

**Mini Review****Open Access** **Review on Epidemiology of Camel Mange Mites****Jarso D<sup>1</sup>, Birhanu S<sup>1</sup> and Wubishet Z<sup>\*2</sup>**<sup>1</sup>Haramaya University College of Veterinary Medicine, Haramaya, Ethiopia<sup>2</sup>Oromia Pastoralist Area Development Commission Yabello Regional Veterinary Laboratory, Ethiopia**Received:** August 10, 2018; **Published:** August 17, 2018**\*Corresponding author:** Wubishet Z, Oromia Pastoralist Area Development Commission Yabello Regional Veterinary Laboratory, Ethiopia**Abstract**

We reviewed the paper to document the status of mange mite in camel raising arid and semi-arid areas of the world. Different published research papers and books from 1980 to 2018 on ecto-parasites of the camel (including mange mites) were reviewed. Published papers were obtained online by web browsing and books from university library. Mange is caused by different species of Sarcoptus, Psoroptus, Chorioptus and Demodex in camels. This parasite is important parasite in camel raising area of the world. High infestations are noted during rainy season, at young and old age, camel with poor body condition, and in large herds. Relatively, Sarcoptic mange caused by Sarcoptes scabieivarcameli is considered to be one of the most and economically important zoonotic and epizootic diseases with spread capacity among animals via direct physical contact with infested animal and indirectly through fomites. It is also one of the most prevalent type of camel mange. Occurrence of the disease is mostly associated with poor management and a mingling of diseased camels with healthy ones.

Camel mange mite infestation usually starts from head region and then extends to the neck and other areas of the body with thin skin. The scabies may spread to the whole body within a period of one month. In conclusion, Camels are important animal raised in arid semi-arid area of area of the world. Even though it provides many advantages to people in marginal areas; the camel has received very little attention as compared to other species of domesticated animals. For this reason, camels are affected by several diseases including mange mites. In developing countries like Ethiopia Pastoralists in lowlands area shifting their livestock production from cattle to camel due to recurrent drought and adaptation capacity of the camel especially in East Africa. Therefore, camel raising communities need to treat their camels regularly by anti-mange mite drugs; and governmental and nongovernmental organization working on livestock health need to give attention for camels in camel diseases research and their management. In addition, pastoralists need to separate infested camels from healthy ones, cleaning fomites before and after used, and treating herds when one or more camel show clinical sign.

**Keywords:** Camel; Epidemiology; Mange mites**Introduction**

Camels are versatile animal species in ensuring food security and fulfilling the livelihood priorities of pastoral households in the arid and semi-arid areas of Ethiopia. They provide pastoral communities with income, food supply, transportation services and other social benefit s such as prestige (social status), ceremonial uses insurance and risk buffering options [1]. The ability of the camel to survive in harsh areas of the world, its endurance in prolonged drought, and above all its high potential to convert the scanty resources of the desert into milk and meat makes them more important to the pastoralists [2]. Even though camel provides this benefit to people, camel has received very little attention as compared to other species of domesticated animals in many area of the world including Sudan, Somalia and Ethiopia where large camel population is recorded [3].

Sarcoptic mange in one humped-camels (*Camelus dromedarius*) caused by *Sarcoptes scabieivarcameli* is considered to be one of the most and economically important zoonotic and epizootic diseases that can spread among animals via direct physical contact with infested animal and indirectly through fomites (ropes, blankets

and saddlery) especially in tropical and subtropical areas [4-7]. Occurrence of the disease is mostly associated with poor management and a mingling of diseased camels with healthy one's [8,9]. Sarcoptic mange is one of the most prevalent type of camel mange. Recently, attempts have been made to understand mange molecular epidemiology using genetic tools to differentiate between isolates from different hosts and geographical regions [10,11]. The epidemiology of mange is still not well understood and seems to differ between animal species and areas of the world. Therefore, the objectives of this review is to collate information on prevalence of mange mite among different countries where *Camelus dromedarius* kept and also to explore different risk factors associated with the spread of mange mites in camels.

**Epidemiology of Camel Mange****Etiology of Camel Mange**

Mange is a highly contagious skin disease caused by one or a combination of several species of mite [12]. These include species from the genera Sarcoptus, Psoroptus, Chorioptus and Demodex. Some species are more widely distributed globally than others.

## Sarcoptic Mange

Sarcoptic mange in camels caused by *Sarcopeltesscabievarcameli* is considered to be one of the most serious, zoonotic [13] and debilitating disease affecting both dromedary (Arabian and bactrian camels) and llamas [14]. It is regarded as one of the most prevalent camel diseases [14].

## Psoroptes Mange

It was shown that *Psoroptesspp* isolates of different phenotypes, hosts and geographic origins are nonspecific [15-17] recorded the only documented case of psoroptic mange in dromedaries and in bactrians in Mongolia. But are less commonly found on camelids than *S. scabiei*.

## Chorioptes Mange

Infestation with Chorioptes most probably rare in camels. It has been reported on a Bactrian camel [14] and in the Netherlands on one llama, three alpacas and two camels, one of which had foot mange [18].

## Demodex Mange

The preferred site of the burrowing mite of the genus *Demodex* is at the hair follicles and sebaceous glands of the skin. These follicular mites mainly live as commensals in the skin. In some animals, these mites may cause mange, causing economic loss [19]. The mite is most probably transmitted from the dam to the offspring during nursing. *Demodexspp* is found in all domestic mammals and humans worldwide. They have been reported on dromedaries in Iran where the eyelids of 15% of the camels were infested [20]. There was no evidence of any secondary bacterial infection in the investigated camels, nor were there any significant histological changes other than distension of the hair follicle. *Demodex spp.*, was isolated from camels exhibiting mange on a ranch in Kenya [21].

## Epidemiology of Camel Mange

Mange mites are ubiquitous ectoparasites that infect more than 100 species of mammals worldwide [10,21]. It affects both domestic animals and humans, but also wild life [21,22]. In humans it is known to cause considerable morbidity in a number of different countries [23,24]. Mange was regarded as a major disease during early 19 century when large trading camel caravans were common with the decline of the large trading caravans and the camel-keeping tribes' conditions are seldom as favourable for the spread of the disease as when large numbers of dromedaries congregated at a given site with caravans continually arriving and departing. Such animals were usually in poor condition and fatigued by long journeys; their feeding was poor and the hygienic conditions unsatisfactory. Epidemics can be caused by contagion from a single case of scabies in crowded living conditions [25]. Sarcoptic mange may lead to considerable economic losses in domestic animals with repercussions for the animal trade. It also has devastating consequences for wild animals, above all in isolated populations a situation that is worsening due to the limitations of available chemotherapy [26-29]. It is prevalent different parts of the world were camels raised.

## Risk factor of Camel Mange

Mange was a term used to describe mite-associated skin disease in livestock. The occurrence of mange mite in dromedary camels depending up on the following factors. In wet season camel mange mites is higher relative to dry season [1]. Prevalence of camel mange on age of camel's different author have used different age group to determine which age group more affected; some author said young and old animal more affected due to decreased immunity when we compared with adult one, which have high immunity than both [30-37]. On prevalence of mange on sex of camel's different authors had different opinions; some stated that camels male is more affected by mange than female [32]. Others however, stated female are more affected than male [1,38-40]. This may be associated with some hormonal influences; the higher level of prolactin and progesterone hormones could make the females more susceptible to any infection [41]. Additionally, pregnancy and lactation stress could also aggravate the susceptibility of the female camels to infections. Furthermore, the breeding behavior of mange infested males could also be attributed to the transfer of disease to a number of females. In contrast these some researchers observed no relationship between infestation with mange and sex animals [35].

Poor body condition was recorded in camels infested with mange mite. This result may be attributed to severe allergy and itching due to outcome of histamine liberated from damaged body cells which are compelling allergens [42]. In addition, the higher prevalence in poor body conditioned animals might be due to trypanosomosis, worm burden and poor nutrition status which can act as predisposing factors of sarcoptic mange infestation as described [5]. In researches done in Ethiopia, majority of the findings attribute to higher prevalence in animal with poor body condition, these results were due to cross-sectional epidemiological studies findings [31,37]. Mites can be transmitted by contact beddings and tree trunks can be other sources of transmission, camels rub themselves on tree trunks leaving the mites where the next animal may pick [32]. Since dairy camels are usually kept indoors and in close proximity, this contact favors transmission of the causative agent of mange and hence easy establishment of the disease in the herd. As herd size increases the prevalence of *S. scabiei* var. *cameli* also increased significantly [43].

## Economic importance of Camel Mange

The economic values of mange infested animal emanate from decreased body weight, expense of therapy, deterioration of skin due to perforation of the skin and intense pruritus as skin lesions may cover almost the entire body, and occasional mortalities in untreated and young animals [4]. In addition, mange mite has enormous zoonotic and public health significance [4,5]. Moreover, mange can harshly decrease the welfare of milking animals as reducing the vitality and increased susceptibility to other diseases as a result of secondary bacterial infection. It can abridge milk production and disserve milking procedure as a result of uneasiness of infested animals [32]. During development of mange, itchiness distracts the animals from eating so that they often become

emaciated. The specific lesions are confined to the integument and comprise hyperkeratosis, anemia, general loss of productivity and body weight [44].

### Clinical Sign, Diagnosis and Treatment of Camel Mange

Camel mange mostly diagnosed base on its symptoms. Which included intense pruritis, exudative dermatitis, parakeratotic scaly crust formation, alopecia and dark thickened skin [45]. Fissures developed in the crust and underlying epidermis resulting in hemorrhages. Emaciation, debilitation, anemia and subcutaneous edema were common signs in mange camels [46, 47]. The hyperkeratotic stage is easy to recognize by large areas devoid of hair, with thickened skin and folds around the joints, affecting the hind limbs and neck. Ivermectin subcutaneous injection can cure the mange mites in camel [5]. The post treatment hematological and biochemical values were within the normal wrinkling, falling of scabs, skin folds becoming less and subsequent appearance of fresh shiny skin with glossy hair 1-3 mm long prior to second treatment absence of tissue swelling because of injections, disappearance of clinical signs of itching with parasitological cure noticed by 56 days[48].

### Conclusion

Camel mange is economically important contagious camel disease that impact on their productivity and health. The overall prevalence of mange mite infestation varies from country to country it was 2.3%-97.4%. *S.scabiei*, *Demodex* spp, *Psoroptes* spp and *Chorioptes* spp being mite that was found from different country where studies were conducted. The most prevalent species were *S.scabiei* followed by *Demodex* spp. Origin, body condition, season, herd size, sex, age, parts of camel body were considered significant risk factors associated with the prevalence of mange mite infestation. Therefore, training should be given for camel raising communities on parasite control and camel management system to reduce mange mites effected in camel production.

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