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Stings and vaccines

Yellow Jacket hunter Carl Roush collects the venomous insects for use in study, antidotes

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LONG BEACH, Wash. — It begins with a peculiar sign on the edge of Sandridge Road in Seaview. It ends with a vaccine that saves lives across the U.S. In between is Carl Roush, a retired biologist who has been collecting yellow jackets for pharmaceutical use since 1986.

Roush, 65, has been collecting, freezing and shipping live wasps to HollisterStier Laboratory in Spokane for more than 30 years, primarily in the Longview, Washington area. But on a Friday in early August, he made his last trip of the season to the Long Beach peninsula, where one of Roush's signs along Sandridge Road was noticed by Ilwaco resident Kelly Bone. Bone reported a basketball-size nest of yellow jackets on the corner of his garage, and Roush came ready to collect.

Buzzing business

Most retreat at the sight of a nest swarming with wasps, but Roush leaned in for a closer look.

"This is a really good one," Roush beamed as he unloaded a shop vacuum and a garden hoe from his Subaru, the two simple tools he has used for nearly three decades. Moments later he was back on the ladder only a few feet from nest of 900 buzzing yellow jackets. A few raps on the side of the garage and a gust of wasps flush from the opening. Methodically, Roush moved around the hive, sucking in wasps by the handful.

"Zoop! Zoop! Zoop!" Roush admits he sometimes becomes mesmerized by the all movement and unfazed by the potential of a painful sting. It happens, but it's rare.

Within minutes Roush has caught most of them, which he estimates to number near 900, a sizable nest for the species. It's one of his last collections of the season, and one of the best for this particular species. Most of his calls this season have been in the Ocean Park area for ground nests, which sometimes contain up to 2,000 wasps. A more calculated approach is needed for the bigger underground colonies, where wasps have a tendency to crawl up pant legs and find their way into seams of clothing. Roush seldom gets stung, the result of decades of experience working around the insects. Instead he considers ladders to be the riskiest part of the profession.

"My worst experience was falling off a ladder," Roush said, describing a fall 10 years ago that ended with a serious knee injury. But he's had his bad days with stings, too.

"I was collecting a western yellow jacket nest that was very sizable, about 2,500 workers," Roush recalled.

"I was pounding on the ground around the edge of the tree and all the needles collapsed, plugging the tunnel." Carefully, Roush began to remove the needles blocking the opening.

"I did my next little scoop and WHOOSH! I was covered with at least 500 yellow jackets." The swarm piled on his headgear, stinging his neck and any exposed skin.

"I had 10 stings in one stop. That's the worst it's ever been," Roush said. "I've learned a lot since then." The experience wasn't entirely negative. Six of the stings were on his Achilles tendon that had been a source of daily soreness.

"I was a runner at the time and my Achilles tendon was always inflamed," said Roush, who had to routinely remedy the soreness with ice and aspirin.



A plume of wasps swarm from the nest as Roush taps a garden hoe next to the nest Friday, August 5 in Ilwaco. After 10 minutes, he's collected 80 percent of the hive.



LEFT: After a few minutes packed next to dry ice, the wasp drift asleep due to the released CO2. Roush then separates the males which have no pharmaceutical use. The remaining female wasps are repacked with more dry ice and sent to Spokane where the venom is extracted. RIGHT: Roush estimated the nest contained approximately 900 aerial yellow jackets.

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"Well, those six stings were right on that tendon and the tendinitis went away for six months. For six months it was gone," Roush said. It revealed a first-hand experience of the medical wonders of the venom.

"The venom is used for arthritis. It's usually from honeybees, but it causes a similar inflammatory response that elicits our defensive cells to react and repair. And it happened to me by accident," Roush said.

Extraction follows collection

After Roush has collected the wasps, a painstaking process of venom extraction follows. Packed in a styrofoam box, the wasps are placed in a cooler next to a chunk of dry ice. Within minutes, the carbon dioxide released from the ice causes the wasps to slip into a deep sleep. After the males are separated, those remaining are placed in a Ziploc bag, labeled, packed on dry ice and shipped off to Jubilant HollisterStier, a pharmaceutical manufacturing facility in Spokane.

"And then someone with forceps pulls

each stinger and cuts off the poison sack into a beaker. The process is repeated 5,000 times per pound," said Roush of a venom-extraction process that varies depending on the species and colony size.

"With a honeybee hive, they can put a glass plate on a platform and on that plate they put a copper grid and run a mild electrical current through it. The bees sting the grid and the venom drips onto the plate. The volatile component evaporates and they have pure crystalline venom," Roush said. The electric technique isn't widely used with other species because the colony sizes are smaller, making it impractical. Paid by weight, Roush sometimes fulfills his 10-pound quota before the official season, which runs June through September. The smaller-colony species garner the highest prices. Bald-faced hornets are most valuable because they're the most difficult to obtain in numbers, according to Roush.

"Basically, it's a supply-and-demand cycle," Roush said. "The western yellow jackets, each colony has so many that it's easier to collect them."

"Only the females sting," said Carl Roush demonstrating by letting a male wasp walk along his tongue. A retired biology professor, Roush, 65, has researched stinging insects, such as bees and ants, since 1978.

EO Media Group photo by Natalie St. John

Value in the venom

The extracted venom has a variety of medical uses, many of which are still being researched. Where some people have allergic responses to stings from honey bees, yellow jackets, hornets or paper wasps, the venom can be used a precursor to prevent such severe reactions when introduced in smaller doses.

"It's a vaccine," said Roush. "It builds up their tolerance by giving them minute doses of the venom, should they encounter the real thing." Alternative research and anecdotal accounts suggest bee venom has potential use in alleviating symptoms of rheumatoid arthritis, as well.

There are numerous misconceptions about bees and wasps that Roush routinely addresses, largely based on common misidentification.

"Wasps are stinging insects that eat meat. Bees are stinging insects that visit flowers for pollen and nectar. It's that simple," Roush said. And it's typically just a few yellow jackets that give the whole hive a bad name.

"Only a few members from each colony learn that they can scavenge food off your picnic plate. Yellow jackets aren't bad. Their role in nature is to collect insects. They are a benefit," Roush said.