By ROBERT R. JACKSON
Photographs by MARK W. MOFFETT

Trespassing with intent to kill, *Portia fimbriata* stands on another spider's web and plucks at the silken threads, imitating the vibrations made by a mosquito, the victim's prey. Like Shakespeare's *Merchant of Venice* heroine, this Portia disguises itself to trick its enemies. The eight-legged version stages elaborate masquerades to sneak up on other spiders—or lure them within striking distance. Researchers wonder: Is Portia running on instinct, or is it just plain smart?

PORTIA SPIDER

Mistress of Deception

Web of Trickery

Among spiders Portia is the great nonconformist. Spiders are often informally separated into two behavioral groups: those that build webs to capture prey and those that hunt away from their webs. Portia does both.

Odd in appearance, it resembles a scrap of vegetation blown into a web by the wind. And rather than scurrying about like other jumping spiders, Portia has a slow, choppy gait—much like robots in science fiction movies.

Most spiders prefer insects as prey. Again Portia is the oddball. One of its specialties is invading another spider's web—and devouring the owner.

The genus *Portia* contains 15 species of African, Asian, and Australian jumping spiders. Measuring up to ten millimeters (.39 inches), the Queensland *Portia fimbriata* is featured in this article.

Landing on the web of a *Hygropoda dolomedes* spider (top), Portia slowly approaches. The deceit begins as it manipulates, plucks, and slaps the web silk with one or a combination of its eight legs and two leglike palps, mimicking a trapped insect.

In this case Portia seems to have hypnotized the other spider with the monotony of signals, closing in for the kill while playing the deadly vibratory lullaby.

Occasionally Portia will land on a web while the wind is blowing or while an insect is struggling to free itself. Such strong vibrations mask the shaking caused by a Portia on the prowl, and the raider can forgo the use of stealth tactics.

My colleague Stim Wilcox (bottom right), of the State University of New York at Binghamton, has developed an ingenious method of recording the seemingly countless patterns of web vibrations that Portia can imitate.

He attaches a voltmeter pointer, a device something like a record player stylus, to a web. Whenever Portia makes a move, the web shakes the pointer, triggering an electrical signal that is recorded on tape. The signal is also digitized and fed into Stim's computer.

We can also do our own mimicry—altering the vibrations to change the message Portia sends. We attach a magnet to Portia's head and place an electrical coil (bottom left) above the spider. As we play back the computer-generated signals through the coil, the magnet vibrates, simulating Portia's plucking on the web. Once we start transmitting to the magnet, Portia stops making its own signals.

For this experiment we increased the intensity of the vibrations. That provoked an attack from the host spider, a *Badumna longinqua*, causing our somewhat confused Portia to flee.

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Reversal of Fortune

Portia plays a dangerous game as it tries to lure other spiders to their doom. This Portia (left) is crawling along the rolled-up-leaf home of the aggressive *Achaearanea camura* spider. Going in after the prey is too risky, so Portia creates a series of vibrations that eventually draws the curious *A. camura* outside. The finely tuned vibrations elicit a cautious approach from *A. camura* (top). When its victim is within reach, Portia strikes with a lethal bite to the head (center).

Sometimes Portia overplays its hand. Startled by some false move, a spider on another web turns (bottom) and throws sticky silk over Portia. The gummy shroud keeps it captive until *A. camura* is ready to feast.

Fatal Attraction

Death comes courting when Portia mimics the mating ritual of the *Euryattus* sp. spider, which lives in a rolled-up leaf suspended by silk cables. Sitting atop a female spider's home (far left), Portia rocks the leaf, dancing atop it like a *Euryattus* male. Fooled for the moment, the spider emerges from its home (center).

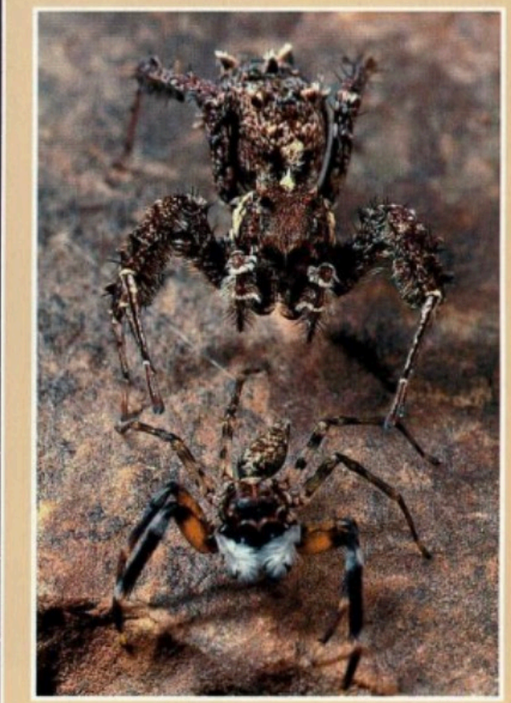
Portia has an uncanny ability to elicit specific responses from other spiders. Most of its targets are themselves formidable predators, and it would be dangerous for Portia to always pretend to be prey and so provoke a full-scale attack. The best way to hunt a lion is, after all, not to imitate a gazelle.

The ruse applied here by Portia often lures a female out of hiding and to her death. *Euryattus,* however, sees better than most spiders. This time the would-be victim recognizes Portia as an impostor and charges. In an unexpected rout, the spider rams into Portia, knocking it from her leaf (right).

How does Portia match signals with different types of spiders?

The answer defies the conventional wisdom that spiders are simply instinct-driven automatons. Portia can find a signal for just about any spider by trial and error. It makes different signals until the victim spider finally responds appropriately—then keeps making the signal that works.

Stalking a Giant's Consort



Even the gutsy Portia knows better than to tackle the huge female *Nephila maculata* (left). But the male of the species, a comparative midget that lives on the same web, is just the right size for a meal.

There's one complication, though: Portia must tailor its signals just for the *Nephila* male. If the female is alerted, she'll attack. Amazingly, Portia lures the male in for the kill—while maintaining "radio silence" with his mate.

Stealth is also essential when Portia stalks a fellow jumping spider (above). If the sharp-eyed quarry wheels about, Portia poses as debris, a deception that proves deadly for its prey.

Scrambling Over Eggs

Portias have no trouble spotting one another on the prowl, so when one female invades the leaf where another is tending her eggs, all-out war erupts (above). During these vicious wrestling matches, legs may get torn off, and often one spider is killed.

This time the intruder wins. After driving the loser from the leaf, she rips open the defeated spider's egg sac, devouring the eggs and spiderlings within (right).

She eats her booty one egg at a time (opposite), pulling each into her mouth with her palps.

Because Portias recognize one another so easily, they have developed what appear to be ingenious methods of mounting surprise attacks.

For example, we observed one Portia as she apparently planned a rear attack on another female's web. After she was repelled by the resident spider, the attacking Portia seemed to retreat.

Once she was out of sight of her rival, however, she climbed some nearby vegetation and ventured out across a vine that extended above the web. From above, Portia dropped on her own silk line alongside the web. Then Portia began to swing toward her unsuspecting victim . . . until she made a kill. Lab experiments suggest that Portias must plan such detours.

We may be uncomfortable with the idea of spider intelligence. After all, with a brain no bigger than a pinhead, a spider like Portia is supposed to follow rigid, simple behavior patterns. There's not much room in there for thinking. But from its deadly skill at mimicry to its elaborate attack strategies, Portia is one of the most behaviorally complex predators in the animal kingdom. □