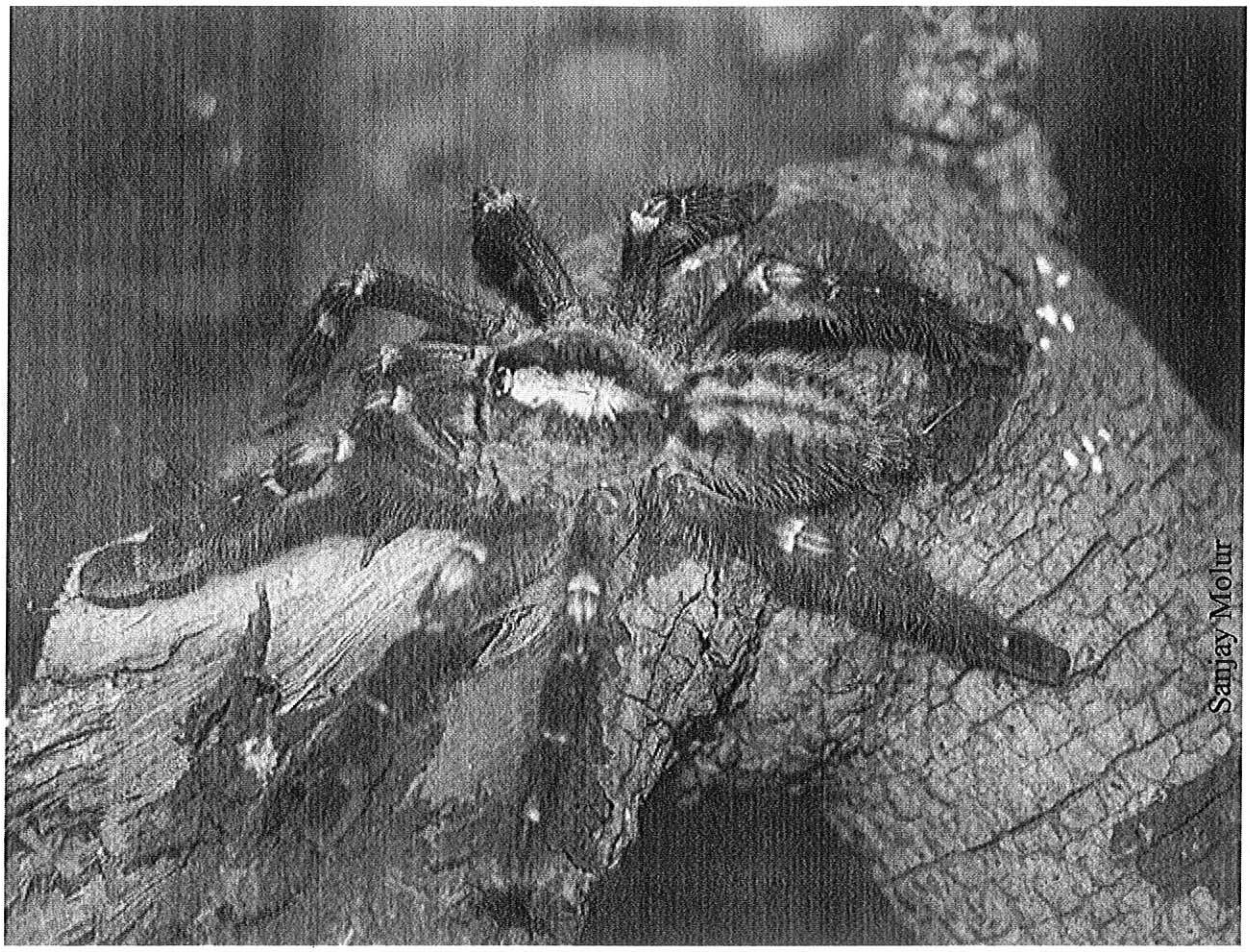
Distribution, status and effect of trade on large-bodied (Mygalomorph) spiders of the genus *Poecilotheria* and other Theraphosid spiders in India



Poecilotheria metallica

Final Report
September 2003

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Distribution, status and effect of trade on large-bodied (Mygalomorph) spiders of the genus *Poecilotheria* and other Theraphosid spiders in India.

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Enclosures in this Final Report:

1. Main Report.
2. Appendix I -- Some technical notes on Indian theraphosids.
3. Appendix II -- Some photogrpahs from the field and of the project.
4. Appendix III -- Interim Report submitted in September 2002.
4. Appendix IV -- Summary of theraphosid trade web sites from the internet.

Distribution, status and effect of trade on large-bodied (Mygalomorph) spiders of the genus *Poecilotheria* and other Theraphosid spiders in India.

Introduction

In 1998, the SSC Wildlife Trade Office in Cambridge contacted the invertebrate network of South Asia for information on tarantulas in the wild because the Sri Lankan government and the US Fish and Wildlife Service had proposed inclusion of the genus *Poecilotheria* under the Appendices of CITES due to increasing trade. Lack of information on these spiders since their first descriptions in early 1900s prompted us to take up a preliminary survey under the invertebrate network. During the course of the study we realised that there was neither a single tarantula expert in India and Sri Lanka nor even remote knowledge among spider biologists in the two countries on this charismatic group of spiders. Much of the information gathered on the distribution came from questionnaire surveys and from interviewing tribals, locals and forest guards/ officials in different forest areas of the country. A report of this preliminary finding was furnished to the SSC office. The information available on Eastern Hemisphere Tarantulas, we learnt, was not enough to justify including the group under CITES. However, trade in this group of spiders is continuing with some cases of confiscations (in Sri Lanka) and successful smuggling (from India) have come to our knowledge.

We worked with various agencies and individuals in 2000 in gathering more information on this group of spiders. We gathered information through the net on the aspects of trade in Indian and Sri Lankan tarantulas and learnt that not only the genus *Poecilotheria* is exploited, but also some species of other genera such as *Thrigmopoeus* and *Chilobrachys*. As part of our groundwork in understanding this group of mygalomorphs, we surveyed a forest area close to Coimbatore, southern India for tarantulas and with the help of the locals we could identify three nesting tree holes/ burrows. In 2001 we made efforts in identifying responsible biologists in different parts of the country who are willing to study the distribution and status of tarantulas in their area. Tarantulas are nocturnal and extremely sensitive and agile creatures that are missed easily by the untrained eye. Spotting them and identifying a potential tarantula habitat is a problem. To train the various stakeholders and ourselves in the techniques of field surveys, monitoring, identification and taxonomy, we organised a 5-day hands-on training workshop along with the Kerala Forest Department and the US Fish and Wildlife Service to train Indian spider biologists. The resource persons include three tarantula experts from Canada and the United Kingdom, who trained field biologists and foresters from 9-13 September 2001 at Parambikulam Wildlife Sanctuary, Kerala, India.

Objectives

The project was conceived to take care of the following objectives, of which only portions of points 1 and 2 below could be met due to lack of funds.

1. Survey, literature study, taxonomy and museum studies to determine distribution, identification and status all over India;
2. Ecological study to determine the effects of change in habitat structure, quality of habitat and threats from physical changes and from trade/harvest;
3. Population and habitat viability studies to understand the probability of extinction of tarantulas in various habitats and influences;
4. Develop conservation and management action plans;
5. Supply documentation on habitat, population status and trade information for CITES and the Indian Wildlife (Protection) Act;
6. Develop training manuals for customs, forest rangers, wildlife enforcers and amateur wildlife biologists;
7. Develop education materials for the general public, with specific reference to students;
8. Provide adequate data for recommending changes in policies for protection at the national and state levels;
9. Provide inputs into regional protection programmes (in South Asia);
10. Provide a model for similar studies on other highly exploited invertebrates in the country.

Methods

(a) Survey: Field surveys were undertaken to record presence/absence of tarantulas in different southern Indian states. The surveys included interviews with locals and tribals in forested areas, and of locals in areas nearby forests or in newly degraded areas. Postal questionnaire surveys were conducted throughout India of all biologists. In all, 25 trips were made to different areas throughout the study period (July 2002 – June 2003). Shorter/local trips were undertaken frequently before July 2002 and until July 2003 to study some of the local areas and record sightings and stories of locals.

Surveys in southern India were mostly conducted by Dr. Manju Siliwal. Each trip she was assisted by one or more collaborators, *viz.*, Sanjay Molur, Dr. B.A. Daniel, Dr. C. Srinivasulu, Sanjay Thakur, Vivek Gour-Broome, P.O. Nameer, Dr. Sapna Surendran, Ms. Binu Priya, and Dr. Rajashekhar Patil. Before June 2002, Sanjay Molur and Dr. B.A. Daniel conducted surveys locally and visited areas in Andhra Pradesh, Tamil Nadu and Kerala. In October 2002, Dr. Daniel and Sanjay Molur visited northeastern India to do very preliminary survey of the areas in Assam, Meghalaya and Sikkim.

The surveys indicated the presence of tarantulas (arboreal and ground forms) in the following sites:

Kerala: Parambikulam WLS, Mannuthy, Vellanikkara, Peechi-Vazhani WLS, Botanical garden of Peechi, Kollam, Thenmala, Ponmudi, Kannur, Wayanad, Pattikadu Reserve Forest, Periyar Tiger Reserve
Andhra Pradesh: Gooty, Nagararjuna-Srisailam, Eastern Ghats, Nandyal-Giddalur Road
Tamil Nadu: Arakonam, Siruvani, Mudumalai, Indira Gandhi WLS & NP, Top Slip, Kolli Hills, Eastern Ghats, Nagercoil, Kanyakumari District, Coimbatore Zoo and Conservation Centre, Anaikatti, Kothagiri.
Maharashtra: Melghat Tiger Reserve, Amba Valley, Turanmal, Tadoba NP, Bhramagadh
Karnataka: Kudremukh, In and around Mangalore University, Coorg, Bangalore
Assam: Basistha Reserve forest, Gauhati, Gibbon WLS, Johrat, Dipu Forest East Division, Karbi Anglong, Garampani, Karbi Anglong, Kaziranga NP, Nameri NP, Assam State Zoo-cum-Botanical Garden

(b) Literature survey: Theraphosids, although are big, there seems to be a distinct lack of literature about them from this region. Apart from publications in the 19th century, and some in the beginning of the 20th century, and mostly published abroad, literature was very difficult to access. Spider specialists from around the world were contacted to source literature, which eventually resulted in only 60% of the region-relevant publications on theraphosid spiders. Literature has been hard to come by due to various reasons such non-availability of old literature and the bulk of photocopying (if possible) available literature.

(c) Taxonomy: The taxonomy of theraphosid spiders is old and much of the work on this aspect was done in the late 19th century and the early 20th century by workers such as Pocock, Thorel, Simon, Karsch, Hirst, Ausserer, Walknaer, Chamberlin, Woodmason and Gravely. Indian spider authorities such as Dyal, Barman and Tikader later worked on this group in the mid and late 20th century. Collections of theraphosids in different museums reveal that due to the lack of proper identification keys and descriptions by the earlier workers, many specimens are wrongly identified. One of the premier institutes in India with arachnological collections of the past housed at Kolkata seems to have at least 75% of the theraphosid spiders wrongly identified. Taxonomy was a major limiting factor during this study, thereby forcing us to relegate species to the generic level, barring a few species that had characteristic identification keys that stood them apart, e.g. *Poecilotheria regalis* and *Poecilotheria metallica*.

(d) Museum Studies: During the course of this project several collections were observed, namely, Kerala Forest Research Institute's collection in the wildlife biology section, Madras Government Museum, Bombay Natural History Society collections, and the Zoological Survey of India branches at Kolkata, Pune and Chennai. Most of these collections were in a bad state of preservation. The holotypes in the British Museum of Natural History (which Sanjay Molur saw in June 2002) were not available for studies due to building renovation.

(e) Distribution: Although the above list of places are not extensive or exclusive, it gives a fairly good representation of the distribution of theraphosid spiders in southern

India and their presence in northeastern India. However, there are 56 species described till date and most of the above locations have at least 2 or 3 different theraphosid species. Due to the lack of proper identification keys and difficulty in collecting them, theraphosid presence/absence were determined through direct and indirect methods. In the case of arboreal tarantulas evidence were gathered from questionnaire surveys, direct sightings (in some cases) and from the presence of exuviae. Migrating males in different habitats were also sources of evidence for their presence. In the case of ground forms direct evidence was the only method of ascertaining their presence.

(f) Identification: Because of the lack of proper identification keys, theraphosids were identified only up to the genus level, with indication of close affiliation to certain species as and when specimens were available. In case of characteristic species like *P. metallica* and *P. regalis*, identification was not a problem. Following published literature we found that species identification is not conclusive based on the characteristics published. One reason could be that the species described earlier were based on very small sample size and from a very few localities. It is presumed that arboreal species are distinguishable based on leg patterns. In the study we found many combinations of characteristics that were not clear indentification patterns. Taxonomy is therefore an important aspect to be considered as a priority for this group.

(g) Status: Based on the studies described above we drew some conclusions on the status of theraphosids in India. However, since the study was not holistic, status could not be concluded for the entire country or the region. More studies on habitat characteristics, distribution information and effects of changing habitat and harvests are required before concluding the status of the species within this group.

Surveys

In the span of 18 months, we were able to survey 25 areas in six states of India (5 in southern India and 1 preliminary survey in northeastern India). The surveys were conducted in more than 50 locations, with concentrated effort in the states of Kerala and Andhra Pradesh, and a few sites in Tamil Nadu, Karnataka and Maharashtra. The northeastern Indian visit was based purely to understand the situation on the ground and peoples' perception of this group of spiders.

The areas visited along with the dates of visit are given in Tables 1 and 2.

Table 1: Institutional visits for literature survey and museum study

Date	Place	Purpose of visit
16– 20 Sep 02	In and around Mangalore University	Literature survey and photographing spiders
30 Dec 02 - 8 Jan 03	Zoological survey of India, Pune	Literature survey
19-30 May 2003	Zoological Survey of India, Kolkata	Museum specimen study (Theraphosids)

Table 2 : Field trips during the course of this project.

Date	Place	Direct sighting of Species	Indirect evidence of the species presence	Members
Jan. – May 02	Parambikulam WLS, Kerala	*Thrigmopoeus* sp. *Poecilotheria regalis, P. striata, Chilobrachys* sp.	Ground theraphosid burrows Manju Siliwal, Sanjay Thakur	Sanjay Molur, B.A. Daniel, Binu Arthur,
	Around Gooty, Andhra Pradesh	*P. metallica, P. regalis, Chilobrachys* sp.		Sanjay Molur, B.A. Daniel
	Siruvani, Tamil Nadu	*P. striata, P. regalis.*		Sanjay Molur, B.A. Daniel, Binu Arthur
	Mudumalai, Tamil Nadu	*P. regalis*		Sanjay Molur, B.A. Daniel
	Masangudi, Tamil Nadu	*P. regalis*		Sanjay Molur, B.A. Daniel
21-26 June 02	Mannuthy, Vellanikkara, Pattikadu, Peechi, Kerala	*P. striata*	*Poecilotheria* sp.	Sanjay Molur, B.A. Daneil, P.O. Nameer, C. Srinivasulu, Sanjay Thakur, Vivek Gour-Broome, Varad Giri
8-13 July 02	Nagararjuna-Srisailam, Eastern Ghats, Andhra Pradesh	*P. regalis*	*Poecilotheria* sp. nest on tree	Sanjay Molur, Manju Siliwal, C. Srinivasulu, Bhargavi Srinivasulu, Neil Cox
26-30 July 02	Mannuthy, Kerala	*P. striata*		Sanjay Molur, C. Srinivasulu, Sanjay Thakur, Vivek Gour-Broome, Varad Giri, B.A. Daniel
12-13 Aug 02	Indira Gandhi WLS & NP, Top Slip, Tamil Nadu	*Thrigmopoeus kayi Poecilotheria* sp.	Small burrows of ground theraphosid	Sanjay Molur, Manju Siliwal, B.A. Daniel, Kulandaivel
20-21 Aug 02	Kolli Hills, Eastern Ghats, Namakkal District, Tamil Nadu	Dipluridae. No confirmation of Theraphosid spiders in this heavily degraded area.	Many burrows were observed on roadside bunds, but none confirmed for Theraphosid	Sanjay Molur, Manju Siliwal, B.A. Daniel, Kulandaivel
20 Aug– 4 Sep 02	Melghat Tiger Reserve, Maharashtra	*Poecilotheria sp.*		Sanjay Thakur
21-29 Aug 02	In and around Kollam (Thenmala, Ponmudi) in Kerala and Nagercoil, Dist. Kanyakumari, Tamil Nadu.	*Thrigmopoeus* sp, other unidentified ground theraphosids	Many burrows of ground theraphosid were observed on roadside bunds.	Manju Siliwal, Binu Arthur
16-20 Sep 02	In and around Mangalore University, Kudremukha	*Thrigmopoeus insignis*		Manju Siliwal, Rajashekhar Patil
16-28 Oct 02	Northeastern India Assam, Meghalaya	Unidentified ground theraphosids	Ground/arboreal (not known) theraphosids as described by people	Sanjay Molur, B.A. Daniel

13-15 Oct 02	Indira Gandhi NP & WLS, Topslip	*Poecilotheria* sp., unidentified ground spider, *Thrigmopoeus* sp. and *Thrigmopoeus kayi*	Small Ground theraphosids	Manju Siliwal, Ravichandran, Gnanaselvan
21 Dec 02 - 8 Jan 03	Maharashtra (Tadoba NP and Bhamragadh)	No direct evidence	Known only from literature.	Manju Siliwal, Sanjay Thakur
24-28 Dec 02	Dehra Dun	No direct evidence	Photographic evidence	Sanjay Molur
7-15 Feb 03	Kannur and Wayanad districts, Kerala	Egg sac, adult and spiderlings of Thrigmopoenae; many unknown ground forms	Peoples' descriptions of wall (arboreal?) forms	Manju Siliwal and Sapna Surendran
19 Feb 03	Coimbatore Zoological Park & Conservation Centre, Anaikatti, Tamil Nadu	No direct sightings	Burrows of ground form	Daniel, B. A., Binu Arthur, Manju Siliwal
27 Mar- 1 April 03	Botanical garden of Peechi, Pattikadu ReserveForest, Periyar, Kerala	*Poecilotheria* sp. Burrows of ground form	Burrows of ground form	Manju Siliwal and Sapna Surendran
13-16 May 03	Kalakkad-Mundunthurai Tiger Reserve, Tamil Nadu and Periyar Tiger Reserve, Kerala	-	Arboreal theraphosids as described by people	Manju Siliwal, Padma Priya
1-19 June 03	Nagarjunasagar- Srisailam Tiger Reserve, Andhra Pradesh	*Poecilotheria regalis*, spiderlings, exuvia, three adult females	-	Manju Siliwal, Srinivausulu, Venkatesh, Rajesh, Shivrama
21-29 June 03	Kalakkad-Mundunthurai Tiger Reserve, Tamil Nadu and Periyar Tiger Reserve, Kerala	Four *Poecilotheria* sp., Unidentified ground theraphosid/ctenizid	Ctenizidae burrow	Manju Siliwal
4-11 July 03	Kodagu, Karnataka	Thrigmopoenae member	Arboreal theraphosids described by people in coffee plantations	Sanjay Molur
6 Aug 03	Moongilpallam, Anaikatti, Tamil Nadu	*Poecilotheria regalis* (male)		Manju Siliwal

Observations and Discussion

Most of the areas we studied were either in a state of degradation, or with teak plantations. Only a few locations, such as the Kalakkad-Mundanthurai Tiger Reserve arboreal theraphosids were observed in primary forests; similarly, in Indira Gandhi Wildlife Sanctuary and Kudremukha National Park ground theraphosids were seen. All other sightings were in secondary forests, or in teak plantations.

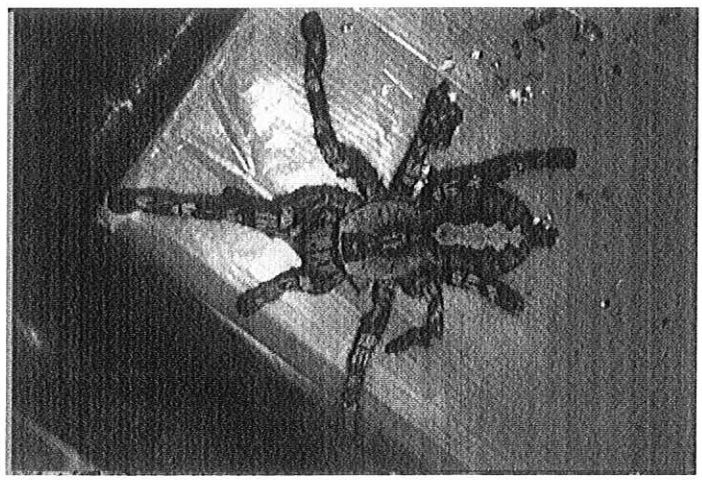
Wherever arboreal theraphosids were sighted it was difficult to determine whether their sighting was due to lack of thick vegetation or due to the presence of a few tree holes. Arboreal forms were difficult to sight in well-wooded areas and in thick forests although it is known from observations and local knowledge of their occurrence there in good numbers. This again could be due to adequate spaces available for the extremely tactile-sensitive forms to hide when being searched. It is believed that old forests have huge trees with many holes that provide adequate cover, thus promoting a healthy population.

However, further studies are needed to determine whether there is a difference in abundance and species composition of arboreal forms between original forests, secondary forests, plantations and degraded forest habitats.

Different habitats from which arboreal theraphosids were collected include teak plantations, banana plantation, primary evergreen forest, secondary moist and dry deciduous forests, highly degraded (lopped) secondary forests and in human habitations close to a wooded area in moister habitats.

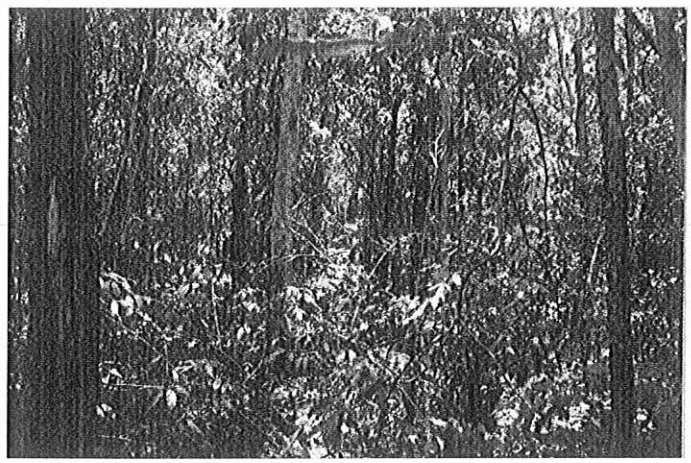
Teak plantations: This is the most common vegetation available in forested areas still preserved in southern India. Teak plantations have been managed by the forest departments as timber species since long. Many areas in southern India have teak monocultures in reserve forests and protected areas. In our observations we noticed only two species of *Poecilotheria* (*P. regalis* and *P. striata*) patchily distributed in teak plantations. In a block that was observed for over two years, we noticed teak plantations with natural tree holes to contain some individuals, while other areas with not as many holes did not contain any. It is not well understood as to whether the presence of these spiders in some patches as opposed to a more continuous distribution is due to their biology or due to scattered availability of food resources (cicadas, gekkos, juvenile skinks and juvenile agamids).

We observed a difference in relative abundance of *Poecilotheria* in older teak forests with mixed vegetation and younger monocultures with the former having a higher density than the latter. Preliminary inferences suggest that older mixed forests are more suited.



Banana plantation: In only one instance one big adult female was found in a banana plantation close to the city of Coimbatore. The animal was hidden in the banana stem between folds and was sighted by accident. More enquiries of the locals, farmers and cultivators did not yield any further knowledge on their occurrence in this agro-ecosystem. The picture is of an adult female of *Poecilotheria regalis* collected from the banana plantation.

Primary forests: Not enough of primary evergreen or deciduous or rainforests were examined as not many primary stands are left in southern India, if present access was difficult and permissions from the forest departments were not easy. Only one location with primary evergreen trees (at Kalakkad-Mundanthurai Tiger Reserve) were examined for a week, which yielded a few individuals of unknown species composition of *Poecilotheria*. Since we were unable to collect the individuals, we were not able to identify them. However, all of them seemed to be new to science.



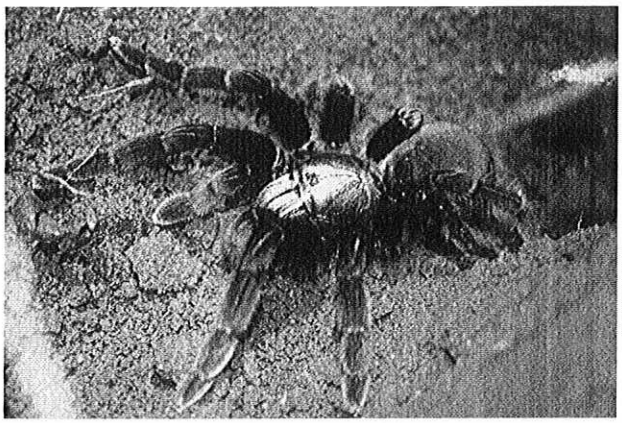
Secondary forests: A few areas of secondary forests were searched. It was easier to observe arboreal theraphosids in relatively less abundant secondary forests compared to well-wooded forests due to accessibility and most probably due to the sensitive tactile perceptions of the species. Like in teak plantations, we feel that the older forests have more species and abundance compared to younger or sparsely wooded forests. However, this must be examined thoroughly using standard methods of relative densities for theraphosids.

Degraded (heavily lopped) forests: In one area where the most brilliantly coloured arboreal theraphosid, *P. metallica* was found, the habitat was highly degraded due to human activities. The habitat did not support any tree more than 10 feet in height, and the two juvenile specimens of this species (rediscovered after 102 years) were found in small holes on two short trees with branches lopped up to 6 feet from the ground. The area, which is supposedly the species' distribution range is under heavy habitat loss and no adults were found. The existence of arboreal theraphosids in such degraded areas cannot be construed as their capability to adapt until further studies are done to prove if this is true. It is popularly believed by smugglers and traders that degraded habitats are suitable homes for theraphosids. This we feel is a very shortsighted inference and the bias is due to the implications on trade.

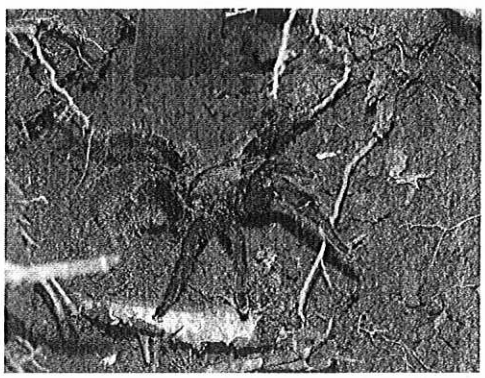
Human habitations: Most of the specimens we studied were males and were collected from human habitations in well-wooded areas. The reason for this is that males tend to migrate in search of females and are usually seen easily in man-made structures where they can find grooves and crevices in the roof, windows, plinths or walls. We have also heard many locals who think these spiders are dangerous, fast and can fly, and therefore kill and burn when one is found. The hair is also considered poisonous. Throughout southern India locals exposed to arboreal theraphosids believe that these animals are dangerous and their bite can cause grievous wounds, muscular dystrophy, paralysis and hallucination. In some cases the patients also complain of neurological problems in the bitten area and in the limbs every lunar cycle and/or annually on the day of the bite.

Ground theraphosids were more commonly sighted in different habitats compared to arboreal theraphosids. Some common habitat requirements of the ground forms are moist soil, shady overhang and vertical or sloping bunds. In some cases they were found on level ground in loose red soil substrate. Unlike arboreal forms these spiders are variedly sized depending on the

genus. The largest species are of *Thrigmopoeus* genus, followed by *Haploclastus*, *Chilobrachys* and the smaller *Annandaliella*. They are heat and light sensitive positioning the opening of the burrows for optimum conditions inside the burrow.



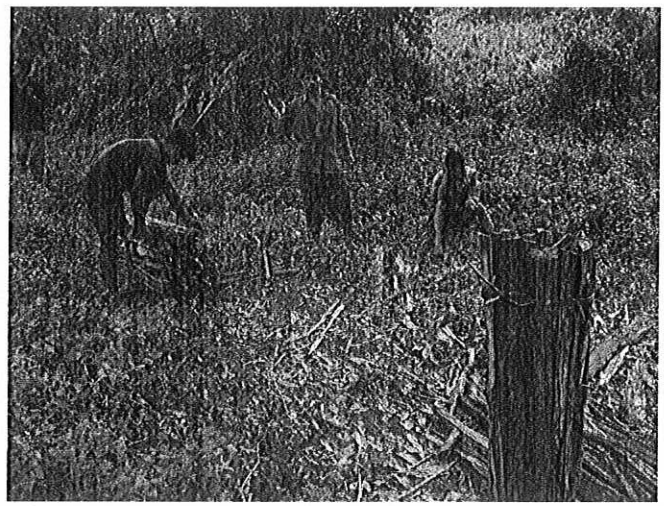
As in the case of *Poecilotheria* spp., the ground forms are also patchily distributed. In only one occasion, a continuous aggregate of burrows were noticed of *Thrigmopoeus*. Normally, the burrows are sparsely distributed and aggregated in a very small area. However, more work needs to be done to identify the abundance of such forms and habitats they occupy. Many of the sightings were purely incidental, rather than by any elaborate search-and-find method. A systematic technique needs to be followed in the case of the ground forms.



Although these forms thrive on bunds, naturally occurring bunds are rare. Several threats such as road expansion works and other forest development works and landslides could cause serious damage to populations. Usually the populations we observed during the study

were under good canopy cover. In rare cases open area bunds with a few burrows were sighted.

Threats



Easily identifiable threats on the ground are habitat loss and fragmentation. Logging is a major threat, which was noticed in many areas, especially where the rare *P. metallica* was seen. Since fragmentation is a universal threat, it is difficult to conjure of places with contiguous habitats enough to support large populations of these large-bodied spiders. In the case of ground forms, expansion of roads and other forest development activities are serious threats. Given these broad-based threats, others such as harvesting of individuals for different purposes could have a major impact on the populations. Killing of migrating males by locals and collection of females and some males by collectors for trade could have serious consequences in the locality where they are collected from. Since the spiders are patchily distributed, and very little is known, it could well mean that collecting from a single area could impact drastically a highly restricted species.

More studies however are necessary to prove the impacts of harvests and the impacts of habitat change on densities and species composition of these large-bodied spiders.

Observations in captivity

Nine individuals belonging to three species of *Poecilotheria* and ten individual of ground forms belonging to genera *Thrigmopoeus* and *Chilobrachys* were maintained in captivity to study behaviour, breeding, life-cycle, food preference, food intake rate, molting intervals, etc.

Behaviour: General behaviour of the spiders was observed daily. It was observed that arboreal forms came out and explored the habitat. Females preferred to stay inside more than males and only occasionally came out. Molting invariably takes place during nights and special webs were prepared by many individuals for molting. Records of each molt is maintained for each species.

Breeding: We were unable to observe any breeding behaviour in *Poecilotheria* spp. due to lack of adequate number of females. In only one instance we wrongly assumed the female to be mature and released a mature male into the enclosure, but the juvenile female consumed the only adult male of the species in our collection. The female is not yet mature.

Observations in ground forms was difficult. Since we had kept the fround theraphosids together in an enclosure, we learnt later that many had been cannabalised.

Life cycle: Life cycle of males was completely studied but as there is no captive born individual its difficult to estimate the correct age of the *Poecilotheria* spp. Male *Poecilotheria regalis* survived for 14 months after the final molt. Molts for each species are maintained for comparative work. Molts are helpful in studying the growth of spider as well as leg pattern for species confirmation.

Food preference: Spiders were usually fed gecko, grasshoppers and occasionally fed with dragonflies, cockroaches and male termites. Due to the limitation of the diversity of prey species we could not provide them more diverse food.

Arboreal forms thrive well in captivity. A few interesting observations were made during the study like male *Poecilotheria striata* spinning a sperm web. Males generally died in between 14 to 24 months because of aging. It is more difficult to study ground forms as they spend most of the time in the burrows. Ground forms also do not dispose off molts properly to obtain intact specimen for studies.

Appendix I
Some technical notes on Indian theraphosids

Tarantulas have gained popularity in the trade market because of their aesthetic beauty (or attractive coloration) and hairy body. Every year number of species are traded from India to the western countries. Generally, all large hairy spiders are referred to as Tarantula but actually, tarantulas are spiders belonging to the family Theraphosidae.

Tarantula are the biggest of spiders. All tarantulas are hairy and of different sizes. They can be distinguished from rest of mygalomorphs by presence of well developed scopulae on ventral side of the leg, claw tufts, distinct anterior maxillary lobe. Till date, about 850 species of tarantula are known to the world. Out of which, 56 species are reported from India. No much transformation or change in the taxonomy of family Theraphosidae have undertaken. One of the reasons for this is that they are poorly studied in India.

Tarantulas are found in rainforests and deserts. They are cryptic, crepuscular and nocturnal in habit. During the day, they hide in their burrows, which are either made in the ground (fossorial) or in tree holes (arboreal). They are sensitive to climatic conditions and strong vibrations. These spiders usually don't come out of their retreats in conditions like rains, wind, movement or excessive light. During drought, excessive rains or winters, they seal the entrance of their burrow with silk and sometimes even cover it with dry leaves for the entire season. Only in the favorable conditions, they come out of their burrow/retreat at dusk.

Theraphosids are 'sit and wait' predators and live in a world of vibrations, seeking prey and defense from predators. They are very sensitive, thus on slightest sign of danger or any disturbance/vibration near their burrow, they go deep into their burrow/retreat and sometimes don't come out for the whole night or many hours. They prey upon insects, rodents, lizards, and small birds. Through their fangs, they pump venom into the prey, paralyze it and then suck the body fluid of it.

Based on burrow, Theraphosid spiders can be categorized into two main groups — opportunistic burrower and obligate burrower. Opportunistic burrowers include spiders like *Poecilotheria*, which never make their own burrow, rather occupy natural tree holes/ cavities, rock faces, human dwelling or pre-existing burrows made by other animals like Woodpecker, rodent, etc. They remain in the same burrow till it becomes too small or prey levels don't satisfy their growth needs. Whereas, obligate burrowers dig their own burrows in the earth and they remain in the same burrow for a life stage and enlarge it as they grow. They are found in soil-specific habitats and thus make burrows in well-drained soil like road-side bunds/road cuts. Soil preferred by these animals is either sandy or loamy, which is easier to dig.

Basic difference between Old and New World Tarantulas is that Old World Tarantula have no urticating hair. Whereas, 95% of New World Tarantulas like members of

Theraphosinae and *Aviculariinae* (in part) have urticating hair on their abdomen. The remaining 5% of the New World tarantulas like members of genera *Holothele*, *Spelopelma*, *Psalmopoeus* and *Tapinaurchenius* have no urticating hair. Moreover, New World Tarantulas are more docile, hirsute and larger while Old World Tarantulas are more excitable, agile, bite more readily and are believed to be more venomous. New World tarantulas live up to 25years and have slow development due to which it takes ten years to mature in some species. While Old world tarantulas live up to 8 years and mature more quickly i.e. within 1-3 years.

In wild, distribution of Theraphosids is either random or aggregated and reasons for this could be that

a. They prefer very specific habitat.

b. Due to various threats like Anthopogenic pressure, Habitat destruction/ fragmentation, forest degradation, etc. no uniform habitat is available and there is habitat heterogeneity.

c. They are poor dispersers and offspring do not travel far from the nests/burrows.

Study Area:

Based on geographical location/distribution, study area is divided into five units/regions

1. Western Ghats
2. Eastern Ghats
3. Northeastern India
4. Northern India
5. Andamans & Nicobar Islands

Western Ghats:

It is one of the twenty five hot spots of the world and is known for its richness in biodiversity. Different types of habitat like Evergreen forest, Moist Deciduous Forest, Dry Deciduous Forest, Bamboo dominating forest, Scrub jungles, etc. exists in the Western Ghat. Literature survey reveals the occurrence of 32 species of family Theraphosidae in the Western Ghats. Due to the favorable habitat, diversity and density of Theraphosids is maximum in this area, as per our current knowledge.

Northeastern India:

It covers evergreen forest and because of which humidity is always high. Thus, it is an ideal habitat for may Theraphosids, especially ground forms. About 14 species of Theraphosids are reported from this area.

Northern India:

Diverse/Various types of habitat like, Evergreen forest, Desert, Dry deciduous forest, Moist deciduous forest, etc. are found in this region. Only five species of Theraphosids are reported from this area. This area is not surveyed properly for the Theraphosids and extensive survey is required to conducted.

Statement of accounts

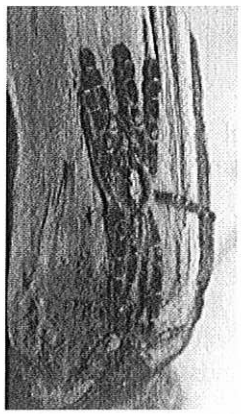
Expenses	As per proposal (£)	Actual expenditure (£)
Local Travel	1000	
Accommodation	500	
Food	500	1895
Counterpart wages Researcher @ Rs. 8.000 per month for one year Rs. 96,000.00 (Pounds 1391.00) Other assistance + honorarium + field help (Pounds 500.00)	1500	1891
Field equipment		
GPS (Garmin)	200	223
Digital Camera (Olympus 20N)	800	1366
Stationery and communication	500	523
References and photocopying, books	100	118
	5100	**6016**

Travel/ Food/ Accommodation details

Date	Place	Travel/ Food/ Accom. (INR)
22–26 June	Mannuthy, Vellanikkara, Pattikadu, Peechi, Kerala	6350.00
8-13 July 2002	Nagararjuna-Srisailam, Eastern Ghats, Andhra Pradesh	12992.00
12-16 Aug 2002	Indira Gandhi WLS & NP, Top Slip, Tamil Nadu	5278.00
20–21 Aug 2002	Kolli Hills, Eastern Ghats, Nr. Namakkal, District Salem, Tamil Nadu	5259.00
20 Aug–4 Sep 2002	Melghat Tiger Reserve, Maharashtra	5980.00
23–25 Aug 2002	In and around Kollam (Thenmala, Ponmudi) in Kerala and Nagercoil, Dist. Kanyakumari, Tamil Nadu.	9494.50
16–20 Sep 2002	In and around Mangalore University, Kudremukh	3519.00
16–28 Oct 2002	Northeastern India	48808.00
13–15 Oct 2002	Indira Gandhi NP & WLS, Topslip	1875.00
21 Dec 2002 - 8 January 2003	Maharashtra (Tadoba NP and Bhramagadh)	11536.00
24-28 Dec 2002	Dehra Dun	12328.00
7-15 Feb 2003	Kannur and Wayanad districts, Kerala	7394.00
Total		**130813.50 ~ £ 1895 ***

* 1 UK Pound Sterling = Rs. 69.00 (in January 2002).

What this project has achieved for species conservation



1. For the first time an entirely focused exercise was conducted to understand the distribution of theraphosids in southern India.
2. Rediscovery of a rare species after 102 years, possible discovery of new species, range extensions for a few species.
3. Some basic information on habitat and occurrence of theraphosids for further elaborate studies.
4. Information from this study was submitted to the Government of India, who took it up to the discussion level for inclusion in the Wildlife (Protection) Act. However, the spiders are still not included onto the list as more information on habitat, threats, densities and effects of harvest are needed.
5. The project has created awareness amongst foresters and researchers in many areas, and amongst locals and tribals.
6. Custom officers in a few places and the wildlife regional offices around India have been sensitized to the aspect of illegal trade in this group of spiders.
7. At least six scientific papers are under preparation for publication in peer-reviewed journals.

Critical future needs

This study has helped in realising the distribution of theraphosids in the country, without being species specific. However, to understand the actual status of this group in general and species in particular, the status of habitats, changing habitat quality with regards to population structure and impacts of harvests due to international pet trade, thorough and focused study for 12-18 months is required. It is generally understood from this study that the group is facing some critical threats, but to pinpoint specific causes and rates of loss and probability of extinction, a few populations in a few habitats have to be monitored closely for at least 2-3 years. This kind of detailed study could guide general principles in invertebrate conservation, status and recommendations in the region. Studying a cryptic species groups such as Poecilotheria could lead to parallel recommendations for other harvested species such as colourful beetles of the family Brupestidae and butterflies that are in heavy international trade pressure.

Project summary

A proposal for a three-year study was submitted in October 2001 for the Whitley Award. The proposal was sanctioned for Pound Sterling 5,000.00 under the Rufford Small Grant on 18 December 2001. The funds were received on 11 January 2002, which is when we started the work. Due to extensive traveling involved in this project we requested for an extension of 6 months, and submitted an interim report in September 2002. Although the project is not complete, we have finally used up all the funds from the initial grant in August 2003. Unfortunately, due to a computer crash we could not send the final report in August 2003. We apologise for the same.

Eastern Ghats:
It consist of dry deciduous forest with some patches of evergreen shoals. Thus, only the sturdy spider, which can withstand hot climate (or harsh climate) can survive in this region. Usually, Theraphosids in this region are found near some perennial water body or in evergreen shola, where prey is available and high humidity remains throughout the year. Six species of Theraphosids are known to occur in Eastern Ghats. Species like *Poecilotheria metallica, P. miranda* are endemic to this area.

Methodology:
1. For Presence-absence study, a random stratified sampling carried out in the protected area.
2. Absolute density: Line transect or Quadrat sampling were carried out.
3. Spiders were collected by handpick method.
4. All the spiders encountered during the survey are photodocumented.
5. Habitat and other ecological parameters were noted down on Data Sheet
6. Species identification by using various standard monographs.

Observations:
As mentioned above Theraphosids are poorly studied in India, we don't have any information about their life cycle. Thus, various protected as well as non-protected areas were surveyed for knowing the presence absence study of Theraphosids. And following are the species, which were sighted during the surveys.

Genus *Poecilotheria*
Due to their bigger size, hairy appearance, dangerous disposition, aesthetic beauty and vivid colouration the members of Genus *Poecilotheria* are attractive and favourites amongst pet trader. Dorsal side of *Poecilotheria* sp. is ornamented with either stripes or blotches of brown and gray, which resembles their background (tree trunk with overgrowth of lichens and moss). Due to their camouflaging coloration, they remain unnoticed by their prey as well as predators. Ventral side the spider is deep-brown or black in colour. Appendages on the ventral side have white, black or yellow bands and scopulae. When the spider is in defensive mode it lifts or raises its body, anterior two pair of legs and palps forming a scary posture to warn the opponent of possessing poisonous apparatus and irritating bristles. In addition to this posture, they also make hissing sound with the help of their stridulatory organs between the mandible and the palp to scare the opponent.

Seven species of genus *Poecilotheria* are known to occur in India and about five species in Sri Lanka.

1. *Poecilotheria regalis* Pocock, 1899 (Indian Ornamental)
This species can be distinguished from other species by presence of longitudinal broad band on the epigynal area (ventral side of the abdomen). It is most widely distributed and common species of this genus. Thus, it is one of the most common species amongst the Indian *Poecilotheria* sp. in pet trade.

In India, it is reported from Nilgiri Hills, Annamalai Hills, Madras Shencottah, Mudumalai, Coorg, Mysore, Matheran, Dahanu in Thana district, Travancore, Palghat gap, Arkonam in Arcot district, etc.

Apart from these areas, we found *P. regalis* in few new localities *viz.*, Nagarjun-Srisailam, Parambikulam Wildlife Sanctuary, Peechi, Mannuthy, Vellanikkara, Siruvani, Mudumalai, Gingee hills, Bangalore, etc.

Past research shows that *P. regalis* is found on teak trees but apart from this, we found them on *Calophyllum* tree, bamboo holes, train compartment, roof of the houses, etc. It is also observed that these spiders mostly occur on the fringe of forest. To substantiate this observation, intensive night surveys are required to be carried in different protected and non-protected areas. Pocock (1900) observed this species feeding on a small rat. No such feeding observation was made by us.

2. *Poecilotheria striata* Pocock, 1895 (Mysore Ornamental)

It shares the same habitat as that of *P. regalis*. Mostly found in evergreen forest or moist deciduous forest with old teak trees. Like *P. regalis*, sometimes this species is also found in houses. In India, its distribution is restricted to Western Ghats. It is reported from Mysore, Trivandrum and Quilon. We found few new localities (that too in Western Ghats) like Siruvani, Pattikadu, Peechi, Parambikulam Wildlife Sanctuary, etc. This spider also needs more intensive survey to know its distribution in various habitats in India.

3. *Poecilotheria metallica* Pocock, 1899 (Gooty Ornamental)

It is the most beautiful species of genus *Poecilotheria*, has metallic blue-green colouration. Pocock (1899) described it on the basis of a single female specimen from Gooty. The specimen he got was from the timber logs, which had come to Gooty railway station for transport. Thus, there is no description about its habitat. After hundred years, it was rediscovered by our team in the Eastern Ghats of Andhra Pradesh. Its habitat is described for the first time over here. It is found in a dry deciduous forest, did not have much teak plantation but was a young secondary forest with a mix vegetation/plantation. It was found on a tree trunk with a very hollow depression or fold instead of any big hollow in the tree. This spider had built a very scanty silken lining (unlike other species of *Poecilotheria*), which was almost unnoticeable. Two immature individuals of this species were found in the same area.

4. *Poecilotheria rufilata* Pocock, 1899 (Redslate Ornamental)

Pocock (1899) described one female and one male from Thiruvananthapuram in Kerala. In present study, it is found form various locations in Kerala like Mooluthala in Nammamukku, Malapuram, Calicut, Irikkur, Kudiyanmala, Edayas, Pesavur, Kottiyur Reserve Forest, Nilambur, Agasthyavanam Biological Park, Vazhachal Forest, Kulathupuzha, Thenmala, Quilon, etc. From the distribution it seems to be endemic to Kerala (that this species is predominantly found in Kerala). It is a general concept that *Poecilotheira* are found in teak plantation but results of present study reveals its

occurrance in various habitats like Sacred Groves, Coconut, Palm tree, road side trees, houses near forested area, etc.

5. *Poecilotheria miranda* Pocock, 1900

It is reported by Pocock (1900) from Chaibassa, Kharangpur Hills, Singbhram, of Chota Nagpur in Eastern Ghats. We also found it in Simlipal Tiger Reserve, Orissa. Now Chota nagpur area comes under/shared by three states *viz.*, Orissa, Jharkhand and Bihar. Habitat is dry deciduous forest. Due to naxallite problem, no much work is carried out in this area.

6. *Poecilotheira formosa* Pocock, 1899 (Salem Ornamental)

It is reported from Kadiampatti, Mallapuram in Salem dist., Madras, Shevaroy Hills, etc. From the distribution it is clear that this species also prefers dry deciduous forest of Eastern Ghats. Our team conducted surveys in Kolli Hills but could not sight the animal. We got indirect evidence of its presence in this area. Intensive surveys are required to know the present status of this spider in wild.

Ground forms

Most of the Theraphosids (except members of Genus *Poecilotheria)* are ground forms. They live in burrows and are brownish in colour. Amongst the ground forms *Chilobrachys* have attended the highest degree of specialization (Gravely, 1915). Ground forms are found on road-side bund or road cuts, on the forest floor, decaying wood, decaying vegetation, etc.

Genus *Thrigmopoeus*

Genus *Thrigmopoeus* is represented by three species in India and during present study could sight two species of it. Members of this species live in burrows usually made on road side bund or road cuts. Diameter of the opening of burrow of an adult spider ranges from 3-3.5inches. Young ones prepares smaller burrows (about 1-1.5inch in diameter). Burrows were found at different height on the bunds ranging from 1to 20 ft.

Thrigmopoeus kayi is found from Parambikulam Wildlife Sanctuary, Thenmala, Indira Gandhi Wildlife Sanctuary, etc. Whereas, *Thrigmopoeus insignis* is found in Kudremukh National Park, Jog falls, Mysore, almost all parts of Karnataka, Indira Gandhi Wildlife Sanctuary, etc.

In Kudremukh NP, density of *T. insgnis* in this area was 12 burrows/ square meter area. The density was very high in the protected area. But it was observed that immediately outside of the KNP there were bunds but could not find a single spider of this species. Outside the protected area there was not enough vegetation and the conditions were dry. This shows that if proper habitat is available to these animals they can flourish well.

Genus *Chilobrachys*

Our team located the species of this genus in Parambikulam WLS, Kolli Hills, Ponmudi, Thenmala, Nagzira, Amba Valley, Sanjay Gandhi National Park, Indira Gahndhi Wildlife

Sanctuary, Kudremukh, Siruvani, Gooty, Nameri NP, Assam Zoo, Nagarjun-Srisailam Tiger Reserve, Nagercoil, etc.

Specimens of ground forms we could not identify:

Unknown sp. 1.

A member of Therigmopoenae was found on a road side bund in Kaidakolli, Wayanad, Kerala. Its state highway, which goes to Mysore from Mannathawady. Spiders were in plenty on the bund. Bunds height was about 12ft. On the top of bund there was bamboo plants. Dry leaves were fallen on the bund. The bund was facing East. Opening of the burrow was having dry leaves or twigs. We found many burrows of various diameter ranging from 15-55mm. The opening was either straight or towards upward. On digging, we found certain burrows had multiple channels, leading to one single / hole/burrow. Largest burrow was 1.5inch in diameter and 1ft deep. Two big burrows were dig for knowing the species. On doing so, we found egg sac hanging like a cradle at the end of the burrow. Dimension of egg sac was 22x27mm. Winter/Post Winter (January-March) is time breeding time for members of Thrigmopoenae.

Unknown sp. 2.

At Kallar in Ponmudi, Kerala, we found many small Theraphosids in small burrows on vertical bunds. Bund's height was 20 to 22ft and it was covered with mosses, leaf whorls and young sapling of fern. Unlike other Theraphosid ground forms, the burrow was in the form of tiny hole with scanty silk lining and didn't have any leaves or twigs attached at its opening. Burrows were noticeable only at a close view i.e. about 1ft distance. Each burrow was having two openings and distance between both the openings was 2 to 3 cm. The outer layer of the soil was sandy and thus the burrows of these spiders were not deep (usually about 2 to 3cm deep). Spider was about 20mm in total body length. Species confirmation/identification is yet to be done.

Unknown sp. 3.

On ficus tree we observed a termitoria at St. Maurus Monestery, Nagercoil, Tamil Nadu. On disturbing the termatoria we found two spider coming out of the other end of the termatoria. On collection we found it to be Theraphosids. Their total body length is about 20-25mm. There was no projection on its opening and it seem to us that abundant termatoria was secondarily occupied by these Theraphosids. Habitat of this area was dry and rocky. At the base of ficus tree there was lot of leaf litter and the soil was porous because of humus. Animals are collected and yet to be identified.

Unknown sp. 4.

In Karian Shola, Topslip, Indira Gandhi Wildlife Sanctuary, we found a grayish-black spider below decaying wood. The spider was found in burrow/ nest like *Filistata* sp. i.e. flat burrow (parallel to the ground) and had two opening. Spider was immature and thus not collected. Photographs were taken for the species. Due to rain, the ground was moist and thus the web or burrow of this spider was not easily noticeable.

Unknown sp. 5.
At Topslip, from the decaying tree, a burrowing Theraphosid was collected. Its difficult to identify whether to call it as Arboreal form or Ground form. It is small form of arboreal form. Spider is video-documented by Mr. Gnayanselvan. It does not match with any of the available literature.

Unknown sp. 6.
During our North-East trip, we come across many ground spiders. Spiders in big burrows could be *Haploclastus*, whereas there were many small ground forms of Theraphosids, which could not be identified in the field. About 20 burrows were observed in Assam Zoo. Photograph of few species is taken and will be identified. Habitat was moist evergreen forest with teak plantation. Few burrows were found on the pathway (less used) near a small river.

Unknown sp. 7.
At Kurwadeep Bird Sanctuary, Wayanad, Kerala, on an old Irimpagam and Zhaval trees trunk we found plenty of burrows. Each burrow had two openings and distance between both the opening was about 5mm. On teasing out the burrow we found a matured female with an egg sac carrying in its chelicerae. Size of the spider is 20mm. Egg sac was like a ball in shape and its diameter was about 10mm. Spider had tightly holed the egg sac in its chelicerae. Similar burrows were also found at the base of bamboo plants and road side bunds (2.5ft height). Opening of these burrows were closed and was covered with dry leaves. Whereas the burrows found on the tree trunk were open and from these burrows we found females with egg sac. Winter/Post Winter (January-March) is time breeding time for these spider.

One interesting observation was made by us at Kolli hill. We found small ground spider burrows on road side bund about 1-2ft above ground level. All the burrows were projected out and opening was having dry leaves and straws. Inside the burrow there was silk lining. Diameter of the burrow was less than 10mm and all burrows were having double opening, each were about 1inch apart. Spider was not hairy but was having robust and big chelicerae. Spiders were collected and later on identified to be members of family Amourobiidae. This shows that Amourobiidae also prepares burrow resembling ground Theraphosids.

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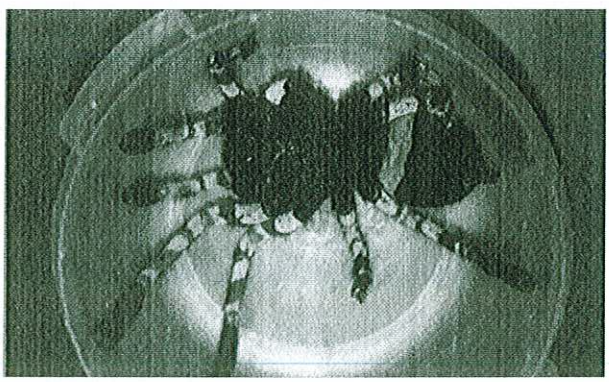
Appendix II
Some photographs from the field and of the project

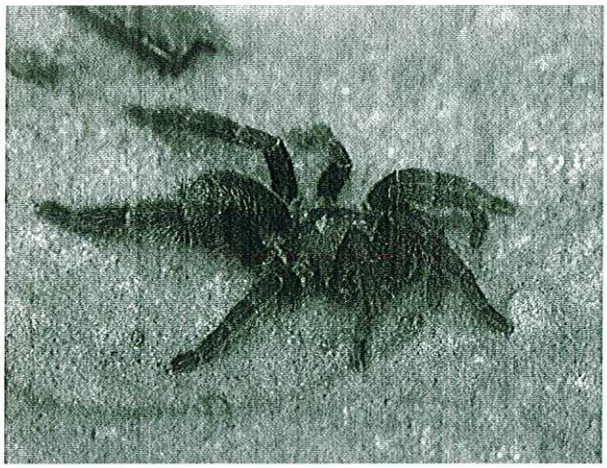
Annandaliella sp. with egg sac at Wayanad, Kerala

Measuring a burrow opening of *Thrigmopoeus* sp. at Top Slip

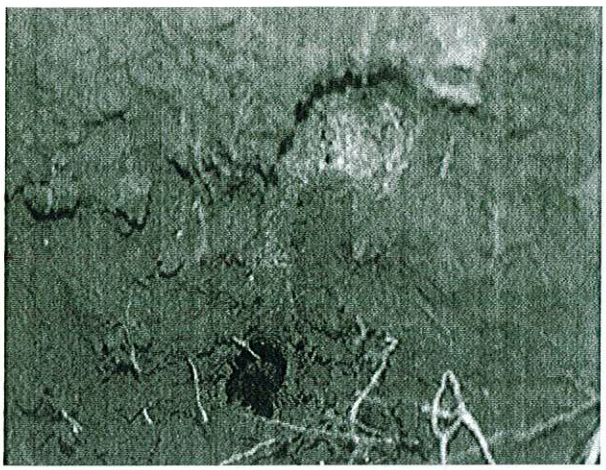
Egg sac of an unidentified ground theraphosid revealed in the inner chamber when excavated.



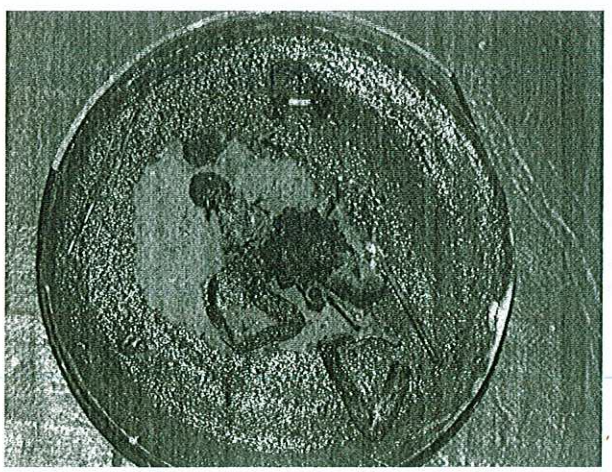
The characteristic epigynal band on the abdomen (ventral) identifies *Poecilotheria regalis* from all other *Poecilotheria* species.



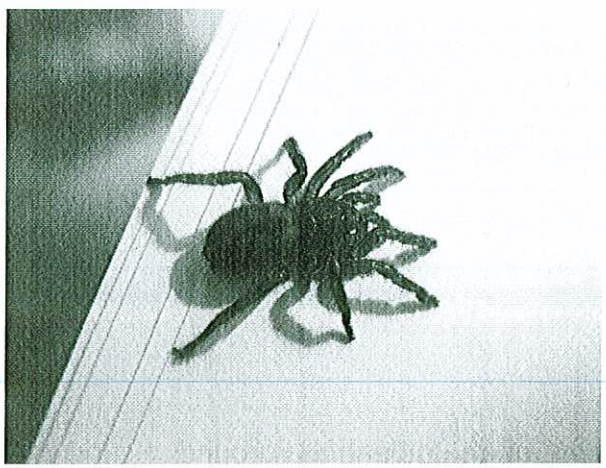
An unidentified ground tarantula from Bangladesh



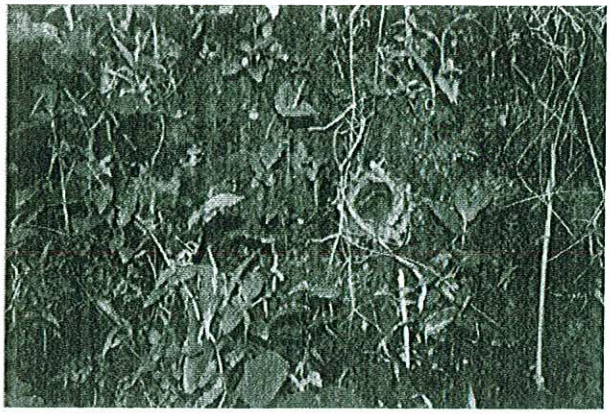
Cross section of an unidentified ground theraphosid burrow. Notice the upper antechamber and the bottom nesting/ brooding chamber with a live individual.



Stomach flushing of a northeastern Indian *Rana* sp (frog) reveals partial remains of an unidentified ground theraphosid.



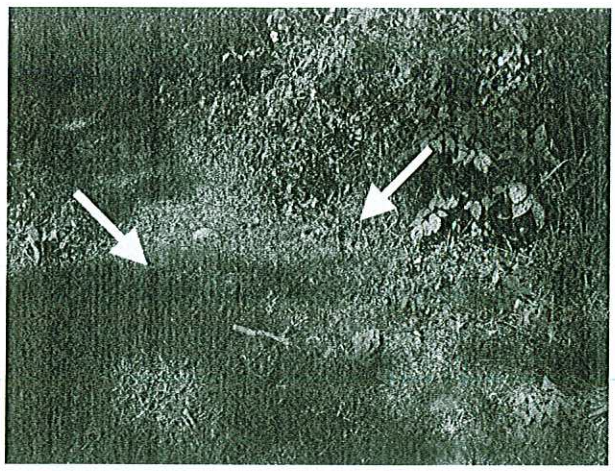
A curious form -- is it a theraphosid or is it a ctenizid? Both belong to the Order Mygalomorph.



A typical *Thrigmopoeus* burrow on a bund.

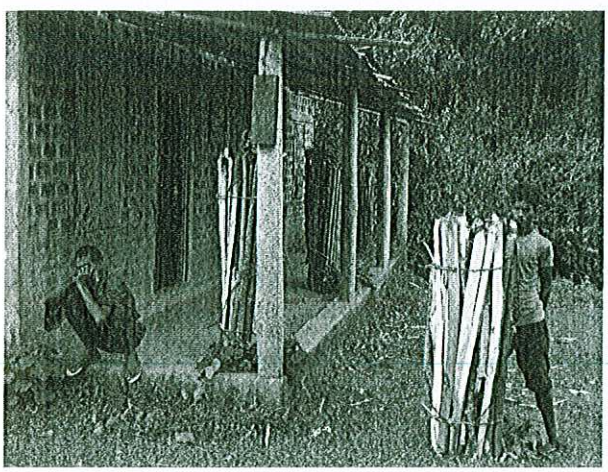
A typical defensive posture of a ground theraphosid.

A burrow opening of an unidentified theraphosid in northeastern India



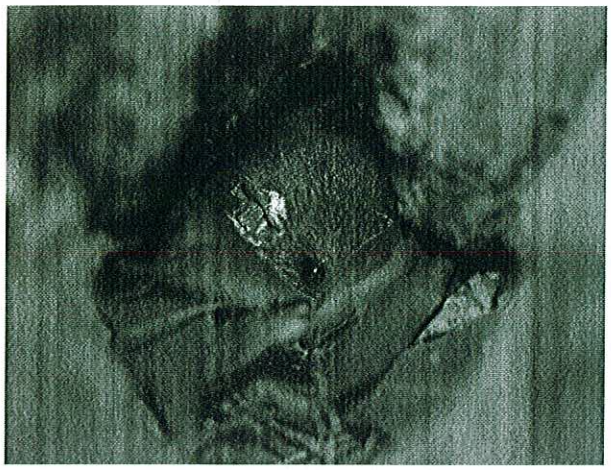
This photograph reveals the existence of two ground burrow openings of an unidentified ground theraphosid species. It is usually very difficult to sight burrow openings as they are well camouflaged in the ground and with dappled sunlight.

Deforestation in the name of subsistence living (sic) is a major threat to all theraphosid habitats, especially in northeastern India.



Migrating male tarantulas are commonly found in human dwellings such as this one in the forest or adjacent to forests.

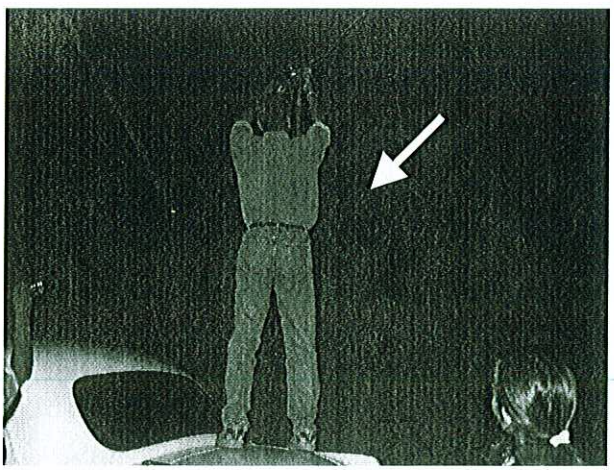
Deforestation is rampant in many parts of southern India, and this is at Kolli Hills, Tamil Nadu.



A rodent nest in a tree hole could eventually become a tarantula home depending on the size and structure of the hole.

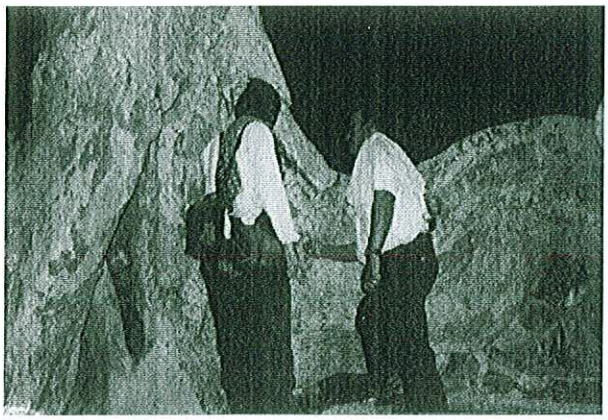
A theraphosid look-alike burrow, but on close examination revealed a spider from another family (Clubionidae)

This is not to be taken lightly! Although Romulus Whitaker (an experienced herpetologist) was bold enough to try this with one of our captive tarantulas at the office, a single bite could have landed him in a hospital. But then international pet trade is at its peak because of such thrill, and illegal trafficking of these spiders out of India for the western pet trade market is a major concern. *Poecilotheria* are known to be very agile, vicious and poisonous, which is why one of the shift in focus is towards this group of spiders.



S. Kulandaivel, a volunteer-cum-professional filmatographer helped with shooting some footages of theraphosid burrows in some places in Tamil Nadu. Here, at 10PM, he is shooting an active burrow at a height of 12 feet from the ground on a vertical bund. Manju Siliwal looks on.

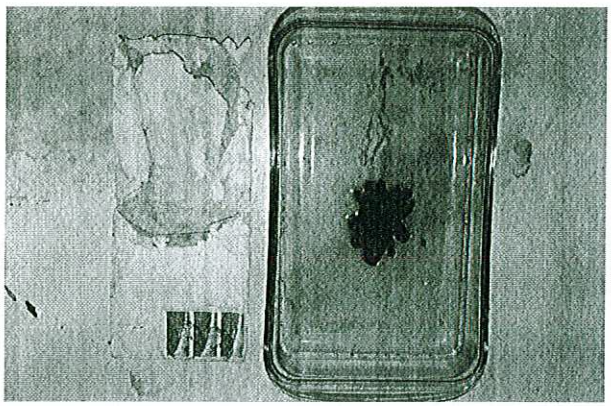
Manju Siliwal observing a *Poecilotheria* nest at Kalakkad-Mundanthurai Tiger Reserve, Tamil Nadu



Manju Siliwal and C. Srinivasulu surveying an old tree for *Poecilotheria* holes at Nagarjunsagar-Srisailam Tiger Reserve, Andhra Pradesh

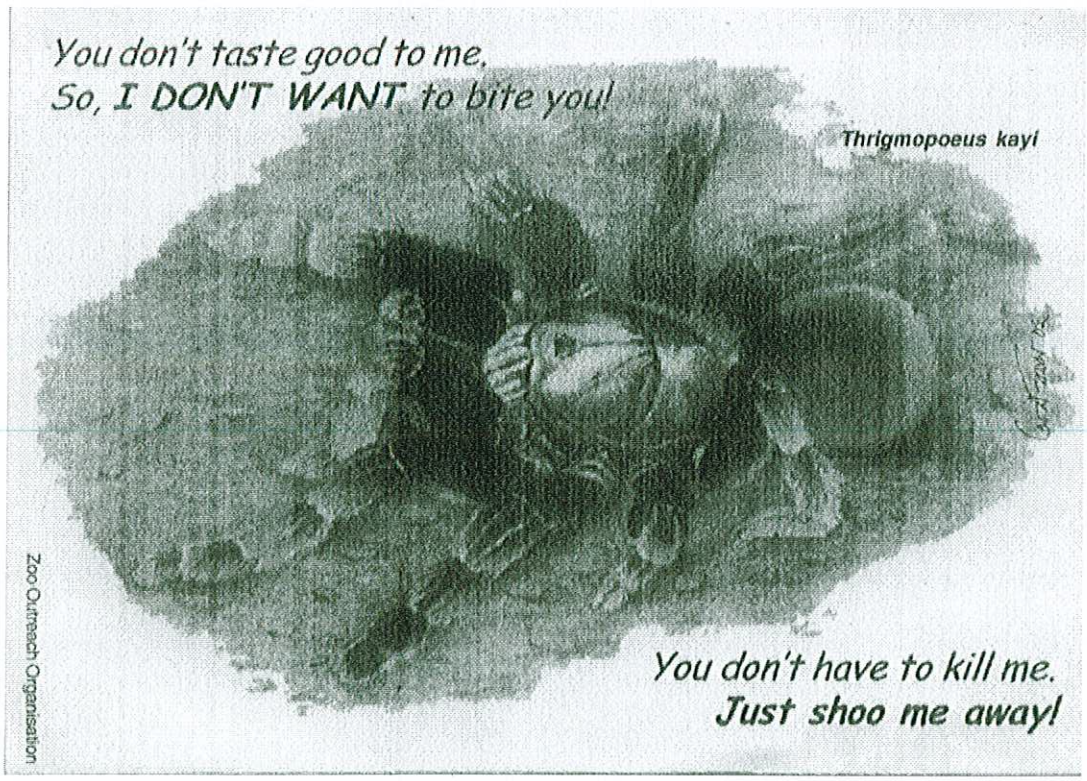
B.A. Daniel and Sanjay Molur examining a *Poecilotheria regalis* nest at Siruvani, Tamil Nadu.

Varad Giri and C. Srinivasulu having a laugh at Sanjay Thakur when a *Poecilotheria* they were observing jumped out of the bag and on Sanjay's back.



This specimen of *Poecilotheria* sp. was recovered from the Dead Letter Office at Chennai, when the envelope started "moving" at the post office. As the address was not visible, the destination could not be traced. The post office donated the specimen to the Zoological Survey of India at Chennai.

Binu , Daniel and Sanjay examine a specimen shown by the tribal at Siruvani, Tamil Nadu during the questionnaire survey.



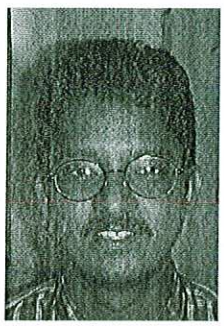
A sticker on tarantulas was printed in large quantities as part of another education programme at Zoo Outreach Organisation. This was circulated to many people, zoos, clubs and NGOs all over southern India

Appendix III
Distribution, status and effects of trade on large-bodied (mygalomorph) spiders of the genus *Poecilotheria* and other theraphosid spiders in India
Interim report

The above project has been funded in part by the Rufford Small Grant, Whitley Conservation Award. The project was initiated almost immediately after receiving permission from the Indian government to receive foreign donation. The project is into its 6th month after commencement and the grant is expected to last until December/ January.

1. The first step in initiating the project was to contact all collaborators and apprise them of the project, the goals, the methods, etc. We had a few meetings of the collaborators from all over India who visited our office between March and June of this year. The collaborators include the following:

Sanjay Molur


B.A. Daniel

Manju Siliwal

Binu Arthur

C. Srinivasulu

P.O. Nameer

Sanjay Thakur

Varad Giri

Vivek Gour-Broome

2. Literature compilation and contacting experts in the field were initiated in the first phase of the project. At least 6 Indian spider experts and 3 international experts are interested and provide advice.

3. Literature search and procurement was initiated and is ongoing.

4. Preliminary surveys were conducted by Daniel and Sanjay in Siruvani, Mudumalai, Kothagiri, Veliangiri Hills, Peechi and Pattikad in the months of January to June. Periodic

trips were made to Siruvani to observe two *Poecilotheria* tree holes.

5. Ms. Manju Siliwal received her doctorate in spider taxonomy from MS University, Baroda and soon after completion of her university work she joined this project in June 2002. After her joining the project more focused effort on tarantula studies were undertaken.

6. The following field trips have been undertaken till date.

Date	Place	Members
21-26 June 2002	Mannuthy, Vellanikkara, Pattikadu, Peechi in Kerala (Western Ghats)	Sanjay Molur, B.A. Daniel, P.O. Nameer, C. Srinivasulu, Sanjay Thakur, Vivek Gour-Broome, Varad Giri
8-13 July 2002	Nagararjuna-Srisailam Tiger Reserve, Andhra Pradesh (Eastern Ghats)	Sanjay Molur, Manju Siliwal, C. Srinivasulu, Bhargavi S., Neil Cox
26-30 July 2002	Mannuthy in Kerala (Western Ghats)	Sanjay Molur, B.A. Daniel, Manju Siliwal, Binu Arthur, P.O. Nameer, C. Srinivasulu, Sanjay Thakur
12-13 August 2002	Indira Gandhi Wildlife Sanctuary & National Park, Top Slip, Tamil Nadu (Western Ghats)	Sanjay Molur, B.A. Daniel, Manju Siliwal, S. Kulandaivel
20-21 August 2002	Kolli Hills, Tamil Nadu (Eastern Ghats)	Sanjay Molur, B.A. Daniel, Manju Siliwal, S. Kulandaivel
21-29 August 2002	In and around Kollam (Thenmala, Ponmudi) in Kerala and Nagercoil, Dist. Kanyakumari, Tamil Nadu (Western Ghats)	Manju Siliwal, Binu Arthur
20 August-4 September 2002	Melghat Tiger Reserve, Maharashtra	Sanjay Thakur

7. The following field trips have been planned.

Date	Place	Members
15-20 Sep 2002	Mangalore, Dakshina Kannada, Karnataka	Manju Siliwal
September 2002	Nagarjuna-Srisailam Tiger Reserve, Andhra Pradesh	C. Srinivasulu, Bhargavi S, Manju Siliwal
Periodic visits	Amba Valley, Maharashtra (Western Ghats)	Vivek Gour-Broome, Sanjay Thakur
Periodic visits	Siruvani, Tamil Nadu	Sanjay Molur, B.A. Daniel, Binu Arthur
October 2002	Assam, Sikkim, northeastern India	Sanjay Molur, B.A. Daniel
Oct/Nov 2002	Maharashtra, Andhra Pradesh, Bihar, Orissa	Manju Siliwal, Sanjay Thakur, C. Srinivasulu
Periodic visits	Kerala	P.O. Nameer

8. Behavioural studies of captive tree and ground forms are being studied in the office. Four species of tree form (*Poecilotheria* spp.) and 3 species of ground form (*Thrigmopoeus* sp., *Chilobrachys* spp.) are maintained in captivity.

9. Trade related information is being compiled. Till date names and information on 10 foreign tarantula traders who smuggle tarantulas from India and Sri Lanka have been reported to the Ministry of Environment and Forests, Government of India. Detailed information on their modus operandi is being investigated by our foreign collaborators in the USA and Canada. Currently we are investigating and pursuing one foreign national

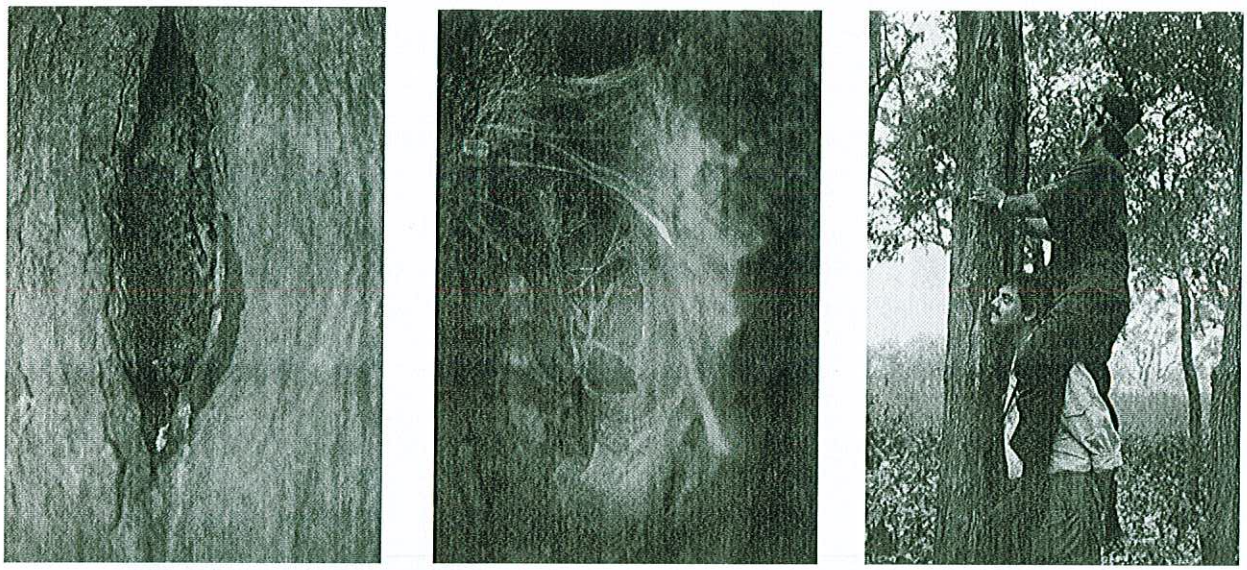
who is allegedly in the country visiting different areas to collect both arboreal and ground forms.

10. Photo documentation of all species encountered till date along with habitat quality is being done. A volunteer videographer (S. Kulandaivel) has been recording tarantula and other mygalomorph spiders on the various field trips undertaken.

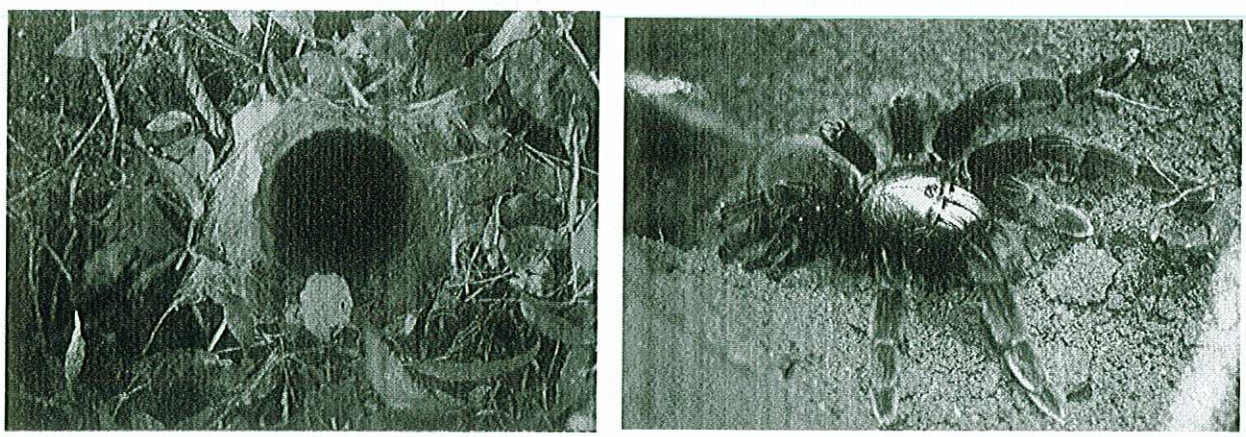
11. Various researchers in different parts of the country have been intimated with details of tarantulas to observe and compile information from locals.

12. Field observations are being noted in detail and one population in the field is under constant observation for understanding ecology.

Some photographs of tarantulas and of the team in the field are attached below.

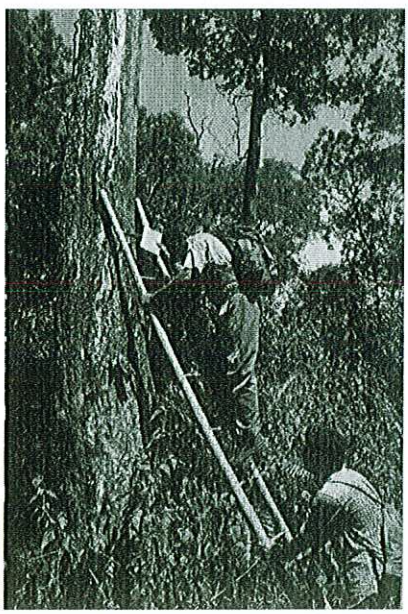


Tree form (*Poecilotheria* sp.) which is under constant monitoring at Siruvani, Tamil Nadu.

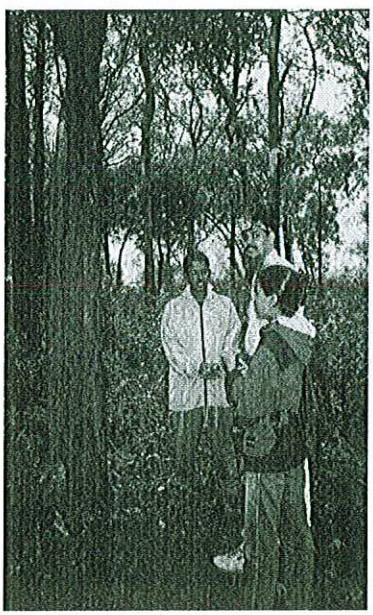


Thrigmopoeus sp. burrow (ground form) and the animal excavated at Parambikulam Wildlife Sanctuary.

Most observations have been in secondary forests or teak plantations such as this one.



Some arboreal forms are found above 20 feet.



Binu joins Daniel and Sanjay in field work.