

# 1 TAXONOMY

## 1.1 Nomenclature

**Class:** Arachnida

**Order:** Araneae

**Family:** Theraphosidae

**Genus:** commonly kept species from the following:  
Avicularia, Brachypelma, Citharishchius,  
Lasiadora, Nhandu, Phrixotrichus (*Grammastola*),  
Poecilotheria, Psalmopoeus and Theraphosa

**Species:** including *A.avicularia*, *B.smithi*, *C.crawshayi*,  
*L.parahybana*, *N.carapoensis*, *P. (G) pulchra*,  
*Poecilotheria regalis*, *Psalmopoeus irminia* and  
*T.blondi*

## 1.2 Common Names

The naming of tarantulas is a notoriously confusing issue especially when the systematics of tarantulas is constantly under review by the experts. See. Bonnet (1945-51), Roewer (1942), Brignoli (1983), Raven (1985), Smith (1984, 85, 87) and Platnick 1989).

Common names are often created by animal traders and generally reflect colouration and habitat. Often they can be quite exotic like 'Venezuelan Tiger Tarantula' or 'Giant Pinkstarburst Tarantula' and are meant to sell spiders. They are prone to error when a species has a wide range of colour or habitat variants, *Phrixotrichus spatulata*, or the Chilean Flame, Chilean Rose or Chilean Redback Tarantula is an example (Schultz 1998).

## 2 Natural History

While amongst the most famous of the spiders tarantulas remain the least studied. Much work has been done on the systematics of Theraphosidae: Bonnet (1945-61), Brignoli (1983), Raven (1985) Smith (1984-88) and Platnick (1989). Captive behaviour including incubation times and egg numbers: Galiano (1973), Baerg (1958), Bucherl (1971) and Perret (1974); growth and development: Celerier (1981 & 1988), Baerg (1928) and Buchli (1970); and adult life cycles: Dresco-Derouet (1970) and Celerier (1981). Other studies have been done on urticating hairs (Stradling 1978) and venom toxicity Ori (1982) and Ibister. (2002).

Outside the lab very few extensive behavioural studies have been conducted. Stradling (1978) conducted an interesting 18month study on *Avicularia avicularia* within a fixed plot on Trinidad, observing such things as preferred tree girths, height of retreat, juvenile habits and prey capture. *Brachypelma smithi* population density, distribution and burrow design were detailed in a report by R. Smith et al (1988) for their debut on the IUCN Red List. Many other studies have been short (only conducted when conditions suit us eg dry season) or restricted to a single species or regions, which may not be representative to the whole genus.

There is much scope for future field study, for example the methods and preferences for burrow building, or the behavioural differences between obligate burrowers and the so called nomads. Also, following around a newly matured male *Theraphosa blondi* or *Lasiadora parahybana* would be useful in learning distances traveled to find mates, predator avoidance and possibly number of females mated. In captivity growth rates, courtship rituals, food supplements and the use of vet procedures and drugs are all in need of further study and can be done by amateurs.

## 3 Housing Requirements

### 3.1 Exhibit/Holding Area Design

In Australia exotic tarantulas must be housed in a Quarantine facility separated from the rest of the institution. The Australian Quarantine and Information Service (AQIS) is the governing body regarding approval of such a construction and the importation of the animals. Appendix III contains a summary of our AQIS Arachnid Quarantine Facility Procedures Manual and gives a good idea of the level of isolation required with keeping exotic tarantulas in Australia.

Ideally the main tarantula room- which by law will be the exhibit and the holding room in one- will have a large window space for the public to view. Tarantulaville has four dedicated viewing windows with 1 or 2 tarantulas displayed in each one as well as a larger window giving view to the whole room. Specimens off display are housed individually on shelving opposite the main window and are visible to the public. The shape and size of the room will depend on the space, existing buildings and money available but should maximise the visibility of the subjects to the public.



View of the back wall holding area. Arboreal tanks at top.  
Photo by N.Psaila.

## 4 General Husbandry

### 4.1 Hygiene and Cleaning

Because we are keeping an animal in a small space with relatively high temperatures and humidity keeping cages clean is extremely important. Any faeces, dead crickets or food parcels will quickly become infested with mites, mould or fungi. Prevention is definitely the best cure when dealing with potential tarantula medical problems and hygiene seems to be a key factor.

To this end staff in Tarantulaville adhere to a strict cleaning regime in conjunction with AQIS guidelines (see Appendix III). A roster has been developed that divides our spiders into four groups, which are fed over four days. Keepers who feed one group of tarantulas' one day, are responsible for cleaning the group that was fed the previous day. The roster changes each month so everybody gets to feed and clean.

Below is a list of enclosure cleaning items permanently located in Tarantulaville:

- Latex gloves
- Forceps
- Paper Towel
- Large Garden Spray Pump (H<sub>2</sub>O)
- Three small spray-bottles (F10, Metho, H<sub>2</sub>O)
- Cotton buds
- Metal teaspoons and larger spoons
- Maglite torch
- Toothbrush

We are bound by AQIS guidelines to use a 340ppm sodium hypochlorite solution (SHS) for all surface disinfection. We use the commercial brand 'HYPO', which is 12.5% diluted on a 1:420 ratio. We mix 10ml of hypo with 1 litre of water.

## 5 Feeding Requirements

### 5.1 Captive Diet

Tarantulas are opportunistic ambush predators, relying heavily on their hairy legs to relay vibrations to their brains, for this reason live food is essential (Brunet 1994). In captivity tarantulas will thrive on a diet of insects alone and as they are readily available and easy to breed the humble house cricket (*Acheta domestica*) will be the main fare. At the ARP we use crickets about 90% of the time, which are readily accepted due to their movement. The remainder of food items would be cockroaches, mealworms and, extremely rarely, pink mice. The only other public facility with tarantulas in Australia (the Victorian Museum) also uses this diet. Little is known of tarantulas' exact dietary needs, so whether this relatively unvaried diet is detrimental needs to be ascertained.



Crickets eye view (*Phrixotrichus pulchra*) Photo by N. Psaila

As mentioned earlier, wild tarantulas' will eat almost anything they can overpower so during summer it may be worth capturing things like grasshoppers, locusts, cicadas, other spiders, phasmids and various beetles. You must be 100% sure that pesticides haven't been used in the collecting area or you'll end up with some very sick (and most likely) very dead spiders.

## 6 Handling and Transport

**Warning:** Although many species of tarantula are docile and handleable, all species possess venom glands and very large fangs. While not known to be seriously dangerous to humans the venom can produce painful and lasting effects (Ibister et al 2002).

### 6.1 Timing of Capture and Handling

Like all nocturnal creatures daytime is usually the best time to catch tarantulas and also the most convenient for us. As exotic arachnids aren't allowed out so to speak, the whole process must be done within the quarantine facility. Recently we thinned out our collection, sending unwanted individuals back to the Victorian Museum and the packing had to be done within the facility.

### 6.2 Catching Equipment

Depending on your reason for removing the tarantula from its enclosure, eg. export or rehousing (substrate change), you will require some of the items from the following list:

|                 |                                   |
|-----------------|-----------------------------------|
| Spare enclosure | Lge plastic jars with screw lids* |
| Forceps         | Tappers                           |
| Goldfish Nets   | Metal spoons                      |
| Perspex Shield  | Cotton gloves                     |
| Wooden Crate*   | Newspaper*                        |

\* Will be needed if exporting out of facility.

### 6.3 Capture and Restraint Techniques

If the tarantula is leaving the facility permanently the best way to capture it is to place a large jar into the enclosure and using a tapper, coax the spider into the jar. A tapper is a piece of PVC pipe with a plastic foam covered spatula (or paintbrush) lodged down one end. If

## 7 Health Requirements

### 7.1 Daily Health Checks

As there is very little professional help available in Australia it is important all staff are trained in identifying potential health problems. When an enclosure is accessed for feeding, cleaning or humidity checks observations are made regarding the tarantulas' condition, disposition and any irregular behaviour displays. These observations are noted on the spiders ID card and if on going, also recorded on a 'Sick List'.

Physical changes such as a loss of hairs on the abdomen followed by a darkening of the skin are precursors to moulting and are duly noted on a 'Moult List'. Specimens that have an entry in either the Moult or Sick list are given a tag with their ID card alerting staff to the fact that extra observations must be made on these separate lists.

Some observations that are noteworthy include wall climbing by terrestrial spiders, sitting in or near water dishes all day, hanging around moister areas of the enclosure, aggressiveness, and any physical changes.

Generally these problems can be fixed by adjusting the humidity and temperature of the enclosure.

## 8 Behaviour

### 8.1 Activity

Both wild and captive tarantulas don't do very much on a daily basis and are usually content to sit in their burrows or enclosures. This is normal behaviour for an animal with a low metabolic rate and probably helps them live longer lives. Some of the terrestrials like *C.crawshayi*, *S.crassipes* and *N. carapoensis* will move considerable amounts of soil around, while arboreals like *A. versicolor* and *P.regalis* will make silken tubes to live in. Most of this activity will be conducted at night (pers. obs)

### 8.2 Moulting

Considering we aren't allowed to breed exotic tarantulas in Australia, moulting is probably the biggest event in our tarantulas' captive life. Juvenile specimens will moult about every three months while mature adult females every year to two years (pers. obs.). Some signs that a moult is on its way are fasting (as mentioned in the Feeding chapter) and a tendency to seek moisture. As the moult approaches hairs may be shed from the abdomen and the skin beneath will noticeably darken, this is called premoult. On the big day the tarantula will roll onto it's back and begin separating from its old exoskeleton, this process can take up to 24 hours (a dead spider will remain upright with its legs tucked underneath) (pers. obs.)



Brazilian Black (*P.pulchra*) moult. By N.Psaila

## 9 Breeding

**NOTE:** Due to the strict quarantine laws imposed by the Department of Agriculture and AQIS it is currently illegal to breed exotic arachnids in Australia. Our license requires us to euthanase any juveniles that mature into males, thus maintaining a single sex collection. As I wanted to concentrate on exotic tarantulas in this manual I will only briefly discuss tarantula breeding, although much of the information can be related to native tarantulas as well.

### 9.1 Mating System

Tarantulas can be best described as being polygamous in their breeding nature. The females may accept more than one male over the course of a breeding season, though once she is inseminated all prospective males will be considered dinner (Clarke 1987). Males, assuming they live through the ordeal, will construct another sperm web and seek another female.

### 9.2 Ease of Breeding

Up until 1984 very little captive breeding was achieved by overseas keepers, but as more has been learnt successful breeding of most regularly kept species is common (Schultz 1998). With such a wide range of species there are going to be some that are more difficult to breed and for this reason are usually hard to acquire.

There is not much detailed information for breeding Australian tarantulas and most large-scale breeders are quite secretive about their methods and the little quirks associated with the various species. Considering all Theraphosids mate in the same way, native species shouldn't be that difficult to breed and the information given here would be applicable.

## 10 Artificial Rearing

### 10.1 Incubator Type

For the reasons mentioned in the previous chapter, many European and American collectors prefer to incubate all of their egg sacs artificially. The main problem with this is the fact that the eggs need to be turned and agitated regularly. Under natural conditions the female will rotate the sac in her jaws and palps so that no egg remains in the middle or bottom of the clump for too long (Schultz 1998).

At present there are no commercially available incubators designed to deal with spider eggs, although a few designs have been published by the experts. The plans for these designs are fairly complex and can be purchased from the American Tarantula Society at <http://atshq.org> under the ATS Shop link. The manual is called 'A Mechanical Mom for Tarantulas', by Schultz & Schultz.

A simpler but more labour intensive technique called the Pedestal Method is also available. This entails setting up an enclosure with a few centimetres of moist substrate. The humidity should be maintained at 60-70% and the temperature at around 27°C. A plastic jar lid of suitable size is placed upside down in the centre of the cage, acting as a pedestal. The egg sac is then placed on the jar lid, preventing contact with the substrate. The main problem with this method is that you need to turn the sac over yourself several times a day. Neglecting this for just one day could jeopardise the whole egg sac as will rough handling (Schultz 1998). This method is apparently more successful than allowing the female to care for the eggs, but far less so than a full on incubator.

## 11 Acknowledgements

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## 14 Glossary

**Abdomen:** the body of the spider also known as the opisthosoma.

**Anterior:** the forward side.

**Aranaemorphae:** the sub-order containing 'modern spiders', includes orb weavers, huntsmens, redbacks etc.

**Arthropoda:** the phylum that includes all animals possessing an outer skeleton and jointed limbs.

**Book Lungs:** respiratory organs located on the ventral surface of the abdomen- one pair in 'modern spiders' two pairs in 'ancient spiders'

**Carapace:** the chitonised dorsal plate of the cephalothorax

**Cephalothorax:** the fused head and thorax of the spider. Often called the prosoma.

**Chelicerae:** the jaws, consisting of fang and fang base (single Cheliceral)

**Coxa:** the first segment of the legs and palps, numbered from the cephalothorax.

**Dorsal:** refers to the upper side.

**Embolus:** spine like tube of male spiders, through which sperm passes from the palpal bulb.

**Epigastric Furrow:** a groove on the ventral surface of the abdomen between the first set of booklungs on tarantulas'.

**Epigyne:** reproductive opening on a female spider.

**Epistome:** the upper lip.

**Exuvia:** another term for the shed skin.

**Femur:** the third segment of the appendages.

**Fovea:** the small pit in the centre of the carapace representing the connection of the stomach muscle. Can be a protusion on some tarantula species.

**Instar:** a stage of development between moults, usually refers to juveniles.

**Labium:** a plate structure forming the floor of the mouth, attached to the sternum on the posterior end.

**Mygalomorphae:** refers to 'primitive spiders' including tarantulas, funnel-webs and trapdoors.

**Ocellus:** pl. ocelli, refers to simple eyes.

**Opisthosoma:** another term for the abdomen.

**Orthognathid:** the more correct term for 'primitive spiders'.

## Appendix I

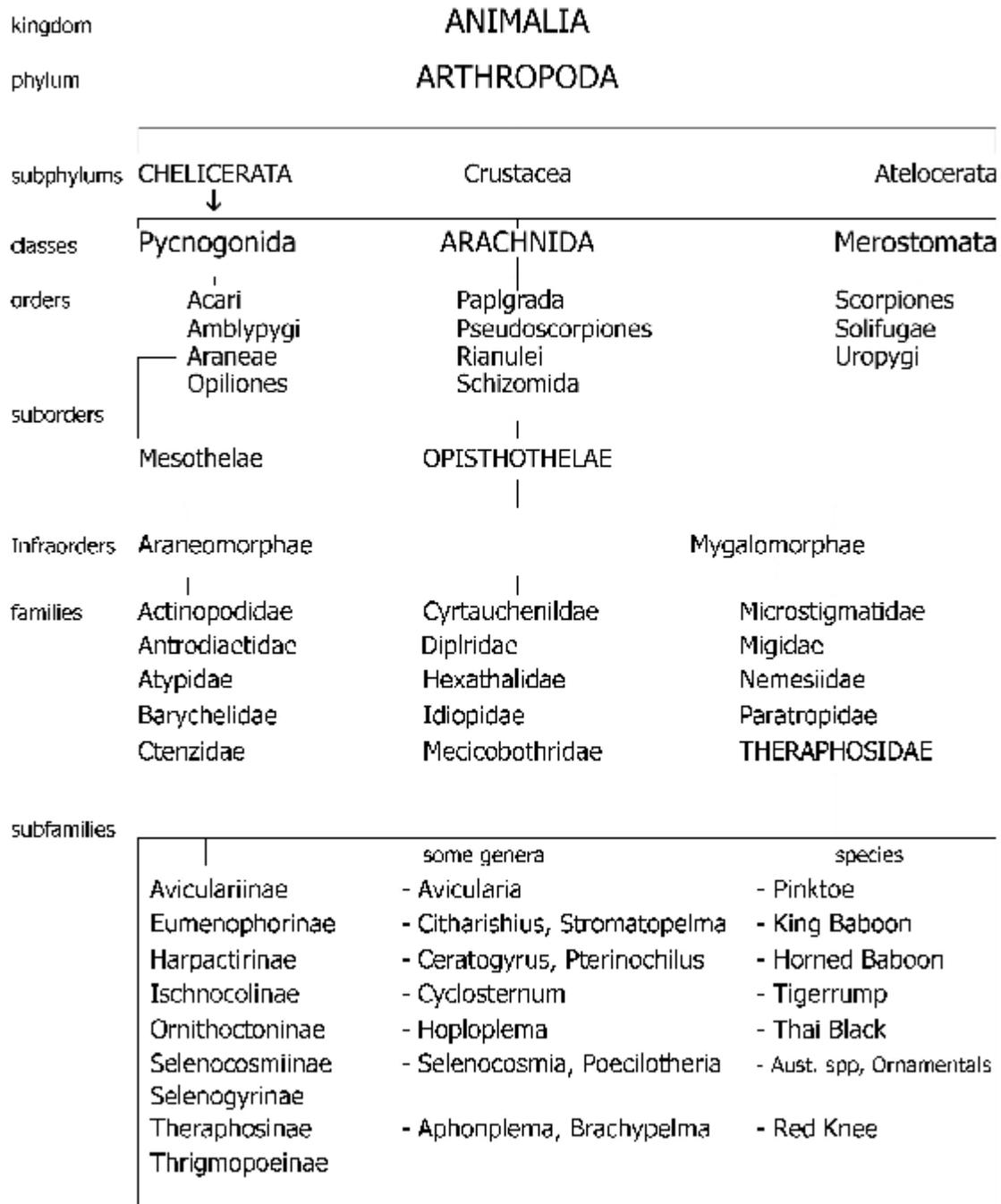
### The Name Game

In the Middle Ages in a northern Italian town called Taranto, there began an outbreak of wild dancing which eventually spread through southern France, Dalmatia and Spain. The 'tarantella' dance was said to be the only antidote for the bite of a spider the locals called the tarantula. It has been said that the spider bite reason used by the peasantry was their excuse to dance- a practice that was outlawed by Church at the time (Martin 1995). In 1790 the spider was described as *Lycosa tarantula* (Rossi) which is a wolf spider. The name tarantula was indiscriminately used to describe any large spider and has become so ingrained in the literature that most people now accept it to refer to Theraphosids, totally ignoring *Lycosa tarantulas'* status.

To make matters worse the sub-order Mygalomorpha is also incorrect. The word Mygale was first used by the naturalist Georges Cuvier to describe a family of water shrews. This name is also ingrained in the scientific literature though the replacement name Orthognatha is slowly coming through (Raven 1985, Smith 1990).

Just when you thought it couldn't get any worse the word tarantula also describes a genus of scorpion! Combine all this with the fact that local names like Birdeater, Baboon Spider and Earth Tiger aren't universally accepted by the scientific community a very confusing picture is presented.

APPENDIX II  
The Tarantula Family Tree



# Appendix III

## Quarantine

### 1 Function

This chapter is probably the most important if considering importing exotic arachnids for your institution, as many rules apply before you even begin. Below is a summary of our Arachnid Quarantine Facility Procedures Manual (AQIS, November 2000).

Under Australian law exotic arachnids can only be kept in an Australian Quarantine and Information Service (AQIS) approved 'High Security Quarantine Insectary Facility'. Our Arachnid Quarantine Facility (AQF) is designed to hold about 50 female arachnids (we currently have 24 tarantulas and 3 scorpions).

No specimen may leave the facility alive without the approval of AQIS and dead specimens must be treated or preserved in accordance to guidelines. Only feed insects may be brought into the facility and even uneaten insects must be destroyed and autoclaved.

Unfortunately the current laws preclude the possibility of breeding exotic tarantulas' in fact any juveniles that mature into males must be euthanised within 24 hours - as we sadly had to do with a handsome male Suntiger Tarantula (*Psalmopeous irminia*).

The reasons for this high level of quarantine are to protect the Australian environment from (a): exotic arachnid predators competing with our natives and (b): to prevent any exotic parasites imported within the arachnids escaping into the local environment.

# Husbandry Manual for Exotic Tarantulas



**Order:** Araneae

**Family:** Theraphosidae

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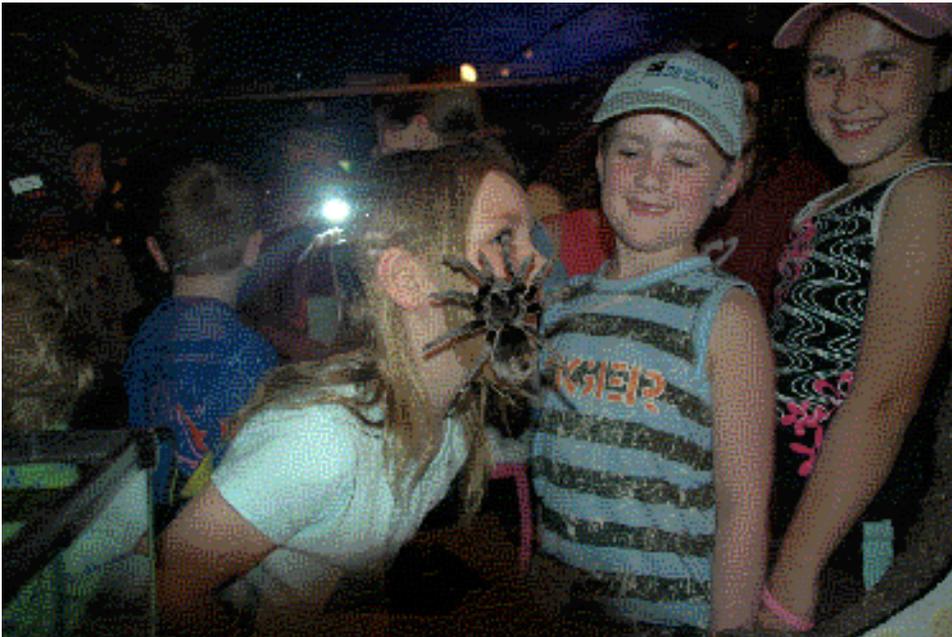
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# Table of Contents

|                                    |           |
|------------------------------------|-----------|
| <b>Introduction</b>                | <b>6</b>  |
| <b>1 Taxonomy</b>                  | <b>7</b>  |
| 1.1 Nomenclature                   | 7         |
| 1.2 Common Names                   | 7         |
| <b>2 Natural History</b>           | <b>9</b>  |
| 2.1 Basic Anatomy                  | 10        |
| 2.2 Mass & Basic Body Measurements | 14        |
| 2.3 Sexual Dimorphism              | 15        |
| 2.4 Distribution & Habitat         | 16        |
| 2.5 Conservation Status            | 17        |
| 2.6 Diet in the Wild               | 17        |
| 2.7 Longevity                      | 18        |
| <b>3 Housing Requirements</b>      | <b>20</b> |
| 3.1 Exhibit/Holding Area Design    | 20        |
| 3.2 Enclosure Design               | 21        |
| 3.3 Spatial Requirements           | 22        |
| 3.4 Temperature Requirements       | 22        |
| 3.4.1 Temperature Problems         | 23        |
| 3.5 Humidity Requirements          | 24        |
| 3.5.1 Humidity Problems            | 27        |
| 3.6 Substrate                      | 29        |
| 3.7 Enclosure Furnishings          | 30        |
| 3.8 Lighting                       | 31        |
| <b>4 General Husbandry</b>         | <b>32</b> |
| 4.1 Hygiene and Cleaning           | 32        |
| 4.1.1 Cleaning Procedures          | 33        |

## Introduction

Tarantulas' of the family Theraphosidae have long held the public's imagination, inducing feelings of fear, revulsion and awe. They are the largest and hairiest of all spiders and have long been surrounded by myths and misconceptions. With over 850 species in 111 genera tarantulas have been able to colonise nearly every habitat on Earth from the deserts to the rainforests. Since the 1980's tarantula keeping has exploded in popularity in Europe and North America with many species being available as captive breeding techniques improve. In Australia we've seen a massive growth in native spider keeping with just about every pet shop holding a native "birdeater". This manual was intended to encourage this interest further and to also provide a clear-cut document covering the basic care and maintenance of these ancient creatures.



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