

by David Hodge

# The Tarantula's Tiny Cousin



Illustration above and photo opposite page by  
Joel Harp

Normally, when one thinks of an endangered species, the image of a "charismatic" species such as a bald eagle (*Haliaeetus leucocephalus*) or a tiger (*Panthera tigris*) comes to mind. But some tiny creatures that few people notice are also in trouble. Though small, they are no less important to the biological web that connects all creatures in a particular habitat. Among the little noticed species is a rare spider that lives in the mountains of North Carolina and Tennessee. The spruce fir moss spider (*Microhexura montivaga*) is a primitive species in the suborder Mygalomorphae. Mygalomorphs are spiders that do not spin a web to capture prey, but instead ambush their prey and stab it with their chelicerae (fangs). Mygalomorphs are mostly ground dwelling, although some live in trees in the tropics. *M. montevega* is a tiny cousin of the more familiar large spiders collectively known as tarantulas.

The spruce fir moss spider is a little different from a lot of its spider kin. While many spiders are small, this species reaches a maximum of only 5 millimeters (0.2 inches) at full growth. It also lives only at high altitudes in habitat that is often cool, wet, and snow covered in the winter, conditions that most spiders would not find very suitable. In fact, temperatures in the winter often fall below freezing, yet the little spiders still function under the snow cover. Perhaps their blood contains some type of natural anti-freeze, an advantage that is not unknown in other kinds of animals. The spruce fir moss mat spider has a relative, *M. idahoanna*, which occupies a similar habitat in the mountains of Idaho. Moss spiders get their names

from the moss they live in, which grows in association with spruce fir trees in the mountains. It is this reliance on moss that has put the moss spider in danger of extinction.

In the early 1990's, Joel Harp, a scientist at the Oak Ridge National Laboratory in Tennessee, began a study of *M. montivaga* populations. He found the beginning of a rapid decline in the species' numbers and range; colonies located earlier had disappeared in only a few months. The reasons for the decline have yet to be determined, although it is probably a combination of threats. The main suspect is a tiny mite that is attacking and killing mountaintop spruce trees. With the death of the trees, much of the moss associated with them was lost to desiccation and the moss mat spiders began to vanish. Other possible reasons for the spider's decline include the insecticide lindane, which was sprayed in an attempt to combat the mites, and forest damage resulting from acid deposition.

Fearing the possible extinction of *M. montevega*, Harp and the U.S. Fish and Wildlife Service (FWS) contacted the Louisville Zoo to set up a captive reproduction program. Because the first 12 specimens received were females, we couldn't reproduce them, but we were able to learn about maintaining the spiders in captivity. They were housed in a petri dish with a moist towel and some moss for security. High moisture is very important because these little spiders desiccate rather easily. Temperatures were maintained on the cool side at about 58 degrees F (14 degrees C). Some of the spiders lived to 6 years, which is amazing for such a tiny animal.

After we received male spiders, matings were attempted. With its final molt, the male develops elongated legs and tibial spurs to hold the female's fangs back when they mate face to face. After copulation, the male departs in haste, hopefully to live to mate again. To date, there has been some mating activity but no egg sack production. If we can produce spiderlings, the challenge will be to raise the very tiny offspring to maturity. The adult spiders are fed spring-tails and tiny crickets, but the diet of newly hatched young is still unknown.

In 1995, the FWS listed the spruce fir moss spider as an endangered species. Three months later, the FWS and The Nature Conservancy met to begin work on a plan to save the spider's habitat on Grandfather Mountain, North Carolina, the last place the species was found at the time. Then in 1998, researchers discovered a moss spider population on Mount LeConte, Tennessee, a place where the little animals were thought to have gone extinct. It turns out that after the moss vanished at this site, the spiders found refuge in rocky areas with some plant cover and enough moisture for the spiders to survive. This population may make it possible to reestablish the species elsewhere in its depleted range. There is still DNA and breeding research to be done, but we are hopeful that our efforts will save this tiny spider from the abyss of extinction.

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