Idaho Innovators

'The things we do here are applicable worldwide'

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study genes was just becoming available, and genomics could be used to measure how the body responds at the gene level, he said.

"It's going down a whole other level to see how life works," he said.

But getting a start-up program off the ground wasn't easy.

Growing an institute

The research program Hardy was trying to develop came under the university's Aquaculture Research Institute. A research institute operates outside the culture of colleges within the university, which each have a dean and their own faculty positions. It's meant to facilitate interdisciplinary science programs and research efforts, and there are no positions just sitting there, he said.

He was unable to get faculty positions for the program within the colleges, making it hard to hire top people. The fledgling research station was operating with post-doctoral graduates and temporary positions. Undeterred, Hardy contacted USDA and proposed setting up an Agricultural Research Service fish program at the station.

The response was "we'd love to do that if you can find the money," he said.

He found that money in 1999 through then-Sen. Larry Craig, who created an earmark for that funding in the federal budget and over time moved into base funding for USDA and four full-time research positions at the station.

The station's work in population genetics for Native American tribes, hoping to bring back salmon populations in the Columbia River, also created positions at the station. That work proved so useful the Columbia River Inter-Tribal Fish Commission set up its own program in collaboration with the station in 2004.

The university's partnerships with USDA-ARS and CRITFC expanded the station's capacity and technology, particularly in genomics, which has been its driving force.

Carol Ryan Dumas/Capital Press

Ron Hardy, director of the University of Idaho Aquaculture Research Institute, checks equipment in the laboratory at the Hagerman Fish Culture Experiment Station on Nov. 27.

Genomics has a fundamental capacity to allow researchers to go in different directions, such as population genetics to better manage fisheries, enhanced food fish production, selective breeding and sustainable aquaculture, Hardy said.

And those are exactly the things Hardy and the teams at the station have been doing for the past two decades.

Hardy's research has been focused on fish nutrition, including developing sustainable feed sources for the global aquaculture industry.

"We're really known for that, and we're really known for the trout selective-breeding program with USDA," he said.

Research at the facility has doubled the growth rate of trout, enhanced disease resistance and led to fish that can thrive on a vegetarian diet — all geared at sustainable aquaculture.

"The things we do here are applicable worldwide," he said.

What's next

Hardy's goal is to integrate nutrition and genetic selection into a holistic program to address all components of fish health across the globe. He also wants to expand the university's efforts into fisheries health management, and a new facility on the Moscow campus for research into salmon and marine species is set to come online next year.

The most rewarding part of his career is "making this happen out of nothing," and he's had a lot of support in that endeavor from the university, elected officials and industry, he said.

"When you have that support, you can do a lot," he said.

"To build a sustainable, smoothly running, respected research laboratory is just a dream come true," he said.

What he's most proud of, however, is training graduate students and researchers from all over the world, he said.

In addition to directing the university's Aquaculture Research Institute since 2002, Hardy also works on salmon and steelhead hatchery and recovery issues in the Pacific Northwest with state and federal agencies and Native American tribes.

He has traveled extensively throughout the world to present lectures, consult and work on behalf of international organizations, such as the Food and Agriculture Organization of the United Nations and the European Commission.

Just recently, he was recognized for his contributions with a lifetime achievement award from the World Aquaculture Society.

As for the future, he's committed to getting the new research facility at Moscow up and running and will probably do a "soft" retirement until he's sees that through. He's also planning to put out a new edition of "Fish Nutrition" and fully retiring "someday."

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Variable rates boost crops

Ryan Christensen brings high-tech prescriptions to his family's farm

By JOHN O'CONNELL
Capital Press

GRACE, Idaho — Ryan Christensen didn't give up when his father balked at the cost of hiring consultants to install variable-rate technology on the family's 3,000-acre wheat and potato farm.

Instead, Christensen researched and set up his own method of precision-application — an approach to farming that uses GPS technology and field data to vary inputs based on field conditions. Christensen believes his approach requires far less labor but achieves comparable yield and input improvements.

It's one of many examples of how Christensen Farms has been transformed into a more productive, data-driven and high-tech operation since the 32-year-old returned to the family business in 2006.

"My philosophy is if data can be collected, I want it," said Christensen, the fifth generation to farm the land his family homesteaded in the 1880s.

He's also incorporated drones and a cutting-edge irrigation method in crop production — and he's succeeded with new grounds-keeping techniques at the family's golf course.

While studying landscape management at Brigham Young University in Provo, Utah, Christensen worked under professor Bryan Hopkins, jointly publishing research on turf grass nutrient management. Hopkins later helped Christensen take on variable-rate production, suggesting an approach involving maps with zones that possess common characteristics but may be in different parts of the field.

Ryan Christensen
Age: 32

Job: A partner in Christensen Farms with his father, Bart, and his brother, Kyle, 42.

Innovation: Helped his farm implement variable-rate irrigation, fertilizer and seeding, using a zone-based prescription map he believes is simpler and more efficient to use than other systems.

Education: Bachelor's degree in landscape management with a business management minor

Hometown: Grace, Idaho

Family: Wife, Andrea, and children Ava, 8, Lila, 5, Lincoln, 3, and Claire, 3 months

Fewer zones

Typically, fields are divided into grids of contiguous 1.5-acre plots, which are all intensively soil sampled to devise variable-rate prescriptions. Christensen, who further honed his system by reading GPS mapping instruction books, may use just a few zones with common conditions, getting by with about 60 soil samples on a 65-acre field compared to roughly 450 samples needed for the grid method.

Christensen made his first zone maps in 2012, based on limited yield data, topographical Google Earth maps and his father's insight about the productivity of each field. He's since included bare-soil drone imagery to assess soil quality based on its color, as well as improved yield data tied to variable-rate fertilizer and seeding-rate maps.

Drone spots stress

He also flies a drone over winter wheat each spring to detect pockets of stressed crops and determine where replanting might be in order. Yields have become far more consistent.

"We've been able to make very poor ground better and good ground a little better," Christensen said.

In 2015, Christensen also added a variable-rate water map to tweak one of his field prescriptions. That year, he became one of the first Idaho farmers to test variable-rate irrigation.

Christensen explained that his family built a nine-hole golf course in 1995 on an unproductive rocky outcropping that bisected a pivot. With its $35,000 variable-rate irrigation system, Christensen said the family can now adjust each nozzle independently to provide optimal water for the golf course, as well as the adjacent crops watered by the pivot.

It's variable

He and Hopkins are entering the second year of a five-year study to assess the economics of variable-rate irrigation and determine the feasibility of installing additional systems.

Too often, Hopkins hears from growers who want to implement variable-rate fertilizer but miss the "low-hanging fruit" by failing to optimize their irrigation. Over-watering can push nutrients through the soil profile and hurt yields, he said.

"When I first started talking about variable-rate fertilizer, people looked at me like I was nuts, and now it's commonplace," Hopkins said. "I think variable-rate irrigation will become commonplace."

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