PARASITES OF DROMEDARIES AND BACTRIAN CAMELS – A REVIEW PART 1: STENOXENOUS PARASITES

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ABSTRACT
The parasite fauna of Old World Camelids consists of roughly 100 species of which 24 species are stenoxenous, occurring exclusively or mainly only in camels. To these species belong six coccideans (Eimeria cameli, E. rajasthani, E. dromedarii, E. bactriani, E. pellerdyi, Cystoisospora orlovi) at least three Sarcoptes species, the Balantidium-like Infundibulorium cameli, five gastro-intestinal nematodes (Physocephalus dromedarii, Nematodirus dromedarii, N. mauritanicus, Nematodirella dromedarii and N. cameli), three extra-intestinal nematodes (Dipetalonema, Onchocerca fasciata and Thelazia leesi), the lung worm (Dictyocaulus cameli), the camel tick (Hyalomma dromedarii), the nasopharyngeal bot (Cephalopina titillator) and the camel lousefly (Hippobosca equina). Information about an unnamed Demodex mite found in dromedaries and about the camel sucking louse (Microthoracius cameli) is scanty. The existence of two other nematodes, Trichuris cameli and Anthostrongylus somalilensis is questionable.

Key words: Bactrian camel, dromedary, Stenoxenous parasites

Camels are fascinating animals adapted to desert conditions due to their ability to withstand dehydration, low protein diet, energetic and mineral deficiencies (Faye and Esenov, 2005).

Anatomical, physiological and behavior features (coprophagy) on one hand, environmental conditions and the occurrence of other hosts or vectors on the other hand determine the spectrum of parasites that can be found in camels.

Despite of the importance of dromedaries and Bactrian camels as source of meat, milk, hides and transportation, camel diseases take only relatively small space in bacteriological and parasitological textbooks. Camel specific books (Wernery and Kaden, 2002; Gahlot and Chhabra, 2009; Wernery et al, 2013) seem to be unavailable for experts in many places were camels are kept.

Wrongly identified parasites of camels leading to subsequent publications (Ibrahim et al, 2016; Kumar et al, 2016) showed how little is known about the parasites of camels. This gave reason to write this review.

Our own experience with camel parasites is based on the results of more than 1000 necropsies of dromedary carcasses and examination of more than 75,000 faecal samples and several thousand serum samples over the past 15 years as well as on the careful evaluation of reliable international literature.

Stenoxenous parasites of the genus Camelus
Relatively few parasites are camel specific. However, it is not exactly known whether or not they are species specific or genus specific because in most of the Russian literature there is no differentiation between dromedaries and Bactrian camels.

Without counting temporary parasites, such as mosquitoes, midges, blackflies, biting and nuisance flies more than 80 parasites can be found in camels. Out of these, 24 species have a narrow host spectrum with camels as the only or as the main hosts.

In connection with Old World Camelids there are five species of Eimeria coccidians named in the literature. Of these, Eimeria cameli is striking due to the large dark brown oocysts reaching 80 – 100 µm and 55 – 94 µm in length. E. cameli oocysts have a similar size as E. macusaniensis of New World Camelids and is lightly bigger and differ in shape compared to the equid species E. leuckarti. The second species, E. rajasthani with an ellipsoidal oocyst measuring 34-39 x 25 – 29 µm and a presence of a dom shaped pole cap is also easy to recognize. The subspherical to ellipsoidal oocysts of E. dromedarii measure 23 – 33 x 19 – 25 µm. Two