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## First Omnivorous Spider Says "No Thanks" to Insects

By Elsa Youngsteadt  
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A small jumping spider has taken to hunting plants instead of bugs. *Bagheera kiplingi* dodges throngs of aggressive ants to feast on the leaf-tip morsels of acacia shrubs, making it the first mostly vegetarian spider known to science. It's like "a tiger who is eating mainly grass," says retired Swiss arachnologist Rainer Foelix.

Christopher Meehan first noticed *B. kiplingi*'s vegetarian tendencies when taking an undergraduate field course in southeastern Mexico in 2007. Of the world's 40,000 known spiders, none had ever been documented as an herbivore--yet here was *B. kiplingi* feasting on acacia shrubs. "I thought I had imagined something," recalls Meehan, now a doctoral student at the University of Arizona, Tucson.

Almost as surprising was the fact that the spiders were intruding on one of the world's best studied symbioses--the [mutualism](#) between acacia shrubs and stinging *Pseudomyrmex* ants. The ants protect the plants from herbivores, and the plants provide the insects with hollow thorns to nest in and a steady diet of nectar and Beltian bodies, the same minivegetables that *B. kiplingi* snatches.

A few years before Meehan's field trip, biologist Eric Olson of Brandeis University in Waltham, Massachusetts, noticed the same thing in northwestern Costa Rica but did not publish his observations. When the two scientists discovered each other, they joined forces; their combined [report](#) appears today in *Current Biology*.

In Mexico and Costa Rica, the researchers logged 72 hours of spider observation, noting more than 150 instances of vegetarian snacking. Beltian bodies made up more than 90% of the spiders' meals in Mexico. The Costa Rican spiders weren't as strict, dining 60% on Beltian bodies and the rest on acacia nectar, ant larvae, and other insects. In both places, the spiders were adept at evading the aggressive ants whose food they swiped. They're so agile that the ants "just can never catch them," Meehan says.

To back up their observations, the researchers also chemically analyzed the spiders. They measured the amount of a rare isotope of nitrogen that accumulates up food chains and is most abundant in carnivores. Mexican *B. kiplingi* had only about half the concentration found in other spiders.

Meehan thinks *B. kiplingi* may have adopted its strange diet as a defense against predators. Provided it can avoid the ants, he says, the spider might benefit from living on an ant-guarded plant where few birds or other predators dare to tread. *B. kiplingi* might have eaten mainly ant larvae before it started poaching the steady supply of Beltian bodies. From there, adds Meehan, the ant-acacia interaction was an "evolutionary stepping-stone" for the emergence of a vegetarian spider.

The study is a "gorgeous example of natural history and evolution," says tropical ecologist Phil DeVries of the University of New Orleans in Louisiana.

Meehan says the next step is to figure out just how the spiders survive on this diet. Unlike insect prey, Beltian bodies are 80% fiber, which is tough to digest. He wonders if, by first eating ants, the spiders may have picked up the same enzymes or gut microbes that help the ants themselves stay vegetarian.

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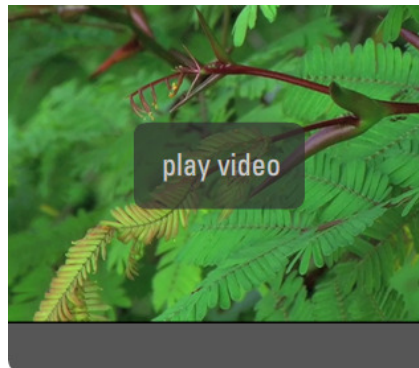
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**No carnivore.** The nearly vegetarian spider, *Bagheera kiplingi*.

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Credit: Christopher Meehan

**Noshing.** Watch *B. kiplingi* grab a snack on an acacia shrub.

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