Diseases of camels in the Sudan

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Summary: The most important diseases reported in the Sudan are trypanosomiasis and helminthoses. Sarcoptic mange and tick infestation also occur. Since there has been relatively little research on diseases other than trypanosomiasis, the creation of a camel research institute is proposed.

KEYWORDS: Camels - Diseases - Dromedary - Ectoparasitoses - Parasitoses - Research - Trypanosomiasis.

Circumstantial evidence indicates that camels entered the Sudan from Egypt. The oldest evidence in the Sudan is a bronze figure resembling a saddled camel found by Reisgher (1923) at Maroe, dating back to between 25 and 15 BC (Addison, 1934, and Robinson, 1936; cited in 5). Bulliet (4) considers that camels must have crossed the Red Sea with the active trade movement between Arabia and the Horn of Africa and western parts of the Red Sea in about the third century BC. From the Eastern desert, camels moved south to the Sudan. Large numbers of camels were introduced into the Sudan through Egypt and across the Red Sea when Moslem Arabs invaded Egypt and Sudan in the seventh century. With the greatest invasions, which occurred in the eleventh century, the camel attained its present numbers and importance.

Distribution in the Sudan

Camels in the Sudan are normally found in northern parts of the country about the 13°N parallel. They are concentrated mainly in the northwestern parts of Kordofan and Darfur regions and in the eastern region.

As a consequence of recent drought and desertification, camels have moved as far south as the 10°N parallel. Their movement further south is hindered by political instability and tribal disputes in the southern parts of the country, in addition to the unsuitability for camels of the muddy soil, a high rate of humidity and presence of fatal diseases like trypanosomiasis.

Camel population of the Sudan

Sudan is the second most densely camel-populated country in the world (after Somalia). According to the 1977 livestock census, the number of camels was put at 2.5 million (Table I). However, this figure may be far below the current number (17).
The camels of the Sudan were least affected by the drought that hit the country a few years ago. The loss in camel population due to this catastrophe was estimated to be about 10%, whereas among sheep and cattle, losses were put at 60-80% in the affected zones.

**TABLE I**

*Camel populations in the Sudan by region*

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of camels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kordofan</td>
<td>853,705</td>
</tr>
<tr>
<td>Eastern</td>
<td>716,885</td>
</tr>
<tr>
<td>Darfur</td>
<td>368,198</td>
</tr>
<tr>
<td>Central</td>
<td>282,841</td>
</tr>
<tr>
<td>Northern</td>
<td>179,355</td>
</tr>
<tr>
<td>Southern</td>
<td>33,352</td>
</tr>
<tr>
<td>Khartoum</td>
<td>15,664</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,248,491</strong></td>
</tr>
</tbody>
</table>

*S.E. = 200,000*

**Camel types of the Sudan**

Sudanese camels are classified according to function (pack and riding) or to conformation and tribal ownership (7).

Pack camels constitute more than 60% of the camels in the Sudan. They are mainly owned by nomadic tribes of the Kordofan and Darfur regions. There is a heavy type which weighs about 400 kg in adulthood and the large massive type which has a body weight of about 500 kg.

Riding camels are lighter and faster, and they are bred mainly in the eastern parts of the country. They are the camel equivalent of the Arab horse (7). The Anafi breed seems to be the best, followed by the Bishari breed and various crosses between these two types and other subtypes.

**The nomadic system**

Camel herds form the basis of a subsistence economy for pastoral nomads in the same way as do sheep, goats and cattle. Camels are kept for their meat, milk, hair and transport. Cash revenue is generated by the sale of surplus animals locally and abroad.

Like all nomads, camel-owning tribes are on the move continuously, seeking water and good grazing.

**CAMEL DISEASES**

The clinical reaction of camels to diseases is usually not very pronounced nor is it predictable. Illness may pass unnoticed (18), a fact which has prompted some to
claim that a sick camel moves about, lies down and then dies. Many workers, including Richard (18) and Schmidt-Nielsen et al. (19) believed that the low density of camel populations, the environments in which they are bred and the long intervals between drinking keep them from frequent contact with other animals, thus diminishing the chance of acquiring infectious diseases.

Nevertheless, camels do contract both infectious and non-infectious major ailments, and the following are the most important.

**Trypanosomiasis**

By far the most important protozoan disease of camels in Sudan is trypanosomiasis, especially infection with *T. evansi*. According to Karib (11) camel trypanosomiasis was first recorded in 1904. By 1908 the disease had been diagnosed in Kordofan province north of the 12° parallel, the whole of the White Nile province and the area between Suakin and Kassala along the border with Eritrea. Darfur province was not annexed to the British colony until 1916.

At present camel trypanosomiasis is widespread in all of the camel breeding areas, occurring in acute and chronic forms. In the acute form the disease is almost always fatal. In the chronic form there is usually loss of production and bodily condition, and anaemia.

Transmission is reported to be exclusively mechanical, carried out by a number of species of haematophagous biting flies, including *Tabanus* and *Stomoxys*. Mahmoud and Gray (14) found a definite correlation between the seasonal outbreak of *T. evansi* infections and the increase in number of tabanids during the rainy season in the Sudan (June-October). Yagi and Razig (21) found that *Tabanus taeniola* and *Tabanus buguttatus* are prevalent throughout the year. The prevalence of tabanid species throughout the year ensures permanent possibility of infections with *T. evansi*, with outbreaks occurring during the rainy season (14).

Malik and Mahmoud (15) found that cattle, sheep, goats and donkeys undergo a protracted infection which may result in a carrier state, and these species may act as reservoir hosts. Although camels do not frequently come into close contact with cattle in the Sudan, they do come into contact with sheep, goats and equines. This situation has now changed as a result of the recent drought, so that wherever cattle are kept in northern Sudan, camels also exist, thereby increasing the possibility of contracting the infection with *T. evansi* and other trypanosomes.

Drugs which have been used in the Sudan to treat camel trypanosomiasis include Naganol (suramin), Antrypol and Antrycide (forms of quinapyramine). With these drugs it has been possible to save the lives of thousands of camels and keep the disease well under control. Nevertheless, drug-resistant stocks of *T. evansi* have been reported in the Sudan (12, 13). According to Luckins et al. (13), a *T. evansi* stock isolated from Kassala in the Sudan was not susceptible to two successive treatments with 10 g suramin and a dose of quinapyramine at 3 mg/kg.

Leach (12) found a stock of *T. evansi* which was resistant to 5 g suramin but susceptible to 2 g quinapyramine sulphate. Diminazene aceturate at 3.5 mg/kg was ineffective as a treatment, and at 7 mg/kg it proved highly toxic to adult camels in the Sudan.

Drug-resistant *T. evansi* are not yet a serious problem because effective alternative trypanocides can be used. The diminishing interest in developing new trypanocides may create an obstacle to control of the disease in the future (14).
Balantidiasis

Among the protozoan diseases which have been reported sporadically in the Sudan is balantidiasis (2). This caused severe diarrhoea and was treated effectively with carbarsone (250 mg) and kaolin (250 mg).

Sarcocystis infection

Ginawi and Shommein found sarcocysts in cardiac muscles of 8% of slaughtered camels. The disease needs further assessment of its pathological and economic significance.

Helminths

Although it is generally accepted that conditions under which camels are reared in the Sudan are not favourable to the development and transmission of parasites, camels do contract various helminth infections. Helminths of importance in camels in the Sudan are *Haemonchus longistipes* and *H. contortus*. Both nematodes have been reported from camel breeding areas of the Sudan. They are usually present as mixed nematodal infections, but Arzoun *et al.* (3) claimed that in 320 infected camels examined post-mortem, apart from ruminal amphistomes, *H. longistipes* was the only helminth found in the gastrointestinal tract. Prevalence varies from region to region and from one season to the next. A prevalence rate of up to 89% was recorded by Arzoun (3) in Sudanese camels in the wet season and 64% in the dry season. The symptoms exhibited by infected camels include emaciation, anaemia and oedema of the lower limbs.

Thiabendazole is used against camel helminth in the Sudan at a dose rate of 90 mg/kg. This has replaced phenothiazine which was formerly used.

Sarcoptic mange

Mange is known to have occurred before modern veterinary practice was established in the Sudan. It is called “Jarab” in Arabic, and was customarily treated with tar and cauterisation.

Sarcoptic mange is widespread in all camel breeding areas of the Sudan and causes serious losses to camel owners and herders. It is thought that nomadic camels on a low plane of nutrition are the worst affected (6).

Sarcoptic mange is treated by spraying or dousing the camel all over with a freshly-prepared solution of Gamatox (lindane) or diazinon. It may be necessary to repeat the applications several times to effect a cure. Ivermectin seems to have a remarkable effect, and may be used in future to control mange in camels and other animals.

Ticks

Although ticks are incriminated as efficient transmitters of various infectious diseases in animals, their role as disease vectors in camels is minor (9). It follows that there is little motivation for camel owners, herders and veterinarians to undertake routine prophylactic measures against camel ticks. Nevertheless, ticks suck blood and can cause anaemia and debility in camels (9) as well as tick paralysis (17).

Camel ticks of importance in the Sudan are *Hyalomma dromedarii*, *H. anatolicum*, *Amblyomma lepidum*, *A. variegatum* and *Ornithodoros savignyi* (17).
Treatment and control consists of spraying or dousing camels with lindane (Gamatox) which has so far proved to be the best acaricide for use in the Sudan.

Viral diseases

Camel pox was first reported in the late seventies by B.H. Ali and by M.A. El Amin (personal communications) in Kassala Province in the eastern region. The virus has been isolated but not yet identified. According to these reports it seems that camel pox is the only viral disease of importance in camels, though its economic and public health significance is not clear.

CONCLUSION

Camel diseases in the Sudan, though few in number, are serious and can cause losses and reduced production. The most important diseases are trypanosomiasis and helminthoses. Of the ectoparasitic infections, two are of real nuisance to camels and their owners: sarcoptic mange and tick infestation.

Research on camel diseases other than trypanosomiasis is scanty. Since camels play an increasingly important role in the livestock economy of the Sudan, it is recommended that further research should be conducted on infectious and non-infectious diseases. A new camel research institute is proposed for the Sudan, and this should help to develop the potential of this important species.

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LES MALADIES DU DROMADAIRE AU SOUDAN. – A.M. Shommein et A.M. Osman.

Résumé : Parmi les maladies du dromadaire signalées au Soudan, les plus importantes sont la trypanosomose et les helminthoses.

La gale sarcoptique et l'infestation par les tiques sont également présentes. Comme il y a eu relativement peu de travaux de recherche sur les maladies autres que la trypanosomose, les auteurs proposent la création d'un institut de recherche sur les camélidés.


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LAS ENFERMEDADES DEL DROMEDARIO EN SUDÁN. – A.M. Shommein y A. M. Osman.

Resumen: Entre las enfermedades del dromedario señaladas en Sudán, las más importantes son la tripanosomiasis y la helmintiasis. También se presentan la sarna sarcóptica así como la infestación por garrapatas. Dada la relativamente poca cantidad de trabajos de investigación sobre enfermedades que no sean la tripanosomiasis, los autores proponen la creación de un instituto de investigación sobre los camélidos.
REFERENCES