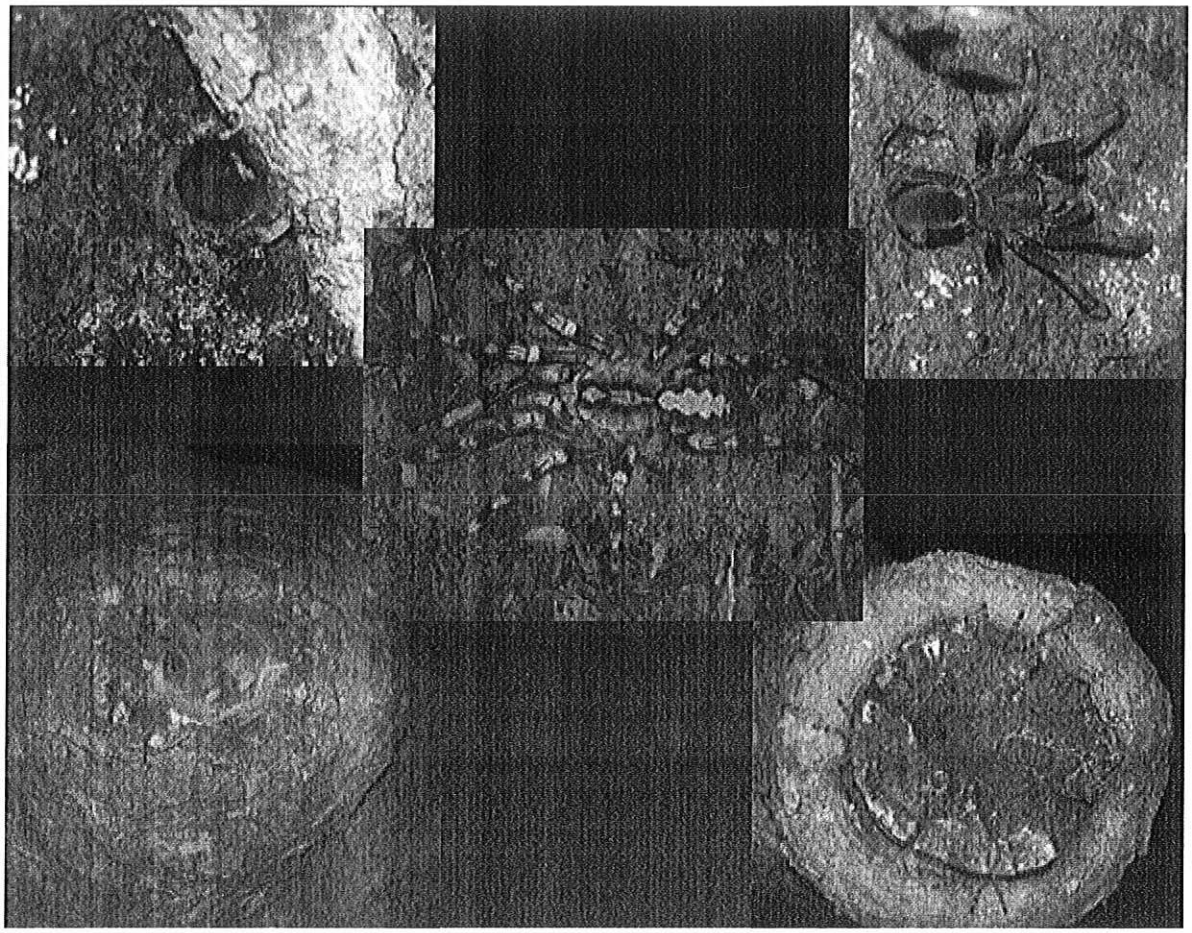
Status and conservation of tarantulas in selected hot specks of southern India



Final Report
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Status and conservation of tarantulas in selected hot specks of southern India

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Photographs on Cover Page:
Upper left: Nest of *Thrigmopoeus truculentus*
Upper Right: Female of *T. truculentus*
Lower left: Nest of a adult female *Poecilotheria hanumavilasumica*
Lower right: Spiderlings of *P. hanumavilasumica* in the nest
Middle: Adult female of *P. hanumavilasumica*

Contents

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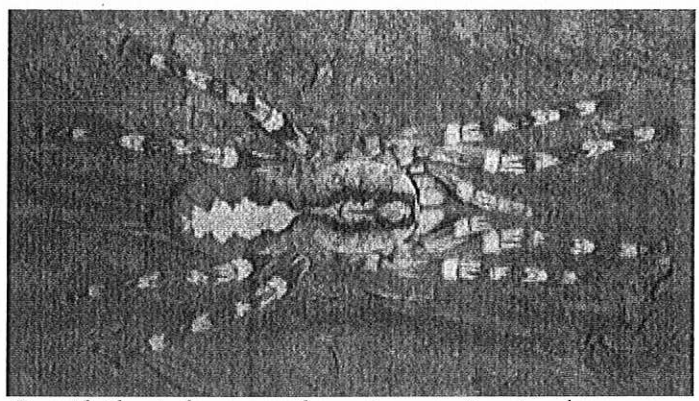
SUMMARY

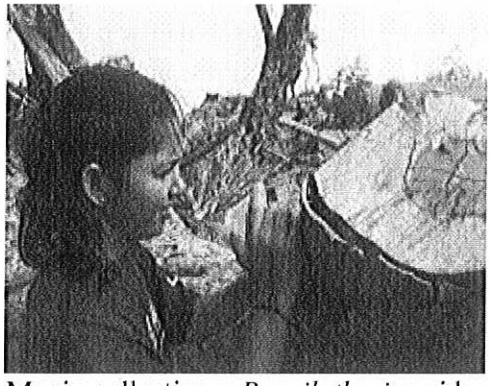
The *Poecilotheria* spiders are in pet trade and for the conservation of the species it is necessary to get them listed under national and international legislation. For listing under any legislation, supporting data/ document is critical to understand the level of threats and impact of various threats (including harvest) on the wild population. Therefore, present project was undertaken to understand the population and conservation status of different *Poecilotheria* spp. in the selected five hot specks (Anamalai hills, Bhramagiri hills, Nallamalai hills, Nilgiris and Rameshwaram Is.). Due to insurgency and logistic problems, two of the study sites were changed based on the distribution of *Poecilotheria* spp. Five species of the arboreal genus *Poecilotheria* (*P. hanumavilasumica* Smith, 2004, *P. miranda* Pocock, 1900, *P. regalis* Pocock, 1899, *P. striata* Pocock, 1895, *P. tigrinawesseli* Smith 2006) and one species of ground burrowing theraphosid, *Thrigmopoeus truculentus* Pocock, 1899 were studied in wild in five hot specks (Nilgiris, Rameshwaram Is., Bhramagiri, southern and northern Orissa). Amongst these six species, *P. hanumavilasumica*, *P. tigrinawesseli* and *T. truculentus* were also studied in captivity. *P. hanumavilsumica* was the only species which occurred in private plantations and therefore, it was very easy to locate and monitor them even in the night and more accurate results were obtained for this species in comparison to the rest of the *Poecilotheria* spp. which occurred in forests. We collected information on distribution, population estimation, breeding biology, ecology, and behaviour for this species. The information collected during the present study was used to estimate the probability of extinction of *P. hanumavilasumica* with no harvest scenario. Population Viability Analysis (PVA) was carried out using computerized simulation model VORTEX. The PVA result shows that the *P. hanumavilasumica* will get extinct in couple of decades if the present scenerio continues. However, more repeated surveys on Rameshwaram Island for few more years are required to confirm the findings/results.



Poecilotheria hanumavilasumica on a tree trunk

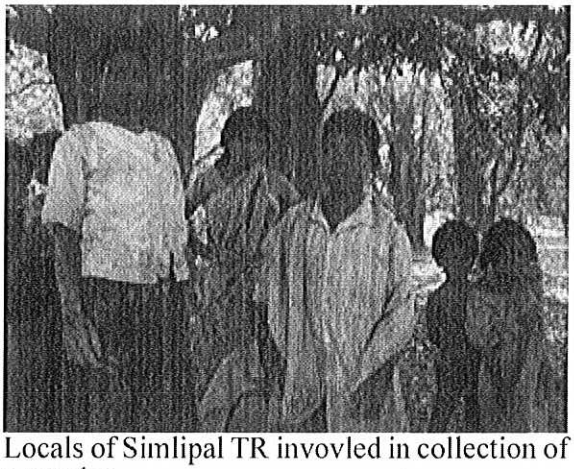
The most obvious threat observed in all the hot specks surveyed was habitat loss and fragmentation. This threat was severe in Rameshwaram Island as these spiders occur in private plantation. Amongst the existing sites/locations, two old tamarind plantations on Rameshwaram Island, holding good populations were cleared for construction purposes and we were able to rescue the last remaining 16 individuals of *Poecilotheria* spiders from these plantations. Interestingly, it was found that *P. hanumavilasumica* is tolerant to the change in habitat quality and adapting to the secondary habitats like casuarina plantation.

Whereas in Coorg, *Poecilotheria* sp. and *Thrigmopoeus truculentus* were found not very successful in adapting to the change in habitat. As a result of high usage of insecticides, *P. regalis* got locally extinct in the Coorg. Apart from habitat loss and fragmentation, additional threat observed in different habitats in northern and southern Orissa was collection of *Poecilotheria* spp. for pet trade. In these areas, there is a strong need to educate locals and clear their misconception of huge money involved in the pet trade of large-bodied spiders. However, more surveys are required to get holistic picture of the effect of various threats on theraphosid spiders in different hot specks.



Manju collecting a *Poecilotheria* spider from a cut down tamarind tree

There are no existing policies or research priorities for the conservation of *Poecilotheria* species in India. The present study has helped us in understanding the status of selected species of *Poecilotheria* and with this information, policy makers and stake holders will be approached to set conservation policies and research priorities for long term conservation. A draft conservation plan for *P. hanumavilasumica* was prepared during the present study and it will be discussed with the stake holders for finalising the plan. The threat evaluation and assessment for all the 14 species of theraphosids have been accepted and will be listed in 2008 Red List. Inclusion of these spiders in the 2008 IUCN Red List of Threatened Species will have an impact in the local/national and international policy.



Locals of Simlipal TR invovled in collection of tarantulas

Local people are required to be sensitized for conservation of species. The level of sensitization determines the success of conservation program for the species. We were successful in creating awareness about the spiders and importance of conserving *Poecilotheria* spiders in Rameshwaram Island. To certain extent, the existing fear in them regarding the venom of the spiders was removed by interacting with locals and involving them in surveys. For example, owners of the two plantations in Rameshwaram were very supportive of our study and as result of our awareness efforts on few locals of Aryagundur and Simbai village, Rameshwaram Island stopped killing these spiders in their houses, instead release them in the nearby plantation or trees. To educate locals, stickers and posters of *Poecilotheria* spiders were designed and used. A poster on Indian *Poecilotheria* spp. has been designed for educating locals about the diversity and charisma of this group of spiders. This poster can be also used as an identification tool for different species of *Poecilotheria*. It will be distributed amongst the policy makers, stake holders and researchers after funds are raised to print them.

In India, very less attention is paid to invertebrate conservation. The studies on *Poecilotheria spp.* done in this project is the first of its kind in field of conservation of invertebrates in wild in India. The outcome of the study will encourage other researchers to carry out such exercise for other threatened invertebrate species.

ACHIEVEMENTS DURING THIS PHASE FOR SPECIES CONSERVATION

1. Population estimation of the *Poecilotheria hanumavilasumica* covering entire Rameshwaram Island and *P. miranda*, *P. regalis*, *P. striata* and *P. tigrinawesseli* in small pockets of different hot specks were carried out.
2. New distribution records were reported for *P. miranda*, *P. regalis*, *P. striata* and *P. tigrinawesseli.*
3. Rescued 16 individuals of *P. hanumavilasumica,* one individual of *P. tigrinawesseli* and 99 individuals from same brood of *Thrigmopoeus truculentus* from highly threatened sites on Rameshwaram and Coorg respectively.
4. Carried out Population Viability Analyses for *P. hanumavilasumica.*
5. Assessment of 14 species of Theraphosid spiders including the nine Indian *Poecilotheria* was done and submitted to IUCN Red List. Assessments are accepted for 2008 Red List.
6. Prepared draft conservation action plan for *P. hanumavilasumica.*
7. Created awareness amongst foresters and researchers in many areas, and amongst locals and tribals.
8. A poster for Indian *Poecilotheria* spp. was designed, which is the first of its kind and can be used as identification for this group of spiders. Copies of this poster will be sent to Ministry, Forest Departments, wildlife researchers and academicians to create awareness, after funds are raised to print them.
9. Custom officers in a few areas and the wildlife regional offices in India have been sensitized to the aspect of illegal trade in this group of spiders.
10. Four scientific papers were published in 2006-2007, eight papers are submitted to various peer-reviewed journals and more than five papers are under preparation for publication in peer-reviewed journals.

RECOMMENDATIONS

1. Population estimation exercises should be continued in different hot specks to optimize and confirm the results of the present study.
2. Generating information on number of hatchlings, mortality rates and sex ratio, which will strengthen PVA results.

3. Draft conservation plan prepared for *P. hanumavilasumica* should be discussed with stake holders and finalized.

4. To correlate the results from wild, a complete brood of spiderlings of same stages should be studied in captivity to understand sex ratio and mortality rates at each stage.

5. Active nests should be monitored every year to understand population trends.

6. More sites needs to be studied to understand population structure of *Poecilotheria* spp. and ground theraphosids.

7. Management plan for threatened populations should be prepared based on interactions with land owners and from computer models.

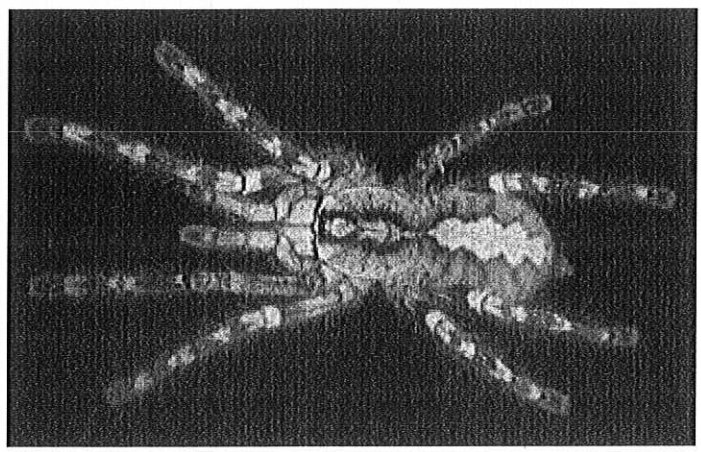
8. Understand rate of decline of *Poecilotheria* spp. and other ground theraphosids in different hot specks.

9. Explore the need and possibility of a reintroduction programme based on the guidelines of the RSG.

Status and conservation of tarantulas in selected hot specks of southern India

BACKGROUND INFORMATION

The genus *Poecilotheria* (Mygalomorphae: Theraphosidae) is the only genus of an arboreal genus in South Asia, and is represented by nine species endemic to India and seven species endemic to Sri Lanka (Platnick, 2007; Siliwal & Molur, 2007). *Poecilotheria* are popular in pet trade since 1999 due to their size, colouration, marking, aggressive behavior and listing of *Brachypelma* species of tarantulas from Central and South America in Appendix II of CITES. The pet trade in western countries is now focused on the South Asian tarantulas as they are not listed under any national wildlife legislation. Distribution of *Poecilotheria* spiders in India is restricted to peninsular India (Smith and Kirk, 2001, Smith 2006). Amongst all the nine Indian *Poecilotheria* spp., one species (*P. regalis*) is having a very wide distribution (Molur *et al.*, 2004), six species with restricted distribution and two species with very highly restricted distribution. *Poecilotheria* spp. exhibits the typical mygalomorph patchy distribution within large conducive habitats. They are, usually, susceptible to habitat loss and degradation, and exhibit classical effects of small populations in severely fragmented locations.



A female of *Poecilotheria hanumavilasumica*

The present project was undertaken to understand the population status of different *Poecilotheria* spp. in the selected five hot specks. The objectives for the projects were;

1. Estimate population densities of tarantula species in different habitats within the five selected invertebrate hot specks (Anamalais, Nilgiris and Brahmagiris in the Western Ghats; Nallamala Hills in the Eastern Ghats; and Rameswaram Island in southeastern India);
2. Determine habitat suitability and effects of changes in habitat structure on tarantula populations in the hot specks;
3. Develop population viability models to determine probability of extinction due to habitat loss, harvest and persecution;
4. Develop a comprehensive action plan for the conservation of *Poecilotheria* and other tarantula species;
5. Identify the necessity and suitability for a reintroduction programme;
6. Supply documentation on habitat, population status and trade information for CITES and the Indian Wildlife (Protection) Act;

7. Develop education materials for the general public, viz., locals, foresters, politicians, government officials and students;
8. Conduct awareness programmes about the spiders and their positive role, and educate locals of the misconceptions about the poisonous nature of the spiders;
9. Provide a model for similar studies on other highly exploited invertebrates in the country.

Most of the objectives were achieved fully except for objective numbers 1, 5 and 6, which were partially achieved due to the stochasticity of the situation and the species biology. The hot specks visited during the present surveys were Nilgiris, Coorg in Western Ghats, Rameshwaram Island in southeastern India, northern and southern Orissa in the Eastern Ghats. Due to insurgency problems in Andhra Pradesh we could not visit Nallamala hills and had to shift the study site to Eastern Ghats of Orissa. Successfully, studies on *P. hanumavilasumica* on Rameshwaram Island was done. In some areas of Nilgiris, Southern and Northern Orissa, we were not able to repeat population estimation exercise due to logistic problems and time constrain. These areas needs to be revisited to confirm the low encounter rates got during the present study. The assessments for 14 theraphosid spiders including nine species of *Poecilotheria* was done and going to be listed in IUCN Red List 2008. Once *Poecilotheria* is listed by IUCN Redlist, with the information collected till date, we will approach Wildlife (Protection) Act (WPA) agencies in the Indian Ministry to include at least threatened species of *Poecilotheria* in the next amendment of WPA. This will strengthen our recommendations for including these species under national and international wildlife legislations.


Nilgiris

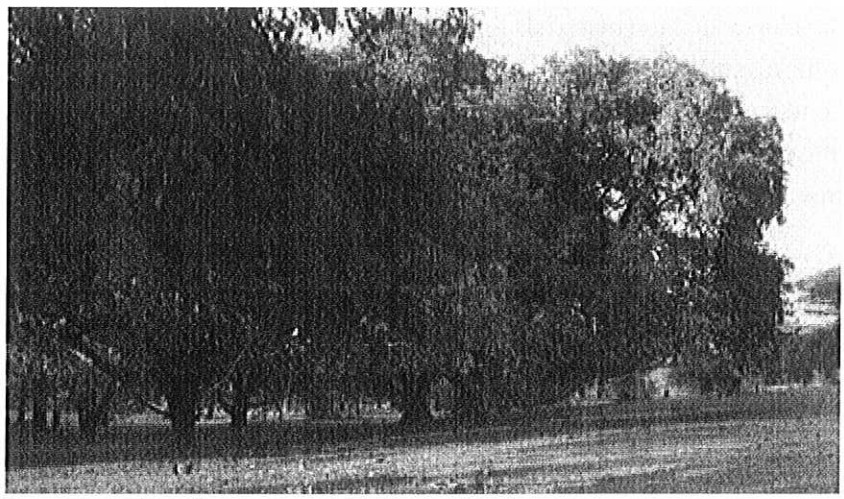
STUDY AREA

Five hot specks were proposed but few sites were changed/shifted due to insurgency and logistic problems. For example, Nallamala hills had insurgency problems and Anamalais had logistic problems and therefore it was decided to shift the hot specks. The new hot specks, northern and southern Orissa were chosen based on the informal information available on distribution of *Poecilotheria* species. Based on the species distribution we selected the new hot specks. The hot specks visited during the present surveys were Nilgiris, Coorg in Western Ghats, Rameshwaram Island in southeastern India, northern and southern Orissa in the Eastern Ghats (Figure 1).

Rameshwaram Island (Figure 1):

The Rameshwaram Island (approx. 61.8 sq km) is situated 634 km from Chennai and 167 km from Madurai on the southeastern coast of Tamil Nadu, southern India. Located along Gulf of Mannar, the Rameshwaram Is. (N 9^0 28' 33" and E 79^0 30' 00"), with an altitude of 22ft (9m) above msl,

biogeographically lies in an important location as it was once connected to Sri Lanka via the Adam's bridge. This area receives rainfall usually during northeastern monsoon in October-November and the annual rainfall recorded for 2006-2007 is 1159.6mm. The climate is hot and humid almost throughout the year, with a mean maximum temperature 31°C and min 25°C and the habitat is largely semi arid type. In the early 20th century this island had *Acacia arabica* proliferating in scrublands with large groves of coconut *Cocos nucifera* and Palmyra palm *Borassus flabellifer*, with some rain fed cultivated lands (Smith, 2004). Due to anthropogenic activities in recent years *A. arabica* have reduced and the island is now dominated by economically important trees like Tamarind *Tamarindus indicus*, palm, coconut *Cocos nucifera*.


Tamarind plantation on Rameshwaram Island

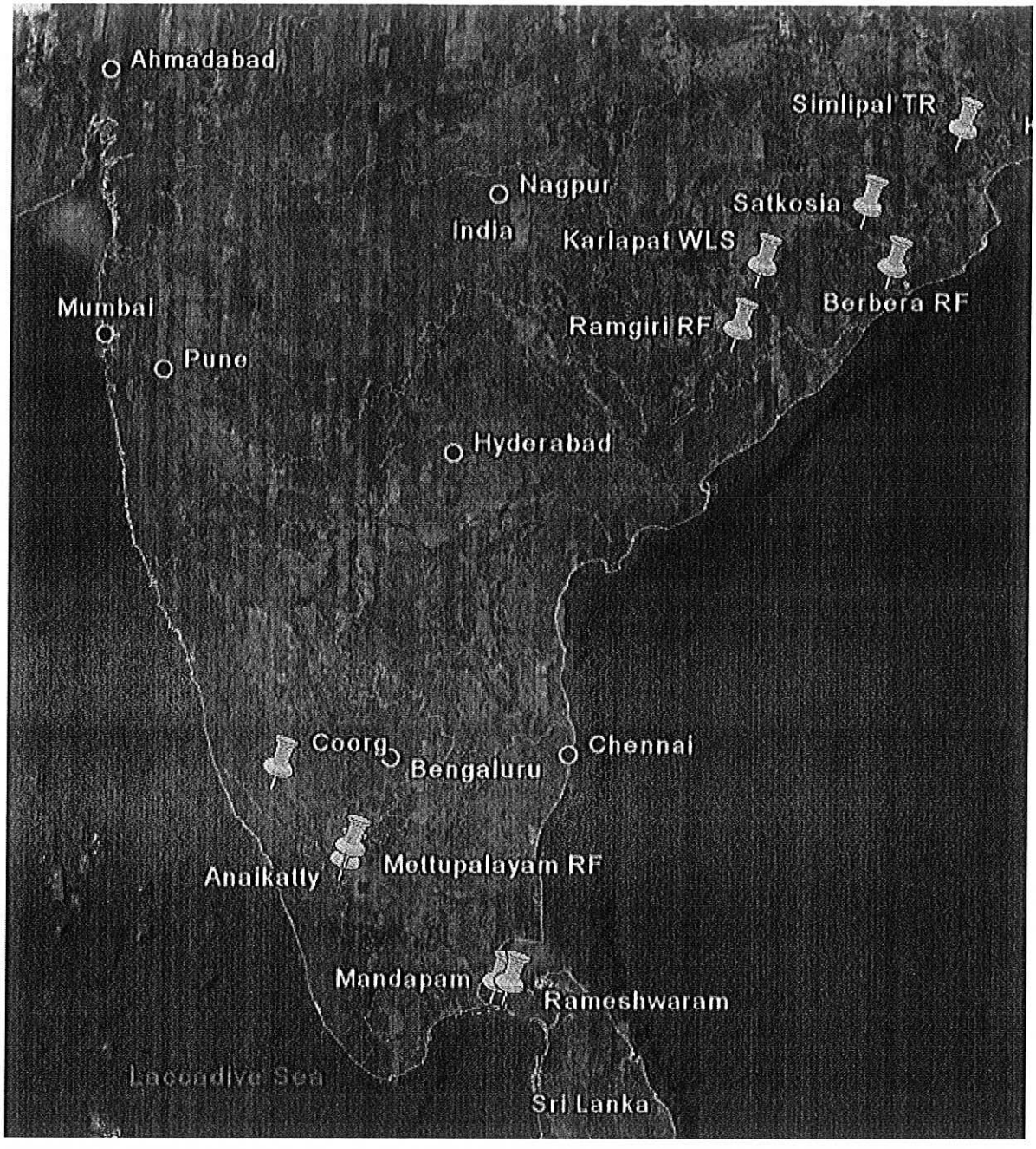
This island is famous for a historic Shiva temple, which is one of the important pilgrimage sites for Hindus. Nearly 16 plantations with the above mentioned trees of two to 10 hectares belonging to the temple committee are present on the island (Raj, *per. comm.*). And, it is here in these plantations *P. hanumavilasumica* is known to occur.

Nilgiris (Figure 1):

The Nilgiris Biosphere reserve (N 10° 45' 12.15, E 76° 77' 15") consists of 5520 sq. km. area, majority of which is in Tamil Nadu (2537 sq. km) and the rest of it is shared by Karnataka (1527 sq. km) and Kerala (1455.4 sq. km). The protected areas in Nilgiris are Mudumalai Wildlife Sanctuary (WLS) and National Park (NP), and Mukurthi NP. There is great diversity in the habitat in Nilgiris, from dry scrub land to evergreen forests. The Nilgiris Biosphere Reserve (NBR) especially in the Sholas are very rich in plant and orchid diversity. About 3300 species, 1232 are endemic to the Nilgiris Biosphere Reserve. The important endemic plants are *Baeolepis* spp., Adenoon, Calacanthus, Baeolepis, Frerea, Jarodina, Wagotea, *Poeciloneuron*, etc. The fauna of the NBR includes over 100 species of mammals, 350 species of birds, 80 species of reptiles; about 39 species of fish, 31 amphibians, 60 species of reptiles, 300 species of butterflies and innumerable invertebrates are endemic to the Western Ghats (http://www.forests.tn.nic.in/WildBiodiversity/br_nilgiri.html, downloaded on 12 December 2007).

Nilgiris in Tamil Nadu is spread over Nilgiris North, Nilgiris South, Sathyamangalam, Erode and Coimbatore Districts. In Coimbatore the altitude ranges from 250m to 1000m. Majority of the area in Coimbatore

Figure 1. Different hot specks identified and surveyed during the study period.



district of Nilgiris consist of dry scrub lands and dry deciduous forests with some patches of evergreen sholas. During the present study, we chose Anaikatty reserve forests (P.N. Palayam Forest Range, Coimbatore North Forest Division), including the campus of Salim Ali Centre for Ornithology and Natural History (SACON) and Mettupalayam reserve forest.

Anaikatty Reserve Forest

The area covered by us during the study includes areas from Karl Kubal Institute to SACON campus and Coimbatore Biological Park. Altitude in these areas varies from 500m to 650m and habitat consists of scrub thorn forest and deciduous forest. Anaikatty fall under rain shadow area and thus gets rain mostly during northeast monsoon in October-November and annual rainfall in this area is less than 700mm. The dominant vegetation consists of *Caparis grandis*, *Randia malabaricum*, *Limonia alata* and *Maba buxifolia*. The mammals reported from Anaikatty are elephant, gaur, sambar, chital, leopard, sloth bear, jungle cat, civets and mongoose (Kumar and Umapathy, 1999).

Mettupalayam Reserve forest

In Mettupalayam Reserve forest, we visited Sundapatti Bit at Nelliturai during the study. Sundapatti bit consists of riparian habitat, a tributary of the River Bhavani flows in this area. Forest about 100m on either side of the river bank is evergreen forest and beyond 100m is mix and dry deciduous forests and bamboo plantations. It is one of the less disturbed and well maintained reserve forests in Nilgiris. There are many sandal wood trees in this area. The common tree species found in this area were *Tectona grandis*, *Terminalia arjuna*, *Terminalia* spp., *Pterocarpus marsupium*, *Gmelina arborea*, *Santalum album*, *Syzygium cumini*, *Phyllanthus emblica*, *Azadirachta indica*, *Tamarindus indica* and *Mangifera indica*. Mammals known to occur in this area are elephant, gaur, panther, sloth bear, wild boar, wild dog, etc. (this information is based on the personal communication with the forest guards).

Mettupalayam Reserve forest, Nilgiris

Orissa (Figure 1):

The River Mahanadi divides the Orissa state into northern and southern zones. This division of the state is important for the geographical distribution of animals. Two species of *Poecilotheria* spp. are likely to occur in Orissa.

Northern Orissa: In northern Orissa we selected two habitats for study, namely, Simlipal Tiger Reserve and Satkosia Gorge WLS.

The Similipal Tiger Reserve/National Park/Wildlife Sanctuary

The Similipal National Park and Sanctuary (N 21° 30' 22.10", E 85° 40' 87.10") covers 2750 sq km. area in the Mayurbhanj district, Orissa. The complete national park and Sanctuary is divided in criss cross manner by river, rivulets and small water streams. Major rivers are Burhabalanga, Pal pala Bandan, Kahairi and Deo. Average rainfall annually received is about 1500-2000mm. Temperature range 10°-40°C. During monsoon, majority of the park area are not accessible due to floods in all water bodies. Forest consists of semi evergreen, moist deciduous, dry deciduous, dry deciduous hill forests and grasslands. The dominant tree species in Similipal is *Shorea robusta*. Other common trees are *Terminalia arjuna*, *Terminalia bellirica*, *Pterocarpus marsupium*, *Callinula chloropus*, *Dalbergia sissoo*, etc. This sanctuary is popular for Tiger and tuskers, other important mammals are leopard, gaur, chital, sambar, Indian spotted chevrotain, muntjac, four-horned deer, wild boar, Indian wild dog, sloth bear, striped hyena, porcupine, rhesus monkey and common langur (Mohanty, 2004).

Similipal Tiger Reserve

During the present study, surveys were conducted in Baniyabasa, Upper Barakamra, Jenabil, and Chahala ranges of the Similipal TR.

Satkosia Gorge Wildlife Sanctuary

The Satkosia Gorge Wildlife Sanctuary (N 20° 31'37" to N 20° 45' 37" and E 84° 43' 03" to E 85° 05' 17") spreads over four districts, *viz.*, Angul, Cuttack, Nayagarh and Boudh. Total area of the sanctuary is 795.52 sq.km areas and is divided into two parts by the River Mahanadi. The northern part of Satkosia WLS covers an area of 520.01 sq. km (which also includes the River Mahanadi), whereas southern part of the Sanctuary is 265.51 sq. km. In the present survey, we covered northern part of the sanctuary, which falls in Angul district. Tikarpara area consists of a dry deciduous forest with a patch of moist deciduous along the River Mahanadi. Major vegetation observed were *Shorea robusta*, *Dendrocalamus strictus* and *Bambusa arundinacea*, *Diospyros melanoxylon*, *Schleichera oleosa*, *Bridelia retusa*, *Terminalia arjuna*. This sanctuary is well known for endangered gharial, fresh water crocodiles, turtles and terrapin and terrestrial endangered animals like tiger, leopard, sambar and spotted deer (Wani and Kothari, 2007).

Southern Orissa: South of Mahanadi is known to have distribution range of *P. tigrinawesseli* (Smith, 2006).

Karlapat forest

Karlapat Wildlife Sanctuary

The Karlapat WLS (N19° 30' to 19° 50', E 82° 45' to 83° 15') is 147.66 sq. km area and is situated about 35 km from Bhawanipatna, District Kalahandi, Orissa. The River Sagada and its tributaries are the major source of water for this sanctuary. The habitat of this sanctuary consists of dry deciduous forest and bamboo forests. The dominant vegetation here is of *Shorea robusta* and its associates like *Pterocarpus marsupium*, *Terminalia chebula*, *Terminalia belerica*, *Lagerstromia parviflora* and bamboo. Mammals reported from this sanctuary are tiger, leopard, elephant, wild boar, sloth bear, gaur, sambar, pangolin, barking deer, giant squirrel, mouse deer, wolf, common palm civet, wild dog and jungle cat (information was collected from forest guards).

Ramgiri hills (Koraput forest division)

The surveys were conducted in Ramgiri hills, Near Gupteshwar temple, Koraput forest divison. Total area of the reserve forest is 127.77 sq. km and is covered with dry deciduous forest. The average annual rainfall is 1,778 mm. The common trees found in this area were *Terminalia arjuna*, *Terminalia belerica*, *Terminalia chebula*, *Pterocarpus marsupium*, *Chloroxylon swietiana*, *Santalum album*, *Buchanaia lanzan*, *Anogeissus latifolia*, *Dalbergia paniculata*, *Sterculia urens*, *Pongamia glabra*, *Diospyros melanoxylon*, *Tectona grandis*, *Shorea robusta*, *Boswellia serrata*, *Bombax ceiba*, *Lagerstromia parviflora*, *Grevillea robusta*, *Albizzia lebbeck*, *Cassia fistula* and *Tamarindus indica*. The mammals known to occur in this area are leopard, gaur, blackbuck, sambar, chital, barking deer and Indian Wild Boar (information was collected from forest guards).

Berbera-Dhuanali reserve forest

The Berbera-Dhuanali reserve forest falls under Puri Forest Division, Khurda, Orissa. It covers an area of 350 sq. km. of a mixed deciduous forest with few patches of semi-evergreen forests. This forest is known for very old teak trees. Smuggling of timber is one of the problems and forest department have deployed Central Reserved Police Force (C.R.P.F.) for keeping a check on smuggling of timber. The major tree species in this forest are *Shorea robusta*, *Terminalia* sp., *Pterocarpus marsupium*, *Anogeissus latifolia*, *Adina cardifolia*, *Michelia champaca*, *Scheleichera oleosa*, *Mangifera indica*, *Bombax ceiba*, *Syzygium cumuni*, *Boswellia serrata*, *Dalbergia latifolia*, *Strychnos nuxivomica*, *S. potatorum*, *Xylia xylocarpa* and *Bridelia retusa*. The fauna in this forest consist of 35 species of mammals, about 150

species of birds and 30 species of reptiles. There have been recent sightings of tiger in this forest. Other important mammals in this area are leopard, elephant, sambar, barking deer, bison, wild boar, giant squirrel, jungle cat and common langur (Chadha, 2004).

Coorg, Bhramagiri hills (Figure 1):

Coorg is in the Western Ghats heart lean in Karnataka with the entire district at elevations higher than 600m. The district is home to some of the best Western Ghats flora in long stretches, which include Nagarahole National Park in the south, Brahmagiri Wildlife Sanctuary in the west and Pushpagiri Wildlife Sanctuary in the northwest. Much of the montane forest inland, however is converted to coffee, cardamom, arecanut and ginger plantations resulting in heavy degradation to natural forests and fragmentation. Coorg has more than a 1000 sacred groves, most of which have either disappeared or are in a state of disintegration. Those that are relatively safe are under pressure, but most are small pieces of fragmented secondary forests. Only a few fragments still retain some primary flora. Most large mammals have been hunted from the middle portion of Coorg and the impacts of habitat loss and degradation in quality is quite apparent.

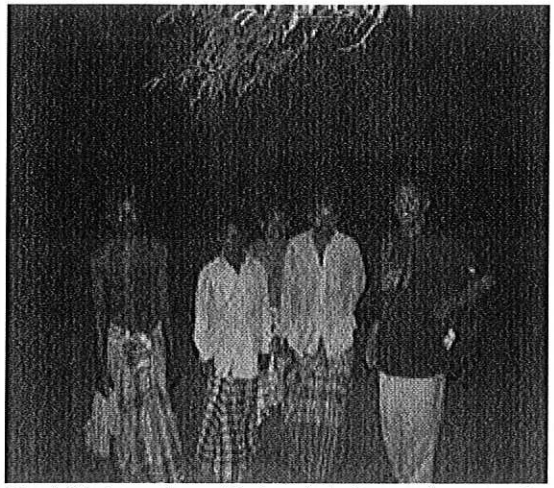
Habitat of *T. truculentus* in Madikeri, Coorg

METHODS

A. Survey

Perception

To understand the perception about *Poecilotheria* spiders by the local community in different hot specks, a questionnaire survey was carried out. During every survey in different hot specks, people staying near the plantation or inside/near the forest area were shown pictures of different mygalomorph spiders including a picture of *Poecilotheria* and its nest. When species was recognized then few more pictures of *Poecilotheria*



Daniel interacting with locals in Rameshwaram Is.

and non mygalomorph like wood spider (*Nephila* sp.) and giant crab spider (*Heteropoda* sp.) were shown to confirm their response. The responses in which the local people identified *Nephila* sp. or *Heteropoda* sp. then the questionnaire responses were discontinued and further questions were not asked. The people who recognized *Poecilotheria* spiders were further asked a set of 13 close and open questions as given in Table 4. The questionnaire survey format was adopted from Brugière et *al.* (2006) and modified according to our study requirements.

Distribution

To collect information on distribution of *Poecilotheria spp.* in different hot specks, we surveyed all potential habitats that included protected area (National Parks, Sanctuaries, reserve forests), plantations, secondary scrub and in around habitations. At every visit and every site, habitat information like tree species, tree height, tree girth, texture of tree trunk, canopy cover, height of the burrow, direction of burrow entrance, width and height of burrow entrance and depth of burrow were recorded. To confirm the identity of *Poecilotheria* species, spiders were caught occasionally in transparent containers to study ventral side patterns on their legs. All spiders caught were released back to the site of collection after taking photographs. Exuvia found during the study, were collected to confirm species identity.

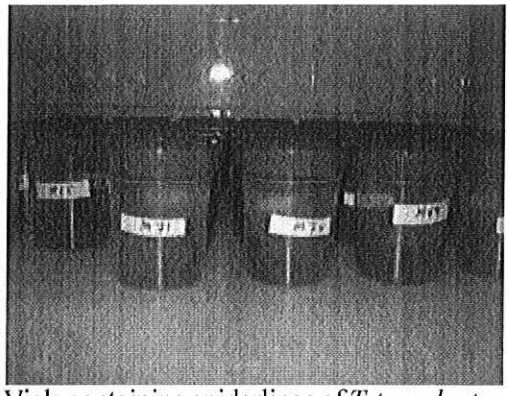
Saroj searching tarantulas in thick forest of Berbera-Dhuanali reserve forest in Orissa

Population estimation

Population of spiders was estimated through two methods 1) total count method and 2) random 100m transects. The total count method was followed only in the sites which were smaller than 10 hectare in Rameshwaram Island, and was done periodically across different times of the year during the study. Each plantation was visited during day time and night time for confirmation of the species and sight records. During every total count exercise, on average, three people searched for spiders from 19:00 to 23:30 hrs, systematically scanning every tree up to a height of 10 to 12 feet. In the rest of the sites in different hot specks, random 100m transects were laid on the either sides of the forest/plantation trails. The trees falling in transect were systematically scanned up to 10-12 feet height. Encounter rates were recorded. In both the methods, on every sighting, information on the number and age class like spiderling, subadult and adult were recorded.

Aravind searching Poecilotheria in a dead wooden log during population estimation exercise

B. Captive Breeding


Vials containing spiderlings of *T. truculentus*

The *Poecilotheria* spiders of varying stages were collected from highly degraded sites from Rameshwaram and Orissa and were maintained in captivity. The adult and large size juvenile spiders were kept in 250mm X 125mm X 150mm size rectangle plastic box; smaller juvenile spiders were maintained in plastic jar of 110mm X 135mm and spiderlings were kept in small vials of 55mm X 70mm size, 100ml capacity. To avoid cannibalism, spiderlings collected from the same brood were maintained separately in small vials. The base of jars and vials was spread with 1-2 cm thick layer of soil with few dry grasses. Vivariums were provided with a piece of bamboo or hollow wood or a small plastic container for hiding. Individual records for each spider is maintained which includes, date of feeding, feed, date of sprinkling water, moulting date, mortality, sex ratio, maturity and other activities. The spiders were fed with grasshoppers, crickets, wing termites, and geckos once a week. Water in the vivarium was sprinkled every week, usually a day before they were fed. These spiders were fed quite often on days of exodus of wing termites during monsoon.

C. Population viability analysis (PVA)

The VORTEX (version 9.72), a computerized simulation model (http://www.vortex9.org/vortex.html, downloaded on 11 January 2008) was used for population viability analysis by projecting population persistence over 100 years for isolated island populations of *Poecilotheria hanumavilasumica.*

D. Education and Awareness

Education and awareness outreach through interaction with local people was done during every visit. Education tools like spider posters and stickers were used to create awareness. Local people were involved in population estimation exercises in different hot specks.

FINDINGS OF THE STUDY

More than 3000 man-hours were spent visiting different hot specks to collect information on distribution, population and habitat association of *Poecilotheria spp.* (Table 1). The number of man hours spent in each hot specks were about 900 man hours in Rameshwaram Island; 200 man hours in Nilgiris; 1600 man hours in Orissa and 300 man hours in Coorg (Table 1). Apart from *Poecilotheria*, other spider species were also sighted and the list of spiders observed in Simlipal TR and Rameshwaram Island are given in Tables 2 and 3 respectively.

PERCEPTION SURVEYS (Table 4)

More than 400 people were interviewed in all the hot specks during the study. Local people called *Poecilotheria* spiders by different names in vernacular languages in different areas, for example in

Table 1. List of field surveys and their details

Date	Place	People	# hrs. spent	Man hrs.	Days
29 May - 6 Jun. 2006	Rameshwaram Island, mainland in Ramnathpuram district	Manju, Daniel, Ravi	98	294	7
26 Jun. 2006	Siruvani & Velingiri, Nilgiris	Manju, Ravi, Arul	6	18	1
3-8 Jul. 2006	Coorg	Sanjay, Payal	30	60	5
20-26 Aug. 2006	Coorg	Sanjay, Payal	36	72	6
22-27 Aug. 2006	Rameshwaram Island in Ramnathpuram district	Manju, Aravind, Ravi	70	210	5
10-16 Oct. 2006	Coorg	Sanjay, Payal	36	72	6
27 Nov. - 2 Dec. 2006	Rameshwaram Island, mainland in Ramnathpuram district	Manju, Aravind, Ravi	60	180	5
18-19 Dec.2006	Annakatti, Nilgiris	Manju, Ravi, Aravind	24	72	2
20-21 Dec. 2006	Annakatti, Nilgiris	Manju, Ravichandran	16	32	2
22-23 Dec. 2006	Mettypalayam Reserve forest, Nilgiris	Manju, Ravichandran	16	32	2
28 Dec. - 6 Jan. 2007	Coorg	Sanjay, Payal	54	108	9
31Dec. 2006 - 4 Jan. 2007	Ganjam, Orissa	Manju, Saroj Suresh,	16	64	5
17-18 Jan. 2007	Forest college campus, Mettupalayam, Nilgiris	Manju, Ravichandran	10	20	2
7-11 Feb. 2007	Rameshwaram Island, mainland in Ramnathpuram district	Manju, Aravind	50	100	5
1-2 Mar. 2007	Forest college campus, Mettupalayam, Nilgiris	Manju, Chandrashekhar	4	8	2
4-9 Mar. 2007	Coorg	Sanjay, Payal	24	48	4
23 Mar. - 19 Apr. 2007	Simlipal TR, Satkosia WLS, Kapilas, Kalahandi, Barbara forest, Orissa	Manju, Suresh, Saroj	248	744	19
15 Aug. - 8 Sep. 2007	Simlipal TR, Barbara forest, Jadeshwar, Chilika lake islands, Orissa	Manju, Saroj, Ganpathi, Suresh	210	630	15
3 - 16 Aug. 2007	Kapilas, Raigadha, Koraput, Orissa	Saroj, Ganpathi	96	192	8
22-27 Nov. 2007	Rameshwaram island mainland in Ramnathpuram district	Manju, Ravichandran	46	92	5
		Total	**1150**	**3048**	**115**

Table 2 List of spiders seen in Simlipal Tiger Reserve

No.	Family	Common name	Species name
1.	ARANEIDAE	Orb-web spiders	*Acusila* sp.
2.	ARANEIDAE	Orb-web spiders	*Araneus* sp.
3.	ARANEIDAE	Orb-web spiders	*Argiope aemula* (Walckenaer, 1842)
4.	ARANEIDAE	Orb-web spiders	*Argiope anasuja* Thorell, 1887
5.	ARANEIDAE	Orb-web spiders	*Argiope minuta* Karsch, 1879
6.	ARANEIDAE	Orb-web spiders	*Cyclosa confraga* (Thorell, 1892)
7.	ARANEIDAE	Orb-web spiders	*Cyclosa hexatuberculata* Tikader, 1982
8.	ARANEIDAE	Orb-web spiders	Cyclosa sp. (new species)
9.	ARANEIDAE	Orb-web spiders	*Cyclosa spirifera* Simon, 1889
10.	ARANEIDAE	Orb-web spider	*Cyrtarachne* sp.
11.	ARANEIDAE	Orb-web spiders	*Cyrtophora cicatrosa* (Stoliczka, 1869)
12.	ARANEIDAE	Orb-web spiders	*Eriovixia excelsa* (Simon, 1889)
13.	ARANEIDAE	Orb-web spiders	*Gasteracantha unguifera* Simon, 1889
14.	ARANEIDAE	Orb-web spiders	*Neoscona mukerjei* Tikader, 1980
15.	ARANEIDAE	Orb-web spiders	*Neoscona* sp.
16.	CLUBIONIDAE	Sac or tube spiders	*Clubiona* sp.
17.	CORINNIDAE	Corrinid Sac Spiders	*Oedignatha* sp.
18.	CTENIZIDAE	Trap-door spider	*Conothele* sp.
19.	ERESIDAE	Velvet spiders	*Stegodyphus sarasinorum* Karsch, 1891
20.	IDIOPIDAE	Trap-door spiders	*Idiops* sp.
21.	LYCOSIDAE	Wolf spiders	*Hippasa* sp.
22.	LYCOSIDAE	Wolf spiders	*Pardosa* sp.
23.	NEMESIIDAE		*Damarchus* sp.
24.	OXYOPIDAE	Lynx spiders	*Oxyopes shweta* Tikader, 1970
25.	OXYOPIDAE	Lynx spiders	*Peucetia* sp.
26.	PHOLCIDAE	Cellar Spiders	*Crossopriza lyoni* (Blackwall, 1867)
27.	PHOLCIDAE	Cellar Spiders	*Pholcus sp.*
28.	PISAURIDAE	Nursery web spiders	*Pisaura gitae* Tikader, 1970
29.	SALTICIDAE	Jumping spiders	*Myrmarachne* sp.
30.	SALTICIDAE	Jumping spiders	*Plexippus paykulli* (Audouin, 1826)
31.	SALTICIDAE	Jumping spiders	*Portia* sp.
32.	SALTICIDAE	Jumping spiders	*Telamonia dimidiata* (Simon, 1899)
33.	SPARASSIDAE	Giant crab spiders	*Heteropoda venatoria* (Linnaeus, 1767)
34.	TETRAGNATHIDAE	Long jawed spiders	*Leucauge decorata* (Blackwall, 1864)
35.	TETRAGNATHIDAE	Long jawed spiders	*Tetragnatha* sp.
36.	THERAPHOSIDAE	Parachute spiders	*Poecilotheria miranda* Pocock, 1900
37.	THERIDIIDAE	Comb-footed spiders	*Achaearanea mundula* (L. Koch, 1872)
38.	THERIDIIDAE	Comb-footed spiders	*Achaeranea* sp.
39.	THERIDIIDAE	Comb-footed spiders	*Argyrodes sp.*
40.	THERIDIIDAE	Comb-footed spiders	*Theridion* sp.
41.	THOMISIDAE	Crab spiders	*Thomisus* sp.

Table 3 List of spiders seen in Rameshwaram Island

No.	Family	Common name	Species name
1.	BARYCHILIDAE	Trap-door spiders	*Sason robustum* (O. P.-Cambridge, 1883)
2.	THERAPHOSIDAE	Rameshwaram Parachute Spiders	*Poecilotheria hanumavilasumica* Smith, 2004
3.	THERAPHOSIDAE	Small burrowing spiders	*Plesiophrictus* sp.
4.	ARANEIDAE	Orb-web spiders	*Argiope ameula* (Walckenaer, 1842)
5.	ARANEIDAE	Orb-web spiders	*Argiope anasuja* Thorell, 1887
6.	ARANEIDAE	Orb-web spiders	*Cyclosa confraga* (Thorell, 1892)
7.	ARANEIDAE	Orb-web spiders	*Cyclosa sp.*
8.	ARANEIDAE	Orb-web spiders	*Cyrtophora cicatrosa* (Stoliczka, 1869)
9.	ARANEIDAE	Orb-web spiders	*Eriovixia excelsa* (Simon, 1889)
10.	ARANEIDAE	Orb-web spider	*Gasteracantha geminata* (Fabricius, 1798)
11.	ARANEIDAE	Orb-web spiders	*Gasteracantha mammosa* C.L. Koch, 1844
12.	ARANEIDAE	Orb-web spiders	*Neoscona mukerjei* Tikader, 1980
13.	ARANEIDAE	Orb-web spiders	*Neoscona theisi* (Walckenaer, 1842)
14.	ARANEIDAE	Orb-web spiders	*Neoscona* sp.
15.	ERESIDAE	Velvet spiders	*Stegodyphus sarasinorum* Karsch, 1891
16.	*HERSILIDAE*	Two-tailed spiders	*Hersilia savignyi* Lucas, 1836
17.	OXYOPIDAE	Lynx spiders	*Oxyopes* sp.
18.	OXYOPIDAE	Lynx spiders	*Peucetia* viridana (Stoliczka, 1869)
19.	PHOLCIDAE	Cellar Spiders	*Pholcus sp.*
20.	SALTICIDAE	Jumping spiders	*Plexippus paykulli* (Audouin, 1826)
21.	SALTICIDAE	Jumping spiders	*Telamonia dimidiata* (Simon, 1899)
22.	SCYTODIDAE	Spitting spiders	*Scytodes* sp.
23.	SPARASSIDAE	Giant crab spiders	*Heteropoda venatoria* (Linnaeus, 1767)
24.	TETRAGNATHIDAE	Wood spiders	*Nephilengys malabarensis* (Walckenaer, 1842)
25.	TETRAGNATHIDAE	Long jawed spiders	*Tetragnatha* sp.
26.	THOMISIDAE	Crab spiders	*Thomisus* sp.
27.	ULOBORIDAE	Hackeled Orb-web spiders	*Uloborus danolius* Tikader, 1969

Note: The list is mainly based on spiders encountered during night surveys.

Rameshwaram, these spiders were called as *Kulmapoochi*; in Nilgiris as *Chelendi* or *Eightkalpoochi;* in Orissa as *Baugh makora* or *Baghla Bindiram* or *Makora.* Of the interviewees in four hot specks, 11% in Ramnathpuram district (Rameshwaram Island and Mandapam area on mainland), 39% in Orissa, 37% in Nilgiris and 100% in Coorg did not recognize *Poecilotheria* spider. But they recognized *Nephila* sp. and *Heteropoda* sp. pictures and reported to occur in their area. Majority of the negative respondent (except Coorg) were those who did not go out in forest or plantations. Most of the villages located inside/ near *Poecilotheria* habitat recognized the *Poecilotheria* spiders and had seen these spiders in their plantation or inside the forest in their area (Table 4). Of these, very few (20%) of the respondents in Ramnathpuram had seen these spiders round the year, whereas rest of the respondent in Ramnathpuram and all the respondents in Orissa and Nilgiris had seen these spiders only during the monsoon season. Majority of the positive respondent said that these spiders are rare (Table 4). And the respondents in Rameshwaram who

said that they had seen these spiders throughout the year lived near or worked in plantations. All of the positive respondent in all the hot specks did not know about the population status of these spiders in their area. In Ramnathpuram 18% of the respondent had witnessed the collection of spiders and collection was done only by foreigners. Whereas in Orissa 72% of respondent had witnessed the collection of spiders of which 9% by foreigner and 63% by local people for foreigner. In all the hot specks it was found that local people kill *Poecilotheria* spider on sighting (Table 4). Of which, in Ramnathpuram, 71% killed these spiders when it entered the houses, whereas rest 29% killed in the plantation. Majority of the respondent in Orissa and Nilgiris killed the spiders in forest (Table 4). The least killing of spiders was in Orissa as they knew about the pet trade. Most of the respondent considered that these spiders give a venomous bite but there were very few who had witnessed the bite or got bitten by spider (Table 4). In Ramnathpuram especially on Rameshwaram Island people had seen these spiders quite often, as recent as 2-3 days before interviewing date. Sighting of these spiders in Orissa and Nilgiris was not very frequent and reports were dated about six months to 2 years back. Summary of the perception survey is given in Table 4.

Daniel collecting information from locals in Rameshwaram

DISTRIBUTION AND HABITAT STATUS

In 2006-2007, surveys were carried out in five different hot specks, where five species of *Poecilotheria* spp. and one species of ground theraphosid *Thrigmopoeus truculentus* were found. *Poecilotheria* spiders are opportunist burrow dwellers, and were found using tree holes, crevices and cavities in the tree, rock crevices, and under bark. Amongst, the five *Poecilotheria* spp. studied during the present study, *P. regalis* and *P. hanumavilasumica* have adapted themselves to changing habitat, while the other species were habitat specific. *P. hanumavilasumica* have been found in degraded plantations, it is felt that their visibility is mainly due to lack of suitable hiding places rather than an increase in their population. Whereas, in the forested area, *Poecilotheria* spiders occupied the depression in the forked branches of the trees and therefore, it was not feasible for us to locate them during day time due to logistic problems. These spiders being nocturnal, it is easy to locate them on tree trunks during the night but in forests, night surveys were not allowed due to wild animals. Therefore, in forested area, apart from direct sighting, we looked out for indirect evidences like exuvia, presence of molting, nesting or burrow silk. In case of *T. truculentus*, it was easy to locate, study and monitor these spiders because of being ground burrowing in habit.

Table 4. List of questions asked during perception surveys, with the number of repodents and positive responses in different hot specks

Questions	Ramnathpuram district			Orissa			Nilgiris			% of total +ve responses
	No. of respondent	No. of +ve responses	% of +ve responses	No. of responses	No. of +ve responses	% of +ve responses	No. of responses	No. of +ve responses	% of +ve responses	
Do you know this spider?	123	109	88.62	155	95	61.29	27	17	62.96	72.46
What is its name in your local language?										
Does it occur in the forest or plantation near your village	109	61	55.96	95	64	67.37	17	5	29.41	58.82
Does it occur	61	0	0.00	64	0	0.00	5			0.00
year round?	0	12	19.67	0	0	0.00				9.23
seasonally?	0	49	80.33	0	64	100.00		5	100.00	90.77
If seasonally, in which season?	49	0	0.00	64	0	0.00	5			0.00
Summer	0	0		0	0					
Monsoon	0	49	100.00	0	64	100.00		5	100.00	100.00
Winter	0	0		0	0					
Is this species?	61	0	0.00	64	0	0.00	5			0.00
abundant	0	12	19.67	0	0					9.23
rare	0	49	80.33	0	64	100.00		5	100.00	90.77
How has its population changed in the last 10 years?	61	0	0.00	64	0	0.00	5		0.00	
increased	0	0		0	0					
decreased	0	0		0	0					
stable	0	0		0	0					
don't know	0	61	100.00	0	64	100.00		5	100.00	100.00
Is this spider collected by anyone?	61	11	18.03	64	46	71.88	5	0	0.00	43.84
by local	0	0		0	40	62.50		0		30.77
by foreigner	0	11	18.03	0	6	9.38		0		13.08
Did you kill this spider	61	21	34.43	64	6	9.38	5	3	60.00	23.08
If yes, then where										
Inside your home	0	15	71.43	0	2	33.33		1	20.00	13.85
In plantation or forest	0	6	28.57	0	4	66.67		2	40.00	9.23
Does it gives venomous bite?	109	89	81.65	95	90	94.74	17	15	88.24	87.78
Has anyone got bitten ?	89	2	2.25	90	1	1.11	15	1	6.67	2.06
Where this spider is found										
When did you see it for the last time?										

The distribution and habitat status for each species is given below;

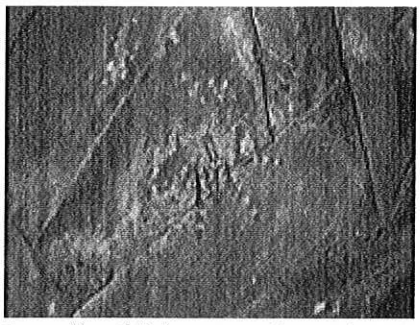

Ravi recording humidity and temperature of a *Poecilotheria* burrow

***Poecilotheria hanumavilasumica* Smith, 2004**

We visited around 80 sites in Ramnathpuram district (including Rameshwaram Island) out of which we located *Poecilotheria* spiders in 24 sites. Seventeen of the 24 sites were on Rameshwaram Island and seven sites on the mainland in Mandapam and nearby area, Ramnathpuram district. Smith (2004) had previously recorded this species in three of these sites; 21 sites are new locality records for this species. All the localities where *P. hanumavilasumica* was found were in plantations (Table 5). Most of the plantations were privately owned by local people except for one large casaurina plantation of Tamil Nadu forest department. Majority of spiders were located in tamarind plantations, while few were also found in *Casuarina*, palm and coconut plantations.

The *P. hanumavilasumica* were located in both disturbed and undisturbed sites surveyed. It was observed that in all the plantations where spiders were found in good numbers (Site I to V), there were very old tamarind trees, suggesting that the spiders prefer old growth plantations. In Site I, spiders were sighted on 35-46 of the 116 tamarind trees on every visit. In these trees there were more number of tree holes/ cavities, which the spiders used as burrows. Adult female spiders in Site I were observed on large tamarind trees. These large tamarind trees also due to their dense canopy (60-80%) likely provided cover from dedication/heat. The other tree species on which spiders were found were *Atalantia monophylla*, *Borassus flabellifer*, *Acacia planifrons* and *Ficus benghalensis*. Only spiderlings were observed on these trees. Site I is relatively less disturbed except during the annual harvest of tamarind and palm fruits but it does not directly affect *Poecilotheria* spiders in the plantation.

In Site II, interestingly, spiders were more sighted on palm trees than on tamarind trees. Whereas, in Site III, the spiders were sighted more on tamarind trees than on palm. Spiders were observed mostly at the base of dried leaf nodes and on tree trunks. On palm trees, all stages of spider except spiderlings were observed during the surveys. The palm trees in Site II were planted in clusters towards the remote end of the plantation, with 70-80% canopy cover. This part of the plantation was relatively less disturbed most of the time of the year. Both these sites are also less disturbed like Site I and there was no prominent habitat threat observed for *Poecilotheria* spiders in these plantations.


Juvenile of *P. hanumavilasumica* on a palm tree

Interestingly, we also observed good number of *P. hanumavilasumica* in Site VI, which consists of young Casuarina plantations. Spiders in this plantation have secondarily adapted to the casuarina habitat, where they occupy the space behind the loose bark on

the tree trunks, where the juveniles were found to prepare silken nest. In casaurina, the spiders have additional advantage of escaping from predation by hiding under the leaf litter. On slight disturbance, the spiders were found jumping from the tree trunk on ground and disappearing in the loose leaf litter where it was very difficult to locate them. Moreover, *P. hanumavilasumica* found in casuarina were dorsoventrally flattened as compared to the individuals found on tamarind trees. When these spiders were collected and kept in captivity, in a weeks time they regained their normal body structure. This the adaptation of spider to the limited space available below the casuarina barks. The only obvious threat in this plantation is cutting of the casaurina trees for firewood, but at present it is controlled and is limited to the periphery of the plantation.

P. hanumavilasumica found below casaurina bark

Manju searching for the spiders in a razzed tamarind plantation

The Site IV was an old tamarind plantation of about four hectares with 90 tamarind trees. This plantation did not fetch good revenue from the tamarind produce and thus the owner of the plantation sold the land to a construction company. All the trees were cut down in May 2006 for construction of a guest house. Similarly, Site VIII was also razed for construction of building in the same month. The plantations close to Rameshwaram main road are under high threat of getting cleared for construction purposes.

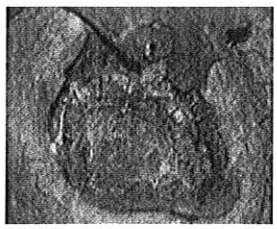
Rest of the plantation on Rameshwaram Island, Sites V, IX to XVII were of one hectare or less in area. These sites have tamarind plantations except for Sites XII, XV and XVI, which were palm and coconut plantations. *P. hanumavilasumica* found in these plantations are highly threatened due to anthropogenic activities. Local people kill these spiders on sighting in their house or on trees in their plantation. Tamarind trees in these sites are old and not having good yield of tamarind, which can be the reason in future for the owners of the plantation to clear the plantation for construction of houses to accommodate the increasing population. The *Poecilotheria* spiders in these sites should be considered first for translocation exercise. The *Poecilotheria* spiders in the palm and coconut plantations (Sites XII, XV and XVI) have additional threat of lack of proper nesting place. These spiders occupy the space below the dry leaf nodes or in the dry leaves in the canopy of palm and coconut trees, which is highly disturbed.

On mainland that is in Ramnathpuram district, we recorded *P. hanumavilasumica* in seven sites of the 24 sites visited in Mandapam and nearby areas. These sites are palm and coconut dominated plantations, located about 5-10 km from the coast and Rameshwaram Is. These sites were not intensively surveyed during night due to logistic problems and noncooperation from owners. Local people in the area recognized

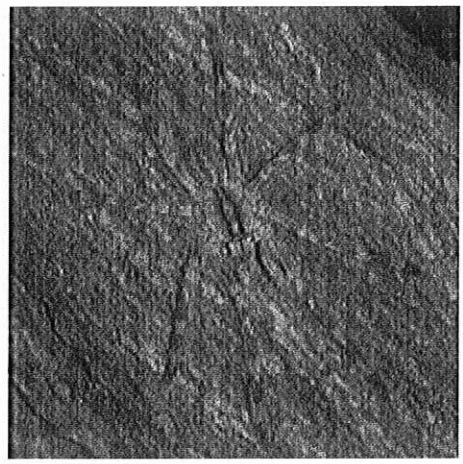
the picture of *P. hanumavilasumica* shown to them, based on which we determined their existence in these plantations.


Juvenile *Poecilotheria* sp. nest

The burrows of adult female spiders were rarely found with silk lining at the entrance and inside the tree hole. While in the case of juvenile spiders burrow are mainly located under the bark, and the burrow entrance was made like a tube with a thick layer of silk. Few adult burrows were deep extending to a depth of 12-30 inches while in majority the burrow depth was 11 to 15 inches. No two adult spiders were seen using the same tree hole or cavity and only spiderlings were found living with the adult female in the burrow. At the time of nesting, adult female spiders close the entrance of the burrow with a thick layer of silk. Burrows with the entrance closed were observed in the area during January to July. Nesting in this species occurs only once a year.

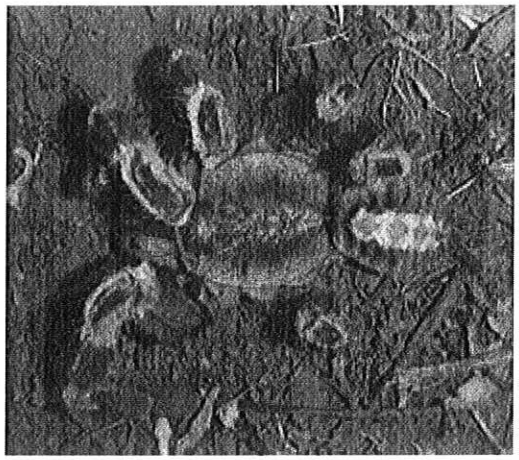

Nest of a female *Poecilotheria*

Local people also reported the *Poecilotheria* spiders to be found occasionally in houses near plantations, which are very likely the wandering males. No such males, however, were observed during our visits to the different habitations in the area. On the whole, though *P. hanumavilasumica* was found to be common on the Rameshwaram Is., its distribution however is patchy, which could be due to the alteration of natural habitat and increase in anthropogenic pressures. The existence of this species on the mainland could be due to inadvertent introduction during the logging and shifting of timber from the island in the early 1900.


Male of *P. hanumavilasumica*

***Poecilotheria miranda* Pocock, 1900**

The *Poecilotheria miranda* is one of the most popular spider in the pet trade and historic distribution records are Chota Nagpur (Pocock, 1900b), Kharagpur Hills and Near Chaibassa in Singbhum District (Gravely, 1915). Though it is popular in pet trade studies on distribution of this species have not been done in last 90 years. There were some informal reports of this species being regularly collected from Simlipal TR and nearby areas, which was confirmed during our visits to Similipal in 2007. According to the foresters and locals these spiders were sighted in monsoon but unfortunately, most of the park area is closed during the monsoons due to floods. Simlipal TR is one of the well maintained forests with minimal habitat loss and fragmentation as compared to rest of the hot specks but major threat observed here was collection of spiders by locals for pet trade.



P. miranda killed by locals in Similipal

In 2007, we visited 10 sites in northern Orissa out of which in 2 sites we located *Poecilotheria* sp. and confirmed it to be *P. miranda* by examining the ventral leg patterns (Table 5). The two sites, where *P. miranda* was found were Simlipal TR and Satkosia WLS. In Simlipal TR we recorded this species from three ranges, Upper Barakamra, Baniyabasa and Chahala range. Foresters of the Jenabil range reported about the occasional sighting of this spider on *Shorea robusta* but during our surveys in this range, we were unable to locate *Poecilotheria*.

In Upper Barakamra, a small juvenile of *P. miranda* was found on an unidentified tree near a water stream. It was found at about 2m height in a small tree hole of 30-40mm diameter and 100mm length. All the nearby trees were checked for *Poecilotheria* but did not find any. In Baniyabasa, one of the local showed us a Sal tree near his house, which had an about 0.5m tree hole at 4.5m height. The person claimed to see every night this spider. We could not make a visit to this area during night. But we consider this report to be authentic and infer the species to be *P. miranda*. Whereas, in Chahala range, we found a dead matured female of *P. miranda*, which was killed by local kids by poking sticks, a few hours before we reached the settlement. This spider was found about less than a meter height on *Mangifera indica*, GBH of 2.5m. The local people also reported sighting of this spider on a nearby *Ficus religiosa* (Peepal tree). The habitat was very disturbed with a patch of nine trees surrounded by huge agriculture land and a small settlement. All the trees were searched thoroughly for *Poecilotheria* but we did not find even an indirect evidence of its occurrence on these trees.

In Satkosia WLS, we found *P. miranda* in two localities (Table 5), Tikarpara village and on the forest trail along Mahanadi towards Baliput gate. In Tikarpara village this spider was found on a *Mangifera indica*, in a settlement area. It was a nesting female at 2.5m height in a tree hole, covered the entrance with a silk. The legs of the spider were seen but it was not possible for us to tease it out. This area was highly disturbed but surprisingly, the people staying in nearby houses were unaware of this spiders existence in their area and in Satkosia WLS.

Another sighting of *P. miranda* in Satkosia WLS was on a trail along the river Mahanadi (2 kms before Baliput gate) on a *Tamarindus indica* (Tamarind). The exuvia of the spider was first sighted under a tamarind tree and on searching high up on the same tree; we found a female inside a tree hole at 4.5m height. The habitat was evergreen area with few sal trees about 5-7m away from the bank of River Mahanadi.

Molting nest of a *Poecilotheria*

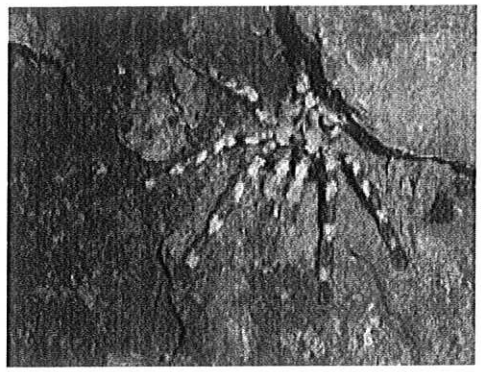
Table 5. Distribution of *Poecilotheria spp. and Thrigmopoeus* sp. in different hot specks

Code	Location	GPS reading	Elevation	Habitat	Status	Threats
Site I	Hanumavilasum Temple site, Aryagundur, Rameshwaram Is.	N 9° 17' 29.7", E 79° 16' 23.6"	15m	Tamarind and palm plantation	Stable	Annual harvest of tamarind and palm fruits, collection of palm leaves, cattle grazzing
Site II	Ambikapati Toppe, Sambai Village, Rameshwaram Is.	N 9° 18.131, E 79° 18.810	10m	Tamarind and Palm plantation	Stable	Cattle grazzing, annual harvest of tamarind and palm fruits, collection of palm leaves
Site III	Raj's tamarind and palm plantation, Aryagundur, Rameshwaram Is.	N 09° 17' 36.1", E 79° 16' 42.1"	18m	Tamarind and palm plantation	Stable	Annual harvest of tamarind and palm fruits, collection of palm leaves, cattle grazzing
Site IV	Petrol Bunk site, Nr. Bus stop, Rameshwaram Is.	N 9° 17' 5.2", E 79° 17' 45.3"	18m	Tamarind plantation	Locally Extinct	Razzed the tamarind plantation to the ground for construction of guest house
Site V	Plantation behind Petrol Bunk, Rameshwaram Is.	N 9° 17' 5.2", E 79° 17' 45.3"	18m	Tamarind plantation	Stable	Annual harvest of tamarind fruits, surrounded by human settlements
Site VI	Forest dept. Plantation behind Eknath Mahadev temple, Rameshwaram Is.	N 9° 16' 32.6", E 79° 15' 59.9"	26m	Casaurina plantation	Stable	Cutting of trees, collection of firewood
Site VII	Entrance site, Aryagundur village, Rameshwaram Is.	N 9° 17' 18.9", E 79° 16' 23.1"	4m	Tamarind plantation	Threatened	Anthropogenic disturbance, collection tamarind fruits, close to human settlements, direct killing of spiders when it enters the houses
Site VIII	Laxshman Tirthum, Rameshwaram Is.	N 9° 17.246, E 79° 18.383	3m	Tamarind plantation	Locally Extinct	Razzed the tamarind plantation to the ground for construction of building
Site IX	Sacred grove near Eknath Mahadev Temple, Rameshwaram Is.	N 9° 16' 56.1", E 79° 15' 59.7"	-6m	Tamarind plantation	Stable	Its undisturbed desserted place, occassionaly people go to this plantation
Site X	Ganeshan's plantation, Sambai village, Rameshwaram Is.	N 9° 18' 8.5", E 79° 18' 49.2"	37m	Tamarind plantation	Threatened	Anthropogenic disturbance, collection tamarind fruits, surrounded by houses, direct killing of spiders when it enters the houses
Site XI	Mangadu, near simbai village, Rameshwaram, Is.	N 09° 18' 18.5", E 79° 19' 02.9"	49m	tamarind, palm, mango plantation	Threatened	-Do-
Site XII	Muniswami plantation, Sambai village, Rameshwaram Is.	N 9° 18' 12.3", E 79° 18' 45.1"	16m	Palm and Coconut plantation	Threatened	Periodic harvest of coconut and palm fruits, collection of palm leaves, anthropogenic disturbance
Site XIII	Nambu's, Sambai village, Rameshwaram Is.	N 9° 18' 13", E 79° 18' 47"	15m	Tamarind plantation	Threatened	Anthropogenic disturbance, collection tamarind fruits, close to human settlements, direct killing of spiders when it enters the houses

Code	Location	GPS reading	Elevation	Habitat	Status	Threats
Site XIV	Talai Nambavel, Sambai village, Rameshwaram Is.	N 9° 18' 10.7", E 79° 18' 44.3"	30m	Tamarind plantation	Threatened	-Do-
Site XV	Taneerutru, Rameshwaram Is.	N 9° 17' 19.6", E 79° 15' 45.3"	44m	Palm and coconut plantation	Threatened	Periodic harvest of palm and coconut, collection of palm leaves, cattle grazzing, anthropogenic disturbance
Site XVI	Akkalmadam, Rameshwaram Is.	N 9° 17' 2.4", E 79° 13' 59.4"	6m	Private coconut, palm, acasia and casaurina in scub land	Threatened	Anothropogenic pressure, expansion of settlements, clearing of plantation, disturbance, firewood collection, killing of spiders
Site XVII	Antony's plantation, Aryagundur, Rameshwaram Is.	-	-	Tamarind plantation	Threatened	Anthropogenic disturbance, collection tamarind fruits, close to human settlements, direct killing of spiders when it enters the houses
Site XVIII	Malvika's plantation, Mandapam	N 9° 16' 35.0", E 79° 05' 27.7"	70m	tamarind, coconut, palm palantion	Stable	Periodic harvest of coconut and palm fruits, collection of palm leaves, anthropogenic disturbance
Site XIX	Mandapam mix plantation	N 9° 16' 33.0", E 79° 08' 46.8"	8m	Tamarind, cashew, coconut, palm and fuirts trees	Threatened	Annual and periodic harvest of tamarind, palm, cashew and other fruit trees, collection of palm leaves, cattle grazzing
Site XX	Munaikar, Mandapam	N 9° 17' 06.4", E 79° 07' 59.9"	74m	palm and coconut plantation	Threatened	Periodic harvest of coconut and palm fruits, collection of palm leaves, anthropogenic disturbance
Site XXI	Pilai madam, Mandapam	N 9° 16' 51.0", E 79° 04' 53.8"	70m	coconut plantation	Threatened	Periodic harvest of coconut, anthropogenic disturbance, close to state highway, vehicular traffic
Site XXII	Sundramadam, Mandapam	N 9° 16' 46.5", E 79° 04' 37.5"	68m	coconut, tamarind, palm palnations	Threatened	Annual and periodic harvest of tamarind, palm and coconut, collection of palm leaves, cattle grazzing
Site XXIII	Iyanar Kovil, Vethalai, Mandapam	N 9° 16' 39.5", E 79° 08' 42.1"	57m	Palm and coconut plantation	Stable	Periodic harvest of coconut and palm fruits, collection of palm leaves, anthropogenic disturbance
Site XXIV	T- nagar, Madapam	N 9° 17' 04.9", E 79° 08' 48.8"	52m	coconut, palm plantation	Locally Extinct	Spiders were present but from last few years not sighted. We assume that the locally spider is extinct due to various threats like killing of spiders by owner on sighting, anthropogenic disturbance, annual harvest of tamarind and palm fruits, collection of palm leaves, cattle grazzing

Code	Location	GPS reading	Elevation	Habitat	Status	Threats
Site XXV	Karl Kubel Istitute Annakatti	-	-	scrub jungle, dry deciduous forest	Unknown	Large trees with tree holes are very few in this area. Anthropogenic pressure, expansion of settlement area, collection of firewood, killing of spiders.
Site XXVI	SACON campus Annakatti	N 11° 4' 58.8", E 76° 46' 51.0"	884m	scrub jungle, dry deciduous forest	Unknown	Large trees with tree holes are very few in this area.
Site XXVII	Karl Kuban-SACON road	N 07° 5' 43.1", E 76° 47' 1.0"	605m	Scrub jungle, dry decduous forest	Unknown	-Do-
Site XXVIII	Mettupalayam Reserve Forest	N 11° 16' 42.6", E 76° 51' 21.7"	321m	Rivarine habitat, mix evergreen and dry deciduous forest	Unknown	Collection of firewood, cattle grazzing in certain parts of the reserve forest.
Site XXIX	Baniyabasa range, Simlipal Tiger Reserve, Orissa	N 21° 45' 12.2", E 86° 29' 7.7"	18m	Sal dominating forest, evergreen forest with patches of dry deciduous forest	Threatened	Anthropogenic pressure, collection of firewood, collection of spider for pet trade
Site XXX	Chahala range, Simlipal Tiger Reserve, Orissa	N 21° 56' 27.6", E 86° 18' 56.3"	607m	Sal forest, dry deciduous forest	Threatened	Anthropogenic pressure, collection of firewood, collection of spider for pet trade
Site XXXI	Upper Barakamra range Simlipal Tiger Reserve, Orissa	N 21° 39' 4.0", E 36° 18' 7.0"	810m	Sal forest, evergreen forest	Stable	No obvious threats observed
Site XXXII	Tikarpara village, Satkosia Wildlife Sanctuary, Orissa	N 20° 35' 46.0", E 64° 47' 6.0"	131m	Dry deciduous forest	Threatned	Anthropogenic pressure, collection of firewood, agriculture land exansion, forest fire, killing of spiders on sighting
Site XXXIII	Near Baliput gate, on Tikarpara-Baliput forest trail Satkosia Widlife Sanctuary Orissa	N 20° 33' 40.5", E 84° 49' 32.5"	94m	Dry deciduous forest	Threatened	Collection of firewood, forest fire, degraded forest
Site XXXIV	Longbali, northern end of Karlapat WLS, Orissa	-	-	Dry deciduous forest	Threatened	Mining, cutting of trees for timber, degraded forest
Site XXXV	Barbara Reserve forest, Orissa	-	-	Dry deciduous forest	Unknown	Cutting of trees for timber, police force camp inside the forest for controlling timber mafia, anthropogenic pressure
Site XXXVI	Ramgiri hills, Koraput forest Orissa	-	-	Dry deciduous forest	Unknown	Anthropogenic pressure, pilgrimage site, collection of firewood, forest fire
Site XXXVII	Coorg, Karnataka	N 12° 25 00.0, E 75° 43 60.0	-	Plantations-coffee, vanilla, pepper		Insecticide usuage

***Poecilotheria regalis* Pocock, 1899**



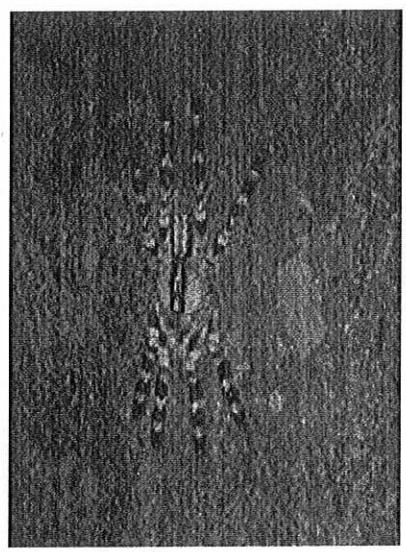
P. regalis in a rock crevice

The *Poecilotheria regalis* is one of the most widely distributed and adapted to wide range of habitats. This species is so far recorded from 23 sites in peninsular India, of which 15 sites were in Western Ghats and rest eight sites were in Eastern Ghats (Molur *et al.*, 2004). This species is easy to identify in the field due to presence of yellow band above the epigastral furrow on the ventral side of abdomen. During the present study we found one more location in Nilgiris, which exists within the known distribution range of the *P. regalis*. Pocock (1900b) also reported *P. regalis* from Nilgiri hills but exact location is not given in Nilgiris.

In 2007, we visited nine sites in Nilgiris, out of which in one site we located *P. regalis* (Table 5). We had three sighting of *P. regalis* from Karl Kubel Institute (KKI) to Salim Ali Center for Ornithology and Natural History (SACON) campus, Anaikatty, Nilgiris. First sighting of *P. regalis* was in SACON campus, where a mature male entered a hostel room and was caught. Second sighting was in the KKI, where a spiderling was found on the institute building and third sighting was 150m away from KKI gate on SACON road, in a rock crevice on the road side cut. According to the local people these spiders were sighted in October-December (south east monsoon) and also sighted during the same time of the year.

The surrounding habitat in Anaikatty between KKI and SACON is scrub jungle of thorny bushes with very few large girth trees. Habitat loss was a major threat in this area. Collection of firewood from forest is a common practice due to many settlements in this area.

Pocock (1900a,b) reported *P. regalis* from Coorg. Intensive surveys were carried out in Madikeri and nearby areas to locate *P. regalis* but did not find any evidence of its occurrence in this area. During the questionnaire survey none of the locals identified *Poecilotheria* pictures or reported about its sighting in their areas. In the plantations high level of insecticide were used and it could be the reason for *Poecilotheria regalis* to get locally extinct in Coorg.



A juvenile of P. striata

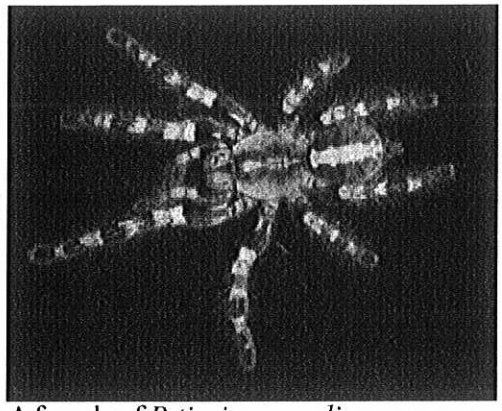
***Poecilotheria striata* Pocock, 1895**

The *Poecilotheria striata* shares part of *P. regalis* habitat in southern Western Ghats and many of the areas both the species coexists. The known distribution for *P. striata* is Penang (Pocock, 1900a), Mysore, Trivandrum in Travancore (Pocock, 1900b). In Nilgiris, *P. regalis* and *P. striata* have been sighted on the same teak tree in Siruvani reserve forests (Sanjay Molur and B.A. Daniel, personal observations). During the present study, we visited nine locations in Nilgiris and of which only in Mettupalayam Reserve Forest (Table 5), we had two sighting of the *P. striata*. Both individuals sighted were spiderlings. They were identified as *P. striata* based on their

body and leg patterns. These spiders were sighted at 1m and 1.5m height on unidentified timber trees along the forest trail. The average GBH of trees on which spider were sighted was 3m. Local people who used this forest trail were not much aware of these spiders. The surveys in the forest college campus and foothills of Kothigiri were not successful in spotting the *Poecilotheria* spp.

***Poecilotheria tigrinawesseli* Smith 2006**

The *Poecilotheria tigrinawesseli* was described for the first time in 2006 from northern Andhra Pradesh, Chhattisgarh and Orissa border areas (Smith, 2006). In 2007, we visited around 18 sites in southern Orissa out of which in 3 sites we located *Poecilotheria* spiders (Table 5). The three localities, where *P. tigrinawesseli* was found were Longbali, Kalahandi, northern most ends of Karlapat WLS, Bhavanipatna district; Ramgiri forests of the Koraput forest division; Berbera forest in Balugaon district. All the three localities are degraded forests. Cutting of trees for timber, firewood, collection of dry leaf was common in these areas. Additional threat is Longbali was mining and in Ramgiri it was pilgrimage.



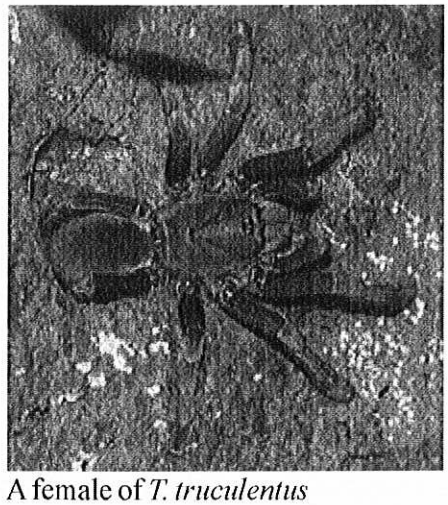
A female of *P. tigrinawesseli*

We found *P. tigrinawesseli* at 6m height on *Shorea robusta* (sal) in Longbali. In Ramgiri forest, this spider was found on *Tectona grandis* (teak) at 1m and 1.5m height. Whereas, in Berbera Reserve forest, this species was found at 2.5 m height on *Tamarindus indica* (tamarind). All the three sites recorded during the present study are new records and range extension for this species. All the spiders were found on old trees with a GBH about 3m and high canopy cover (more than 70%). There was no silk lining observed in burrow of spider. In sal forests presence of less tree holes, these spiders were found in the depression of forked braches as high as 20ft. More surveys are required to be carried out to understand distribution of *P. tigrinawesseli* in these areas.

However, more intensive studies are required to get a complete picture of the distribution of *P. tigrinawesseli* in all the three states, Orissa, Andhra Pradesh and Chhattisgarh.

***Thrigmopoeus truculentus* Pocock, 1899**

The *Thrigmopoeus truculentus* is known only from the type locality, Karwar (Pocock, 1899, 1900b). Amongst ground tarantulas, this species is also popular in international pet trade. Inspite of this in last 110 years there have been no scientific reports or publication regarding the species from India. During the surveys in Coorg for *P. regalis* we found burrows of a ground burrowing Theraphosid which was later identified as



A female of *T. truculentus*

T. truculentus. This species was observed a patchy distribution in the Coorg. Burrows of this spider were found on bunds by the roadside or trek paths. We have observed the existence of burrows in at least six different locations in Coorg, but have monitored two burrows with adult females and their young over the last two-three years.

One burrow and adult female spider was observed on the way to Abbe falls, on a roadside bund, where the female has had to move at least three times in as many years to keep safe from the pick axes and shovels of bund maintenance workers. Although the female had successfully littered thrice during as many years, we observed that only one individual out of at least 300 individuals in the litters made it successfully to year 2. Most of the other young ones were either destroyed during bund maintenance or were predated upon by garden lizards and other predators. Some young males and females might have escaped, but searches in the stretch of the bund on either side of the burrow revealed no sign of any establishment. In another instance, a female spider and her litter of 101 spiderlings were collected since the bund on which she was residing was torn down for development purposes. We reared these spiders, but there was 99% mortality in the young, the oldest one surviving for 16 months.

A female of *Thrigmopoeus truculentus in its burrow*

Other areas where we have observed this species have been bunds on the Madikeri-Talakaveri road, Madikeri-Somwarpet road, Madikeri-Mysore road, in a private coffee estate, Abbe falls estate, Aranya Bhavan office, etc. In all the sightings, the common factor was that the bunds were either west or north facing, and the burrows were under an old native tree, usually *Ficus* spp. or *Terminalia* spp.

POPULATION ESTIMATION

In the present study, population estimation of five species of *Poecilotheria* spp. and one species of ground theraphosid *Thrigmopoeus truculentus* were done. Intensive population estimation was successfully done for *P. hanumavilasumica* on Rameshwaram Island. Whereas, population estimation for *P. regalis, P. striata, P. miranda* and *P. tigrinawesseli* and *Thrigmopoeus truculentus* was restricted to few areas in the selected hot specks in Nilgiris, Orissa and Coorg. To get complete population status of these *Poecilotheria* spp., all the areas of known distribution of the species needs to be revisited and population estimation exercise should be repeated in these area to get optimum results. The population estimation for each species is given below;

***Poecilotheria hanumavilasumica* Smith, 2004**

In the present study, intensive population estimation was done for *P. hanumavilasumica* on Rameshwaram Island. For this exercise, the Rameshwaram Island was divided into two areas, the first area included all the private plantations of total area less than 10 hectares and the second area with large casaurina plantation of the forest department of 1400 hectares size. The findings for the study are given below;

Poecilotheria hanumavilasumica

In private plantations, *P. hanumavilasumica* were found only in 16 sites of a total area of 28.8 hectare (Table 5). A total of 176.97 ± 24.82 spiders were recorded from the total counts of the 16 sites (Table 6). However, two sites (Sites IV and VIII) were destroyed for the construction of buildings during the study period. In November 2005, when surveys were conducted in this Site IV, total spiders counted were 58 ± 10.45. During surveys in May-June 2006, we were able to rescue only 14 individuals of spiders from tamarind stumps and fallen logs. Rests of the spiders were killed by the locals during the process of cutting trees.

The most intensely studied sites were Sites I, II and III. An average of total spiders in Site I was 101.80 ± 49.32; in Site II was 11.00 ± 2.45 and in the Site III was 16 ± 2.83. Overall encounter rate was 13.57, 3.14, 1.78/hectare, respectively. The difference in counts between these sites was mainly because of the difference in vegetation structure and habitat status. Sites I and III are undisturbed located well away from city while Site II is very disturbed being located inside the village and surrounded by habitations. Site III

Table 6. Total number of sighted in each private plantation on Rameshwaram Island

Locality	Area sq. km.	Area hectares	Age class/Sex					Total	No of nest
			Female	Male	Subadult	Juvenile	Spiderlings		
Site I	0.075	7.5	19.00	1.00	7.40	48.80	25.60	101.80	1.40
Site II	0.035	3.5	2.40	0.40	1.80	5.80	0.60	11.00	0.60
Site III	0.09	9	4.00	0.00	4.01	11.50	0.00	16.00	0.00
Site IV	0.04	4	1.00	0.00	0.00	7.00	8.00	16.00	1.00
Site V	0.005	0.5	5.00	1.00	0.00	6.00	0.00	12.00	0.00
Site VII	0.002	0.2	1.00	0.00	0.00	2.50	0.00	3.50	0.00
Site VIII	0.0075	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site IX	0.0025	0.25	0.00	0.00	0.00	2.00	0.00	2.00	0.00
Site X	0.005	0.5	3.33	0.00	0.67	0.67	0.00	4.67	0.00
Site XI	0.0025	0.25	0.00	0.00	1.00	1.00	0.00	2.00	0.00
Site XII	0.001	0.1	1.00	0.00	0.00	0.00	0.00	1.00	0.00
Site XIII	0.002	0.2	2.00	0.00	0.00	0.00	0.00	2.00	0.00
Site XIV	0.0025	0.25	1.00	0.00	0.00	0.00	0.00	1.00	0.00
Site XV	0.001	0.1	0.00	0.00	1.00	0.00	0.00	1.00	0.00
Site XVI	0.015	1.5	0.00	0.00	0.00	2.00	0.00	2.00	0.00
Site XVII	0.002	0.2	0.25	0.00	0.00	0.75	0.00	1.00	0.00
Total	0.288	28.8	39.98	2.40	15.88	88.02	34.20	176.97	3.00

though being undisturbed, number of spiders encountered are less. The reason for this could be presence of less number of tamarind trees, which are preferred over other tree species by *Poecilotheria*.

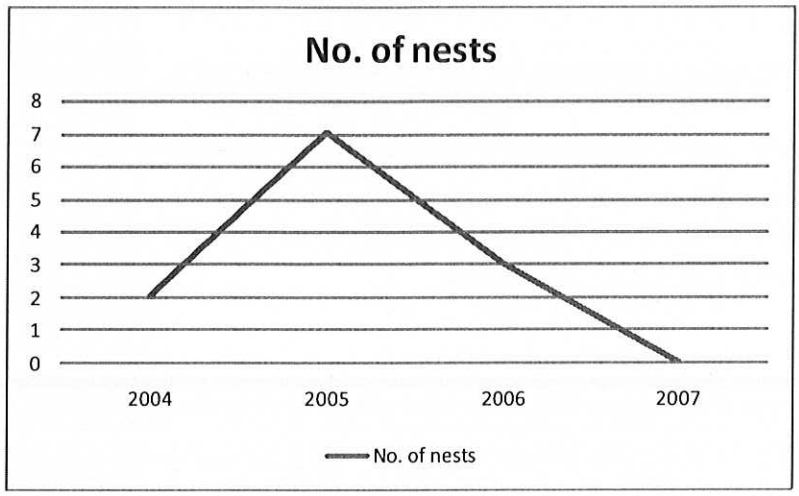


Figure 3. Number of *P. hanumavilasumica* nests observed in Site I from 2004-2007

For Site I, we have population data since 2004 and in these last four years, we have observed a gradual decline in the spider number and number of nests (Figure 1, 2). Interestingly, no nesting was observed during 2007 (Figure 2), which was reflected by absence of spiderling and small size juveniles in the area. This could be influenced by environmental factors like rains. In Site II, not much fluctuation in population was observed during the study period. Number of adults in both the sites did not fluctuate more during 2006-2007. The decline in population in drier months observed was due to the less number of females and sub adults seen in the area. During this time many of the burrows in the area had their entrance sealed with silk, which is likely related to the nesting activity by the females or moulting of the immature spiders. The increase in spiders in May-August 2006 was due to the emergence of females along with their spiderlings from three nests. And, a maximum of 53 spiderlings were seen with the adult female in the nest in Site I. In Site II, only one nesting burrow was seen; one female with 6 spiderlings. No nesting and spiderlings was observed in Site III.

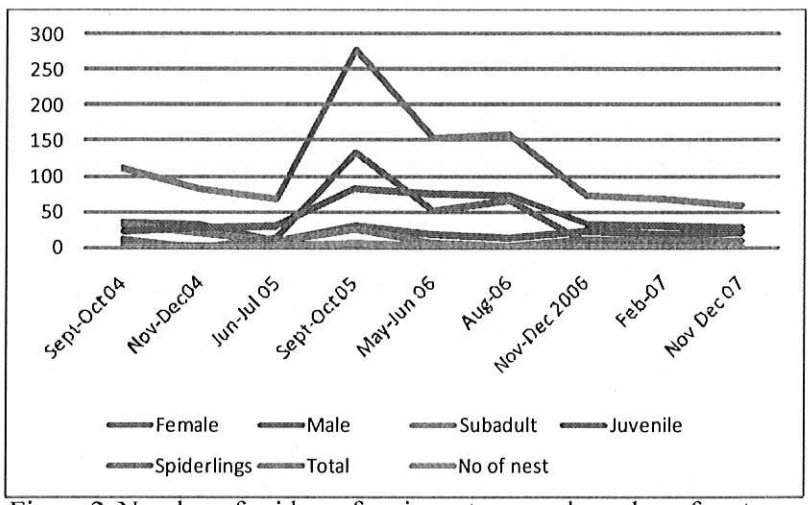


Figure 2. Number of spiders of various stages and number of nests observed in Site I from 2004-2007

The Site VI, spider encounter rate was 0.22 spiders/km and the adult encountered/km was 0.03 (Table 7). The low encounter rates in this site were due to relatively less hiding places for spiders.

Table 7. Encounter rates of Poecilotheria *spp. and* Thrigmopoeus truculentus *in different sites*

Study site	Area (sq.km)	Total km of transects*	No. of spiders encountered	No. of adults encountered	spiders encountered /km	Adult encountered /km
Site VI	14.00	56.00	12.50	1.75	0.22	0.03
Anaikatty (Sites XXV-XXVI)		28.00	3.00	1.00	0.11	0.04
Site XXVIII	9.10	14.00	2.00	0.00	0.14	0.00
Satkosia WLS (Sites XXXII)	745.52	8.00	1.00	1.00	0.13	0.13
Satkosia WLS (Sites XXXIII)	745.52	18.00	1.00	1.00	0.06	0.06
Simlipal TR (Sites XXIX)	2200.00	7.00	1.00	1.00	0.14	0.14
Simlipal TR (Sites XXX)	2200.00	22.00	1.00	1.00	0.05	0.05
Simlipal TR (Sites XXXI)	2200.00	14.00	1.00	0.00	0.07	0.00
Site XXXV	350.00	4.00	1.00	1.00	0.25	0.25
Site XXXVI	127.77	14.00	2.00	2.00	0.14	0.14
Site XXXIV	147.66	7.00	1.00	1.00	0.14	0.14
Coorg (Site XXXVII)	4143.981	120.00	36.00	2.00	0.30	0.02

* it only counts the total distance covered by walk

***Poecilotheria miranda* Pocock, 1900**

The *P. miranda* was found in five sites of the two major areas and encounter rates for each area is provided here rather than each site. Encounter rates for Simlipal Tiger reserve was 0.26 spiders/km, whereas in Satkosia the encounter rate was 0.19 spider/km. Individual encounter rates for each site is given in Table 7. The highest encounter rates were in Sites XXIX and XXXII. Site XXIX is part of the well managed forest and it provides a suitable habitat for *P. miranda*. Whereas, Site XXXII was a disturbed site and it is likely that spiders was sighted here more easily than the other sites.

***Poecilotheria regalis* Pocock, 1899**

In Nigiris, Anaikatty was the only area (Sites XXV-XXVII) where *P. regalis* was sighted during the present study. The spider encounter rates are given for the area rather than giving for each site, as these sites are in contiguous. A total of 28km transect was carried out in Anaikatty and the encounter rate was 0.11 spiders/km, whereas adult encounter rate was 0.4/km (Table 7). Reason for low adult encounter rate could be absence of old trees with tree holes and lack of suitable nesting place.

***Poecilotheria striata* Pocock, 1895**

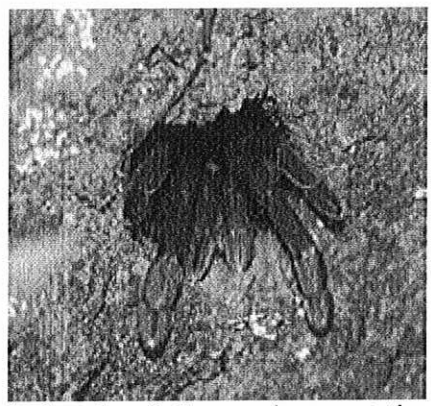
The *P. striata* was found only in one site in Nilgiris (Site XXVIII). Here only the juvenile spiders were sighted and encounter rate was 0.14 spider/km (Table 7). This forest supported an ideal habitat for *Poecilotheria* spiders due to presence of large old trees. It is more likely that adults nest in the higher strata of trees.

***Poecilotheria tigrinawesseli* Smith, 2006**

A total of 25km transect was carried out to understand population status of *P. tigrinawesseli* in different areas. In Site XXXV the encounter rate was 0.25, in 4 km transect we encountered one matured individual. Whereas, in Site XXXIV and Site XXXVI the encounter rate was 0.14/km each and all the sightings were of mature individuals (Table 7). The difference in encounter rates between these sites was because of the variation in the habitat and its status. The Site XXXV was a well protected reserve forest, supported old teak trees and other economically important trees like tamarind and mango, which provided nesting and hiding place for *Poecilotheria* spiders. And the settlements are at the periphery of the forest. Whereas Sites XXXIV and XXXVI were disturbed because of being pilgrimage and mining sites respectively. Deforestation in these sites was also a common problem. Further surveys are required to be repeated in these areas to confirm these encounter rates. More surveys in different parts of all the three sites are also required to find more potential population of *P. tigrinawesseli*.

***Thrigmopoeus truculentus* Pocock, 1899**

In the case of the Coorg population monitoring, the individuals of a ground burrowing Theraphosid, *Thrigmopoeus truculentus* is being monitored for two years lives on a roadside bund. The road is one of the most used ones and regular movement of traffic is there throughout the day, the bund is often disturbed by road cutters, leaf litter gatherers, and post-monsoon bund maintainers. This has resulted in non establishment of the colony of ground tarantulas as only the adult female is seen, while many of the juveniles who had established burrows nearby have been disturbed due to human activities.



A female of *T. truculentus* at the entrance of its burrow

In one instance in Haleri village, north Coorg, a total of 19 burrows were counted in a stretch of 30m on a bund with an average height of 4ft. The bund did not have any adult living in a burrow and all the 19 were juveniles. On a bund on the way to Abbe falls, in a coffee plantation, 14 burrows with juveniles were counted. This was in the month of May. However, in the month of July, not a single burrow was to be seen.

The female spider observed for three years had three litters/nesting in that period. Regular observations and visual counts of spiderlings and/or of newly established burrows indicated a high turnover of the young. Only one of all the 25 burrows counted over three years had a subadult female that had established close to the burrow of its mother. The rest of the spiderlings were either lost to bund maintenance or were predated upon as the bund of about 50m did not yield any burrows of young ones (Table 7).

TRANSLOCATION/REINTRODUCTION AND CAPTIVE BREEDING

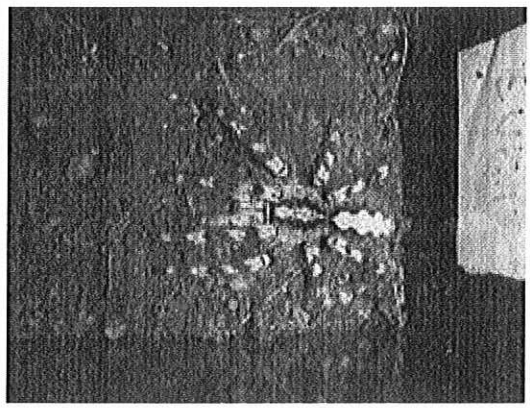
Surveys were carried out on mainland in Ramnathpuram district and nearby areas to find a suitable habitat /plantation where translocation/reintroduction exercise could be performed, follow up with monitoring of

the population. Coconut and palm plantations were dominant on the mainland and the tamarind trees were mainly found along the roadside but no large plantation was found. Till date we could not find any suitable plantation where translocation or reintroduction of threatened population could be done. More surveys are required in different areas apart from Ramnathpuram districts.

Studies on captive breeding of tarantulas are necessary to understand the impact of breeding biology and life cycle of Indian tarantulas. Sixteen individuals of various stages of an arboreal tarantula, *Poecilotheria hanumavilasumica* and one female, 99 spiderlings of ground burrowing tarantula *Thrigmopoeus truculentus* were observed in captivity during the project period. In, August 2007, a female of *P. tigrinawesseli* was collected from Koraput district, Orissa.

***P. hanumavilasumica* Smith, 2004**

During the study period, in total 16 individuals of *P. hanumavilasumica* of varying stages were rescued from degraded habitats in Rameshwaram Island. Fourteen of the 16 individuals were collected in June 2006 from a razed tamarind plantation. These spiders were brought to the office and maintained in captivity. Three of the 14 individuals of *P. hanumavilasumica* matured into adult males and two of them died after six and eight months after maturation due to aging; 6 of first stage spiderlings died in first three months most probably due to fungal infection. Males matured from 6 months to 18 months of collection and survived thereafter for six months to one year. Due to absence of mature female, we were unable to carry out captive breeding experiments. Therefore, in November 2007, we collected one large female and a large juvenile, which was then thought to be a matured female due to its large size abdomen but it molted in a weeks time of collection. With spiders of both sexes we are trying to do captive breeding of *P. hanumavilasumica*.



A female of *P. hanumavilasumica* in captivity

***P. tigrinawesseli* Smith, 2006**

During surveys in August 2007, a female of *P. tigrinawesseli* was collected from Ramgiri hills in Koraput district of Orissa. It is maintained in captivity. We searched for male of this species in same habitat as well as other parts of southern Orissa but could not find. Surveys for getting male are scheduled in the monsoon season, June-August 2008.

***Thrigmopoeus truculentus* Pocock, 1899**

A female of *T. truculentus* with its brood of 99 spiderlings was rescued in January 2006 from a disturbed roadside mud bund, which was going to be removed for construction of a hotel compound wall. First six months 40% of the spiderlings died. By the end of one year 98% of the spiderlings died. Only one individual

Freshly molted spiderling of *T. truculentus* with its molt in captivity

survived so far. This individual molted for five times in last two years. 10% of the spiderlings died out of fungal attacked, which grew on meat ball, dead prey and excreta of spider. It is observed that earlier stages of spiderlings are more susceptible then the adults to these fungal infections. Mortality was high (about 40%) during summers, as these spiders could not withstand the heat, though spiders were kept below fan for 24 hours.

IMPACT OF PET TRADE ON WILD POPULATION

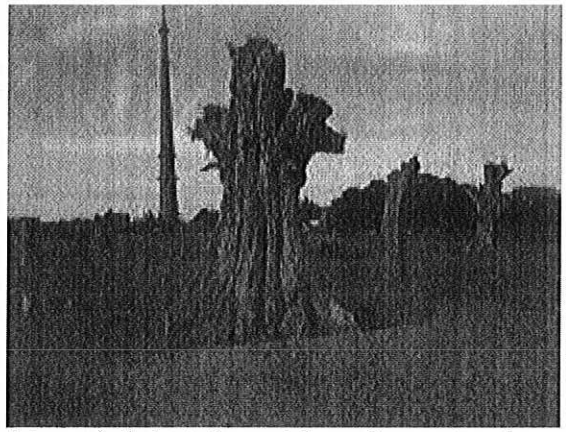
The Indian arboreal tarantula of the genus *Poecilotheria* spp. are in great demand in the western countries for pet trade due to their hairy body, beautiful colouration and resembles to the South American tarantulas which are now listed under CITES. Eleven Indian species have been listed on the websites as being traded. We have been able to collect some data from the wild for only five of arboreal tarantulas, *Poecilotheria* spp. and one ground tarantula, *Thrigmopoeus truculentus*. Several other species are also on offer as more expeditions have been made by traders and newer species are being introduced into the pet trade to keep the interest and trade going.

In comparison to 2004-2006, we did not get much information from our sources about *Poecilotheria* smuggling during the present study period. The evidence of *Poecilotheria* trade can be found in the scientific publication (Smith, 2004, 2006) where *P. hanumavilasumica* and *P. tigrinawesseli* were described as new species. Moreover, in 2006-2007, the listing of *Poecilotheria* spp. on pet trade websites has been reduced by 60%. As per the information gathered during 2005, there were 46 websites on which Indian tarantulas were available. Traders have probably changed the modus operandi by communicating through chat or emails or postings on web pages by which the name and place of both the parties (buyer and owner) are not disclosed except for the nick name. The most popular and common species in pet trade are *P. metallica*, *P. regalis*, *P. miranda*, *P. rufilata* and *P. striata*.

Middleman, who gets *P. miranda* from local people in Similipal TR

During the present survey, we got direct exposure to the existing spider pet trade occurring in Orissa. Interestingly, locals/tribal staying inside the Similipal TR were aware of the existing pet-trade for large-bodied spider. Most of the youth had good information

about *Poecilotheria* and were directly or indirectly involved in pet trade. They use to collect spiders for a middleman from Bhubaneswar or Jashipur, who had connection with foreign buyers. Many times instead of coming personally, middleman use to send message to one of the villager for collection of *Poecilotheria* and the news spreads to all the settlements. Often it had happened in past that tribal/local people collected spiders (2-3 individuals/person) and middleman failed to collect these spiders. Result of which the Poecilotheria spiders died because of starvation as these people lacked knowledge about keeping these spiders in captivity. For more details refer above section 'Perception of *Poecilotheria* by local people in different hot specks' and Table 4.


A tamarind plantation cut down for construction

LAW ENFORCEMENT

Assessment for 14 species of tarantulas including 9 species of *Poecilotheria* spp. was done for including them under IUCN Red List of Threatened Species 2007. All the species will be included in the 2008 Red List. The assessment for all the 14 tarantula spiders is given in Table 8. Nine of the 14 species of Tarantulas are threatened with extinction. Once these spiders get listed under 2008 Red List, it will be easy for us to pursue with national and international wildlife protection agencies for including these species under Wildlife (Protection) Act and CITES. Our efforts will be to include at least these nine species of threatened tarantulas under Wildlife (Protection) Act.

VORTEX, POPULATION VIABILITY MODEL

The population viability analysis (PVA) is a process which helps in estimating the probability of extinction in an estimated time for a given species (Lacy, 1991, MaCarthy *et al.*, 2003). It can also help identify the most important factors that threaten an endangered species (Song, 1996). The PVA includes from simple simulation of population trends to complex models of spatial and temporal variation. It uses the basic demographic parameters like age structure, sex ratio, population size, birth rate, mortality rates, migration and help in accessing different threats like habitat quality, fragmented habitat, fragmented populations, inbreeding depression and migration rates between subpopulations (Keedwell, 2004).

We used VORTEX, which is a computerized simulation model to understand the probability of extinction of *P. hanumavilasumica* on the island. Data on behavior, population, breeding, threats and habitat status from wild are available from this study. Additional information on biology from similar species either from captivity or from other field studies have also been used in the simulation model. The basic parameter values provided for VORTEX population viability analysis is given in Table 9.

Table 8. List of Indian Tarantula spiders and their assessments:

Scientific name	Common Name	Category	Criteria
1. *Chilobrachys fimbriatus* Pocock, 1899	Fimbriated Striated Burrowing Spider, Indian Violet	Least Concern	
2. *Chilobrachys hardwicki* (Pocock, 1895)	Eastern Indian Striated Burrowing Spider	Least Concern	
3.*Haploclastus kayi* Gravely, 1915	Parambikulam Large Burrowing Spider	Endangered	B1ab(ii,iii)
4. *Poecilotheria formosa* Pocock, 1899	Beautiful or Finely formed Parachute Spider, Salem Ornamental	Endangered	B1ab(i,ii,iii)+2ab(i,ii,iii)
5. *Poecilotheria hanumavilasumica* Smith, 2004	Rameshwaram Parachute Spider, Rameshwaram Ornamental	Critically Endangered	B1ab(ii,iii,iv,v)+2ab(ii,iii,iv,v)
6. *Poecilotheria metallica* Pocock, 1899	Peacock Parachute Spider, Gooty Tarantula or Metallic Tarantula or Peacock Tarantula	Critically Endangered	B1ab(iii)
7. *Poecilotheria miranda* Pocock, 1900	Wonderful Parachute Spider, Bengal Ornamental	Endangered	B1ab(iii)
8. *Poecilotheria nallamalaiensis* Rao *et al*., 2007	Nallamala's Parachute Spider	Data Deficient	
9. *Poecilotheria regalis* Pocock, 1899	Regal or King Parachute Spider, Indian Ornamental	Least Concern	
10. *Poecilotheria rufilata* Pocock, 1899	Reddish or Rufus Parachute Spider, Travancore slate-red, Red Slate Ornamental	Endangered	B1ab(ii,iii)
11. *Poecilotheria striata* Pocock, 1895	Striped or Striated Parachute Spider, Mysore Ornamental	Vulnerable	B1ab(ii,iii)+2ab(ii,iii)
12. *Poecilotheria tigrinawesseli* Smith, 2006	Anantagiri's Parachute Spider	Data Deficient	
13. *Thrigmopoeus insignis* Pocock, 1899	Notable Large Burrowing Spider	Vulnerable	B1ab(ii,iii)+2ab(ii,iii)
14.*Thrigmopoeus truculentus* Pocock, 1899	Karwar Large Burrowing Spider	Near Threatened	B1ab(ii,iii)

Table 9. Summary of the parameter values used for VORTEX population viability analysis for Poecilotheria hanumavilasumica.

Parameter	Values	
Type of mating system		Polygamous
Age at first reproduction for female		6
Age at first reproduction for male		2
Sex ratio at birth (in % males)		70
Reproduction parameters:		
Percent adult female breeding		100
SD in reproduction (% breeding)		10
No. of offspring per adult breeding female per year		100
Maximum age of reproduction for female		10
Maximum age of reproduction for male		2
Mortality:		
Female	0-1 years	90%
	0-2 years	50%
	2-3 years	30%
	3-4	20%
	4-5	20%
	5-6	20%
	>6 years	5%
Male	0-1 years	90%
	0-2 years	60%
	>2 years	100%
Initial population size (in a stable age structure)		1500
Carrying capacity		1600
Probability of catastrophe (cyclone) on the population:		
Effect of catastrophe on reproduction		1
Effect of catastrophe on survival		0.75
Mate monopolization:		
Percentage of males in breeding gene pool		100
Percentage of successfully siring offspring		46.9
Mean number of mates/successful sire		1.3

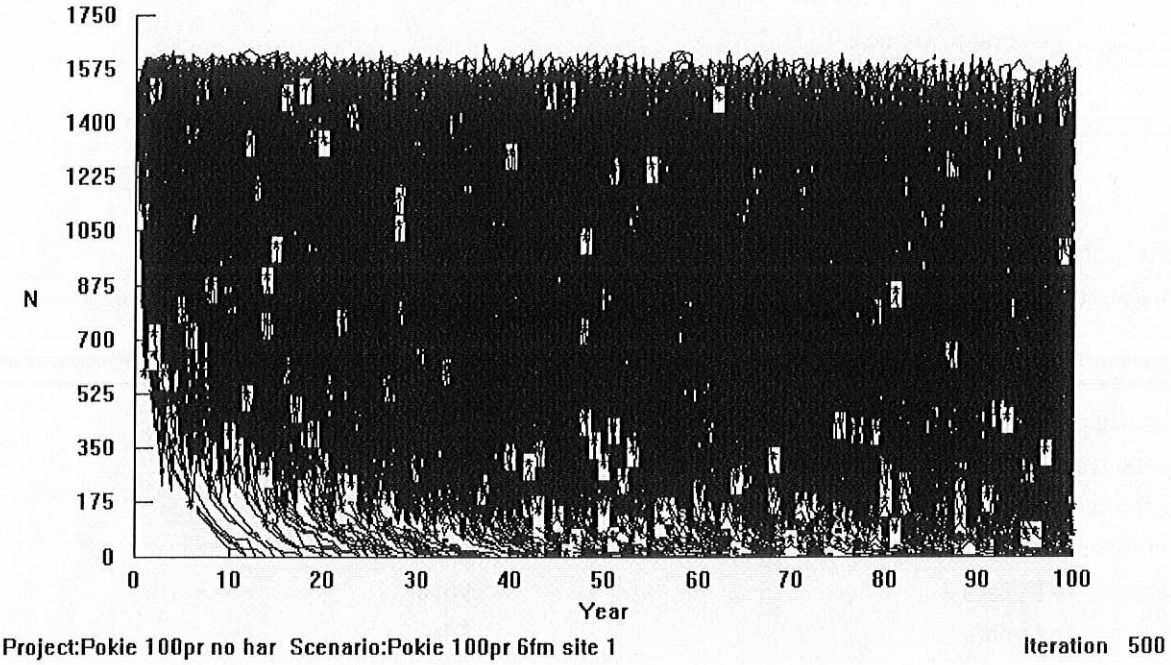


Figure 4. Plot of 500 individual iterations of the baseline VORTEX simulation model of *Poecilotheria hanumavilasumica* population dynamics. The average rate of population growth across these iterations is 0.010.

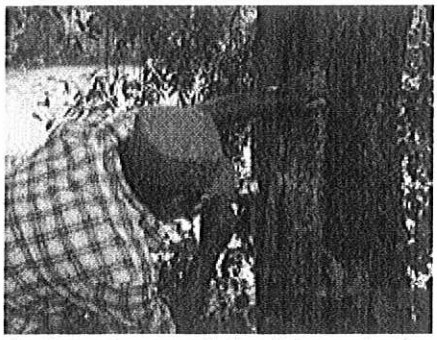
A single population (Site I) with progeny of 100 individuals/year with an initial population size of 1500 individuals predicts a high probability of extinction (55%) for this species (Figure 4). The scenarios with more than 30,000 individuals indicated a fairly good degree of persistence, which is not the case in this species. The fragmented locations containing very few individuals also show stochasticity impacting the population numbers and the species even without harvests.

EDUCATION AND AWARENESS

Awareness

We interacted with local people in all the hot specks to educate them about the positive role of large-bodied spiders and need for conservation of *Poecilotheria* spiders. We learnt that the local people had misconceptions about tarantulas like these spiders are extremely poisonous and should be killed on sighting. To take out their fear, few locals in Rameshwaram Is. were taught to collect spiders in plastic jar and were encouraged to release them in plantations instead of killing them when sighted inside the house. They were assured that tarantula bite is not fatal to human beings and so there is no need of being scared of these spiders. The only limitation of involving locals in the study was communication, these people didn't know english writing or reading, it was difficult for us to teach them to record or monitor the nesting females and spiderlings on our datasheet. Only verbal information about the spiders was available from most of the

locals. In Nilgiris, forest guards were given a brief introduction about the spiders and were involved in the population estimation exercises.



A forest guard looking at the *Poecilotheria* spider in Nilgiris

In Orissa, Mr. Saroj Behara and Mr. Ganpathi Sahu from Ganjam village, Southern Orissa are volunteers for local snake rescue programme. They were first hired for assisting in *Poecilotheria* spider surveys in Orissa. During the initial surveys, they were given an informal training for searching *Poecilotheria* spiders and habitats, parameters required to note down in datasheet after spotting spider, taking GPS readings and to carry out transects for population estimation. They were sensitized with importance of *Poecilotheria* spider and the pet trade. In the following surveys, they helped us in creating awareness amongst the locals about these spiders. They also helped us in getting distribution information about the spiders from local people. Even after the surveys got over, till date, Saroj and Ganpathi, voluntarily continues to collect information on *Poecilotheria* spiders from different parts of Orissa.

Saroj and Ganpathi ready for carrying out transects

Education materials

Three thousand stickers for each of the four species of tarantulas, *Thrigmopoeus truculentus*, *Thrigmopoeus kayi*, *Poecilotheria metallica*, *P. hanumavilasumica* were printed (Annexure I). These stickers were sent as a part of daily wildlife education packet in different parts of the country. The education packets were used in the education programmes conducted for school children. A few copies of the stickers are enclosed with the report.

A couple of A-4 size posters (50 copies each) of mygalomorph spiders were printed to distribute them during the surveys, mainly to educate local people and foresters (see Annexures). First poster included three types of mygalomorphs and their nest: an arboreal form of spider, *Poecilotheria hanumavilasumica* Smith, 2004 and its nest; new species of *Sason* and its trapdoor retreat; a ground burrowing mygalomorph, *Atmetochilus* spp. (Nemesiidae) and its burrow, which resembles other ground Theraphosid spiders (Annexure II). Second poster was A-4 size of *Poecilotheria hanumavilasumica* and its activities (Annexure III). This was to depict the beauty, nest, prey and burrow of *Poecilotheria* spiders.

A poster of demy size for different Indian *Poecilotheria* spp. and their taxonomic identification is being designed (Annexure IV). This poster was reproduced from the *Poecilotheria* poster with permissions from Richard Gallon and Ray Gabriel, London. The original poster consists of only 14 species of the 16 *Poecilotheria* spp. from India and Sri Lanka and doesn't include pictures of two of the Indian species, *P. hanumavilasumica* and *P. nallamalaensis*. The poster made by us includes the *P. hanumavilasumica*

picture. The poster will be sent to different forest department, arachnologist, universities and zoos in India. The pictures of male, female and ventral side of the leg pattern are provided. This poster will serve as a pictorial guide for identification of Indian *Poecilotheria* spiders. Funding is being sought to print the poster.

Conservation Action Plan

Based on the information gathered from present study, a draft conservation plan has been prepared for *P. hanumavilasumica* (see after report). This conservation plan will be discussed with the stake holders before finalising it.

ACKNOWLEDGEMENT

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DRAFT CONSERVATION PLAN FOR *POECILOTHERIA HANUMAVILASUMICA* SMITH, 2004

The conservation action plan is under development and this is just a draft of it. The final conservation action plan will be developed in discussion with the stake holders.

INTRODUCTION

The genus *Poecilotheria* is endemic to South Asia and till date, nine species of this genus have been reported from India. Of these nine *Poecilotheria* spp., six are threatened with extinction and the key threat is habitat loss. Amongst Indian *Poecilotheria* spiders, *P. regalis* is the only species with wide distribution range and rest of the species are having restricted and/or habitat specific distribution. Moreover, species like *P. hanumavilasumica* and *P. metallica* are restricted to small degraded areas. The PVA exercise for *P. hanumavilasumica* with no harvest scenario predicts the species will get extinct within 15 years. Therefore, it is necessary for us to pay immediate attention towards the sites where threatened *P. hanumavilasumica* occurs.

POTENTIAL THREATS

The major threat observed during the present study in Ramnathpuram district was increasing human activities in and around the sites could likely lead to local extinctions of the *Poecilotheria* spiders. For example, Site IV and VIII are lost due to increase in tourism activity. The plantation was cleared for construction of building. Sites II and V holds good population of these spiders but as these plantions are not having good yield, they are likely to get cleared.

In all the sites firewood collection was a common practice and it could affect indirectly the habitat of *Poecilotheria* spp. Few aspects of breeding biology information needs to be collected from wild to understand and monitor the long-term viability of different populations in the area.

The different threats observed in during the study are listed below;

- **Loss of habitat:** Present study reveals that habitat loss and fragmentation is a common problem on Rameshwaram Island and mainland in Ramnathpuram. *P. hanumavilasumica* occurs in private plantation and thus is facing highest threat of extinction due to habitat loss and fragmentation in Rameshwaram Island.

- **Lack of education:** People in all the sites in Rameshwaram Island lack awareness about the positive role of large-bodied spiders in the ecosystem. Local people consider these spiders to be highly venomous.

- **Deliberate killing of spiders:** Due to fear and lack of awareness about the spiders, local people very often kill the spiders on spotting it. Killing of *Poecilotheria* spiders is very common in Rameshwaram.

- **Extraction of wood for fuel:** The people collect the dead wood which is a potential hiding place for *Poecilotheria* spiders. Collection of firewood and dead palm leaves is very common practice in Rameshwaram, where the spiders occur in private plantations.

- **Construction:** It is biggest threat in Rameshwaram Is. and not been reported or observed from any other hot specks. Large plantations (5-10 hectares) are cut down for construction of guest houses and apartments.

In captivity, additional management problems are there which could lead to failure of captive breeding programme. They are as follows;

- **Fungal infection in captivity:** In captivity, the fungus develops on the meat ball (the chewed animal part thrown by the spider), dead prey and excreta of spiders and if the infected part is not removed or cleaned for a long time then it spreads to the alive *Poecilotheria* spiders and result of which the spider dies. It is observed that earlier stages of spiderlings are more susceptible then the adults to these fungal infections.

- **Insecticides:** *Poecilotheria* spiders are highly susceptible to the insecticides. In past, we lost two matured individuals of *Poecilotheria* spp. in captivity when the insecticide was spread outside the office premises (though the spiders were inside the closed room about 5m away from the insecticide spread site).

CONSERVATION NEEDS

1. **Key areas:** Identification of key areas (like Hanumavilasum temple site, Raj's plantation, Ambikapati toppe) should be the first priority for conservation of *P. hanumavilasumica*.

2. **Surveys:** Intensive surveys should to be carried out on mainland in Ramnathpuram district and nearby districts to establish distribution range and population status of this species and also to locate suitable site for reintroduction of the rescued population from the Rameshwaram Island.

3. **Ecology and Biology**: Studies on population structure, behaviour, and breeding biology of all the *P. hanumavilasumica* is required in different habitats.

4. **Local benefits**: There is a need to involve local people in monitoring of the *Poecilotheria* population. Few more local people (including auto drivers and tourist guides) on Rameshwaram Island are required be educated about the *Poecilotheria* spiders so that they can be a tourist guides and spread awareness and popularize these spiders.

5. **Habitat monitoring**: Conduct an seasonal census for *P. hanumavilasumica* in all the known sites including assessment for the habitat and threat status.

6 **Sustainable use**: Local people should be involved in the captive breeding programme. There is a need to give a formal training for maintaining spiders in captivity to local peoples, which will help in

conservation of spiders as the spiders won't die out of starvation and it can be livelihood for few locals.

7. ***In-situ* and *Ex-situ* conservation**: Monitoring of the existing population in the wild is most essential and if any spider population is found to be threaten then immediately all the individuals should be translocated. But if suitable habitat is not found before collection of spiders then they should be maintained in captivity and later can be released back on finding a suitable habitat.

8. **Law and enforcement**: Should try to include threatened *Poecilotheria* spp. under Wildlife (Protection) Act amendment. To ensure the protection from habitat loss of *P. hanumavilasumica*, at least Hanumavilasum temple plantation should be declared as a Spider Sanctuary and additionally, Casaurina plantation on Rameshwaram Island could also be considered part of the Spider Sanctuary.

9. **Awareness programme**: A strong need is there to conduct local education programme to reinforce ideas about the positive values of spiders, including *P. hanumavilasumica*, within the local community to reduce the disturbance caused to the plantation (like lopping of braches, collection of fire wood and dry leaves) and/or killing of spiders on spotting.

10. **Captive programs**: To understand the breeding biology of the spider, it is necessary to study few individuals of *P. hanumavilasumica* in captivity. Understanding biology of these spiders in wild is difficult. Captive breeding will also help in saving the rescued population till a suitable site for reintroduction is found.

11. **Translocation/Reintroduction**: The rate at which the habitat loss is occurring in Rameshwaram, it is necessary to develop strategy for translocation/reintroduction.

12. **Systematics and Bar Coding**: Taxonomy of *Poecilotheria spp.* is highly confusing and thus very necessary to develop a comprehensive identification manual for the family Theraphosidae. Bar coding of theraphosids could be considered a tool to resolve confusion between the species. This will help in confirmation of the species on mainland in Ramnathpuram and also know the genetic variation existing in the island population and mainland population.

ACTION STRATEGY

Vision: *P. hanumavilasumica* will exist in plantation areas of Tamil Nadu.

Aims: To prevent extinction of *P. hanumavilasumica*.

Objectives

1. Initiate *in situ* conservation in key area sites like Hanumavilasum plantation.
2. Monitor the breeding nests in different sites

3. To conduct surveys for population estimation of *P. hanumavilasumica* on mainland and continue monitoring population in established sites on Rameshwaram Island.

4. Monitor the habitat and threats of the spider.

5. Highly threatened population should be rescued before it gets lost.

6. Captive breeding programme with the help of locals should be initiated.

Recovery of the threatened species

P. hanumavilasumica is highly threatened and population in Site I in last three years is gradually declining. Therefore, this species should be the priority for conservation activities for saving the wild population and should be focused on:

1. Population assessment in different habitats and monitoring the wild population.

2. Removing the brood at early stage and maintain them in captivity. Followed by reintroduction after suitable age and monitoring them in wild to decrease the mortality rates in early stages.

3. Supplement of males to the potential females to ensure the fertilization in females in wild.

4. Introducing the males from different fragmented sites to increase the heterozyosity in the gene pool and avoid inbreeding depression.

5. Regular assessment of threats and habitat of *P. hanumavilasumica.*

6. Primary focus on the recovery of species by stopping further decline in the present population of the *P. hanumavilasumica.*

Actions to date

1. Research: Population and distribution

a. Thorough population estimation of *Poecilotheria hanumavilasumica* has been done in Rameshwaram Island.

b. Distribution information for *P. hanumavilasumica* has been collected in Rameshwaram Island and Mandapam in Ramnathpuram district, Tamil Nadu.

c. Monitoring of *P. hanumavilasumica* population in different plantations on Rameshwaram Island.

d. Rescued the threatened population of *P. hanumavilasumica* from razed tamarind plantation and maintaining it in captivity.

e. Understanding the biology of *Poecilotheria hanumavilasumica* in captivity and wild.

f. Carried out assessment of all the Indian *Poecilotheria* and sent to IUCN Red List. The assessments will be accepted in this year meeting.

g. Nesting sites: locating and monitoring

h. Only on Rameshwaram Is., the information on the nesting females is available. Four plantations, where nesting females have been located are the priority for monitoring breeding population. The following nesting sites/plantations have been the priority for conservation of *P. hanumavilasumica*

i. Hanumavilasum temple site (Site I),

Three to seven females have been found nesting in last four years.

ii Ambika toppe plantation (Site II)

One to two female have been nesting every year.

iii. Raj's plantation (Site III)

One to two females nesting in this plantation is recorded every year

iv. Bus stop plantation (Site V)

Nine females were found in last visit and one female was already nesting.

v. Casaurina plantation (Site VI)

Nesting females are difficult to locate in Casuarina plantation but it is estimated based on the young spiderlings encountered during transects that 3-4 nests females nest every year.

2. Education/Awareness:

a. Created awareness on Rameshwaram and mainland in Ramnathpuram districts.

b. Printed and distributed spider stickers and poster to Ministry of Environment and Forests, forest offices, zoos, research institutes, spider amateurs and wildlife biologists (Annexure I-II).

FINANCIAL DETAILS

Total Amount allotted: £ 3300.00
Rate of converson: 1£ = 85 INR

Heading	Details	Requested from FFI	Amount allotted	Total Amount spent
Travel Expenses				
- international	-			
- local	Field visits and local travel	£ 1,000.00	£ 800	£ 951.03
- other	-			
Logistics				
- visas/permits	-			
- insurance	Insurance			
- other	Medical/ health & safety	£ 100.00	£ 50	£ 51.11
Accommodation and subsistence	Food, accommodation and local expenses.	£ 1,000.00	£ 800	£ 820.22
Materials				
-equipment *(specify)*	Camera	£ 300.00	£ 0.00	
- consumables	Chemicals (Alcohol)	£ 50.00	£ 50.00	£ 14.45
	Vials, vivariums,	£ 50	£ 50	£ 64.5
- other	Camera memory cards, readers, printer cartridges, glossy prints	£ 300.00	£ 100	£ 136.82
Allowances/per diems *(specify)*	Field assistant (1) @ Rs. 2,500.00 per month for 12 months	£ 600.00	£ 600	£ 517.88
Education/training				
- materials				
- other costs	Developing costs and front end evaluation	£ 500.00	£ 300	£ 414.01
Administration *(specify)*	Secretarial Assistance	£ 350.00	£ 350.00	£ 350
Communication *(specify)*	Postage, Fax, Email, Internet	£ 200.00	£ 100.00	£ 153.47
Contingency		£ 100.00	£ 100.00	£ 108.79
Other				
TOTAL		**£ 4,550.00**	**£ 3,300.00**	**£ 3582.28**

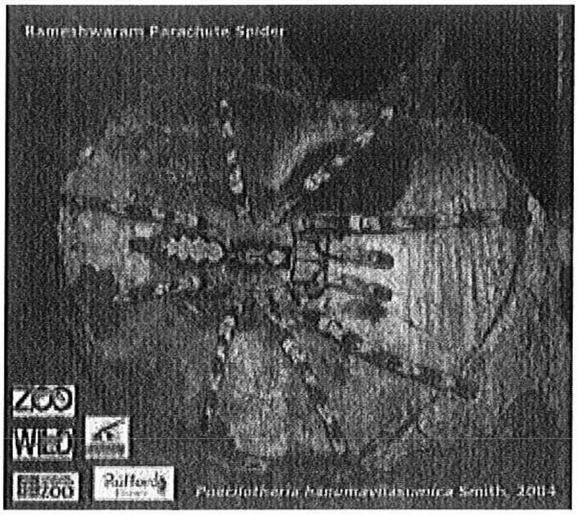
List of publications (2006-2007)

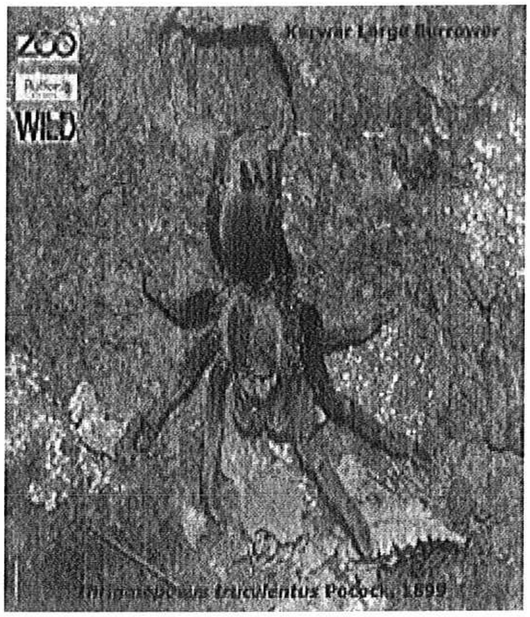
1. Siliwal, M., S. Molur and R. Raven (2007). A new species of the Genus *Plesiophrictus* (Araneae: Theraphosidae: Ischnocolinae) from Western Ghats, India. *Zoos' Print Journal* 22(10): 2853-2860.
2. Siliwal, M. and S. Molur (2007). Checklist of spiders (Arachnida: Araneae) of South Asia including the 2006 update of Indian spider checklist. *Zoos' Print Journal* 22(2): 2551-2497 + 84 pages as web supplement.
3. Ganeshkumar, M. and M. Siliwal (2007). First record of *Achaearanea brookesiana* Barrion & Litsinger, 1995 (Araneae: Labidognatha: Theridiidae) from India. *Zoos' Print Journal* 22(12): 2926-2928 (with web supplement).
4. Siliwal, M. and S. Molur (2006). Some observations on the webs of *Gasteracantha geminata* Fabricius, 1798 and *Macracantha arcuata* (Fabricius, 1793) (Araneae: Araneidae). *Zoos' Print Journal* 21(1): 2133-2134 (with web supplement).
5. Molur, S. B.A. Daniel and M. Siliwal. Peacock Parachute Spider *Poecilotheria metallica* Pocock, 1899: Rediscovery, Taxonomy and some observation in captivity. *Zoos' Print Journal* (Accepted).
6. Siliwal, M. and S. Molur. Status review of Mygalomorphs and Conservation Priorities in Western Ghats in *Invertebrates Diversity and Conservation in the Western Ghats,* ATREE, Bangalore (in press).
7. Siliwal, M. and S. Molur. Redescription, distribution and status of the Karwar Large Burrowing Spider *Thrigmopoeus truculentus* Pocock, 1899 (Araneae: Theraphosidae), a Western Ghats endemic ground mygalomorph. *Zoos' Print Journal* (submitted)
8. Siliwal, M. and S. Molur. New species of Brush-footed trap door spider of genus *Sason* (Barychilidae) from Rameshwaram Island, Tamil Nadu, India. *Zootaxa.* (accepted).
9. Siliwal, M., M. Nair, S. Molur and R. Raven. First record of the genus *Conothele* (family Ctenizidae) from India with description of two new species. *Journal of Arachnology* (accepted).
10. Siliwal, M. New species of the genus *Gasteracantha* from Vadodara, Gujarat, India. *Journal of the Bombay Natural History Society* (Submitted).
11. Siliwal, M., S. Molur and R. Raven. Trapdoor spiders of Orissa (In prep.).

Popular articles

12. CBSG South Asia (2007). The Indian Mygalomorph Spider Project. *CBSG News* 18(2):7
13. Siliwal, M. (2006). Monster in the sand - a monster Cricket from western Arunachal Pradesh. *Hornbill* October-December: 17-19.

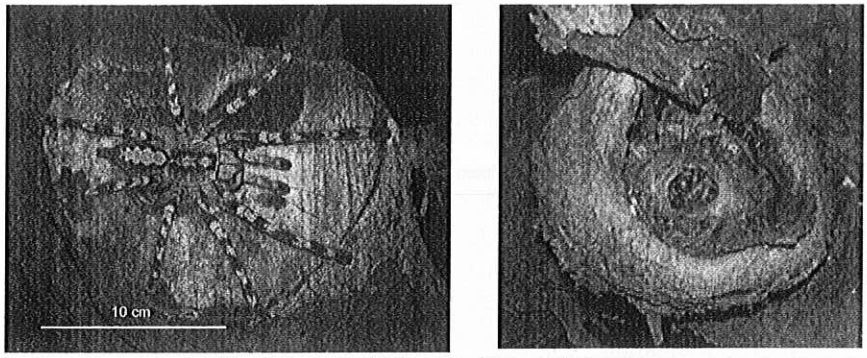
Annexure I



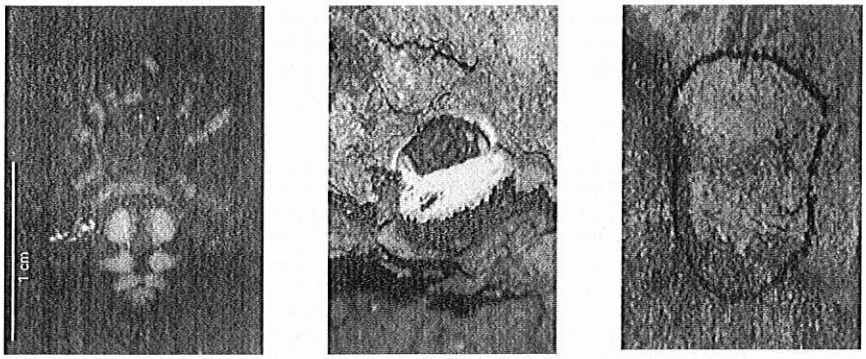


Annexure II

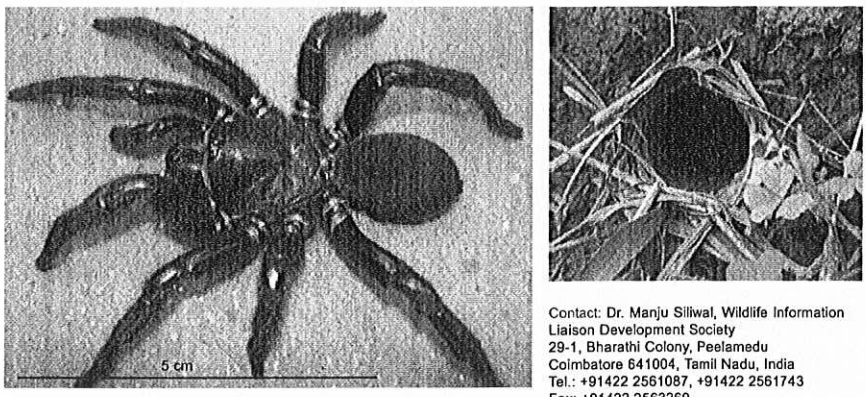
Mygalomorphs and their burrows



Tree living mygalomorph spider and its burrow



Trap-door mygalomorph spider and its burrow on tree trunk



Ground burrowing mygalomorph spider and its burrow

Contact: Dr. Manju Siliwal, Wildlife Information Liaison Development Society
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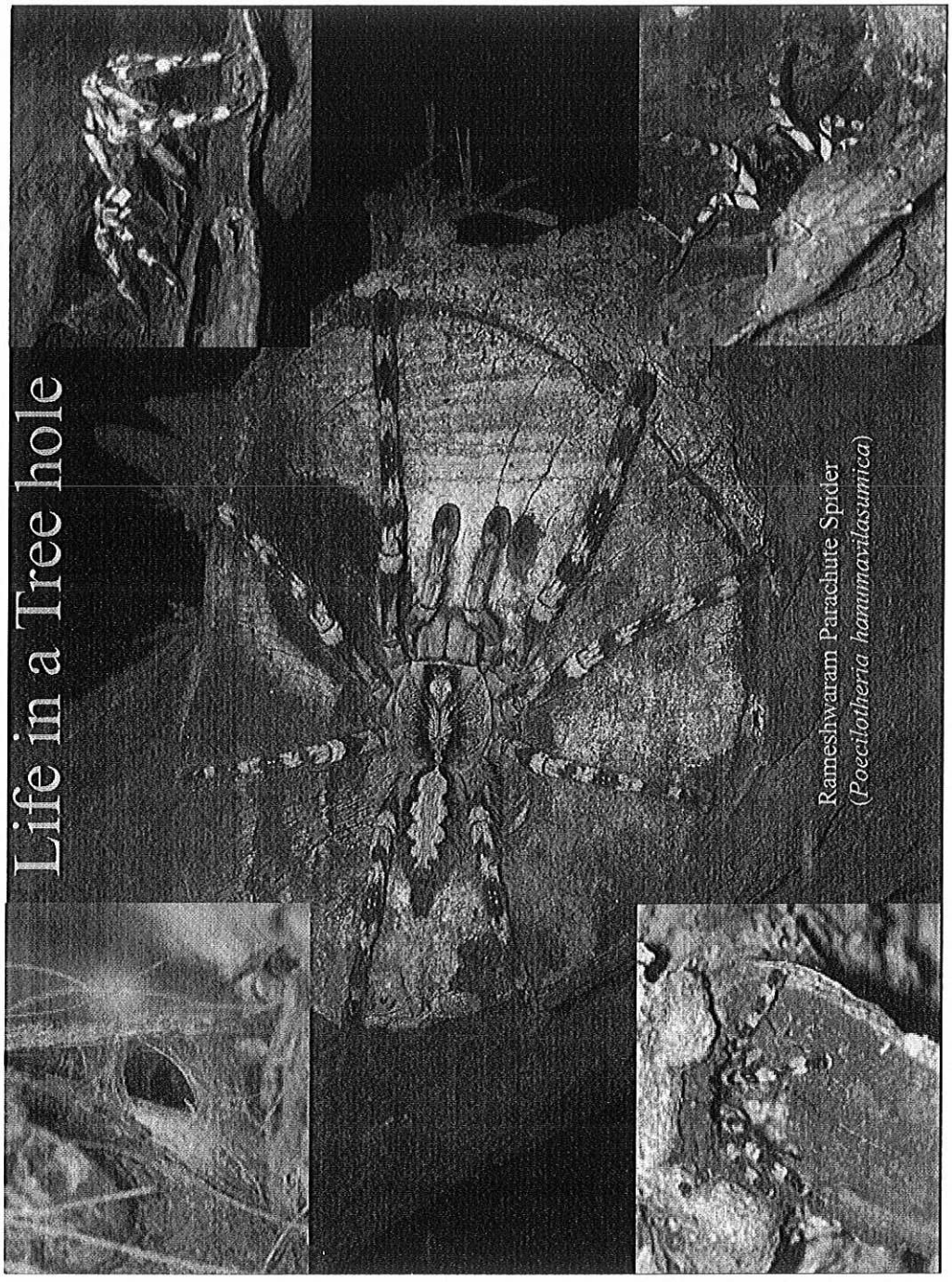
Annexure III



Annexure IV