



Ex- situ conservation of scorpion species occur in the Maharashtra state.

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Abstract -

Scorpions (Order- Scorpionida) are the most venomous arachnids inflicting an extremely painful sting, although all are not fatal to human beings. Due to unscientific management of natural resources much of our native flora and fauna are fast disappearing and there is urgent need to restore our lost habitats to conserve biodiversity. Scorpion like all animals, need appropriate habitat to live in, where they can find food, avoid enemies, and reproduce under suitable conditions. When suitable habitat destroyed and reduced through human activities by logging, construction or agriculture, the inconspicuous invertebrates' area uprooted and more noticeable mammals and birds' companions. Ex-situ conservation means literally "Off site Conservation". The perspective plan for conserving the some of scorpion species of degraded habitats has been discussed in this research paper.

Introduction-

Ex situ conservation is a process of protecting an endangered species of plants and animals by removing part of population from a threatened habitat and placing it in a new location, which may be a wild area or within care of humans. Zoos and botanical gardens are the most conventional methods of ex-situ conservations, all of which, whole protected specimens for breeding and reintroduction in the wild when necessary and possible. (Bastawade DB,2012 et.al). Among the most ancient arthropods derived from amphibious ancestors that lived in the Silurian period more than 400 million years ago, scorpions have earned the title of "Living fossils." Scorpions and their ken are ancient, medically important, and ecologically, morphologically, and taxonomically diverse and distributed in most terrestrial

habitat and elevations on all continent except Antarctica. Scorpions are most abundant and divers in tropical and subtropical regions. The greatest abundance and diversity of scorpions occur in desert and semi desert habitat, but they may be found in Savannas and Grass lands, in deciduous, coniferous and tropical rain forest, on high mountain slopes (About 5500 m. elevation) in the Alps, Himalayas and Andes on some of mountain slopes. Most of the scorpions occur in new world genera *Centruroides* and *Tityus*, and the old world genera *Androctonus*, *Leiurus*, *Buthus*, *Mesobuthus*, and *Parabuthus* (Badhe RV et.al,2007). As listed in the synopsis of described scorpion of the world and scorpion files, approximately 1500 extinct species in 170 genera (Depending up on the authority) between 13 to 20 families, as well as 92 extinct species in 71

genera and 42 families are recognized in the arachnid order scorpions. Scorpions are fairly common in India. Out of which species occur in Maharashtra will be collected for ex-situ conservation from different regions of Maharashtra. The species commonly occur in Maharashtra are Palamaneous Swammerdammi, Buthus Tamulus and Mesobuthus Ramulus (Red scorpion in Konkan region) (Kankonkar RC et.al. 2007).

Materials and Methods: -

All the scorpions are strictly nocturnal in habit they are considered to be shy and sting when encountered in their hide outs such as burrows, beneath the boulders, bricks, barks and crevices of logs and trees. Although all three categories of scorpions, viz burrowing, (pilophilous), rock dwelling and arboreal are found in India. There is general paucity of information in the country, about the ecology of scorpions. The key information regarding scorpions and the history of area was collected through personal discussion with landowners and farmers of habitat area.

A. Objectives of the Project-

- I. Breeding of selected scorpion females in captive condition.
- II. Ex situ protection of scorpion species through artificial habitat.

B. Site selection for Habitat preparation

The identified site for this project is “Kavyatri Bahinabai Choudhary Zoo Park, Chinchwad with prior permission from concern departments, rules and regulations mentioned in Wildlife Protection Act. Along with Konkan region some species will be collected from rest part of Maharashtra by arranging field visits and

taking primary information of local inhabitants of that area.

Identification of scorpions

The scorpions collected from various parts of Maharashtra are identified and classified on the basis morphological characteristics such as body color, the shape and size of pedipalps, shape of sternum, color of telson and number of pectin teeth. The authorities from the Zoological Survey of India (ZSI), Pune will be involved for technical inputs. The collected scorpions are identified at species level. The precautions will be taken to maintain region-wise separation of scorpions. Cannibalism is also common among few species of scorpions which will be noticed.

Collection of scorpions

The scorpions were collected from degraded habitats of Konkan and rest of Maharashtra, India. Brown colored scorpions were found underneath the stone and wood materials over damp soil. Black scorpions (*swammerdami*) were found burrowed in soil at depths of 5–10 inches. Most of the scorpions are burrowing in nature and nocturnal in habit. While considering the breeding seasons and habits the scorpions were captured carefully using long forceps by holding the tip of their tail without harming the animal. Black and brown scorpions were then transferred into separate containers with soil of about two inches in depth upon which small stones were placed. All the experiments were strictly performed according to the guidelines approved by the Institutional Animal Ethics Committee (IAEC).

Preparation of Habitat-

The wooden chambers or well cement constructed blocks will be prepared. In the laboratory, scorpions were placed in large plastic tubs/ wooden chambers (diameter: 54 cm; height: 22 cm) and cages. On top of a soil bed of about 3 inches in depth, above which proper size stones (~15 × 8 × 15 cm) were kept, mimicking their natural habitat. As a source of drinking water, a Petri dish lid containing tap water was kept at the center of the plastic tub/cage. About 8–10 brown scorpion and the black scorpion, were housed in cages and plastic tubs respectively, and then covered with a mosquito net of proper dimensions. After breeding a large habitat will be prepared to house more than 5000 scorpions.

Feeding of Scorpions

Scorpions are strictly nocturnal in nature and fed on insects as grasshoppers, crickets and occasionally cockroaches. In extreme conditions they may attack on each other. Cannibalism is also very common and is also natural cause to reduce population. Most of scorpions are active in monsoon days when there is ample availability of

The Project will be last for two years. The activities are as follows.

insect population. The size of the insects fed to the scorpions was directly proportional to that of the scorpions themselves. The water availability in the habitat will be made through small petri dishes in chambers. Considering breeding season the females (Broad abdomen will be separated in separate chambers). After 20-25 days mother with young ones will be released in their specific environment from reported site. Some selected species will be kept for venom extraction. Molted scorpions were not fed insects for 3 to 4 days to avoid any physical damage to themselves, nor were subjected to venom extraction for about 20 days. The scorpions were manipulated only on the day of venom extraction and during the replacement of soil, which was carried out once every two months. The venom was not extracted on the day immediately after feeding and also no food was added until three days after the venom extraction.

C. Proposed activities-

Proposed activities are divided into the four major sections. The details month wise activities is as follows

Sr. No	Months	Nature of work		Target to be achieved
		Literature collection	Field work	
1	Jan- June	✓	✓	Review of literature, Literature collection, Laboratory set up, Infrastructure development.
2	July* - December	✓	✓	Brief survey of scorpion species will be carried out through out study region and zones will be demarcation will be made
3	Jan- June	✓	✓	Laboratory work and Investigation
4	July* - December	--	✓	Establishment of system for sustaining project, post care of scorpion species and Antivenin research report.

* Most of scorpion species are burrowing in nature for about 06 months and April to July is the breeding time of these species

International status

Among the most ancient arthropods derived from amphibious ancestors that lived in the Silurian period more than 400 millions years ago, scorpions have earned the title of “Living fossils.” Scorpions and their ken are ancient, medically important, and ecologically, morphologically and taxonomically diverse and distributed in most terrestrial habitat and elevations on all continent except Antarctica. Scorpions are most abundant and divers in tropical and subtropical regions. The greatest abundance and diversity of scorpions occur in desert and semi desert habitat, but they may be found in Savannas and Grass lands, in deciduous, coniferous and tropical rain forest, on high mountain slopes(About 5500 m. elevation) in the Alps, Himalayas and Andes on some of mountain slopes.

Many scorpion species are also extremely habitat specific and range restricted, exacerbating their risk of extinction due to human activities. Only few scorpion species received formal protection and many may disappear before being described. In the world wild life preserving group gives bulk of attention to preserving large mammals and birds, which are viewed by the public as ‘cute’ or ‘interesting’. ‘Icky’ and ‘scary’ animals such as scorpions or centipede receive only a fraction of attention in conservation. Worldwide very little effort has been made by the government agencies to give legal protection to scorpions. Formal protection of scorpions is not also been vc. Three members of ‘*Pandinus*’ genus of scorpions have been listed under CITES (conventions on international trade in endangered

species) in appendix –II this includes the most popular of the pet shop scorpions, the emperor scorpion ‘*Pandinus* imperator.

After present investigation an attempt will be made to protect these species of scorpions by Indian Wild Life Protection Act, 1986.

National status

Scorpions (Order- Scorpionida) are the most venomous arachnids inflicting an extremely painful sting, although all are not fatal to human beings (Bawaskar HS, 2012). Due to unscientific management of natural resources much of our native flora and fauna are fast disappearing and there is urgent need to restore our lost habitats to conserve biodiversity.

All the scorpions are strictly nocturnal in habit they are considered to be shy and sting when encountered in their hide outs such as burrows, beneath the boulders, bricks, barks and crevices of logs and trees. Although all three categories of scorpions, viz burrowing, (pilophilous), rock dwelling and arboreal are found in India. There is general paucity of information in the country, about the ecology of scorpions. Present attempt will be base for scientific information of Indian scorpions at national level.

Discussion

The large area of Africa, South America and Asia have been deforested through human activities depleting suitable habitat causing huge loses in wild life scorpions comprising a major group of arthropod in arid e cosystem as they are valuable bio-indicator. Small litter sizes, long generation time and low survivorship among especially immature female

contribute to low rate of population increase for most scorpions. Only few scorpion species received formal protection and many may disappear before being described. In the world wild life preserving group gives bulk of attention to preserving large mammals and birds, which are viewed by the public as 'cute' or 'interesting'. 'Icky' and 'scary' animals such as scorpions or centipede receive only a fraction of attention in conservation. Worldwide very little effort has been made by the government agencies to give legal protection to scorpions. India witness same situations. Three members of '*Pandinus*' genus of scorpions have been listed under CITES (conventions on international trade in endangered species) in appendix –II this includes the most popular of the pet shop scorpions, the emperor scorpion '*Pandinus imperator*'. The ex-situ conservation of scorpions leads to protection of scorpions through breeding in captive conditions. As per our previous experience of captive breeding it is observed that, 100% surveillance of all the offspring's is only possible in captive environment. As there is no efforts was taken to conserve scorpion species through captive breeding and artificial habitat. This project proposal will go ahead with both aspects research and investigation and commercial use of scorpion species.

References -

1. Bastawade DB, Jadhav SS, Sharma RM. Scorpionida. Zool Surv India. 2012;4(6):1–16.
2. Badhe RV, Thomas AB, Deshpande AD, Salvi N, Waghmare A. The action of red scorpion (*Mesobuthus tamulus coconsis*, Pocock) venom and its isolated protein fractions on blood sodium levels. J Venom Anim Toxins incl Trop Dis. 2007;13(1):82–93.[View Article](#)
3. Kankonkar RC, Kulkurni DG, Hulikavi CB. Preparation of a potent anti-scorpion-venom serum against the venom of red scorpion (*Buthus tamulus*). J Postgrad Med. 1998;44(4):85–92.[PubMed](#)
4. Bawaskar HS, Bawaskar PH. Scorpion sting: Update. J Assoc Physicians India. 2012;60:46–55.[PubMed](#)
5. Sureshan PM, Bastawade DB, Radhakrishnan C. Taxonomic studies on a collection of scorpions (Scorpiones: Arachnida) from Western Ghats in Kerala, India with two new distribution records. Zoos Print J. 2007;22(12):2903–8.[View Article](#)
6. Veronika K, Akilan K, Muruganathan A, Eswaramohan T. Diversity and identification key to the species of scorpions (Scorpiones: Arachnida) from Jaffna Peninsula, Sri Lanka. J Entomol Zool Stud. 2013;1(5):70–7.

	
<p>Fully grown scorpions – (25 days) Captive breeding of scorpion</p>	<p>Mother with 02 day offspring's</p>
	
<p>P. Swammerdamii</p>	<p>Degraded habitat</p>