

Nature's Crawling Conservationists

By William Hines



MODERN SOCIETY, concerned over conservation and efficient use of scarce resources, would do well to take inspiration from the spider.

Not only do spiders work with incredible speed and accuracy to construct and periodically renew their webs, but, an expert in spider behavior points out, they do so with amazingly little waste of the silk from which their food traps are made.

Dr. Peter N. Witt of Raleigh, N.C., says it is pointless to study either the web without the spider or the spider without the web. But studying the spider-web unit, Witt says, can give interesting insights into the behavior of higher animals, possibly even including human beings.

Practically anything said about spiders as a generalization turns out to be wrong.

Only about 5,000 of 30,000 spider species make food traps of the familiar spider-web pattern, and while most spiders are solitary, there are a few species that live together in colonies as large as 100,000 individuals.

Fascinating Facts

Comparatively recent studies of spiders have stripped these creatures of a lot of the folklore that has surrounded them, Witt says. But at the same time, systematic investigation has revealed about them some facts that are every bit as fascinating as the myths that

have been demolished.

For instance, a common spider species that rebuilds its web every day or so takes only about 20 minutes to construct the intricate pattern and recycles the building material with close to 100 percent efficiency.

Scientists have been able to show, by radioactive tagging of an amino acid used in the web's silk, that a spider can spin tomorrow's web with silk that it chewed up and digested while reworking its web today.

The actual "weaving" process takes place at a speed of close to 1,000 operations a minute and goes on so rapidly that high-speed motion-picture photography was required before stop-action analysis of the web-weaving procedure was possible.

Although individual web-weaving species and individual spiders within these species prefer to build their own webs, new spiders can be introduced to old webs and cheerfully take them over for their own.

Among solitary spiders, the female is the dominant influence, building the web, lying in wait for prey, and tolerating the much smaller male only when it is time to breed.

The matriarchal spider usually dies after laying eggs, but long before the young are hatched. Thus, the next generation of solitary spiders must be programmed completely for life when they are hatched.

But among the rare species of "communal" spiders there seems to be a good bit of interaction between generations, including even nurturing and what may be a form of instruction by adults, Witt says.

Discovery that a Mexican species of communal spider has a clear mother-young relationship has disturbed some scientists as well as non-scientists, according to Witt. In this species, the young are fed a material regurgitated by the adult female.

Witt is the scientist who several years ago induced spiders to build bizarre webs by doping them with various drugs such as "speed" (amphetamines), marijuana and LSD. A drugged spider's behavior deviates from the spider-norm in much the same way that a drugged human being deviates from rational human activity.

Studies by other scientists on several species of spiders that build

their webs horizontally close to the ground rather than vertically at greater heights have indicated a clear sense of territoriality or "turf," Witt relates. In a given area, the distribution of spiders building webs is spaced to assure the greatest possible distance between them.

Other Designs

Although all spiders spin silk, not all build "orbital" (the familiar shape) or sheet webs. Witt has photos of various other kinds, including one that looks like a few segments of an orbital web without the rest of the criss-cross pattern.

This, he explains, was a one-time-only web built by a spider that then retreats to a distance and holds taut a slim filament attached to the web.

When an insect blunders into the web, the spider lets go the filament, whereupon the hapless prey finds itself neatly wrapped up in the sticky fabric, securely packaged for the spider to consume at leisure.

An even more bizarre spider uses not a web, but a "weapon" much like a South American gaucho's bola — a long, single strand of silk with a round, sticky glob at the end. The spider twirls its bola until a moth is encountered and then reels in the moth for dinner.

Recent research, Witt says, has disclosed that the glob on the end of the bola contains a chemical attractive to moths.

*The Scientist
Who Drugged
Spiders
Has Some New
Information*
