Breeding a better honeybee

By MATTHEW WEAVER
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PULLMAN, Wash. — Honeybees buzz freely around the lights in Brandon Hopkins' office and in the hallway outside.

The bees enter the building on equipment Hopkins and his co-workers bring indoors, drawn by the smell of the honey-laden frames.

Hopkins and several workers converse casually about the day's work, lightly brushing bees off their sleeves and out of their hair.

"We're just used to it," Hopkins said of the visitors.

Hopkins is a research associate at Washington State University, where he manages the laboratory and germplasm repository for WSU's apiary program.

He's part of a team of researchers working to breed a better U.S. honeybee.

Hopkins, WSU entomology professor and department chairman Steve Sheppard and research associate Susan Cobey want to improve the genetic diversity in the U.S. honeybee population by importing bee semen from Europe and Asia. They hope to breed bees more capable of warding off pests and diseases, surviving over winter and pollinating in inclement weather.

They produce breeder queen bees, which they provide to commercial queen bee producers, who in turn can produce thousands of queen bees for the nation's beekeepers. WSU can produce 300 to 400 queen bees a year, Hopkins said.

The U.S. honeybee population is a "mongrelized" or "mutt" mix of races, Hopkins and Cobey said.

"We're trying to separate them out more and show the true traits of different species," Cobey said.

Honeybees are not native to the U.S. The federal government closed the border to honeybees in 1922, restricting their importation to prevent the introduction of parasitic tracheal mites.

"What was established before that date is what our industry is based on, which is full of genetic bottleneck issues," Cobey said. "There's 28 subspecies of honeybees, and basically our industry is built on two. There's a real need to conserve that diversity worldwide, because different combinations of things will give us different results, different ability to deal with these pathogens, problems."

Genetic diversity offers improved bee fitness and productivity. A genetically diverse colony handles diseases better, Hopkins said.

The biggest need in the U.S. honeybee population is anything that would increase resistance to parasitic Varroa mites, Hopkins said.

Varroa mites are fatal to honeybees and are part of the complex colony collapse problem. They feed on bee larvae and reproduce in the hive. In two years a Varroa mite infestation can kill an entire bee colony, according to WSU.

"It's also the pathogens and viruses they vector — that's really what's killing the hives," Cobey said. "Some bees are more resistant to those than others."

Varroa mites were first found in the U.S. in 1986, and came from Europe and Russia, so the possibility of finding bee genes for resistance is greater in those overseas bee populations.

The university is preparing queen bees for overwintering at its Pullman, Wash., campus. Researchers will monitor them for foraging behaviors or hygienic behavior to see if they possess the desired characteristics.

Some will go to California in February to be assessed for almond pollination.

The next queen bees will be delivered to commercial queen bee producers in February or March. Many producers are waiting in line for the bees, Hopkins said.

Without WSU's work, honeybees would have to travel farther to places such as California and Washington state to meet the demand for fruit and nut tree pollination, Cobey said. The U.S. even imported bees from Australia for several years to help with early season almond pollination, she said.

"The cost of producing bees for pollination and keeping bees healthy would greatly increase, along with increasing the cost of producing food," she said.

Hopkins said WSU's research will make the future more secure for honeybees.

He's seen photos from China and Japan of workers pollinating fruit trees with paintbrushes.

"I guess that's the picture I imagine without bees," he said. "Production standards are going to have to be much, much lower, because there's no way people or anything else can do pollination. You're never going to get the production you see today."

Kathy Keatley Garvey/University of California-Davis

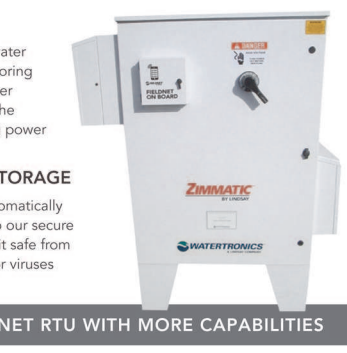
Susan Cobey with a frame full of bees.

Kathy Keatley Garvey/University of California-Davis

Washington State University research associate Susan Cobey with queens.

Brandon Hopkins/Washington State University

A researcher collects semen from a honeybee.



What Can be Monitored	FieldNET
Pressure	X
Flow	X
Pump Running	X
VFD Output Frequency	X
Motor Amps	X
Pump Enabled/Disabled Status	X
Alarm Status	X
VFD Fault (specific faults)	X
Total Water Pumped	X
Energy Usage (kWh)	X
Temperature	X
Voltage	X
What Can Be Controlled	**FieldNET**
Pump Enable/Disable	X
Pump Fault Reset	X
VFD Parameter Changes	X
Pressure Transducer Set Point	X