

**CONTINUING REPORT**

**Year: 2019**

**Project Title:** WTFRC Internal Program – Food Safety Efforts

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**Cooperators:** Jacqui Gordon (WSTFA), Faith Critzer, Meijun Zhu & Girish Ganjyal (WSU), Manoella Mendoza and Mackenzie Perrault (WTFRC), Rob Atwill & Ronny Bond (UC Davis), Bonnie Fernandez-Fenaroli (CPS)

**Other funding sources**

**Agency Name: WA SCBGP**

**Amt. awarded: \$ 216,682** Title: Enhanced food safety education and training for tree fruit producers (awarded to WSTFA with Jacqui Gordon as PI)

**Agency Name: FDA**

**Amt. awarded: \$243,651** for FY19 awarded to WCFSS (Atwill et al.) Title: Facilitating implementation of FSMA regulations for agricultural water quality

**Agency Name: CPS**

**Amt. awarded: \$290,000** to Zhu and Suslow; Title: Control of *Listeria monocytogenes* on apple through spray manifold-applied antimicrobial intervention

**Agency Name: WA SCBGP**

**Amt. /awarded: \$ 248,227** to Zhu; Title: *E. faecium* as a surrogate for *L. monocytogenes* intervention in apple dump tank systems (additional \$80,000 of matching funds)

**WTFRC internal program budget:**

Item	2019
Salaries <sup>1</sup>	3,100
Benefits	1,325
Wages <sup>2</sup>	7,500
Benefits	3,230
Supplies <sup>3</sup>	350
Travel <sup>4</sup>	3,100
<b>Total</b>	<b>18,605</b>

**Footnotes:**

<sup>1</sup>Salaries: 5% of Mendoza (with 41% benefits), not included in salaries: 15% of Hanrahan time, 1% Schmidt

<sup>2</sup>Wages: 53% benefit rate

<sup>3</sup>Supplies include 1 poster for ASHS and misc.

<sup>4</sup>Travel includes: CPS annual meeting, 3 trips to WSU in Pullman, in state day travel to attend trainings, Annual NW Food Safety and Sanitation Conference in Portland

## OBJECTIVES

1. Enhance collaboration in all areas of food safety (research, policy, FSMA implementation)
  - a. Participate in development of training for industry
  - b. Develop an effective food safety outreach program

## SIGNIFICANT ACCOMPLISHMENTS IN 2019

Food safety remains one of the highest priority items within the industry. As some compliance dates of FSMA have been effective, it is of utmost importance to continue to provide the Washington growers with timely assistance. Further, in order to interest and engage microbiologists to work on problems related to food safety for tree fruit, a strong collaboration from scientists with a horticulture background is of great advantage to ensure that project goals and outcomes reflect immediately actionable items. Lastly, translating research into layman's terms and providing a bridge between science, politics and farming is another important goal of this project.

### Research:

We participated in several on-going and new collaborative projects, funded by WTFRC, CPS, SCBG and FDA (see Table 1). Notably, WTFRC is increasingly sought as collaborator in national grant applications to NIFA or SCRI.

The WTFRC, under leadership of Ines Hanrahan, continued to serve as a partner in research for the Center for Produce Safety (CPS) and she attended the annual meeting in Austin, TX. Tree fruit specific research priorities were developed and integrated into the annual CPS call for proposals, with the help of the NHC Food Safety Committee. During the proposal process Dr. Hanrahan frequently serves as subject matter specialist to answer questions asked by scientists preparing to propose new research projects. In 2019, one project involving local scientists has been brought to completion: 'Control of *Listeria monocytogenes* on apple through spray manifold-applied antimicrobial intervention' (Zhu/Suslow; \$290,000). WTFRC has developed and executed a packing line survey for this project in 2017 to determine the current industry practices related to spray manifold interventions and has been assisting Dr. Zhu's team to set-up packingline validation studies with industry collaborators in 2018-19. The team has also been sourcing fruit for the experiments.

Our team collaborated with Dr. Zhu on another project in 2019: "*E. faecium* as a surrogate for *L. monocytogenes* intervention in apple dump tank systems", funded through the SCBGP. WTFRC developed and conducted a dump tank survey to assist the project team in developing industry relevant experimental methods.

In 2018 and 2019 Hanrahan has participated in SCRI industry relevance reviews of proposals submitted to USDA-NIFA in the area of food safety.

Table 1: Summary of WTFRC collaborations\* in food safety research in 2019 and pending research for 2020

Keyword	PI's	Affiliation(s)	Funding Source	Amount
<b><i>Continuing/finishing/new in 2019</i></b>				
Listeria storage*	Zhu/Amiri/Hanrahan	WSU, WTFRC	WTFRC	195,414
Imp. Dryer	Ganjyal/Zhu	WSU	WTFRC	57,000
Water safety	Atwill/Bond	UC Davis, WTFRC	FDA	243,651

Food Safety Training	Gordon	WSTFA	SCBG	216,682
List. Cleaning*	Zhu/Hanrahan	WSU, WTFRC	WTFRC	306,285
FMSA PCHF	Ganjyal	WSU, WTFRC	WTFRC	98,971
Brush bed sanitation*	Critzer et al.	WSU, WTFRC	WTFRC	51,967
Listeria monitoring	Kovacevic et al.	OSU	ODA SCBG	174,540
Packing sanitation*	Critzer et al.	WSU, WTFRC	WTFRC	203,000
Rapid detection tools*	Critzer	WSU, WTFRC	WTFRC	112,000
Ozone in storage*	Zhu	WSU, WTFRC	WTFRC	300,000
<i>E.Faecium</i> as surrogate	Zhu et al.	WSU	WA-SCBG	250,000
Water treatment	Critzer	WSU	WA-SCBG	194,000
Listeria growth/survival	Strawn	Virginia Tech	CPS	185,052
<b><i>Pending for 2020</i></b>				
Lm apple waxing*	Zhu	WSU	WTFRC	TBD
Microbiome*	Zhu	WSU	WTFRC	TBD
Sensing platforms	Critzer et.al.	WSU	USDA	TBD
Effective mgt. for FSMA	Danyluk	U. of Florida	USDA-CAP	TBD
Listeria HUB	Kovacevic	OSU	USDA-NIFA	TBD
Wax supplements	Wang	UC Davis	USDA-NIFA	TBD

\*collaborations involve a separate WTFRC internal budget

**FSMA implementation:** In order to best serve the needs for timely information distribution related to new laws pertaining to food safety, WTFRC staff (Hanrahan, Mendoza) leads efforts to coordinate outreach activities by the various industry organizations. Specifically, NHC (policy), WSTFA (education) and WTFRC (research) efforts have continued to be combined and talking points were coordinated to assure clarity of messaging, when stakeholders are learning how to implement the already complicated laws. Further, the WSTFA continued to host numerous PSA training sessions in 2019. WTFRC staff assisted in meeting logistics and Hanrahan frequently serves as expert to help field questions.

**Development of industry training modules:** Under leadership of the WSTFA and in collaboration with UC Davis, a workshop named: “FSMA water quality testing” was held in two locations in 2019. This workshop built on a curriculum originally developed in 2016. At the time it was the first of its kind in the nation to address practical considerations for water testing under FSMA. Workshops are designed to give participants theoretical background knowledge of water testing, in combination with outdoor activities geared towards learning based on examples, coupled with hands on training. The entire workshop was video taped and is available at no cost to industry members through the WSTFA portal.

**Food safety outreach:** For the Annual WSTFA meeting in Wenatchee, Drs. Critzer (WSU) and Hanrahan lead a session named: “Fruit Maturity & Precision Harvest Management”. This session included several food safety related items such as: “Risk management within the harvest environment” (review of OFRR’s, panel discussion) and “Produce Safety Rule On-farm Inspections” (panel discussion on implementation of on farm inspections).

In addition, Ines Hanrahan is serving as an adjunct faculty member for the WSU/UI School of Food Science. She is currently participating as a committee member on two Ph.D. and two MSc. committees in the Food Science Department. All students work in the general area of food safety on very relevant tree fruit industry topics and are interested in a career in tree fruit upon graduation.

Further, Dr. Hanrahan is serving on the PNW Food Safety Committee, which is housed by NHC. She contributes to the annual in-person meeting program development and serves as presenter. Other outreach activities covered by WTFRC staff, may include, but are not limited to posters at national/international meetings, invited talks, lectures for WSU classes. The following is a list of the most important invited talks/posters/lectures given in 2019:

Ines Hanrahan, 2019, Food Safety Research Priorities: Looking into the Future, talk at PNW Food Safety Committee annual meeting

Ines Hanrahan, 2019, Food Safety Research Roundup, talk at PNW Food Safety Committee annual meeting

Ines Hanrahan, 2019, Food Safety for the Tree Fruit Industry, 75-minute lecture for FS 220 students at WSU/UI

Manoella Mendoza, Ines Hanrahan, Lina Sheng, Xiaoye Shen, Meijun Zhu, 2019, Fate of Listeria on Granny Smith Apples Treated with Continuous Ozone During Storage, talk at ASHS presented by Mendoza

Alexis Hamilton, Ines Hanrahan, Marcela Galeni, Victor Villegas, Martin Blackburn, Monique Aguilar Borba, Cecilia Yiu, Daniel Gleason and Faith Critzer, 2019, Assessment of the Efficacy of Rapid Tests on Predicting Bacterial Growth on Apple Packinghouse Equipment Surfaces, poster at IAFP presented by Hamilton

Ronald F. Bond, Melissa L Partyka, Jennifer A. Chase, Ines Hanrahan, Justin Harter and Edward R. Atwill, 2019, The Whole Is Greater Than the Sum of Its Parts: Building Cooperative Monitoring Programs Among Farms, talk presented by Bond at IAFP