U.S. Fish & Wildlife Service

Spruce-Fir Moss Spider

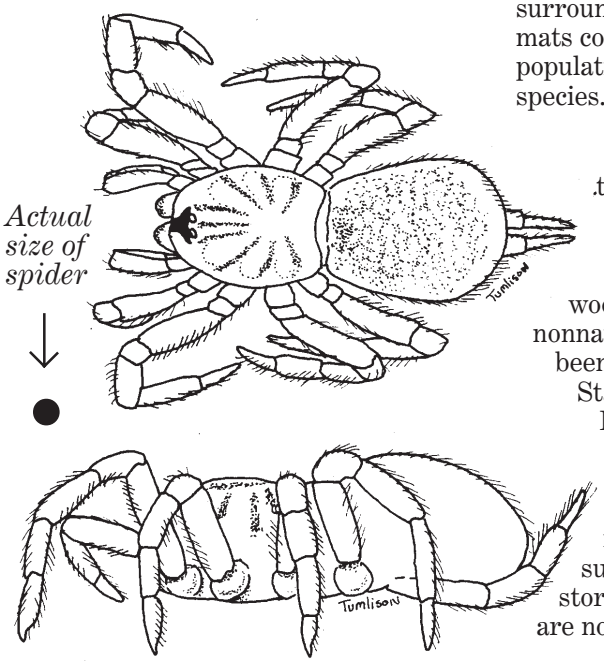
The Federal Endangered Species Act

The Endangered Species Act of 1973 (Act) recognizes that many of our nation's valuable plant and animal resources have been lost and that other species are close to extinction. The Act provides a means to help preserve these species and their habitats for future generations. The spruce-fir moss spider (Microhexura montivaga) is presently known to exist at only five locations--four sites in North Carolina and one site in Tennessee. Suitable habitat for the species at all five sites is extremely limited and is extremely threatened. The U.S. Fish and Wildlife Service added this spider, as an endangered species, to the Federal List of Endangered and Threatened Wildlife and Plants on February 6, 1995.

Description, biology and habitat

The spruce-fir moss spider is one of the smallest members of the primitive suborder of spiders that are popularly referred to as "tarantulas." Adults of this species measure only 0.10 to 0.15 inch (about the size of a BB). Coloration of the spruce-fir moss spider ranges from light brown to yellow-brown to a darker reddish brown, and there are no markings on its abdomen.

The spruce-fir moss spider only lives on the highest mountain peaks in the Southern Appalachian Mountains of western North Carolina and eastern



Tennessee. The high elevation forests where this spider is found are dominated by Fraser fir with scattered red spruce. This forest type is commonly referred to as spruce-fir forests. The typical habitat of this spider is found in damp, but well-drained, moss mats growing on rocks and boulders in well-shaded situations within these forests. The moss mats cannot be too dry (the species is very sensitive to desiccation) or too wet (large drops of water can also pose a threat to the spider). The spider constructs tube-shaped webs between the moss mat and rock surface. There is no record of prey having been found in the webs of the spruce-fir moss spider, nor has the species been observed taking prey in the wild, but the abundant springtails in the moss mats provide the most likely source of food for the spider.

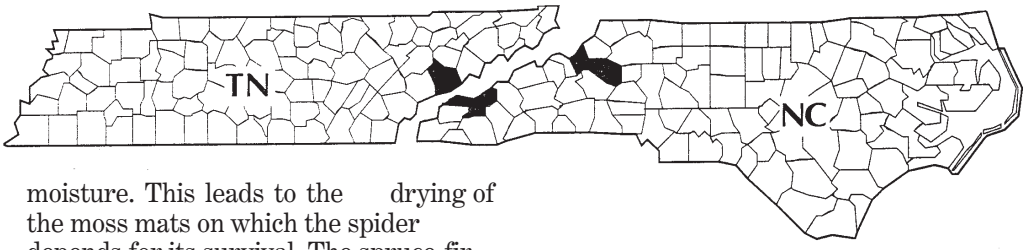
Why is the Spruce-fir moss spider so rare?

The primary reason the spruce-fir moss spider is rare is its habitat is rare. The surviving populations of the spruce-fir moss spider are restricted to small areas of suitable moss mats on a few scattered rock outcrops and boulders beneath fir trees in the spruce-fir forests. Destruction of the moss mats (or even a portion of the mats) or damage to the surrounding vegetation shading the mats could result in the loss of the entire population or even extinction of this species.

In recent years, Fraser fir trees throughout the Southern Appalachian Mountains have suffered extensive mortality due to infestation by the balsam wooly adelgid (Adelges piceae), a nonnative insect pest believed to have been introduced into the United States from Europe. Most mature Fraser firs are easily killed by the adelgid, with death occurring within 2 to 7 years of the initial infestation. The remaining trees become more susceptible to exposure, wind, and storm damage. The red spruce trees are not damaged by the insect.

Furthermore, during the past century, most of the Southern Appalachian spruce-fir forest has suffered extensive changes and declines in size and/or vigor because of past logging and burning practices, storm damage, and possibly atmospheric pollution, climatic changes, disease, insect damage, exposure shock, and other factors not yet fully understood.

As the spruce-fir forest decreases in health and size the death and thinning of the tree canopy results in locally drastic changes in the microclimate, including increased temperatures and decreased

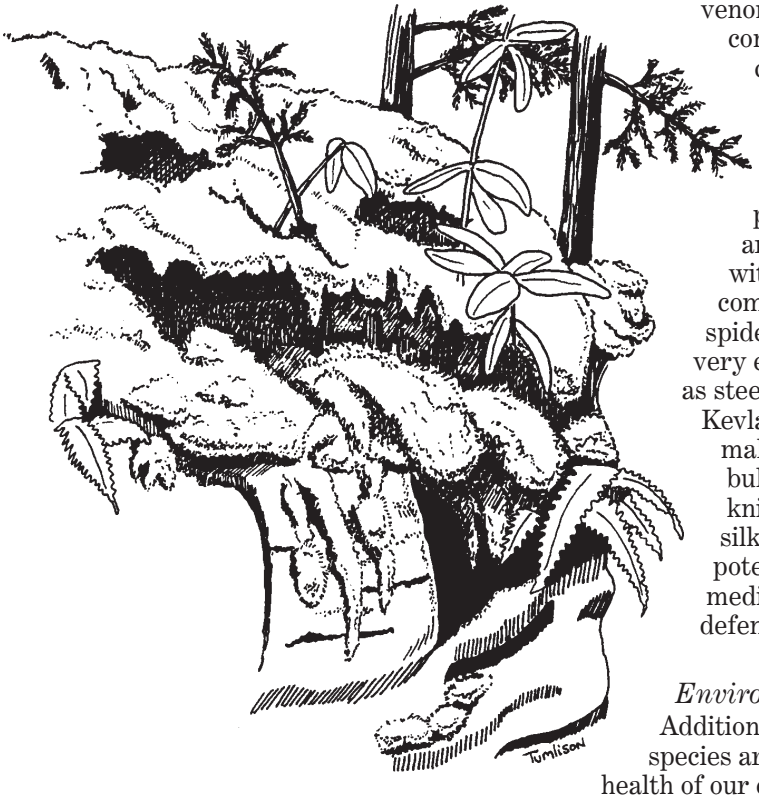


moisture. This leads to the drying of the moss mats on which the spider depends for its survival. The spruce-fir moss spider is very sensitive to desiccation and requires climates of high and constant humidity. As the mats dry out, so does the spider.

Why should we be concerned about the loss of species?

The Web of Life

All creatures, including humans, are interconnected in the web of life. If enough of these living connections are broken, the delicate balance of the entire system can be forever altered. Extinction is a natural process and under normal conditions the rate of extinction would roughly correspond to the rate at which new species develop to take the place of the species that disappear. Today, however, virtually all of the documented historical extinctions are due to direct or indirect environmental changes caused by humans. We are altering the environment faster than species can adapt. When a species is lost, the benefits it might have provided are gone forever.



A Biological Treasure Trove

Consider, for instance, that wild plants and animals are important to the development of new and improved medicines, agricultural crops, and other industrial products. Half of all the prescriptions written in the United States today contain chemicals that were originally discovered in plants and animals. If these organisms had been destroyed before their values were known, their secrets would have died with them. Currently, spider venom is being studied in connection with possible cures for Alzheimer's and Parkinson's diseases and for preventing brain damage in stroke patients. Also, studies are being conducted with regard to the commercial production of spider silk; spider silk is very elastic, twice as strong as steel, and stronger than Kevlar (a material used to make products like bulletproof vests and knifeproof gloves). The silk has numerous potential industrial, medical, recreational, and defense uses.

Environmental Barometers

Additionally, endangered species are indicators of the health of our environment--an early warning system. Their decline alerts us to the fact that the quality of some of the basic elements of our environment--air, land, and water-- are being compromised. Remember, we drink the same water and breathe the same air as all the other living things on our planet. We are connected!

What you can do to help

- When hiking in the high mountains, tread lightly, stay on designated trails, and avoid climbing vegetated rocky outcrops and boulders. The spider and the moss mats it inhabits are very fragile and easily destroyed by human trampling.
- Participate in the protection of our remaining wild lands and the restoration of damaged ecosystems.
- Recycle as much as you can. As landfills become full, new ones are often placed in uninhabited areas, causing the destruction of hundreds of acres of wild habitat.
- Be careful with the use and disposal of pesticides and other chemicals, especially near sensitive habitats.

Wild lands and the plant and animal life that inhabit unique natural places are now dependent on us for survival. These natural places, with their diversity of life, can be enjoyed by and benefit all of us; with our help, they can be there for future generations.

Prepared by:
U.S. Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, North Carolina 28801
828/258 3939
http://nc-es.fws.gov
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