASSETS

| Contracts payable to Oregon State University Accrued liabilities Unearned contract revenue Capital lease liability Total liabilities NET ASSETS Unrestricted Temporarily restricted Permanently restricted Total net assets | | 9,561,569 4,288 14,548,682 4,319,526 9,635,351 989,395 14,944,272 |
|--|---------|--|
| Accrued liabilities Unearned contract revenue Capital lease liability Total liabilities NET ASSETS Unrestricted Temporarily restricted | | 9,561,569 4,288 14,548,682 4,319,526 9,635,351 |
| Accrued liabilities Unearned contract revenue Capital lease liability Total liabilities NET ASSETS Unrestricted | - | 9,561,569 4,288 14,548,682 4,319,526 |
| Accrued liabilities Unearned contract revenue Capital lease liability Total liabilities NET ASSETS | | 9,561,569 4,288 14,548,682 |
| Accrued liabilities Unearned contract revenue Capital lease liability | | 9,561,569 4,288 |
| Accrued liabilities Unearned contract revenue Capital lease liability | 76 | 9,561,569 4,288 |
| Accrued liabilities Unearned contract revenue | | 9,561,569 |
| Accrued liabilities | | |
| Contracts payable to Oregon State University | | 9,696 |
| | | 4,822,807 |
| Accounts payable to Oregon State University | W. Late | 121,344 |
| Accounts payable, trade | \$ | 28,978 |
| CURRENT LIABILITIES | | |
| LIABILITIES AND NET ASSETS | 10.11 | A Alaba |
| TOTAL ASSETS | \$ | 29,492,954 |
| Total noncurrent assets | | 23,851,340 |
| Restricted endowment investments | | 1,119,694 |
| Other long-term investments | | 22,615,431 |
| Long-term contribution receivables | | 100,000 |
| Equipment and leasehold improvements, net | | 16,215 |
| NONCURRENT ASSETS | | |
| Total current assets | 198 | 5,641,614 |
| Advance research payments | | 178,537 |
| Investment earnings receivable | | 269,483 |
| Contracts receivable | | 3,114,543 |
| Short-term investments | | 1,469,464 |
| Casil and casil edulvalents | \$ | 609,587 |
| Cash and cash equivalents | | |
| CURRENT ASSETS Cash and cash equivalents | | |

^{*}The financial statements of ARF as of and for the year ended June 30, 2018 were audited by Jones and Roth, P.C. and their report dated September 26, 2018 expressed an unmodified opinion on those statements. A copy of the full audit report is available from the ARF office.

AGRICULTURAL RESEARCH FOUNDATION

AUDITED STATEMENTS OF ACTIVITIES YEAR ENDING JUNE 30, 2018 - ACCRUAL BASIS

| | 2018 | | | |
|--|--------------|---------------------------|---------------------------------------|---|
| | Unrestricted | Temporarily Restricted | Permanently Restricted | Total |
| REVENUES, GAINS, AND OTHER SUPPORT | | | | |
| Contract income | \$ 5,821,663 | \$ - | \$ - | \$ 5,821,663 |
| Contributions | | 2,765,899 | 500 | 2,766,399 |
| Investment earnings | 794,288 | 41,023 | 4,280 | 839,591 |
| Realized gain (loss) on investments | 294,529 | 1,590 | 1,209 | 307,328 |
| Net assets released from restrictions - | | | | |
| fulfillment of purpose | 3,012,364 | (3,012,364) | | |
| Total revenues, gains, and other support | 9,922,844 | (193,852) | 5,989 | 9,734,981 |
| EXPENSES | | - | | A TOP AND A STATE OF THE ADDRESS OF |
| Program services: | | | | |
| Research expenditures paid | | | | |
| through Oregon State University | 8,207,053 | THE WALL | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 8,207,053 |
| Research expenditures paid | | | | |
| through the Foundation | 701,722 | | | 701,722 |
| Research expenditures paid | 70.040 | | | 470.040 |
| through other universities | 76,940 | | THE PERSON NAMED IN | 176,940 |
| Supporting services: Management and general | 359,249 | | | 359,249 |
| Total operating expenses | 9,444,964 | X I | A AMAGE | 9,444,964 |
| Changes in net assets before | 221 | | Land Albert | The law or - |
| unrealized gain (loss) on investments | 477,880 | (193,852) | 5,989 | 290,017 |
| Unrealized gain (loss) on investments | (380,068) | | | (380,068) |
| Change in net assets | 97,812 | (195,852) | 5,989 | (90,051) |
| NET ASSETS, BEGINNING OF YEAR | 4,221,714 | 9,829,203 | 983,406 | 15,034,323 |
| NET ASSETS, END OF YEAR | \$ 4,319,526 | \$ 9,635,351 | \$ 989,395 | \$ 14,944,272 |

ARF Competitive Grants Program Impacts – Vegetable Cropping Systems

In each annual report, we highlight the research of an individual who has used ARF Competitive Grant funding to jumpstart research activities. Dr. Ed Peachey is this year's featured scientist.

Dr. Peachey is a professor of horticultural crop agronomy and weed management in the Oregon State University Department of Horticulture. Dr. Peachey has received five ARF Competitive Grants over the last six years, all with a focus on enhancing commercial vegetable crop production in western Oregon.

2012-14 - Integrated strategies to improve weed control in table beets and chard

2013-15 - Enhanced efficiency fertilizer technologies for improved production in sweet corn

2014-16 - Elucidating the effect of root rot on phosphorus uptake by snap beans

2015-17 - Improving winter cover crop establishment in sweet corn production in the Willamette Valley

2016-18 - Improving irrigation efficiency and profitability in winter squash production in Western Oregon- the case for deficit irrigation

Full reports on these projects can be found at http://agresearchfoundation. oregonstate.edu/past-projects.

Vegetable crops are a major component of western Oregon agriculture. Crop types are as

that need to be addressed in each crop. As in most cropping systems, weed, disease, fertility, and insect management are areas of on-going research need. Dr. Peachey addresses these needs in his research and extension activities.

varied as the production problems

Key findings of Dr. Peachey's ARF work to date include the following:

• Weed control in beets and chard. Producers have primarily depended on herbicides to control weeds in beets and chard, but the number of herbicides available continues to decline for this small acreage crop. Weeds such as common lambsquarters and hairy nightshade are the most problematic, and if unchecked, severely impede mechanical harvest. Cultivation can be used but must be timed to optimize control and not interfere with other weed control practices. In this study, beets were precision cultivated with a specialized inrow cultivator that was fitted with 'spyders' and torsion weeders. Precision cultivation of 2-leaf beets doubled beet yield when coupled with standard herbicides and cut weed growth by 90%.

• Enhanced efficiency fertilizer technologies (EEF) - EEF fertilizer products can have measurable

effects in slowing the rate of conversion of urea-N to leachable nitrate-N. However, even under a "worst case" leaching scenario on a medium-textured soil, the use of inhibitors was ineffective in achieving a corn-ear yield response. These products are most effective when used on well drained, sandy soils planted in the spring when the threat of leaching is greatest.

• Root rot and phosphorous in snap beans - a high root rot disease situation was created under field conditions in which P fertility was then superimposed as a treatment. Despite high disease pressure in unfumigated plots in these studies, bean pod yields did not respond to P fertilizer application. This study suggests that P fertilizer rates do not need to be adjusted for fields with high soil test P and a high root rot potential. Longer rotations out of beans could significantly increase pod yield due to a decrease in bean root rot disease severity.

• Winter cover crops in sweet corn - Cover crop establishment for producers of sweet corn in the Willamette Valley is a challenge because harvest may occur late into the fall. Soil may already be saturated from fall rains, and the combination of wet soil and crop residue on the soil surface precludes tillage that benefits cover crop establishment. Crimson clover/oat cover crops interseeded into sweet corn at the early elongation stage (V6) showed some promise but

varied greatly among years. Sweet corn yield was typically not affected by the cover crop when sown at the V6 corn stage. Typical weed control practices could be used without harm to the cover crop.

• *Irrigation and winter squash* - Over the past two decades, yields of Golden Delicious squash (Cucurbita maxima) have declined. This cultivar is grown for both flesh and seed markets on approximately 4500 acres in the Willamette Valley. Possible causes of yield decline may be increased disease pressure due to short crop rotations, too much or too little irrigation, or a combination of both. This project explored the relationship between rotation, disease severity, and irrigation on yield (fruit and seed) and quality. Highest yields were obtained at the highest irrigation level

(105% evapotranspiration) regardless of rotation history. However, in a long rotation (lower disease pressure), there was no difference in yield when the irrigation level was ≥45% of ET. These results indicate that irrigation amounts could likely be reduced without suffering a yield loss, but only when the disease pressure is low and when the soil has a high water holding capacity.

Western Oregon vegetable cropping systems are ever evolving. Dr. Peachev is directly involved with producers in monitoring these systems and in exploring options for dealing with system changes and problems as they arise. ARF Competitive Grand funding has played a role in helping to deal with system changes.





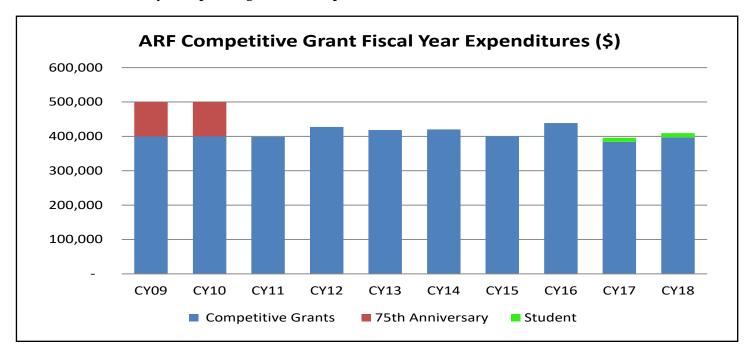
Competitive Grants Program

The Competitive Grants Program of the Agricultural Research Foundation is designed to encourage and fund research studies at OSU that will enhance Oregon's agricultural productivity, the quality of its produce and products, and wise management and use of its natural resources – air, water, forest, fisheries, and wildlife. Our goal is to make small catalytic grants that help young scientists launch their research and help established scientists embark on new research directions or approaches. Grants for the 2018-20 period funded in fiscal year 2017-18 ranged from \$11,310 to \$12,500 (the grant maximum). The average amount of the 32 grants given was \$12,415. Grant total was \$397,285. Eighty two proposals were submitted for 2018-20 funding.

The funds available to support the Competitive Grants Program are discretionary funds generated by the Foundation's investments. The level of funding available for the program is determined each year by the Board of Directors. Funding the Competitive Grants Program at the highest level possible is a board priority. In 2016-17 the directors decided to provide \$12,000 in competitive grant funding to undergraduate research in the College of Agricultural Sciences (CAS). Funding at this level was continued in 2017-18. In this program, undergraduate researchers are paired with a faculty partner to do a specific research project. The ARF Executive Director works with the CAS Experiential Learning Program coordinator to manage this program.

A history of this Competitive Grants program can be found at:

http://agresearchfoundation.oregonstate.edu/sites/agresearchfoundation.oregonstate.edu/files/ combined_history_for_printing_05-10-18_0.pdf



Competitive Grant Awards 2018-2020

| Researcher | Unit | Proposal Title | | |
|---------------------|---|---|--|--|
| Ates, Serkan | Animal & Rangeland Science | Milk and forage production from mixed or spatially separated simple and diverse pastures | | |
| Cherian, Gita | Animal & Rangeland Science | Nutritional strategies for mitigating breast meat myopathies in meat-type broiler chickens | | |
| Murthy, Ganti | Biological & Ecological Engineering | Exploring nutrient recovery and reuse from nursery wastewater treatment using an algal and biochar based approach | | |
| Murthy, Ganti | Biological & Ecological Engineering | Potential of algal biomass as biofertilizer for nurseries | | |
| Johnson, Ken | Botany & Plant Pathology | Diagnosis and control of winter squash storage rots in the Willamette Valley, OR | | |
| Mundt, Christopher | Botany & Plant Pathology | Microbiome-mediated resistance of wheat to the take-all disease | | |
| Stockwell, Virginia | Botany & Plant Pathology | RNAseq-guided identification of genes for production of a novel antimicrobial by the biocontrol agent <i>Pseudomonas fluorescens</i> A506 | | |
| Dung, Jeremiah | Central Oregon Ag Research Center | Development of epidemiological models for IPM of bacterial blight in carrot seed crops | | |
| Wilson, Tracy | Central Oregon Ag Research Center | Balancing yield and forage quality in orchardgrass hay | | |
| Kwon, Jung | Coastal Oregon Marine Experiment Station - Astoria | Utilization of crustacean shells as a source of natural astaxanthin with anti-obesity effect | | |
| Kwon, Jung | Coastal Oregon Marine Experiment Station - Astoria | Efficacy of sea vegetable dulse as a prebiotic crop for metabolic health | | |
| Student Researchers | College of Agricultural Sciences | Projects in Animal & Rangeland Science, Biological & Ecological Engineering, Botany & Plant Pathology, Crop & Soil Science, Fisheries & Wildlife, and Marion County Extension | | |
| Danelishvili, Lia | College of Veterinary Medicine | Discovery of novel secreted antigens of <i>Mycobacterium avium</i> subsp. <i>paratuberculosis</i> as biomarkers for Johne's Disease | | |
| Hase, Claudia | College of Veterinary Medicine | Development of a zebrafish infection model for Coldwater Disease and investigation of the route of infection and the role of leukocytes in Coldwater and Columnaris Diseases | | |
| Pastey, Manoj | College of Veterinary Medicine | Development of a rapid, sensitive and specific probe-based real-time PCR for the detection of chronic bee paralysis virus, sacbrood virus and chalkbrood in honeybees | | |
| Hagerty, Christina | Columbia Basin Ag Research Center | Are new SDHI fungicides worth the higher price for controlling stripe rust of wheat? | | |
| Brander, Susanne | Environmental & Molecular Toxicology | The potential for marine plastic ingestion in a commercial fishery | | |

Competitive Grant Awards 2018-2020 (continued)

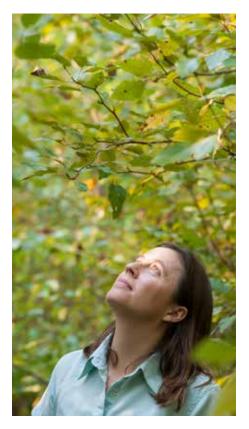
| Researcher | Unit | Proposal Title | |
|-------------------|---|--|--|
| Park, Si Hong | Food Science & Technology | Development of rapid molecular detection methods for foodborne pathogens in fresh produce cultivated in Oregon | |
| Lukas, Scott | Hermiston Ag Research & Extension Center | Reducing water and nitrate losses in onion production systems of the Lower Umatilla Basin | |
| Rondon, Silvia | Hermiston Ag Research & Extension Center | Effect of Colorado potato beetle control on beneficials and alternative management strategies | |
| Choi,Man-Yeon | Horticulture - USDA-ARS | Identification of antennal odorant receptors for biological targets to control Spotted Wing Drosophila | |
| Hooven, Louisa | Horticulture | Novel delivery method for insecticidal proteins | |
| Moretti, Marcelo | Horticulture | Weed control in organic blueberry using saturated-steam and organic herbicides | |
| Sagili, Ramesh | Horticulture | Understanding and improving honey bee nutrition to mitigate colony losses | |
| Vining, Kelly | Horticulture | Varietal improvement in mint using chromosome doubling | |
| Walton, Vaughn | Horticulture | Two products to reduce Spotted Wing Drosophila egg laying in strawberry and caneberry | |
| Dreher, Theo | Microbiology | Assessment of the entry of toxic cyanobacteria from lake blooms into irrigation waters | |
| Halsey, Kimberly | Microbiology | Volatile organic compound production during summer algal blooms in Upper Klamath Lake, Oregon | |
| Castagnoli, Steve | Mid-Columbia Ag Research & Extension Center | Implementing alternative management techniques for Spotted Wing Drosophila in cherry orchards. | |
| Buckland, Kristin | North Willamette Research & Extension Center | Quinoa varieties and planting dates for the Willamette Valley | |
| Wiman, Nik | North Willamette Research & Extension Center | Establishing fertilizer guidelines for non-bearing hazelnut trees | |
| Feng, Zhenxing | School of Chemical, Biological & Ecological Engineering | From wastewater materials to high-energy-density lithium-ion batteries | |
| Fu, Elain | School of Chemical, Biological & Ecological Engineering | Paper-based sensor for the detection of arsenic in agricultural water sources | |

Contributors 2017 - 2018

10 Barrel Brewing, LLC A & R Farms, Inc. A to Z Wineworks, LLC Abel, Dana Accamando, Amanda Adelman, Ed AG World Group, Inc. Agbiochem, Inc. Agpro Marketing & Manufacturing, Inc. AgReserves, Inc. Ahnert, Nancy Alan Mckee Farms Albaugh, LLC Albert, Dennis All West Select Sires Alley, Michael & Margueritte Allflex USA, Inc. Alpha Scents, Inc. Amabel Heer Farms Amebagone, Inc. American Vineyard Foundation **AMVAC Chemical Corporation** Anderson, Chuck & Mary Anderson, Ion Aotearoa Foundation Aquafine Aquamar, Inc. Aqua-Terra Consultants Arizona Plant Breeders, Inc. Armstrong, Peter Arnold, Susan Arrimeier Properties II, LLC Art Mattson Dist. Co., Inc. Arysta Life Science

Ashby, Theodore & Betty Association of Pineapple Producers of Ecuador Augustine, Elizabeth & William Bailey Nursery, Inc. Bailey, Don & Betty Baker & Murakami Produce Co., LP Balaban, Maryln & Lou Ball Horticultural Company Ballinger, Court BAMBU, LLC Bank of Eastern Oregon Barenbrug Bastian, Stephani & David Bayer CropScience, LP BDAS, LLC Bear Creek Timber Company Beck Pack Systems, Inc. Becker, Charles & Peggy Beekeepers Assn. - California State Beekeepers Assn. - Columbia Gorge Beekeepers Assn. - Klamath Basin Beekeepers Assn. - Lane County Beekeepers Assn. - Linn-Benton Counties Beekeepers Assn. - Portland Metro Beekeepers Assn. - Southern Oregon BeekeepersAssn. - Portland Urban BeekeepersAssn. - Tualatin Valley **Beetanical Apiary** Bejo Seeds, Inc. Bell, Craig

Bengry, Margaret Benton Soil & Water Conservation District Berger International, LLC Bernards, John Bernards, Marvin Beyer, Gene Bilderback, Diane Bio Gro, Inc. BioMedix BioSafe Systems, LLC Birkemeier Farms, Inc. Birky Farms, LLC



Black Dog Landing, LLC Blue Hill Blue Mountain Community College Bluhm, James Bluhm, Wilbur Boge, Dallas & Sharon Bolte, Elizabeth Bonito, Gregory & Patricia Bourdeau, Virginia Boxton, Bonnie & Winslow Boyd, Steven & Shellie Bozeman, Gary Bradford, Jason & Kristin Bradley Winery, LLC Braley, Linda Brandt Consolidated, Inc. Brassica Foundation Brewers Association, Inc. Brooks, Paula Brown, Carl Brown, Joy Brown, Melanie Bryant Pipe & Supply, Inc. BSG Craft Brewing Buck & Ann Fisheries, LLC Burke, Daniel & Susan Burrell, Elizabeth & Eric Weitz Bylund, Steve Bylund-Kiger Farms, LLC California Table Grape Commission Camas Prairie Angus Ranch Canaday, Jim Canham, Sarah Carollo Engineers

Carr, Gerald & Barbara

Carroll, George & Fanny Cartier, John Cascade Foods, Inc. Cascade Mycological Society Cascade Timber Consulting, Inc. Case, Jack & Nancy Central Oregon Eco-Lawns Certified Nuts, LLC Certis USA, LLC Chambers, Kenton Chapin Orchards, LLC Chapman, Nancy Chemeketa Community College Chester M. Wilcox Endowment Chetock, Ann & Jerome Chevis, Cheryl Chignell, Kimberly

Christensen Farms Christmas Tree Promotion Board CHS Primeland Citrus Research Board Ciuffetti, Lvnda CK Fiber Clark, Alisa Clark, Jason Clean Water Services Cleaver Farming, LLC Cleveland Rapids Orchards CLIF Bar & Company CM & WO Sheppard, Inc. Coakley, Stella & James Cole, Glen College of Earth, Ocean, and Atmospheric Sciences



Columbia Bank - Pendleton Columbia Basin Onion Research Committee Columbia Empire Farms, Inc. Columbia Gorge Fruit Growers Columbia Pulp Columbia Reach Pack Columbia River Inter-Tribal Fish Commission Columbia State Bank Combs. Barbara Community Bank ConAgra Foods Confederated Tribes of Siletz Indians Conger, Dennis Cook, Stanton Cool, Harry & Judith Copley, Delaine County of Umatilla Coussens, Brian Craft Brew Alliance, Inc. Creekside Valley Farms **Crop Production Services** Crosiar, John & Donna Crowson Farms Crowson, Kenneth Crumb, Ellen Cultiva, LLC Cummingham, Jon Cypress Systems, Inc. D & B Supply D & L Sanders Trust D D Nuts Da Yang Seafood, Inc. Dallas Jewish Community Foundation



Damron, Judy Danielsen, Alexandra Danstar Ferment AG Dean, Stanley Delange Farms Denfeld Orchards, Inc. Detweiler, Kathleen & Thomas DeVries, Fred DeWilde & Basinger, Inc. Diamond Fruit Growers, Inc. Diaz, David & Barbara Distributors Processing, Inc. Dixon, Jo Anne & Gerald Cooper **DLF** International Seeds Dobak, David Doig, Joyce Donehower, Weston & Gretchen

Doolittle, T Dorow, Janet **Dow International Finance** Dryden, Linda DSM Biotechnology Center Ducey, Beverly Duckwall-Pooley Fruit Co. Duggan, Jack DulsEnergy Duncan, Phyllis & Wayne **Duncan-Plaisance Joint TTEE** Dune Sciences, Inc. Dyck, James & Lynda E & J Gallo Winery E L Cattle Eastman Edwards, Mary & James

Egan, Ellen EI Dupont DE Nemours & Co. Eichier Farms **Eichler Brothers** Eli Lilly & Co. **Ellis Corporation Engineered Aesthetics** Enza Zaden USA, Inc. **Erath Family Foundation** Ernst Horseshoe Lake Orchards Evers, David Expert Fish Pathology, LLC EZ Orchards, Inc. Faber, Bernie Fall Creek Farm & Nursery, Inc. Farm Equipment Headquarters, Inc. Farrell, Janet Ferrero

Fessler, Rick Fichtner, Edwin & Patricia Finley, Deborah & Sidney Firestone Farms Firman Pollen Co. First Fruits Foundation Fitzgerald, Jeanette Five Mountain Farms, Inc. Flanagan, Charles & Emily Anne Flora USA, Inc. Flottweg Separation Technology Flow-Tech Systems, LLC **FMC** Corporation Forman, Michael & Paulette Fort Rock-Silver Lake SWCD Fosrbes Seed & Grain, Inc. Foss, Timothy & Sharon Four Ridge Orchards Fowler Jr., John



Freeman, Kenneth & Karen Friedman, Sam Fritz, David & Patricia Fruit Haven G.S. Long Co. of Oregon, Inc. Garofalo, Tom Garrison, Ricahrd & Anita Geary, Kathleen & Patrick Geddes, David & Corienne Gerlach, Muriel Geschwill, William & Heidi Gibbs & Soell Gilmore, Clare & Paul Gladhart, Peter & Emily Glei, Dana Glide Wildflower Show **GMFI** Goheen, Donald Golden Valley Golden Valley Warehouses, Inc. Gomes, Stephen & Debbie Gomez-Burgess, Louise Goode, Scott Gorman, Leah Goulder Family Foundation Gowan Company, LLC Grande Ronde Model Watershed Foundation Grant, Duane & Narlene Grassman, Blaine Greening, Chip Greenleaf Farm Management, LLC Guth, Candice Gwillim, Vincent Haifa North America, Inc. Haines Family Trust Hales, Mike

Hall, James Halls Ferry Farms Handley, Jeffrey Hanneman, Craig & Kathleen Hansen Nursery Hardison, Linda Harlow Hills Farms, Inc. Harris, David & Portia Hartline, Jane Harvey, Tanya Hawes, Virginia Hays, Phillip Hazelnut Marketing Board Hazen, Rebecca Heesacker Farms Heyer, Sandra Heyman, Lyla Highland Oak Farm, LLC Himes, Kenneth Hofer, Roy Hoffmann, James & Grace Hog Island Oyster Co., Inc. Holiday Special Trees, LLC Holmgren, Noel & Patricia Homann Schoell, Erika Homuth, Donald Hood River County Farm Bureau Hood River Supply Association Hook, John Hooper, Richard & Toni Hop Research Council Hull, Jeremy **Humbug Farms** Hunt, Bruce Hyne, John Idaho Eastern Oregon Onion Committee

Indie Hops, LLC Inland Environmental Resources, Inc. Inland Northwest Bank INRA - Agence Laboratory Irrometer Company, Inc. ISCA Technologies, Inc. **ISK Biosciences Corporation** Ivan Sigfridson Family Ranch, LLC J Frank Schmidt Family Foundation **Jackman Foundation** James & Ann Hancock Trust Janeway, Lawrence Iaster, Theodora Jefferson County Jefferson County Smoke Management Program Jefferson, Jafar Jentzsch, Andrew & Deanna Jernstedt, Kathryn Jessup, Laura & Steven **Jet Harvest Solutions Jewish Communal Fund** Johansen, Jerry Johanson, Victor John I Hass, Inc.



Johnny's Selected Seeds Johnson, Morris & Margaret Joiner, John & Karen Jones, Ryan **Jossy Farms** JR Simplot Co. JWC Environmental, LLC Kami Tech, Inc. Kaminker, Martin & Marcia Karen Yoerger Reversable Living Trust Karoly, Keith Karow, Russ & Marla Kaseberg, Larry Kave, Thomas



Kephart, Susan Kerr, Mike & Sandy Kessler, Richard Kestner, Patricia & Robert King and Prince Seafood Corp. Kirkpatrick, Kaylyn Rose Kischel, Aline Kiyokawa Orchards, Inc. Kizer, Catherine & David Klemp, Daniel Klopfenstein, Wilbur Kochsmeier, Karol Kocide, LLC Koenig, John Kohlmeyer, Stuart Kombucha Brewers International Koppert Biological Systems, Inc. Kozloff, Rae Krugel, Woodrow & Meredith Kuenzi, Leon Kuo Testing Labs, Inc. L & C Tree Farms, LLC LaFollette's Berry Farm LaMar, Kristena Land O'Lakes, Inc. Larime, Carolyn & Douglas Larsen, K & P Larson, Ron Legacy Health System CPC, LLC Lehigh Agri & Bio Services, Inc. Leonard, Gerald & Mabel Leoni, J & H Les Schwab Tire Center Letendre, Glenn Life Technologies Lillegard, Jim

Keasbey, Doramay



Limagrain Cereal Seeds, LLC Lindquist, Mark & Kathleen Lipscomb, Barney Liston, Aaron & Sara Longstreet, Patty Lorang, Jennifer Lord, Tracy Sharp, Lori & Norman Lost Armadillo, Inc. Love, Glen & Rhoda Loveland Products, Inc. Lozano, Natalie Lunde, Anna Katarina Lunden, Jeff Luoma, Dan Luukinen, Charles & Valeria Luxembourg Pamol, Inc. Lyman, Helen Lynch, M.D. & Peggy Maclaren, Keith Magill, Nancy

Magna-Bon II, LLC Maher, David Majestic Oak Farms, Inc. Makhteshim-Agan of North America, Inc. Maletzky, Barry Marc Adams School of Woodworking Marcus, Craig Mark Cox Farms Mark Hitz, Mark Mark, Stephen Markham, Craig & Susan Aldrich-Markham Marquardt, Kathleen Marquering, Henry & Louise Marrone Bio Innovations, Inc. Martin, Bruce Martin, G & E Martin, Warren & Rose Ann Martinson, Richard



Master Gardener Assn. - Linn County Master Gardener Assn. - Central Gorge Master Gardener Assn. - Central Oregon Master Gardener Assn. - Polk County Master Gardener Assn. -Washington County Mathews, Daniel Mauritz, Charles & Sara Mayrsohn, Cheryl Mc Cleary, John McCaffrey, Cheryl McEvoy, Peter & Esther McGregor Company McKellip, Michael & Angela McKim, Harriett & Justin Smith McKinney, Jean McLean, Claude & Linda

McMenamins, Inc. McNeil, Deborah McRae, Andrew Meadow Ridge Farms, Inc. MEDURI Farms, Inc. Meiosis Limited Melcher Farms Menken, Nancy Mercure, Joseph Meridian Orchards, Inc. Oregon Metro Michaels, Troy & Holly Michalek, Tom Mid Valley Livestock Midcoast Watersheds Council Miles Breeding Service Miller Nash Graham & Dunn, LLP Miller, Elin & Bill Miller, Marylin Miller, Matthew Miller, Robert & Annette

Monsanto - Walla Walla Monterey Peninsula College Moore, Frank & Jeanne Moore, Madeline Moore, Mary Ann Moore, Rich Moore, Stanley Morales, Nathan & Devon Morris, Phyllis Morrow County Grain Growers Mosaic Crop Nutrition, LLC Moskowitz, Joel Moulton, Georgia Muddy Paws Acres Muir, Patricia Mullens, Linda Multimin USA, Inc. Mundt, Chris Munger Farm Mystery Creek Ranch N3Feed NABG Research Foundation, Inc. National Pesticide Safety **Education Center** National Watermelon Promotion Board Native Plant Society of Oregon Native Plant Society of Oregon -Corvallis Chapter Native Plant Society of Oregon -**Emerald Chapter** Native Plant Society of Oregon -High Desert Native Plant Society of Oregon -Siskiyou Chapter

Mills, Annette

Mint Industry Research Council

Native Plant Society of Washington Nature Conservancy Nature Tech Nursery Ltd. Naturipe by Hortifrut Naumann Enterprises Nemarnik, David NeoTech Aqua Solutions, Inc. Netafim Nevor Shellfish Farm, LLC Newberry, George Newell, Paul Nichols, Rory Niewald, Kenneth & Janice Nitschke, Kenneth Nix, Molly & Kip Noah, Creed & Melissa North American Butterfly Assn. North American Rock Garden Society - Siskiyou Chapter North Carolina State University Northcraft, Ronald & Shirley

Northstar Chemical Northwest Farm Credit Services Northwoods Nursery, Inc. Nufarm Americas, Inc. Oberto Sausage Company Oehler, Nellie & Dennis Okerstrom, Norm Oloughlin, Dan OO Agricultural Investment Co. Oregon Albacore Commission Oregon Alfalfa Seed Commission Oregon Association of Nurseries Oregon Beef Council Oregon Blueberry Commission Oregon Cattlemen's Association Oregon Clover Commission **Oregon Community Foundation** Oregon Dairy Farmers Association Oregon Fine Fescue Commission Oregon Forest Industries Council Oregon Hazelnut Commission

Oregon Hop Commission **Oregon Mint Commission** Oregon Orchard Grass Seed **Producers Commission** Oregon Potato Commission Oregon Processed Vegetable Commission Oregon Raspberry & Blackberry Commission Oregon Seed Council Oregon Sheep Commission Oregon State Beekeepers Assn. Oregon State University **Oregon Strawberry Commission Oregon Sweet Cherry** Commission Oregon Tilth, Inc. Oregon Trail Livestock Supply, Inc. Oregon Trail Seeds Inc. **Oregon Wheat Commission** Oregon Wine Board Oregon Wine Brotherhood Organic Valley Organically Grown Co. Otting, Nick Ovabrite, Inc. Pacific Berry Breeding, LLC Pacific Biocontrol Corporation Pacific Seafood Pacific Trends, Inc. Partnership for the Umpqua Rivers, Inc. Pauletto, Thomas Peerless Produce, LLC Penhallegon, Ross & Kathryn Penner, Mike

Perlite Institute, Inc.

Peterson, Allen & Gale PEWE LLC Pfund, Itsue PGG/HSC Feed Company, LLC Pierce, Allen Pierce, Dennis Pioneer Hi-Bred International, Inc. Platt, Jim Pleva, Gregory Poinsett, Sandra Porath, Marna Portland Garden Club Post, J & V Potato Seed Solutions, LLC Potato Variety Management Institute Potatoes USA Powder River Prag, Raymand & Margaret Pratt, John Predeek, David Price Cattle Co. Puget Sound Mycological Society Purdy, Michael Oian, Michael RCB International, LTD RDO Equipment - Wasco Reed, Matt Regenesis Bioremediation **Products** Republic Services Residex Reynolds, Phyllis Reynolds, Wes & Susan Richland Feed & Seed, Inc.

Perrine Family Trust

Perrott Farms, LLC



Rickreall Farm Supply Riddell Farms Riecks, Karolyn Ripley, James & Arlene Riser Farms, LLC Rivard, John Roads End Ranch Robert E Briggs TTEE Robison, Steven & Melissa Rodakowski Farms, Inc. Rodgers, Linda & Nelson Leonard Rogers, Jeremy Rogers, Wyma Ronald, Bruce & Alice Rose, Lindon Ross, Robert Rossman, Amy Roufs, Paul & Renee Rowdy Mermaid Kombucha Roy, Barbara Ruddenklau, Bruce

Rusch, Christina Ryan Parkhurst Trucking, LLC S S Steiner, Inc. Sakata Seed America, Inc. Samuel Adams The Boston Beer Company Sanders, Darrell & Linda Sarbanand Enterprises, LLC Satrum Farms Savce, Kathleen Schaefer Brothers Schmidt, Bill Schreider, Peggy Schrumpf, Barry & Elaine Schuller, Reid Schwindt, Rachel Scientific Ecological Services, Inc. Scofield, Larry & Ruth **Scott Family Farms** Sedlack, Elaine Seed Testing Research Foundation Seevers, Joan



Seifer Brothers Selg & Associates, Inc. Sensiplicity, LLC SePRO Corporation Shapiro, Michele Shepard, Robert Sherman Farm Chemicals Shindler, Bob Shiner, Matthew Shining Ocean, Inc. Sibell, Xuan & David Simonson Farms SiteOne Landscape Supply Skogerboe, Scott Slichter, Paul SLR International Corp. Smith Farm Smith Seed Services Smith, Gayle Snake River Sugarbeet, LLC Society of Toxicology Sorensen, Janelle Specialty Seed Growers of Western Oregon Sperling, Wendell Squires, Charles & Tika Stadelman Fruit, LLC Stan's Landscaping & Water Gardens Starker Forests, Inc. State of Oregon Stearns, Douglas Sterett, Jack & Deanna Sterns, Douglas Stika Projects, LLC Stoel Rives, LLP Stoel, Peter

Stuntz Mycology Fund Sturges, James Suhrstedt, Virgina & Tim Sullivan, John Sundberg, Kent Sundberg, Mark Susan E Morton Trust DTD Susich, William Swanson Skinner, Martin & Julie Swanson, JL Swanson's Pest Management Swisher, Pamela Sym-Agro, Inc. Syngenta Crop Protection, LLC T&I Kirk Farms, Inc. T3 Bioscience, LLC Tabcomp Takasago International Corp (USA) Talbert, Kevin Taormina, Chris Tarver, Charles & Mary Anne Teasel Brook Farm Telly Wirth Farms, Inc. Terramax, Inc. Territorial Seed Company Tessenderlo Kerley, Inc. Texture Technologies Corp Third Knight Farms, Inc. Thomas Angus Ranch, Inc. Thomas, Daniel Throop, Janet Tika J. Squares Empire Torgerson, Karessa Torres, Linette Totman, Stephen

Trans Ocean Products, Inc.

Trickle Creek Farm

Trident Products & Services, LLC **Trident Seafoods Corporation** Tualatin Soil & Water Conservation Dist. Turba, Tim Turner, Don Underwood Fruit & Warehouse Co. **Union County Seed Growers** Assn. United Phosphorus, Inc. University of Hawaii Foundation Utah State University Valent Valley Ag Service, Inc. Van Winkle, Michael & Mary Vanasche, David & Ellen Vanleeuwen, James VanVechten, George Various - Other Vetsch Farms of California Viking Farms Vitello, Chris Von Flue, Daniel Vonhippel, Peter & Josephine Voss, Diane & William Wadsworth, Homer Wagner, David Walker, Austin Walker, Jeffrey Walker, Rebecca Wallace & Patricia Dinsmore **Restated Family Trust** Walters Ag Research Wasco County Landfill Wasco Electric Cooperative Washington Blueberry

Commission

Washington Hop Commission Washington Oilseeds Commission Washington Red Raspberry Commission Washington State Council of Farmer Cooperatives Washington Tree Fruit Research Commission Washington Turfgrass Seed Commission Watrous, Ellen Grace Waugh, Bruce & Christine Weisberg, Eric Wert, David & Michal Wesmar Company, Inc. Westbridge Agricultural Products Westcott, Richard & Kathleen Western Ag Improvements, Inc. Western Laboratories, Inc. Western Poultry Scholarship & Research Foundation Wetlands Conservancy Weverhaeuser Wheaton, Jeffrey & Jody Whiskey Creek Shellfish Hatchery Whitney Equipment Co., Inc. Wilco-Winfield, Inc. Wilkinson, Robert & Lorraine William D Klug Revocable Living Trust Williwaw Engineering Willson, Mary Alice Wilson, Mark Wilson, Mark Griswold Witters, Robert & Carolyn Zeigier-Olsen Farms Zettergren, Judy Zuck, Robert



Photo Credits

- **Cover:** Goats in poison oak feeding trial Massimo Bionaz
- **Page 1:** Wheat stripe rust trials in eastern Oregon
 Christina Hagerty
- **Page 2:** Calf of a cow involved in selenium feeding trials
 Massimo Bionaz
- Page 3: Stripe rust on wheat leaves Christina Hagerty
- **Page 4:** *Vetch flowers in a forage trial* Guojie Wang
- Page 5: (Bottom left) Sheep grazing unirrigated hill pasture
 Serkan Ates

 (Right) Amanda Vance with weed cloth in a blueberry
 trial Bernadine Strik
- Page 6-7: (Top & Bottom left) Phil Walker

 (Top right) Phil Walker & former Oregon

 Congressman Denny Smith

 (Bottom right) Phil Walker, Little League Coach
- **Page 8:** Counting bees in a "bee meadow" control plot

 Alec Kowalewsksi
- ${f Pg}$ 10-11: Sheep grazing balansa clover Serkan Ates
- Page 12: Winter squash in western Oregon Ed Peachey
- **Page 13:** Winter squash seedlings in an irrigation trial

 Aaron Heinrich
- **Page 17:** *Posy Busby in a Populus common garden* Lynn Ketchum
- **Page 18:** (L to R) Maoyu Wang, Joseph Pedersen, Zhenxing
 Feng, and Morgan Messer in Feng lab
 Hannah Marie O'Leary
- Page 19: Jovana Kovacevic in her lab Lynn Ketchum
- **Page 20:** *Lindsay Collart taking water samples on Upper Klamath Lake* Kimberly Halsey

- Page 21: (Bottom center) Microplastic from a black rockfish digestive tract Susanne Brander

 (Bottom right) Ellen Leinhaupel and Payton Hermanson making bee markers Hannah Lucas
- **Page 22:** *Nanoinjection of a spotted wing drosophila* (*Drosophila suzukii*) Man-yeon Choi
- **Page 23:** Weeding in flowering lawn experimental plots
 Carolyn Breece
- Page 24: Erik Augerson and Marcelo Moretti next to a field steamer for weed control – Photo provided by Marcelo Moretti
- **Page 25:** Graduate students Nami Wada (left) and Clara Weidman (right) burying samples in a soil solarization trial
 Jennifer Parke
- **Page 27:** Scott Lukas drawing a water sample for analysis of nitrates from a lysimeter buried in an onion trial

 Onion World
- **Page 28:** Colorado potato beetles OSU HAREC Irrigated Agricultural Entomology Program (Rondon)

