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The Red Widow Spider: A secretive, harmless resident in Florida scrub

By ARCHBOLD BIOLOGICAL STATION

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A female Red Widow Spider.

JIM CARREL PHOTO

Hidden away in the native scrub habitats at the Archbold Biological Station is a rare spider whose presence generally goes unknown to all but ardent field biologists. The Red Widow Spider spends most of its life hidden in short palmetto bushes. Its world-wide range is restricted to undisturbed sand ridges in four central counties and two counties near Florida's Atlantic coast.

Dr. Jim Carrel, Research Associate at Archbold and former professor of biology at the University of Missouri, explains, "Although this species has a toxic venom like the dreaded Black Widow, there is no record of it having ever harmed a person. This is not at all surprising considering how much work I have to do to find them.

The likelihood of anyone encountering a Red Widow by chance is near zero.”

Dr. Carrel’s work with the Red Widow started badly. In 1985 he and his wife, Dr. Jan Weaver, also a spider biologist and former Director of Environmental Studies at the University of Missouri, decided they’d inspect the palmettos at Archbold daily for tangle webs of this spider, which extend horizontally about a yard to another bush. After days of checking at least a thousand palmettos a day, Dr. Weaver got up to 10,000 palmettoes without a single success. Then she stopped...clearly, this approach was futile.

A breakthrough came in February 1987. Dr. Carrel and two students went out in a truck at dawn on a very foggy morning to look at the webs of various spiders in scrub. Laden with dew, all sorts of spider webs could be seen glistening in the weak sunshine. They saw an unusual tangle web next to a palmetto and located a female Red Widow resting down in a silken retreat made within a tightly folded palmetto leaf.

They quickly located a dozen more Red Widow webs but when they returned in the afternoon sun, the webs had disappeared from view. Dr. Carrel comments, “I telephoned my wife with conflicting emotions. On the one hand, I was ecstatic that we had stumbled on a sure-fire method for finding Red Widows. But on the other hand, I was embarrassed to tell her about my success considering how much effort she had already invested in fruitless searches.”

Using the drive-by method on foggy mornings, Dr. Carrel measured the density of Red Widow Spiders in native scrub every February for 14 years in a row starting in 1987. He found the spiders were common early in his study, averaging 12 per acre. But the numbers declined each year; by 1998 he was lucky to find one spider in 10 acres. The cause for the change is unexplained. He speculates, “I suspect the cause was biological, such as a parasitic insect that started to attack populations when Red Widows became pretty common.”

A scientific question that long intrigued Dr. Carrel was why Red Widows are confined to the ancient sand ridges harboring scrub. Since saw palmettos are found in every county in the Florida peninsula, it seems reasonable for this spider to be found throughout Florida.

Dr. Carrel hypothesized, “What if this species gradually came to specialize in catching and eating mostly insects that are restricted to scrub. Hence, Red Widows could be narrowly adapted to Florida scrub for dietary reasons.” To test this idea, he teamed up with Dr. Mark Deyrup, Research Entomologist Emeritus at Archbold, who is familiar with most of the insects found in Florida scrub.

Carrel inspected webs of 60 female Red Widows at dawn and dusk for five days in a row. Using forceps, he removed each insect hanging in a web and placed it in a labeled vial. At the end of five days, he fed a few insects to each spider to make up for lost food. All spiders were alive a week later.

Deyrup identified the preserved insects. All told he found 41 insect species that had been trapped by spiders. Most prey were present in the morning, indicating that the insects were nocturnally active. Deyrup discovered that the bulk of the trapped insects consisted of five species of heavy-bodied scarab beetles, such as the Scrub Palmetto Scarab, that fly just above and in between the scrub vegetation.

Based on calculations of the caloric content of the scarabs, Dr. Carrel commented, “If I pretended to be a Red Widow, then catching a scarab would be the equivalent of me buying a whole pig. I’d be in hog heaven for weeks. This may also explain how a Red Widow can routinely go a week or two without feeding.”

In the past 15 years Dr. Carrel has been unable to reliably sample Red Widow Spiders at Archbold because foggy mornings have become relatively uncommon in February. Before the turn of the millennium, he could go out in the mist every second or third day to find tangle webs of this spider. But conditions are different now.

Carrel reflects, “For example, the only densely foggy dawn in the entire month this year happened to occur on Valentine’s Day. I’ve had to curtail my observations on Red Widow Spiders because I haven’t figured out a new method for finding them in native oak scrub.”

A Moody