SPIDERS AS CONSERVATION MONITORING TOOLS

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INTRODUCTION

Spiders are ubiquitous predators in terrestrial ecosystem and generalist feeders that primarily attack insects and other arthropods are known to occupy nearly every terrestrial habitat, from the peaks of the highest mountain ranges to the depth of a largest caves and pot holes, from damp marsh to dry desert. Some spiders spend some part of their lives running around on the surface of fresh water lakes and ponds and a few of these can dive to safety and survive below the surface of the water for a short time. Only the true water spider has perfected this ability to the extent that it is able to live a wholly aquatic existence, and few spiders live along the coastal areas and some of them can tolerate immersion in salt water (Mafham 1984, Wise 1995).

Spiders can produce silk using their spinnerets, a modification within the abdomen, although all spiders do not produce silk for building web used for capturing prey. Those that don't spin web use their silk to build nests or burrows, protect their eggs or transfer sperm. These spiders use an ambush technique for capturing prey. They hide among plants until they see an insect prey to pounce on. A few spiders are large enough to ambush birds. All spiders are carnivorous and most have venom to paralyze their prey.

DISTINGUISHING FEATURES OF SPIDERS

Spiders belong to the order Araneae of class Arachnida of phylum Arthropoda. The order Araneae, which consists of the true spiders includes about 37,000 species have been documented worldwide. The largest spiders can grow to have a leg span of up to ten inches. The body of spiders separated into two segments: the cephalothorax and abdomen, lack of antennae, four pair of legs, respiration using trachea or book lungs, feeding on liquid or external digestion by secreting salivary enzymes to make food liquid are the main characteristic features of class Arachnida. On the cephalothorax region six to eight eyes are present. The eyes are generally of two kinds *viz.* black or diurnal and white or nocturnal eyes. When only one type is present the condition is described as

homogenous, in contrast to heterogeneous when the both types are present. The eyes are usually arranged in a double row *viz.* anterior row and the posterior row. Each row usually contains four eyes. The rows of eyes are frequently curved.

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Spiders, like many invertebrates, receive little attention from the conservation community. This may be due to fear and dislike of their appearance, behaviors or venomous nature; the fact that most spiders are probably widely dispersed and not presumed to be threatened; or because relatively little is known about the distribution and abundance of these creatures. Most likely it is a combination of these factors. However, none of these reasons seem sufficient to keep spiders off the conservation radar screen. Churchill (1997) and Clausen (1986) studied the use of spiders as ecological indicators and as conservation monitoring tool. Gibson et al. (1992) discussed the changes in spider assemblages in relation to succession and grazing management. Kremen et al. (1993) suggested that use of spiders in conservation planning. McIver et al. (1990) defined that litter spiders as bio-indicator of recovery after clear cutting in a western coniferous forest. New (1999) reviewed the spiders and the challenges of invertebrate conservation. Oliver and Beattie (1993, 1996) conducted case studies that spiders and other invertebrates are the possible method for the rapid assessment of biodiversity. Wise (1995) highlighted the importance of spiders in ecological webs. The role of spiders as assessing the biodiversity as monitoring tools (Clausen 1986).

There are many reasons to conserve spiders, even without considering that all species have intrinsic value in and of themselves. Spiders are clearly an integral part of global biodiversity since they play many important roles in ecosystem as predators and source of food for other creatures. Spiders also have utilitarian value. For many years spiders have been model organisms for research in ecology, behavior and communication. They may also be important as biological control agents in agro ecosystems, providers of silk for materials science, and suppliers of venom for both medical and insecticide research. Some exciting research in these areas is currently underway. Spiders as a group may even provide useful conservation tools as ecological indicators or in rapid biodiversity measurement. Spiders are predators of pest like thrips, caterpillars, aphids, plant bugs, leafhoppers, flies etc. Spiders have always been known to be effective predators, though their potential as bio control agent.

THREADS TO SPIDERS

Many threats to spider diversity have been documented. The primary threat is habitat loss and degradation, as with many other elements of biodiversity. More specifically, some spiders have become imperiled due to urban development, land-use management techniques, air and ground water pollution by pesticides and fertilizers, the introduction of alien species, and in some cases, collection and trafficking due to the pet trade. For a few species, these threats have pushed them to the threshold of extinction, attracting the attention of conservation professionals. Many other species may be threatened but research on them is lacking. Without the appropriate baseline information on status, distribution and abundance, it is difficult to target appropriate habitats for protection, develop appropriate management techniques, or consolidate the necessary resources for obtaining legal conservation status for spider diversity.

STATUS OF INDIAN SPIDERS

Indian spiders from different biogeographical regions have been studied earlier by several European workers and later by Indian arachnologists. Review of available literature on Indian spiders reveals that the earliest contribution by Stoliczka (1869); Karsch (1873); Simon (1887); Thorell (1895) and Pocock (1900) were the pioneer workers of Indian spiders. They described many species from India, Burma and Sri Lanka. In the twentieth century studies on Indian spiders were documented by Sherriffa (1919); Gravely (1921); Narayan (1915); Reimoser (1934) and Dayal (1935). Tikader (1980, 1982) and Tikadher and Malhotra (1980) described spiders from central Indian region. Gajbe (1987-1999) mainly studied the spiders of Madhaya Pradesh region and described many new species and families. Spiders of protected areas *viz*. Indravati Tiger Reserve by Gajbe (1995a) recorded 13 species. Rana and Singh (1977); (Gajbe 1995b) documented 27 species of spiders from Kanha Tiger Reserve. Patel (2003) described 91 species belonging to 53 genera from Parambikulm Wildlife Sanctuary, Kerala and Gajbe (2003) documented checklist of spiders of Madhya Pradesh and Chattisgarh area. Center for Indian Knowledge System Chennai has also conducted ecological studies of spiders in Guindy National Park and study of spiders in a cotton ecosystem. Only southern and central Indian spiders mainly Kerala, Tamil Nadu, Madhya Pradesh and Chattisgarh have added to the Indian spider fauna. Very little information is available from northern part of India. De (2001) listed 19 species of spiders from Dudwa Tiger Reserve in his management plan. Tikadhar (1982) described 44 families, 42 genera and 190 species of spiders in *Fauna of India.* Alfred et al. 1998 described 46 families; 240 genera and 1035 species of spiders from Indian region.

HUMAN ATTITUDES TOWARDS SPIDERS

Many people feel a high degree of revulsion towards spiders and may in fact be frightened of them. Spiders have little apparent effect on the day -to-day life of human being. In many areas of the world, general attitude towards spiders is favourable and members of a considerable number of different cultures consider it unlucky to kill a spider (Rod and Kin, 1984). Body of the spiders has the benefit to mankind, as a valuable source of protein and flexible silk they produce for variety of uses. Obtaining the silk directly from spinnerets of the living spiders. Spider silk is used in variety of applications but, fewer attempts have been made in production of textile.

Poisonous Spiders

Number of toxic spiders has been documented from the world. When a bite of the spiders take place the effects are serious, skin being punctures and extreme pain develop around the biting site. Numbers of alarming symptoms develop as the powerful neurotoxin poison begins to affect the nervous system. The patient feels nausea and feeling of faintness and dizziness develop. Speech may be affected and breathing problem develops. In severe cases of poisoning, the patient may eventually become prostrate and die.

SPIDER CONTROL IN HOUSES

Following precautionary measures can be utilized to control the house hold spiders:
Sweep or vacuum households and corners of rooms frequently to remove any food debris.
Remove spider webs when spiders are not available.
Sweep behind washers and dryers regularly and rearrange furniture periodically to avoid spiders spinning webs in the same location.
Keep clothing, shoes and blankets off the floors so that spiders do not hide in them during the day.
If there is a spider near a door or window, just sweep or brush it outside.

You can also trap live spiders with a glass jar and a piece of stiff paper and then release them outdoors. If necessary, they can be eliminated by using a fly swatter, rolled-up paper or magazine.
Use yellow light bulbs outdoors to attract fewer insects, thereby discouraging spiders from spinning webs near the house.
Debris around and in your home and yard needs to be cleared. It is a good idea any time, to maintain conscientious cleaning practice.
Prime areas for spiders are woodpiles, compost, and dead leaves that have accumulated, and trash. Moist areas such as basements, cellars, garage, crawl spaces need be free of debris and kept as dry as possible.
Caulking small cracks and crevices will discourage "outside" spiders from entering home. Well-fitted doors and windows will stop the invading army of spiders from entering your abode. Inside the residence vacuum and dust under furniture, and in and around corners and closets as often as possible.
Use of chemical, Diazinon 25% for outdoors is a good control agent. Spray around the foundation of home covering about eight or so inches of soil adjacent to the foundation.

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