# Safe laboratory management for true spiders (Araneomorphae) of medical importance

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## Abstract

Several species of arachnid produce significant health effects in man due to envenomation. This makes their captive care in the laboratory a source of specific concern. Species include the wandering spiders of South America (family *Ctenidae,* species *Phoneutria fera* and *P. boliviensis*), Brown recluse spiders (family *Sicariidae*, species *Loxosceles laeta*) and the *Theridiidae* family members– *Latrodectus mactans* and *L. hasselti.* Presented here is a novel, safe method for captive husbandry of these species in the laboratory environment that dramatically reduces the risk of envenomation from husbandry procedures. Risks are reduced with modified enclosures that allow separation from the animals during most husbandry procedures and use of anaesthesia where contact is inevitable. The equipment and techniques presented here thus allow for greatly improved staff safety when working with dangerous invertebrates.

## Introduction

Many spiders of the Araneomorphae order provoke significant fear reactions in humans; of these only a few are regarded as medically important. The medical significance varies between species and sex as well as the victim's age and health. Detailed below are 3 families of Araneomorphae of particular medical significance and their venom effects.

### Ctenidae

Brazilian wandering spiders like *Phoneutria bolivensis* have a fearsome reputation but in adults only 0.5% of bites result in severe envenomation and, rarely, death in children[1].

### Sicariidae

Bite pathology from brown recluse spiders like *Loxosceles laeta*, termed loxoscelism, can be cutaneaous (necrotic lesions) and systemic (haemolytic anaemia). Fatality <0.1%[2].

### Theridiidae

Lactrodectid bites are far more likely to cause fatal envenomations but this is still only ~6% of bites[3]. Latrodectism pathology is characterised by severe pain and muscle cramps. Image- PhotographyIS.com

Bibliography- **1.**. Rev. Inst. Med. trop. S. Paulo 42 (1): 17-21, January-February, 2000.. **2**. *J. Venom. Anim. Toxins incl. Trop. Dis.V.12, n.1, p.110-123, 2006.* **3.** Handbook of Toxinology, Shier, Mebs (Dekker) 1990

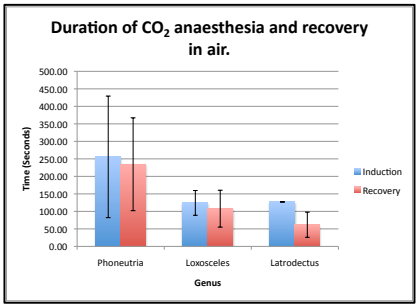
## Method

Typical containment used for housing small dangerous spiders (like *Loxosceles sp.)* made from a 0.7 litre plastic box (Really Useful Products Ltd). For larger spiders the boxes are scaled up accordingly. All animals in this study were maintained at 24°C, 12hr day night cycle (including a 2 hour 'twilight' period prior to the onset of each dark phase). Substrate is vermicullite (Eurorep) with plastic plants for climbing and enrichment. All Phoneutria species are kept at ~80% relative humidity with the *Loxosceles* and *Latrodectids* much drier.

Image thanks to PhotographyIS.com

10mm diameter aperture for feeding (crickets and flies) as well as water top up, secured with M10 16mm nylon bolts (Nylons and Alloys Ltd).

5mm diameter occluded tube, with pinprick holes for CO2 anaesthesia and water for hydration (via syringe).




$CO_2$ is introduced through the protruding tube (left) from a standard regulator using 1 l/min, sufficient anaesthesia is achieved when the right reflex ceases. Animals are moved to new enclosure and placed in ventral side up such that the point of return of the right reflex is the recovery point.

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