

World's most heavily trafficked turtle plays vital role in Indonesia environment, economy

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A Southeast Asian box turtle. Credit: Nancy Karraker

The Southeast Asian box turtle is the most heavily trafficked turtle in the

world – captured and sold to China for food and medicine and for the pet trade in the United States, Japan and Europe. But little was known about its ecology until a University of Rhode Island herpetologist spent six months studying the animal's habits and habitat last year.

Her findings suggest that the attractive turtle plays a vital ecological role in the region's lowland swamp and savannah pool ecosystems by increasing the germination rate of tree seeds, including trees that are important to the region's lumber industry.

"Trafficking in [turtles](#) is a major issue in Southeast Asia, and it's important that we understand the key ecological roles that species like this box turtle play before it's too late," said Nancy Karraker, URI associate professor of natural resources science. "As we learned through this study, protecting this one single element of biodiversity may be especially important."

The Southeast Asian box turtle is found throughout the region, from eastern India to Indonesia and the Philippines. Karraker describes it as a shy, gentle turtle with a black shell, and black head "with yellow racing stripes down the side."

She and a colleague from Bogor Agricultural Institute in Java, Mirza Kusrini, along with students from URI and Bogor, conducted several studies of the turtle from January to May 2018 in Rawa Aopa Watomohai National Park in southeast Sulawesi and at nearby wetlands and aquaculture ponds outside the park. They captured 106 turtles inside the park but just 28 outside the park – and none at the aquaculture ponds.

"The park seems to be doing a good job of protecting the turtles. The habitats are in relatively good shape, and it doesn't appear that people are collecting turtles from within the park," Karraker said. "But it does

appear that people may be collecting and selling turtles from the wetlands outside the park.



URI herpetologist Nancy Karraker studied the ecology of the Southeast Asian

box turtle at Rawa Aopa Watomohai National Park in Indonesia in 2018. Credit: Jessica Atutubo

"Another concern is that the wet agriculture lands that were historically used in rice production still serve as [habitat](#) for turtles, but those are being converted to aquaculture ponds for growing fish, and we didn't catch a single turtle in aquaculture habitat," she added.

Of particular interest was a study of the turtle's diet and capacity for [seed dispersal](#). After collecting and analyzing turtle feces, the researchers found that the turtle is omnivorous, eating a wide variety of food including crustaceans, fish, insects, snails and many kinds of plants and fruit. A telemetry study found that the turtles wandered widely across the landscape, so they likely dispersed seeds in their droppings far from where they were eaten.

"The thing that most aids germination is getting a [seed](#) out from under its parent tree, out of the shadow and away from seed predators, and dropping it somewhere that it has a chance to germinate. And the turtles appear to be doing that," Karraker said.

She also suspected that the process of passing seeds through a turtle's digestive system enhances the likelihood that the seed would later germinate, since the turtles don't chew the seeds and their stomach acid may break down the seed's hard outer coating. So she conducted a germination study and found that three of the six seed species tested had a 25 to 43 percent improvement in germination success if the seeds had first passed through a turtle.

"Two of the trees that had improved germination rates are very important throughout Indonesia for lumber," said Karraker. "They grow

very large, are strong, and are highly valued for building houses and furniture. They're also important to Indonesian people for their livelihood, and provide important habitat and fruit for other animals in the national park."

As a result of her findings, Karraker and her colleagues are making a case to the Indonesia government to formally recognize the Southeast Asian box turtle as a species requiring strong protection.

Provided by University of Rhode Island

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