

# People & Places

## Researcher seeks natural insect controls

Anandasankar Ray targets spotted wing drosophila fly in experiments

By DAN WHEAT  
Capital Press

A research entomologist at the University of California-Riverside may have found a non-toxic control for spotted wing drosophila and is working on doing the same for other insects.

Anandasankar Ray was born in Calcutta, India, raised in a small town near there and excelled in school. After completing his undergraduate and master's degrees in India, he came to the United States and received his doctorate in molecular, cellular and developmental biology from Yale University in 2005.

Since 2007, he has headed the Disease Vector Research Center at UC-Riverside, studying insects that transmit animal and plant diseases.

He is an associate professor of entomology focusing on the molecular basis of insect olfaction — the sense of smell. His wife, Anupama Dahanukar, also an associate professor of entomology at the center, studies how insects taste things.

"At Yale, I realized the sense of smell is one of the most challenging to understand. My lab tries to understand mechanisms that underlie insect olfaction. The key is how do insects detect such a wide variety of odors and process that information," Ray said.

In 2013, his lab designed new computer software to predict new types of insect repellent. The idea was to find better alternatives to diethyltoluamide, popularly known as DEET, the most common active ingredient in most insect repellents.

The work revealed hundreds of natural chemicals in food and bacteria and tested



Courtesy of I. Pittalwala/UC-Riverside

Christine Krause Pham, left, and Anandasankar Ray look at blueberries used in lab tests on the effectiveness of butyl anthranilate, known by the initials BA, on spotted wing drosophila.

### Western Innovator Anandasankar Ray

Age: 41

Born: Calcutta, India. Raised in nearby small town.

Family: Wife, Anupama Dahanukar, associate professor of entomology, University of California-Riverside; daughter, Zoya, eight months.

Education: Bachelor's degree in chemistry, Presidency University, Calcutta, India, 1996; master's degree in biotechnology, Jnu University, New Delhi, India, 1998; doctorate in molecular, cellular and developmental biology, Yale University, 2005.

Occupation: Associate professor of entomology and director of Disease Vector Research Center, UC-Riverside.

Work History: Post-doctorate researcher, Yale University, 2005 to 2007.



several from grapes and fruit classified as safe for human consumption.

"Chemicals safe enough for food products are great to work with where we don't want to spray toxic insecticides before harvest," Ray said.

His work first centered on insect repellents for people. He won awards for developing the non-toxic Kite Mosquito Patch to block mosquitoes' ability to efficiently detect carbon dioxide, their primary means of finding human blood.

But Ray also was interested in invasive plant pests.

"We decided to pick one

as a test and realized spotted wing drosophila causes immense damage in Northern California, Oregon and Europe," he said.

In 2014 and 2015, he tested butyl anthranilate, known by the initials BA, which is a natural, non-toxic compound, that smells like grapes and is found in low concentrations in several fruits. It is approved by the U.S. Food and Drug Administration as a food additive and is commonly used for flavor and fragrance.

Ray tested it on blueberries for spotted wing drosophila. BA targets the same neurons in

insect antennae that respond to DEET.

Ray found that a single treatment of 2.5 percent BA reduced the number of eggs, larvae and pupae in the blueberries by about 50 percent and that 10 percent reduced them to zero.

Next year, he plans to partner with an agriculture protection company for field trials with an eye toward Environmental Protection Agency registration of a commercial product in another two to three years.

The UC-Riverside Office of Technology Commercialization helped Ray start Sensorygen Inc., last year to develop the BA technology. The office has filed for a patent and licensed it to Sensorygen.

"We've found hundreds of natural chemicals. BA is only one of them. So we have many to try. We're just beginning to explore and understand which works best with what types of insects and how long they last," he said.

Ray said he has data that suggest the natural chemicals could be effective against ants, bed bugs, fruit flies, mosquitoes and just about any insect. He believes they could be used on fruit grown in fields or greenhouses and

fruit in storage.

"We are approaching all of these avenues to see if we can make an impact to reduce crop and food damage and with the longterm idea of improving existing insecticides," he said.

Natural chemicals could be sprayed on most of a field, funneling insects to a smaller portion sprayed with insecticides. "Insects don't like the smell of these natural chemicals so when they fly into a feeding site, they would direct them to the insecticide," Ray said.

It could reduce insecticide usage.

"Thousands of tons of toxic chemicals are used to protect our food chain and still 30 to 40 percent of crops are destroyed by insects worldwide," he said.

Use of BA for spotted wing drosophila in cherries should allow for use of the natural bait, GF-120, to control cherry fruit fly again, Ray said.

GF-120 was used extensively in Central Washington prior to the arrival of spotted wing drosophila in 2010. Delegate with the active ingredient spinetoram, Entrust with spinosad, Warrior with lambda-cyhalothrin, Sevin with carbaryl and malathion are used for spotted wing drosophila in cherries. They are not compatible with GF-120.

"It looks like an interesting concept," said Elizabeth Beers, entomologist at the Washington State University Tree Fruit Research and Extension Center in Wenatchee.

"We've looked at some other repellent properties from other materials for spotted wing drosophila. The difficulty is do they stop egg laying and how long do they last," she said. "Growers can't spray twice a day. It also comes down to cost."

"It looks promising but there's a long way to go before we know," said Jim McFerson, the center's director. "It's great news and should be pursued. It needs research to determine ultimate use at the orchard and packing shed levels."

## Australian sheep yields 30 sweaters worth of fleece

By ROD MCGUIRK  
Associated Press

CANBERRA, Australia — A lost, overgrown sheep found in Australian scrubland was shorn for perhaps the first time on Thursday, yielding 40 kilograms (89 pounds) of wool — the equivalent of 30 sweaters — and shedding almost half his body weight.

Tammy Ven Dange, chief executive of the Canberra RSPCA, which rescued the merino ram dubbed Chris, said she hoped to register the 40.45 kilogram (89 pound, 3 ounce) fleece with the Guinness World Records. An official of the London-based organization did not immediately respond to a request for comment.

The most wool sheared from a sheep in a single shearing is 28.9 kilograms (63 pounds, 11 ounces) taken from a wild New Zealand merino dubbed Big Ben in January last year, the Guinness World Records website said.

"He's looking really good, he looks like a new man," Ven Dange said, as the now



RSPCAACT/ via AP

In this photo provided by the RSPCA/Australian Capital Territory, an overgrown sheep found in Australian scrubland is prepared to be shorn in Canberra, Australia, Sept. 3. The wild, castrated merino ram named Chris, yielded 89 pounds of wool — the equivalent of 30 sweaters — and shed almost half his body weight.

44-kilogram (97-pound) sheep recovered at the Canberra animal refuge. "For one thing, he's only half the weight he used to be."

Champion shearer Ian Elkins said the sheep appeared to be in good condition after being separated from his huge fleece under anesthetic.

"I don't reckon he's been shorn before and I reckon he'd be 5 or 6 years old," Elkins said.

Chris was found near Mulligans Flat Woodland Sanctuary outside Canberra by bushwalkers who feared he would not survive the approaching southern summer. He was

found several kilometers (miles) from the nearest sheep farm. A bushwalker named him Chris after the sheep in the "Father Ted" television comedy series.

Chris was rescued by the RSPCA on Wednesday and taken to Canberra, where he was shorn under anesthetic

because he was stressed by human company and because of the potential pain from the heavy fleece tearing skin as it fell away.

Ven Dange said he had suffered skin burns from urine trapped in his fleece and could have died within weeks if left in the wild.

"When we first brought him in yesterday, he was really shy, he was shaking, he would move his head away from people and he could barely get up and walk," she said.

"The drugs might be wearing off right now, but he's actually coming to you and actually wants a pat. He's certainly moving a heck of a lot better," she added.

She said Chris would be found a new home after vets gave him the all-clear.

Elkins said the fleece was too long to be sold commercially. He hoped it would end up in a museum.

"I wouldn't say it's high quality, but you wouldn't expect it to be running around in the bush that long unshorn," he said.

### Calendar

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#### Friday, Sept. 11

Washington State Fair, 10 a.m., Washington State Fair Events Center, Puyallup.

Sublimity Harvest Festival, 4 p.m.-1 a.m. Sublimity Harvest Festival grounds, Sublimity, Ore. The three-day festival features stock and modified tractor pulls, entertainment and monster truck competitions.

#### Saturday, Sept. 12

Washington State Fair, 10 a.m.

Washington State Fair Events Center, Puyallup.

Sublimity Harvest Festival, noon-1 a.m. Sublimity Harvest Festival grounds, Sublimity, Ore.

Pendleton Round-Up, noon Pendleton Round-Up Grounds, Pendleton, Ore.

#### Sunday, Sept. 13

Washington State Fair, 10 a.m. Washington State Fair Events Center, Puyallup.

Sublimity Harvest Festival, 10 a.m.-9 p.m., Sublimity Harvest Festival grounds, Sublimity, Ore.

Pendleton Round-Up, noon Pendleton Round-Up Grounds, Pendleton, Ore.

#### Monday, Sept. 14

Washington State Fair, 10 a.m. Washington State Fair Events Center, Puyallup.

Pendleton Round-Up, noon Pendleton Round-Up Grounds, Pendleton, Ore.

#### Tuesday, Sept. 15

Washington State Fair, 10 a.m., Washington State Fair Events Center, Puyallup.

Pendleton Round-Up, noon Pendleton Round-Up Grounds, Pendleton, Ore.

Wednesday, Sept. 16 Washington State Fair, 10 a.m. Washington State Fair Events Center, Puyallup.

Pendleton Round-Up, noon Pendleton Round-Up Grounds, Pendleton, Ore.

#### Thursday, Sept. 17

California Poultry Federation Annual Meeting and Conference, 8 a.m.-5 p.m. Monterey Plaza Hotel, Monterey.

Washington State Fair, 10 a.m., Washington State Fair Events Center, Puyallup.

Mount Angel Oktoberfest, 11 a.m.-11:55 p.m., Mount Angel, Ore. 1-855-899-6338. Mount Angel's Oktoberfest will bring together 350,000 people to celebrate the harvest. Something for everyone.

Pendleton Round-Up, noon Pendleton Round-Up Grounds, Pendleton, Ore.

#### Friday, Sept. 18

California Poultry Federation Annual Meeting and Conference, 8 a.m.-5 p.m. Monterey Plaza Hotel, Monterey.

Washington State Fair, 10 a.m., Washington State Fair Events Center, Puyallup.

Mount Angel Oktoberfest, 11 a.m.-11:55 p.m. Downtown Mount Angel, Ore.

Pendleton Round-Up, noon Pendleton Round-Up grounds, Pendleton, Ore.

#### Saturday, Sept. 19

Washington State Fair, 10 a.m., Washington State Fair Events Center, Puyallup.

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