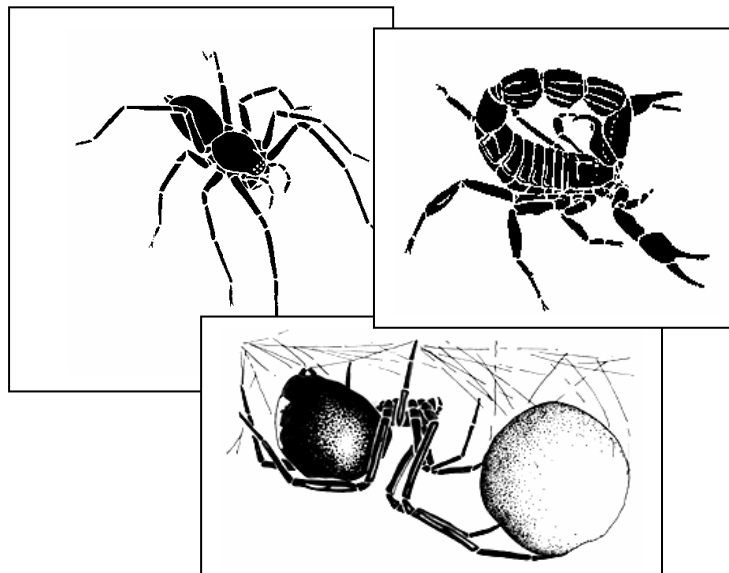


SPIDERS AND SCORPIONS OF MEDICAL IMPORTANCE IN SOUTHERN AFRICA

by

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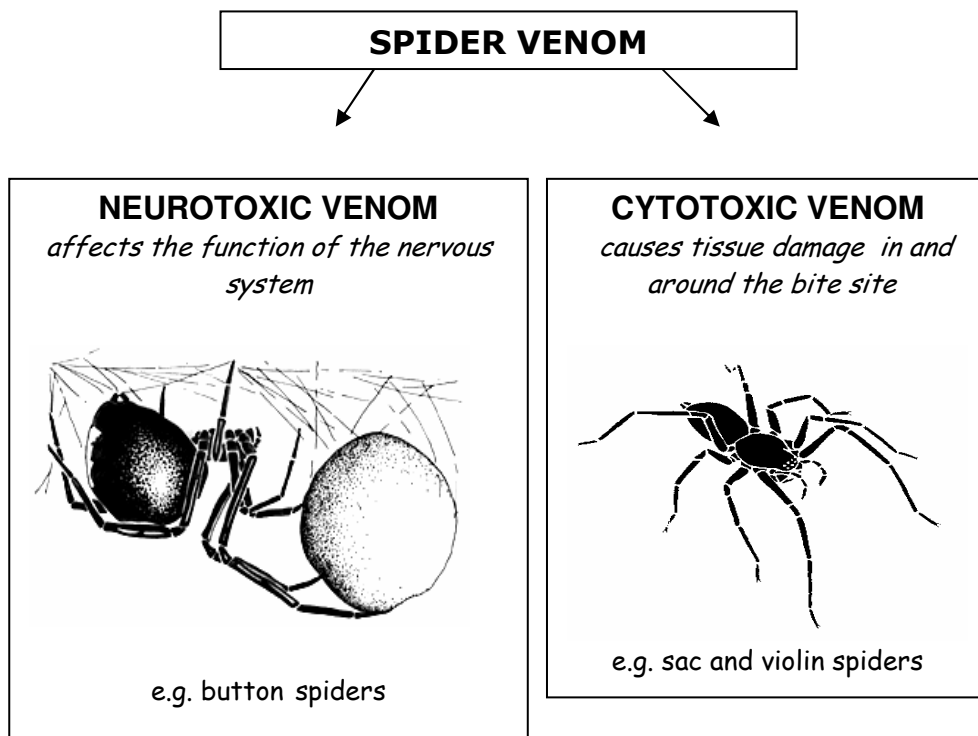


SPIDERS

South Africa has a rich fauna of spiders with about 3000 known species. A variety of spiders occur in houses and outbuildings and it is inevitable that they often come into close contact with man. Most spiders will avoid physical contact, but when they are accidentally touched or squeezed, in self-defence they might deliver a bite. Very few spiders are potentially harmful to man. The following may influence the action of the venom:

- Size of the spider and the amount of venom injected.
- Part of the body where a person is bitten.
- Age and health of the person.
- Sensitivity of an individual to the venom.
- Species of spider that administered the bite.

All spiders (except one family) produce venom used to kill their prey. The spiders can be divided into the ones that produce neurotoxic or cytotoxic venom.



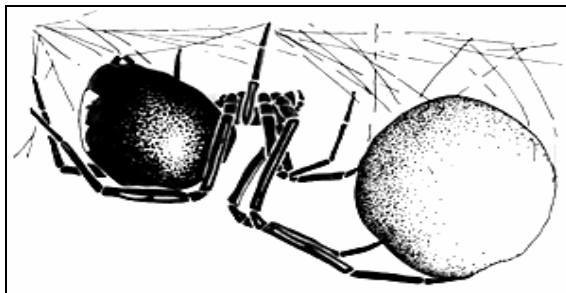
I. NEUROTOXIC VENOM

Several spider families produce neurotoxic venom, but the button spiders (widow spiders) are the most important. They belong to the family Theridiidae genus *Latrodectus* and six species are known from Southern Africa. They construct funnel-like webs in dark corners - active at night.

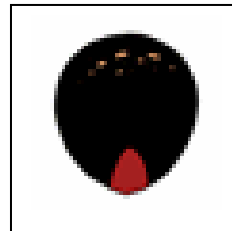
BLACK BUTTON SPIDERS

(more venomous group – 4 species)

Diagnostic characters: black spiders with red pattern on top part of body - no markings below - egg sac round.



female with egg sac



pattern on top



no pattern below

Species: *Latrodectus karoensis* (karoo button); *L. cinctus* (east coast button); *L. renivulvatus* (inland button); *L. indistinctus* (west coast button).

SIGNS AND SYMPTOMS

- burning pain at bite site
- generalised muscle pain and cramps
- abdominal pain and cramps
- limb pain, especially thigh muscles
- abdominal muscles rigid
- cramps and pain in back muscle
- weakness in legs, with difficulty in walking a feeling of constriction of chest muscle
- tender regional lymph node
- sometimes headache
- patient usually restless, agitated and anxious
- profuse sweating (common)
- raised blood pressure common
- often swelling of face and especially eyelids
- bite site evident in 70% of cases.

TREATMENT

- hospitalise and monitor vital functions [24 hours]
- administration of antivenom the only effective treatment for severe latrodectism and if not treated state of envenomation can be drawn out for a week or longer
- administer antivenom (10 ml) intravenously
- follow up dose of 5 ml occasionally necessary after 4-6 hours

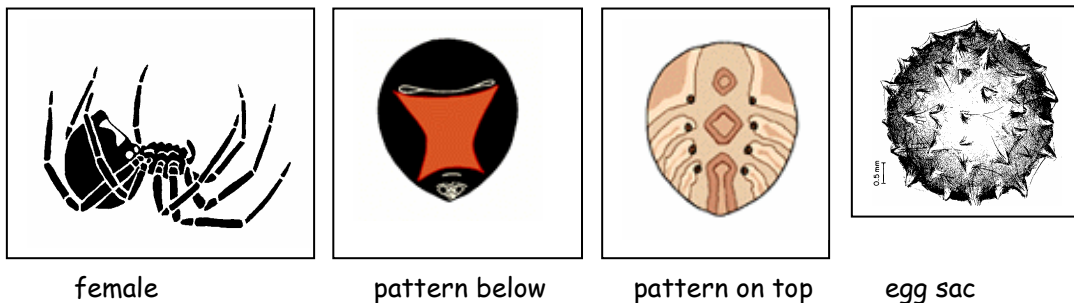
- patients respond dramatically within 10-30 minutes
- intravenous fluids should be administered to keep patient well hydrated
- opioids and central nervous system depressants ineffective and potentially dangerous (can cause difficulty in breathing)
- only effective agent for relief of muscular pain and cramps - intravenous calcium gluconate (however effects last only 20-30 minutes)
- use of histamines not recommended except when given to lessen effects of possible allergic reactions a button spider bite may occasionally become infected

BROWN BUTTON SPIDERS

(less venomous group- 2 species)

Diagnostic characters: Cream, brown or black spiders with geometric pattern on top, and distinct red hour-glass marking below, abdomen round, legs slender, egg sac with tufts.

Species: *Latrodectus geometricus* (brown button; house button); *L. rhodesiensis* (Zimbabwean brown button).



female

pattern below

pattern on top

egg sac

SIGNS AND SYMPTOMS

- bite causes sharp burning pain
- milder form of envenomation
- 3-4 times less venomous than black button spider
- reaction usually restricted to bite site
- localised muscle stiffness may develop
- pain in regional lymph nodes may develop
- abdominal pain and cramps sometimes experienced
- restlessness, agitation and raised temperature may be experienced
- bite site evident with red blanched area or localised rash in 80% of cases
- occasionally localised increase in sweat secretion (small droplets)
- symptoms usually clear up within 1-2 days in children or some adults a mild form of systemic envenomation (latrodectism) may develop.

TREATMENT

- antivenom in most cases not needed.
- symptomatic and supportive treatment recommended.

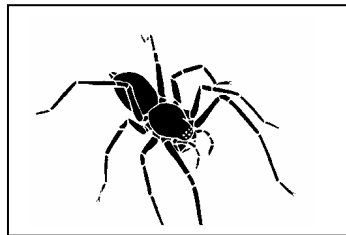
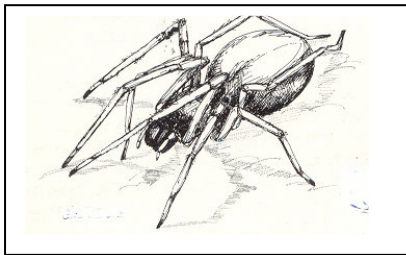
II. CYTOTOXIC VENOM

The only spiders with cytotoxic venom so far known to be of medical importance are the sac spiders (*Cheiracanthium*) violin spiders (*Loxosceles*) and six-eyed crab spiders (*Sicarius*).

SAC SPIDERS

The sac spiders of medical importance belong to the family Miturgidae, genus *Cheiracanthium*. All species are regarded as venomous. They are normally found on plants but some species are now commonly found in buildings where they construct sac-like retreats in folds of material folds. They wander around at night. Commonly found throughout Southern Africa.

Diagnostic characters: Cream coloured spiders with mouth parts in front black, long legs, medium size spiders.



SIGN AND SYMPTOMS

- bite usually not painful and victim often not aware of being bitten
- at first resembles mosquito or flea bite
- sometimes 2 fang bite marks (4-8 mm apart) visible
- typical bull's eye lesion develop
- surrounding area gradually becomes swollen, red and painful
- centre of wound undergoes necrotic changes, leaving an ulcerated wound
- local tissue damage and necrosis may be minimal or extensive (severity variable)
- systemic symptoms may be experienced after day or two e.g. tender lymph nodes, rash, low-grade fever, headache, muscle and joint pain.

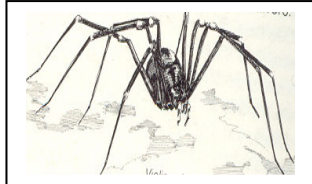
TREATMENT

- majority of lesions self-limiting and heal spontaneously
- treatment should be directed at preventing and treating secondary infection [e.g. BETADENE; PHENEGAN]
- occasionally an infected wound can develop into a rapidly spreading cellulitis which requires aggressive antibiotic therapy [e.g. AMOXIL; FIBRAMYCIN]
- no antivenom available
- patient should receive a tetanus toxoid booster.

VIOLIN SPIDERS

The violin spiders belong to the family Sicariidae, genus *Loxosceles*. There are 7 species known from Southern Africa and all species must be regarded as venomous. Two species are found in buildings: *Loxosceles parrami* and *L. spinulosa*.

Diagnostic characters: Spiders brown with long legs, six eyes and patterns on body (resembles daddy-long-legs but larger).



SIGN AND SYMPTOMS

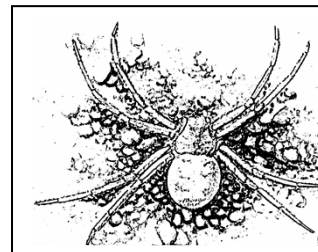
- superficial bite site painless and initially goes unnoticed
- about 2 hours after bite a red swollen lesion, sometimes with a purple centre develops
- over next day or two bleeding into site causes a blackened lesion
- at day 4 swelling and inflammation subside, while cutaneous necrosis continues to spread slowly necrotic tissue sloughs off, leaving a deep ulcerating wound - slow to heal, leaving a nasty scar.

TREATMENT

- treatment should focus on preventing and treating secondary infection
- use local antiseptics and systemic antibiotics to promote healing ulcers managed conservatively through cleaning and dressing [e.g. BETADENE, GENTIAN VIOLET, LIQUAMYCIN]
- timely surgical cleaning may arrest a rapidly spreading lesion
- Dapsone treatment in low doses for 14 days may limit extent of ulceration
- disfigured scars may require reconstructive surgery with skin grafting at later stage
- patient should receive tetanus toxoid booster.

6-EYED CRAB SPIDERS

Vary rare spiders from arid regions. Not found in buildings, little contact with people.



SIGNS AND SYMPTOMS

- spiders assumed to bite only when threatened
- laboratory studies on rabbits indicate that venom may cause massive local tissue destruction
- serious internal haemorrhage may develop clinical evidence however lacking in humans.

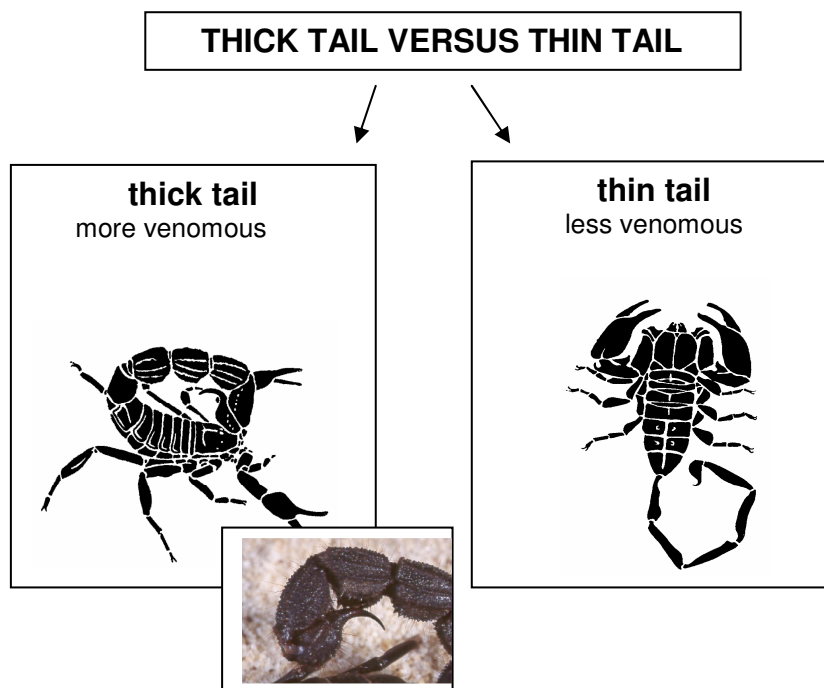
TREATMENT

- no known antivenom available; symptomatic and supportive treatment recommended.

SCORPIONS

Southern Africa has a rich scorpion fauna with 127 known species. They can be divided into two groups namely the more venomous scorpions: thin pincers and thick tail versus the less venomous group: thick pincers and thin tail.

The most venomous scorpions belong to the family Buthidae and the genera *Parabuthus* and *Buthotus*. Two smaller buthid genera *Uroplectes* and *Pseudolychas* are commonly found in build-up areas but their stings are only painful. The venom of all scorpions is neurotoxic and it affects the function of the central nervous system.



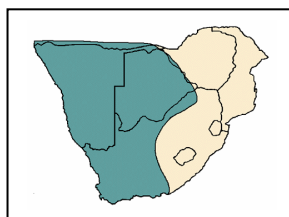
THICK TAIL SCORPIONS

BUTHIDAE: *PARABUTHUS*

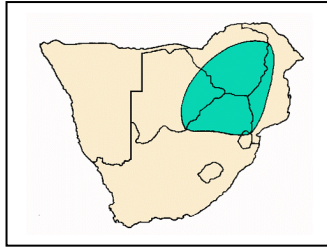
Large scorpions generally found under stones but some species might enter dwellings. Active at night. Two of the more venomous species: *Parabuthus granulatus* and *P. transvaalicus*.



Parabuthus granulatus



distribution: dark area



Parabuthus transvaalicus *distribution: dark area*

SIGN AND SYMPTOMS

- immediate excruciating local burning pain
- minimal to mild local inflammatory reaction at bite site
- general muscular pain and cramps
- numbness, general feeling of pins and needles sometimes sensation of vibration
- difficulty in swallowing and increased salivation
- difficulty in breathing, primary cause of death general weakness a common symptom
- adult patients anxious, restless and obviously in severe pain
- children have similar features but display a unique form of restlessness marked by screaming, uncontrollable thrashing movements and writhing, and an inability to lie still
- striking features include: visual disturbance tremors, drooling, some loss of pharyngeal reflexes, increased sweating, stiff gait and patient unable to stand or walk raised blood pressure in some species

TREATMENT

- treatment symptomatic and supportive
- patients with systemic symptoms should be hospitalised
- monitor vital functions closely
- provide breathing support early if necessary
- intravenous fluid therapy may be necessary
- patients with systemic envenomation should be given 10 ml scorpion antivenom intravenously a follow up dose of 5 ml may be necessary after 4-6 hours
- morphine and other nervous system depressants contra indicated. These compounds are ineffective and may even worsen breathing patterns
- aspirin or paracetamol not effective only effective treatment for local pain is infiltration of sting site with a local anaesthetic agent. Severe raised blood pressure can be controlled by calcium channel blocking agents.

APPENDIX

SPIDER: NEUROTOXIC VENOM

- Venom of button spiders contains a protein - a neurotoxin known as **alpha-latrotoxin**.
- This neurotoxin binds with high affinity to a specific presynaptic receptor.
- It creates ionic pores.
- A process is set in motion resulting in a massive release of neurotransmitters.
- Two peripheral neurotransmitters accounts for clinical picture of **latrodectism**.
- A bite induces a hyperactive state, initially due to a generalized stimulation of somatic and autonomic nerve endings.
- This is followed by a phase of relative paralysis due to depletion of neurotransmitters.
- Central nervous system not affected.

SCORPION VENOM

- Scorpion venom is complex containing: mucus, inorganic salts, low-molecular weight organic molecules and many different small basic proteins which are neurotoxins.
- Neurotoxins act on sodium channels of excitable cells, either by retarding inactivation (alpha-toxin) or enhancing activation (beta-toxin).
- This leads to spontaneous depolarisation of excitable cells.
- Overall effect a tendency of neuron to fire spontaneously and repetitively
- Noradrenaline and acetylcholine released from adrenergic and cholinergic nerve endings, respectively and adrenaline released from adrenal medulla.
- This may explain the sympathetic, parasympathetic and skeletal muscle effects of venom.

CONTACT TELEPHONE NUMBERS

South African Vaccine Producers:	011 882 9942 (office hours)
Tygerberg Poison Centre:	021 931 6129 (all hours)
Unitas Pretoria	012 664 1100 (all hours)
Johannesburg MRI	011 403 7080 (all hours)
ARC-PPRI	012 356 9824 (office hours)

MORE INFORMATION

- Dippenaar-Schoeman, A.S. & Müller, G. 2000. Spiders and scorpions of medical importance in Southern Africa. CD-ROM version 2000.1 ARC-Plant Protection Research Institute, Pretoria. Price R100.00 available ARC-PPRI.
- **Dippenaar-Schoeman, A.S. 2002.** The Spider Guide of Southern Africa. CD-ROM version 2001.2 ARC-Plant Protection Research Institute, Pretoria. Price R100.00 available ARC-PPRI.
- **Dippenaar-Schoeman, A.S. 2003.** Venomous spiders of Southern Africa. Plant Protection Research Institute Poster series 2003.1, Agricultural Research Council, Pretoria. Price poster R30.00 available ARC-PPRI.
- **Dippenaar-Schoeman, A.S. & Müller, G. 2003.** Venomous scorpions of Southern Africa. Plant Protection Research Institute Poster series 2003.2, Agricultural Research Council, Pretoria. Price poster R30.00 available ARC-PPRI.