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SPIDER-BITE IN SOUTH AFRICA *

M. H. FINLAYSON, B.Sc., M.B., Ch.B., D.P.H.

Pathologist, Cape Town

The existence of venomous spiders in Southern Africa has long been known but until the early part of the present century no definitely venomous species had been identified. In 1902 F. Pickard-Cambridge¹ described two species of *Latrodectus*—*L. indistinctus*, and *L. concinnus* which Smithers⁹ in 1944 showed to be a synonym of *L. geometricus*.

From time to time cases of spider-bite were reported in the Union, particularly in the coastal belt of the Western Province. The cases varied in severity and in a number of instances serious illness and even death was recorded. These cases were attributed to a black spider locally known as the *knopiespinnekop*. In 1929 Dr. G. W. E. Macpherson² of Stellenbosch published a note on a series of 6 cases of spider-bite occurring in the Stellenbosch district. He stated that the cases were due to the bite of *Latrodectus maculata*. Specimens of this spider were later identified as *L. geometricus*. In 1936 and 1937 Finlayson^{3, 4, 5} showed that the bite of the female of both *L. geometricus* and *L. indistinctus* could produce illness in man. The female of *L. indistinctus* was found to be the *knopiespinnekop* or Button spider.

Apart from the two species of *Latrodectus*, a member of the genus *Harpactirella*, *H. lightfooti* was reported by Finlayson and Smithers⁶ in 1939 as producing two cases of arachnidism on Jutten Island, an island in Saldanha Bay, Cape.

DISTRIBUTION AND BIONOMICS

Smithers⁹ (1944) investigated the distribution and bionomics of *L. indistinctus* and *L. geometricus*. He found that both species are widely spread throughout South Africa and the Rhodesias. Cases of spider-bite due to *L. indistinctus*, however, have only been reported

from the wheat lands of the Western Province and of the Eastern Orange Free State. Illness due to the bite of *L. geometricus* has been reported from the Stellenbosch and Constantia districts.

Smithers found that *L. indistinctus*, amongst other sites, makes its nest in the wheat lands of the Western Province. During the harvest season these nests are disturbed and exposed to the sun, causing the spiders to seek shade and shelter in the sheaves of wheat which are left to dry in the fields. The workers collect several of these sheaves under their arms and may thus come into contact with a spider, which, being irritated by friction with the clothing or skin, may inflict a bite.

The majority of cases of spider-bite, none of which were fatal, caused by *L. geometricus*, have been reported as occurring in vineyards in the Western Province. This spider makes its nest in and around buildings, round barns, stables, garden buildings, under the bark of trees, under stones and in tufts of grass, bushes and vines. The reported cases have occurred in summer when grapes are being harvested and the spiders have been disturbed.

Four species of *Harpactirella*, an exclusively South African genus, have been described, all from the Cape Province. *H. lightfooti* was originally described from Paarl, but is apparently of much wider distribution than was at first supposed. These spiders are very active and aggressive and as they are hunting spiders they readily come into contact with man. The nests consist of silk-lined tunnels under stones, logs or other debris. *H. lightfooti* is a large spider with formidable fangs and closely resembles the non-venomous *Harpactira baviaana* locally known as the *Bobbejaanspinnekop*.

TOXICOLOGY

The venom of the South African species of *Latrodectus* was investigated by Finlayson^{3, 4, 5} (1936, 1937), who showed that extracts of the cephalothoraces of these spiders contained a potent venom. The venom of the female *L. indistinctus* was, however, much more potent

* Abridgment of paper read before the First International Conference on Animal Venoms, 121st Annual meeting of the American Association for Advancement of Science, Berkeley, California, December 1954.

than that of the female *L. geometricus*, the minimum fatal dose of the venom of the former for rabbits being 3 mg. as against 12 mg. of the venom of the latter.

Cross neutralization and precipitin tests with the venom of *L. indistinctus* and *L. geometricus*, and antisera prepared with these venoms, showed that *L. indistinctus* venom not only contains the same antigens as *L. geometricus* venom but also an additional antigen. Antisera prepared against *L. indistinctus* venom could therefore be used in the treatment of spider-bite caused by either *L. indistinctus* or *L. geometricus*.

In 1945 Finlayson and Hollow⁸ showed that a sample of purified *L. mactans* antiserum concentrate obtained from Dr. R. Sampayo was very effective in neutralizing the venom of *L. indistinctus* and in protecting mice against the bite of this spider. It would appear therefore that *L. mactans* and *L. indistinctus* venoms contain a common antigen and unless the venom of *L. mactans* contains additional antigens, the antigenic composition of the two venoms is identical, as complete protection against the bite of *L. indistinctus* was achieved by the injection of anti-mactans serum. Until the action of *L. indistinctus* antiserum on *L. mactans* venom is investigated the complete identity of the two venoms cannot be determined.

Whilst it was possible to demonstrate that *H. lightfooti* possessed a potent venom by causing the spider to bite mice and guinea pigs, the extreme lability of the venom prevented its isolation. It was therefore not possible for an antiserum to be prepared against this venom. Experiments with mice passively immunized with *L. indistinctus* antivenine and then bitten by *H. lightfooti* suggested that *L. indistinctus* antivenine conferred some protection, in experimental animals, against the bite of *H. lightfooti*.

TREATMENT OF SPIDER-BITE IN SOUTH AFRICA

Following the preparation of a potent antiserum against *L. indistinctus* venom, which was also shown to be effective against the venom of *L. geometricus*, this serum was issued on request to magistrates and district surgeons throughout the Union. In 1937 Finlayson⁶ published a report on the effect of the antiserum in the treatment of 18 cases of spider-bite, all of which appeared to benefit from the serum injections. From time to time further reports on the efficiency of the

serum in the treatment of 'Knopie-spider' bite were received, and it is of interest to note that no reports have been received of death in cases of spider-bite treated with serum, whereas before the issue of the serum a number of fatal cases of spider-bite had been reported in the Union.

During the period 1936-1945, 762 phials of antivenine were issued from the Union Health Department Laboratories at Cape Town and, from 1949 to 1953, 1,794 ampoules were issued by the South African Institute for Medical Research, Johannesburg, which undertook the manufacture and issue of the serum in 1949. It is evident from these figures that there has been a marked increase in the demand for *L. indistinctus* antivenine over the 4-year period 1949-1953 as compared with the 7-year period 1939-1945. No reports have been received of the effect of the serum in treating cases of bite by *H. lightfooti*.

Bogen,¹⁰ discussing in 1955 the treatment of poisoning from the bite of *L. mactans* (Black Widow spider) in the U.S.A. stated that a multitude of therapeutic measures, including the use of convalescent serum and immune animal serum had been enthusiastically acclaimed and just as strongly flouted. He emphasized the need for controlled studies and critical consideration of the action of the various therapeutic measures and stressed the necessity for investigation of the treatments used.

It is not unreasonable to assume that the increased demand for *L. indistinctus* antivenine in the Union, results from its therapeutic efficiency. In view, however, of the paucity of reports on its efficacy since 1937, it is suggested that an estimation of the value of serum therapy in the treatment of spider-bite in South Africa should now be made.

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