Review of the Medically Important Spiders in Southern Africa

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SUMMARY

Known and suspected medially important Southern African spiders are reviewed in terms of their distribution, identification, action of the venom and treatment of the bite. Simple diagnostic characteristics of each species are provided to assist the non-specialist in identifications.


The perpetual stream of enquiries concerning spiders which medical practitioners address to the South African Institute for Medical Research, local museums and universities, shows clearly that a great deal of confusion regarding the medical importance and identity of spiders still exists. Since latrodectism was last reviewed in South Africa, there have been two developments. A new species of Latrodectus from Southern Africa has been described and loxoscelism has been strongly suspected in the Transvaal. In this review the medically important spiders are considered individually.

GENUS: LATRODECTUS WALCKENAER

(Fig. 1)

Latrodectus mactans (Fabricus, 1775)

In his revision of the genus Latrodectus, Levi found the following Southern African species to be conspecific with mactans: cinctus Blackwall 1865, indistinctus Cambridge 1904, incertus Lawrence 1927 and indistinctus karooensis Smithers 1944. Local vernacular names applied to this cosmopolitan species are button spider, knopie or knoppiespinnekop and black widow spider, the latter name being preferable, as it is used internationally. Distinguishing characteristics. The male is of no medical importance, is only 3 mm long and is rarely seen, and thus it is not considered in this study. Females are smallish black or very dark brown spiders, with a body length of up to 15 mm (excluding the legs). The abdomen bears red dorsoposterior markings in the form of a stripe or stripes, which are particularly prominent in juveniles and which become shorter and less intense in colour with each moult. Thus, in mature specimens, these markings are often hard to see and may be represented by a mere dull red dot, just above the spinnerets. An irregular pattern composed of yellow dots is sometimes present on the dorsal surface of the abdomen. The body is thickly covered with short black setae which give these spiders a velvety appearance. The legs are of an even black colour and the ventral marking, in the shape of an hour-glass, is absent in African specimens, but is present in American specimens of this species. Traces of the hourglass-shaped marking are present in the very early nymphal stages. The spherical egg sacs which are generally seen in the webs of these spiders are cream-coloured, 10-15 mm in diameter, and of smooth silken texture. The web is an untidy structure with no apparent order, made among grass or between rocks. When molested, these spiders sham death and may eject a very sticky substance from their spinnerets.

Distribution. They are widespread throughout the world between the latitudes 55° N and 50° S. In Pretoria and Johannesburg, mactans is common in the peripheral suburbs of lower housing density, but is virtually absent in the developed high-density city areas. The belief that this spider is restricted to the South-Western Cape is clearly wrong.

Action of the venom. According to Finlayson, the clinical symptoms in man are excruciating cramp-like pains in the limbs, chest and abdomen, which may be accompanied by a feeling of painful tightness in the chest and abdominal rigidity. The patient perspires profusely and salivates excessively. Body temperature may be subnormal, or may rise to 39,5°C. The reflexes are often overactive and the patient may be cyanosed. Nausea and vomiting may follow. Death is caused by cardiac or respiratory failure, but it must be emphasised that the mortality rate is very low — between 4% and 6% in untreated cases. It is however, very misleading to give mortality rates, for only details of severely ill people, who are hospitalised or treated by a physician, can be used in the compilation of these statistics. In South Africa no statistics are available, and most cases of latrodectism probably never reach the medical practitioner. The mortality rate is almost certainly very much lower than 5%.

Bücherl states that the venom of Latrodectus is neurotoxic in action and affects the spinal cord. For this reason, intravenous injections of calcium salts have proved effective in treating cases of latrodectism. Calcium salts depress the neuromuscular junctions which are stimulated by Latrodectus toxins. Other pathology includes generalised injury to the liver, kidneys, spleen, lymph nodes, thymus and adrenals. The principal lesion seen in test animals was a parenchymatous necrosis which affected the blood vessels,
epithelial cells, nerve tissue and lymphoid cells. However, not all bites are followed by severe symptoms. Many factors are involved, but the most basic is the amount, if any, of venom injected at the time of the bite. In many cases, the bite is followed by little disturbance apart from local stinging, which may be accompanied by mild oedema and erythema.

**Treatment.** A specific antivenom is prepared by the South African Institute for Medical Research in Johannesburg and the following usage is recommended by the Institute. A 5-ml dose of antivenom should be injected subcutaneously or intramuscularly at the earliest sign of systemic poisoning. The patient should be kept still and if there is little or no improvement after an hour, a further dose of 5 - 10-ml of antivenom should be administered intravenously. In the absence of adverse reactions to the first dose of antivenom, it is safe to give the second intravenously. The possibility of dangerous serum reactions must be catered for by having adrenaline or soluble corticosteroid ready for immediate use. The indiscriminate use of the antivenom is not advocated. Morphine can be administered to relieve the pain. Intravenous injections of calcium gluconate have proved very effective in relieving the symptoms of latroductism.

**Latroductus geometricus Koch, 1841**

Levi' found *concinnus* O. P. Cambridge 1904 to be conspecific with *geometricus*. Local vernacular names are brown widow or gutter spider, the former being preferred, as it is used internationally.

**Distinguishing characteristics.** The normal colour variation of *geometricus* is considerable, and there is some evidence that the habitat may play a role in this diversification. Black, brown and grey specimens are common and may have the following markings. The dorsal surface of the abdomen often has a prominent and intricate pattern of bright yellow and red markings. In certain black specimens, the dorsal pattern is absent. The ventral surface of the abdomen always bears the characteristic red or orange hourglass-shaped marking. In paler specimens, the joints of the legs are darker and impart a banded appearance to the legs. The body of the female reaches a length of about 12 mm and that of the male about 3 mm. Egg sacs generally found in the web are easily distinguished from those of *mactans* by the numerous short projections which are evenly dispersed over the entire surface. The webs consist of an irregular series of silken strands which are evenly dispersed over the entire surface. The webs are very common beneath window-sills and other structural projections of buildings. One of the garden spiders, *Araneus* sp. (Family: Argopidae) is often confused with *L. geometricus* because it also has a red hourglass-shaped marking on the ventral surface of the abdomen. This spider differs from *L. geometricus* in the following manner: its legs are much shorter, the third pair being much shorter than the body length. The median and lateral eye groups of *Araneus* sp. are widely separated from each other, while in *Latroductus* sp. all the eyes are virtually equidistant from each other (Fig. 2).

**Distribution.** They are widespread in Africa and South America and occur in isolated instances in other parts of the world. In Southern Africa, this spider is very common indeed in the built-up areas.

**Action of the venom.** The physiological symptoms following *geometricus* envenomation are similar to those of *mactans* envenomation, but are very much less severe. In test animals, the venom of *geometricus* varied from about a quarter as toxic as *mactans*, in the case of guinea pigs, to one tenth as toxic in mice, when based on the minimal lethal dose.

**Treatment.** Treatment is the same as that described for *mactans*.

**Latroductus rhodesiensis Mackay, 1972**

The toxicology and medical importance, if any, of this newly-described species, have not yet been established, but in view of its close relationship to *geometricus* and *mactans* this spider should be regarded as being potentially harmful to man. It is, however, most unlikely that the non-specialist would be able to distinguish this species from *geometricus*, since the only difference is in the morphology of the genitalia. The egg sacs differ from those of *geometricus* in that they are much larger, and are smooth. This species appears to be restricted to the northern parts of Rhodesia. There are no acceptable records of this species in the Transvaal.

**GENUS: LOXOSCELES HEINECKEN AND LOWE (Fig. 3)**

**Loxosceles spinulosa Purcell**

Loxoscelism (envenomation due to the bite of loxosceline spiders) is established in the Americas and in Israel, and a milder form is strongly suspected in the Transvaal. Three species occur in Southern Africa, two of which are found only in caves. If the cases which have appeared in the Transvaal from time to time are in fact the result of loxoscelism, then the species involved is *L. spinulosa*. The author regards the following species to be synonyms of *L. spinulosa*: bergeri Strand, pilosa Purcell, simillima Lawrence and pinicea Lawrence. Vernacular names are violin spider, fiddle-back spider and brown spider.

The reasons for suspecting loxoscelism in the Transvaal are (a) the similarity of symptoms to those caused by proven cases of loxoscelism in America and Israel; (b) the abundance of *Loxosceles spinulosa* in Southern Africa; and (c) the fact that the venom of *spinulosa* induced local necrosis in guinea pigs. Loxoscelism is not easy to prove, because there is little or no pain at the time of the bite and painful symptoms only appear 2 - 8 hours later. Accordingly, little or no notice is taken of the spider at the time of the bite and in many cases, the victim is bitten at night while he is asleep. These spiders are nocturnal, move about freely at night and then take refuge under any available cover when the morning
approaches. Thus, spiders entering human dwellings often take refuge in clothing or under bed coverings when day approaches. A person who dons clothing in which one of these spiders is hiding stands a fair chance of being bitten if the spider is hurt.

Distinguishing characteristics. They are small, long-legged spiders, with body lengths up to 9 mm. The body of the male is slightly smaller than that of the female, but the male's legs are longer. These spiders have only 6 eyes (most spiders have 8), which are arranged in a re-curved row near the anterior of the carapace. The body is light brown and is covered with spine-like setae, yellowish and black in colour. The anterior of the carapace bears a black violin-shaped marking, hence the vernacular name. Loxoscelines resemble the common 'Daddy-long-legs' (Pholcus) in general appearance, but can easily be distinguished by virtue of the above characteristics and by the fact that when disturbed, Pholcus displays the characteristic vibrating movement in its web. Loxosceles does not make a web in the conventional sense.

Action of the venom. As South African cases of suspected loxoscelism have not yet been fully documented, the following information is based on American findings. The initial symptoms may include mild transitory stinging at the time of the bite, but there is normally little or no pain. Pain varying in intensity from slight to severe is felt after 2 - 8 hours. Puffer summarised the symptoms as producing oedema and erythema, followed by local necrosis and ulceration.

Treatment. Treatment is directed towards controlling the symptoms and limiting the extent of tissue destruction. Russell suggests treatment with hydrocortisone sodium succinate (Solu-Cortef). No antivenom is available locally or in North America, but an antivenom for the bites of L. laeta (Nicolet) is available in South America.

GENUS: HAR Pactirella Purcell
(Fig. 4)

Harpactirella lightfooti Purcell

This species is the only megalomorph spider thought to be of medical importance in Southern Africa. It is
doubtful whether the non-specialist would be able to identify the genus with certainty, let alone the species, and accordingly, only the family characteristics are given in this account. Vernacular names are baboon spider and bobbejaan-spinnekop and these apply to all the large species of the family.

**Distinguishing characteristics.** The chelicerae articulate in a plane parallel to the long axis of the body. Eight eyes are positioned on a raised and rounded ocular tubercle (small) near the anterior of the carapace. The spinnerets are very long and protrude well beyond the posterior margin of the body. The body length may exceed 30 mm. There are 2 pairs of book-lungs on the ventral surface of the abdomen. The body and legs are covered thickly with hair-like setae, brownish or grey in colour. The exact distribution of *lightfooti* is not well established, but it appears to be restricted to the South-Western Cape. The nests consist of silk-lined tunnels beneath rocks and logs.

**Action of the venom.** Finlayson\(^{15}\) reported two cases of *H. lightfooti* bites and reported the following symptoms. A burning pain was experienced at the site of the bite. After a latent period of 2 hours, the patient vomited continuously, showed marked signs of shock, was pale, collapsed and was unable to walk. No discoloration or swelling was visible at the site of the bite.

**Treatment.** The treatment of *lightfooti* envenomation is still a matter of speculation. Finlayson\(^{15}\) found that mice experimentally bitten by this spider responded to treatment with the *Latrodectus* antivenin, while untreated bites ended fatally.

**GENUS: PALYSTES KOCH (Fig. 5)**

**Palystes natalius** Karsch

Vernacular names applied to this spider are wandering spider, lizard-eating spider and dwaalspinnekop. This spider is common in South Africa and is probably the largest araneomorph spider in the region.

**Distinguishing characteristics.** The only spiders with which *Palystes* might be confused are the baboon spiders (Theraphosidae), but they are easily distinguished from the latter by the following characteristics. The eyes are arranged in 2 rows of 4 across the anterior width of the carapace; the legs are slender and the chelicerae open and close in a plane at right angles to the long axis of the body. In the theraphosids, the eyes are clustered on a single, small median ocular tubercle near the carapace anterior, the legs are stout and very hairy and the chelicerae open and close in a plane parallel to the body's long axis.

Other distinguishing characteristics of *P. natalius* are that the body is a brownish grey, the ventral surfaces of the legs are bright yellow with transverse black bands and the setae in the oral region are reddish. These are very large spiders, with body lengths of up to 40 mm in the female. The male is only slightly smaller than the female. These spiders are often found running across the walls of houses; they are free living and are not normally associated with a web.

**Action of the venom.** Steyn\(^{63}\) suggested that *P. natalius* was of medical importance because it caused convulsions and death in guinea pigs experimentally bitten. One case of *P. natalius* envenomation was seen by the present author when a mature *P. natalius* female bit a man on the wrist of the left hand. A burning pain at the site of the bite was accompanied by slight swelling, which persisted for a few days. No other symptoms were evident and the victim was treated only to prevent possible infection at the site of the bite.

**CONCLUSION**

The above review clearly demonstrates that a great deal of uncertainty still exists regarding the symptoms and possible medical importance of our spiders. The only way to solve this problem is to document all cases of arachnidism and to have the culprit positively identified by a specialist. Specimens can be identified at natural history museums or at the Entomology Department of the South African Institute for Medical Research.

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**REFERENCES**