Interview

Jed Colquhoun,

professor, Extension specialist and IPM (Integrated Pest Management) program director, University of Wisconsin (UW)-Madison Department of Horticulture

By Joe Kertzman, managing editor, *Badger Common'Tater*

NAME: Jed Colquhoun

POSITION: Professor, Extension specialist and IPM program director

UNIVERSITY & DEPARTMENT: UW-Madison Department of Horticulture

LOCATION: Madison, WI

HOMETOWN: Grew up primarily in northern New York, with his family currently living on an island off the Maine coast

YEARS IN PRESENT POSITION: 17

PREVIOUS EMPLOYMENT: Faculty member at Oregon State University until 2005

SCHOOLING: Bachelor of Science and Master of Science degrees from Cornell University, and Ph.D. from UW-Madison

ACTIVITIES/ORGANIZATIONS: Serves on boards and committees for several agricultural associations and foundations, public agencies, and food security-related NGO's (non-governmental organizations)

FAMILY: Wife, Julie, son, Patrick (20 years old), and daughter, Ellie (17)

HOBBIES: Anything outdoors – boating, hiking, biking, fishing, skiing, making firewood and maple syrup, etc., as well as woodworking and cooking

Though he didn't grow up on a farm, Jed Colquhoun says he always enjoyed plants and the productive feeling of growing his own food.

A professor, Extension specialist and IPM program director in the UW-Madison Department of Horticulture, Colquhoun says, "I was a biology major in college and originally thought I would go into the medical field, but the draw of a good day working outdoors pulled me away from the fluorescent lights of the labs."

"My early experiences had much in common with working in agriculture," he adds. "My father worked as a fisheries biologist, and I spent many days working outdoors with him and appreciated that hard work yielded harvest from the water, in that case, instead of the land."

"My early job experiences were in construction and property maintenance," Colquhoun remarks, "where working with your hands led to visible, tangible outcomes."

Dr. Colquhoun began working in fruit and vegetable production in the summer after his first year in college and hasn't looked back.

Do you specialize in potatoes and vegetables, and weed management therein, or what exactly, and how did that come to fruition? In my present position, I cover commercial fruit and vegetable production, which in Wisconsin means I spend my time primarily in potatoes, fresh market and processing vegetables and cranberries.

We also do work in other specialty crops, such as hops and mint.

Above: In addition to being a University of Wisconsin-Madison professor, Extension specialist and integrated pest management program director, Jed Colquhoun has served in several administrative roles, such as (inset image) interim Extension program leader and College of Agricultural and Life Sciences (CALS) associate dean. He has also served on advisory committees, shown in the second photo (center) as part of the State Association of Feeding America Foodbanks Advisory Committee. ***Images courtesy of Michael P. King/UW-Madison CALS***

My "bread and butter" research and outreach programs continue to be focused on integrated weed management, but over the years, by request and given position vacancies, we've added work in sustainability metric development for the food industry (such as potato carbon and water footprint metrics).

I also serve as IPM program director, so the staff and I develop and deliver outreach programming via a diversity of tools, such as smartphone apps to predict and manage pest outbreaks and a YouTube channel with over 2 million views, as well as hands-on, in-person programs statewide.

You are a professor and Extension specialist. How do you split those duties, and how do they complement each other? My goal is to not split those duties at all, but to have the applied research flow seamlessly into the Extension or outreach programming.

Our research is very applied intentionally as our interest is to have the beneficial outcomes of that work adopted by farmers.

And, our outreach is based on objective, science-based data. Our niche isn't to sell products, but instead provide clientele with timely knowledge to make informed decisions.

Do you have a lab and graduate students working for you, and if so, how many and in what capacities? I have one student that just graduated and is currently publishing the results of her research, and

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Left: Approved for WPVGA base funding for a weed management project in 2022, Jed Colquhoun says his research team's overall goal is to provide potato growers with a suite of tools that are economically reasonable and consistently effective, while protecting the environment where they farm. Shown is a potato research plot at the Hancock Agricultural Research Station.

Right: Jed Colquhoun spends a good deal of time troubleshooting commercial production issues.

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two new students that joined our program this spring.

One student is working on our water quality research in potato production, looking at novel ways that we can filter leachate below the potato root zone and before it reaches groundwater using inter-seeded cover crops and bio compounds applied via fumigation equipment prior to potato planting.

The other student is looking at ways to use naturally occurring plant growth regulators to optimize marketable potato and vegetable production, while improving early season growth and emergence such that the crops are more competitive with weeds.

Through the IPM program, I raise funding to support about a half-dozen long-term staff that are wonderful to work alongside.

Above: Alternative crops that Jed Colquhoun's team is studying include the high-protein Bambara groundnut (left), which is drought tolerant, nitrogen fixing and has potential as an alternative crop on sandy soils, and goji berries (right, nearing harvest, taken in 2021).

Bottom: Herbicide research includes everything from multi-species screening plots with about a dozen vegetables, where the initial look at crop safety happens (first photo), to winter grow-out of potato seed herbicide carryover studies (second image).

You were approved for WPVGA base funding for a weed management project in 2022. What are you and your crew researching, and what are your goals or objectives in the project? Our overall goal for the integrated weed management program is to provide potato

growers with a suite of tools that are economically reasonable and consistently effective, while protecting the environment that we farm in.

One of the greatest challenges in specialty crop weed management is that we have few herbicide options relative to the "big 5" agronomic crops (corn, wheat, soybean, rice, and cotton), and that can lead to not only poor weed control and potato yield, but also a greater risk of selecting for resistant weeds.

In response, we essentially run a recycling program where we take the new herbicides developed for the major agronomic crops and screen them across the specialty crops.

Those that show hope are then refined across use rates, timings, varieties, seasons, regions, and soil types, all while collecting robust data to support the registration process.

We also continue to investigate non-chemical tools that could reasonably fit within our existing weed management programs to add resiliency without significant labor or cost, such as in our current plant growth regulator work.

Another area where funds have been allocated by the WPVGA and the Chip Committee is "Innovative Potato Production Systems to Protect Water Quality." What are the areas of concentration on this research and what's the end goal?

One of the primary benefits of growing potatoes in irrigated coarse-textured, low organic matter soils is that soil moisture can largely be controlled, except for when it rains a lot in a short period of time.

This has happened more often lately and can lead to leaching events. The overall goal of our work here is to find practical ways to add a filter between the potato root zone and groundwater to capture potato inputs

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– Professor Jed Colquhoun,
UW-Madison Department of Horticulture

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such as fertilizer and herbicides during leaching events.

More specifically, we're looking at deep-rooting, nitrogen-scavenging cover crops that can be inter-seeded among potato rows.

Our initial focus in this project is agronomics: Are the cover crops compatible with potato weed management? Do they grow well as an inter-seeding? Can we still produce and harvest a marketable potato crop?

In a preliminary soil column study, we're also looking at novel, natural bioremediation soil additives that capture crop inputs that we could inject below the potato root zone prior to planting with fumigation equipment.

Initial results from this study are very exciting and encouraging, and we look forward to sharing more at the 2023 Grower Education Conference & Industry Show.

Overall, Jed, what do you consider your area of expertise or what do you specialize in? My training and primary focus are on integrated weed management in specialty crops, with a specific interest in non-chemical strategies that pair well with our herbicides to provide a more resilient, holistic, and

Above: Table beet research is conducted in a commercial production field near Ripon, Wisconsin.

Left: Leeks and onions are part of Jed Colquhoun's weed management research.

balanced program.

Over time and based on opportunities and needs, I've also developed work in other areas such as developing metrics to optimize production (i.e., more production with fewer inputs).

I like to consider the entire production cycle in my approach, knowing that every decision has ramifications down the line, and measuring those together can help optimize the overall system.

How do you hope to use those skills to help Wisconsin potato and vegetable growers? My goal is to develop practical tools and to provide timely information for growers to make reasonable decisions.

I'd rather see the results of our work in a grower's field than on a bookshelf, and constantly ask myself if I'd take my advice if I were on the other side of the conversation!

You've been at this a long time. What are your favorite aspects of your work and career? What do you most like doing or discovering? The opportunities to develop meaningful relationships and interact with those that produce our food has been a wonderful honor for me and gets me out of bed in the morning.

My research is also constantly driven by the curiosity of how little I know! The mental satisfaction of discovering something new is very rewarding.

Jed Colquhoun receives the "Friday Chair for Vegetable Production Research" award from CALS Dean Kate VandenBosch (right), who recently retired after leading the college since 2012. Glenda Gillaspy, a plant scientist and former professor of biochemistry at Virginia Tech University, was named as her successor and took over as the new dean effective August 4.

You told me you've been "melting in the field" lately with all this heat. How has it affected your work and/or cultivation of crops? Well, we just refill the water jug a bit more often. It hasn't affected our work and, "knock on wood," our research crops look great so far.

Do you think the heat will affect overall yield for potato and vegetable growers this year? Time will tell, of course, with a lot of the season left, but I don't feel that we've had anything too out of line so far in

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terms of heat.

The big storms that have rolled across the state lately make me much more nervous, particularly in terms of wind and hail, as most of our crops are in sensitive growth stages.

What exactly have you been up to in the field? We're almost completely in the field or behind the windshield these days, with minimal keyboard time, as we plant, grow, treat, and evaluate field research plots in about a dozen specialty crops statewide.

I also spend a good deal of time on call, troubleshooting production issues with growers, food processors and consultants.

Just like growers, we'll soon switch over to harvest mode, where we get to see if our research work has made the most important difference—filling

Above: As part of inter-seeding studies, the early spring rye rooting depth in potato is measured (first image), and yellow mustard as an inter-seeded cover crop in potato is evaluated (second image).

Left: Mint research is conducted in a commercial production field.

the bins with a high-quality product.

As far as weed and resistance management, what are the biggest challenges? In specialty crops, the limited number of labeled and effective herbicides puts a lot of pressure on a few tools, and that increases the risk of selecting resistant weeds.

Additionally, recent weeds such as water-hemp spreading from agronomic production elsewhere to our specialty crop production often arrive resistant to several herbicides.

How can those challenges be met or how can the damage be minimized? By far, the best bet is to rotate herbicide modes and sites of action, particularly across the rotation, and be diligent about not introducing already-resistant weeds from elsewhere (i.e., as a seed contaminant).

Do you continue to see overuse or misuse of herbicides? Other? Are growers buying into your program? Our potato and vegetable growers are very knowledgeable when it comes to proper herbicide use. Specialty crops are sensitive to damage. These direct-consumed crops are tracked and tested for residues often, and the financial cost of not paying attention or making mistakes is just too significant.

I see my job as providing the best information possible to support that good decision-making.

What do you feel are the biggest strides growers have made over the years in managing resistance? I would say awareness of the issue has grown significantly in recent years from something back of mind to a strong consideration when planning programs across crop rotations.

Growers and crop consultants are also aware of, and keep an eye out for, the most problematic species such as water-hemp and Palmer amaranth.

Cranberries are hand raked as part of IPM research near Millston, Wisconsin.

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You've mentioned Palmer amaranth in your Extension outreach work during field days. How bad of a problem is it becoming in Wisconsin? In the past few years, my colleagues in agronomy and I have run across a few populations that have spread into the state and I suspect we'll continue to see more geographic distribution in the next few years. We're still not in as bad of a situation as in states to the south of us, but now's the time to keep it that way with awareness, proper identification and keeping our inputs "clean," such as seed and equipment.

What is the number one piece of advice you have for growers in weed management? It's actually Benjamin Franklin's advice: "An ounce of prevention is worth a pound of cure." In weed management, that means preventing the introduction of new species on your farm that you won't be able to control, like Palmer amaranth, as well as preventing the selection of resistant weeds that will persist for years.

The most common reply I've heard after telling a grower that their most challenging weed wasn't controlled because it has become herbicide resistant is: "I wish I hadn't used that herbicide so much—now it's not even an option for me."

Above: A malformed potato plant was photographed after being found by Jed Colquhoun during a diagnostic troubleshooting visit, and, in the second image, potato cover crop plots are shown in 2022.

Above: On July 7, 2022, Dr. Jed Colquhoun updates Hancock Agricultural Research Station Field Day attendees on water quality and weed management research.

What are you most proud of in your career? The times when I've had someone say that I've made a positive difference for them, making their lives easier or better, whether that's on their farm or through food security programs like "Field to Foodbank"—that makes me proud.

I've also had the opportunity to work in so many different crops and production systems in New England, Wisconsin and the Pacific Northwest over the past 30 years and appreciate the times when I get to apply that diverse experience to help others out (although my wife calls some of it "useless food trivia …"). BC'T