Assiut Vet. Med. J. Vol. 58 No. 135 October 2012

CONSIDERING THE EXTENT OF MANGE DISEASE IN CAMELS THROUGH THE SUMMER SEASON AT TAIF REGION, KSA

SHERIFA MOSTAFA SABRA[1], M. SALEM AL-HARBI[2] and M. MOSTAFA AL-BASHAN[3]
Consultant Microbiology[1](Animal Health Research Insitute,Dokki, Giza, Egypt), Assistant Prof.Behavior and Animal Phsiology[2]and Prof. Microbiology[3]
Biology Dept., Science Collage, Taif University, KSA.

ABSTRACT

Received at: 24/9/2012

Accepted: 20/10/2012

The skin scraping (no. = 600) were collected from (4-8 yrs.) ages of camels during 1st May – 1st September 2012, had been sampled by skin tested for the presence of demodex mites. The skin examination showed the demodex mites, infection in 33.3%, the distribution of infection on the months of May, June, July, August and September 2012 as 31.7%, 37.1%, 39.2%, 33.6% and 26% respectively. All ages are involved in infestation with demodectic mange but more commonly in camels in age (4-8 yrs.), the degree of infection were in 4-5yrs., 5-6 yrs. 6-7 yrs. And 7-8 yrs., as 19%, 30.5% 29% an 21.5% respectively. The high infection recorded in age between (5-7 yrs). The sites of lesion in head, neck, back, lambs, axilla and tail were, 16.8%, 29.4%, 14.1%, 8.5%, 5.3% and 1.9%. The most affected area was neck, back and head, then limbs and axilla, the tail was the lowest region for infection.

Key words: *Mange disease, infestation, demodex, Camels.*

INTRODUCTION

Some skin diseases caused by parasitic mite, the term "mange", suggesting poor condition of the hairy coat due to the infection, Thus, mange was a term used to describe mite-associated skin disease in livestock. Since mites belong to the arachnid subclass Acari (also called Acarina), another term used to describe mite infestation was Acariasis. Parasitic mites that cause mange in mammals embed themselves either in skin or hair follicles in the animal, depending upon their genus. Sarcoptes species burrow into skin, while Demodex spp. live in follicles. Sarcoptic mange in camels caused by Sarcoptesscabieivarcameli was considered to be one of the most serious, contagious, zoonotic and debilitating disease affecting both dromedary, Arabian and Bactrian camels. (Singh and Veer, 2005). 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. Infection starts on the head region then spreads to the neck and the rest of the body (Higgins, 1983). The infection by mange in camels was 8.8% in KSA (El-Bahy *et al.*, 2008). In spite of the fact that mechanization had greatly supplanted camels quality as beasts of vurden (Fahmy *et al.*, 1998). But at ill, they was very dear in KSA because they was recognized as an important wealthy patrimony resources from the ancestors (Abdally, 2008). Camels were considered as hard and tough animals which can tolerate the harsh climate and extremes of temperature encountered in the desert (Abdally, 2008; Fahmy *et al.*, 1998).

Mange infection affects these important animals and reduced their prices and causes huge losses of these wealthy patrimony resources. Sarcoptic mange infection was a serious problem in many parts of the world passing a serious threat to animals health (Dorn *et al.*, 1986; Higgins, 1985; Melaku and Gibreah, 2001; Kumar *et al.*, 1992; Pegram and Higgins, 1992; Radostits *et al.*, 2000; Walker, 1994). Sarcoptic mange was regarded as one of the most prevalent and serious camel diseases (Lodha, 1966; Higgins, 1983). It was often ranked second in importance to all the disorders in dromedary camels (Pegram and Higgins, 1992). It can be generally regarded as a chronic debilitating condition with high morbidity and low mortality (Fowler, 1998). The disease "SarnaSarcoptica" was previously widespread in North American (Rosychuk, 1989). Any Camelid may be affected by S. scabiei (Nayel and Abu-Samra, 1986). However, the infection was more prevalent in younger camels (Rathore and Lodha, 1973). It was cited that animals in poor condition are more prone to infection (Lodha, 1966; Higgins, 1986).

However, this was controversial as others report that animals in a very good condition can also become infected (Nayel and Abu-Samra, 1986). There were conflicting opinions regarding the seasonality of the disease, a quiescent phase usually coinciding with winter (Pegram and Higgins, 1992; Lodha, 1966; Rathore and Lodha, 1973; Nayel and Abu-Samra, 1986; Higgins, 1986), other hand found a higher prevalence in KSA during the hot summer months.

They found Sarcoptic mange was endemic in Al-Najaf governorate in Iraq (Al-Romehi, 2000). The main sites of lesions in examined camels were neck, head, and dorsum with no lesion on the hump. No relation was detected between the infection and the sex, but young dromedaries were more susceptible to infection. Psorotic mange mites spend their entire life on the skin, feeding superficially. They reportedly infest Camelids, but are less commonly than S.scabiei. Psoroptes spp. was isolated from different phenotypes, hosts and geographic origins which nonspecific (Zahler *et al.*, 1998; Gabaj *et al*, 1992).

Some authors recorded the only documented case of Psoroptic mange in dromedaries and in Bactrians in Mongolia (Wemer *et al.*, 1989). In many countries Sarcoptic and Psoroptic mange were reportable diseases. Infestation with Chorioptes is most probably rare in camels, reported on a Bactrian camel (Higgins, 1986). An infestation of Chorioptes spp. was also responsible for mange in Chile camels recently imported in France (Petrowski, 1998). The preferred site of the burrowing mite of the genus Demodex was at the hair follicles and sebaceous glands of the skin. The mite is a cigar- shaped, elongated 0.2 mm long, transmitted from the dam to the offspring during nursing. Demodex spp., is found in all domestic mammals worldwide. Most of the species are named after their hosts, i.e. D. canis, D. bovis... etc. These follicular mites mainly lived ascommensals in the skin. In some animals, these mites may cause mange, causing economic loss (Wemery and Kaaden, 2002). Demodex spp. had been reported on Dromedaries in Iran where affected eyelids of 15% camels (Rak and Rahgozar, 1975). Demodex spp. was isolated from camels exhibiting mange in Kenya (Bomstein, 1995; Sqire, 1972).

The mite was a very specialized group of parasitic mites which live in the hair follicles and sebaceous glands of various mammals causing Demodectic or Follicular mange. The parasites occurs on different species, although it is difficult to distinguish between them morphologically, since the main differences are of size. Demodectic mange was diagnosed in 58.2% of camels (5-10 years old), 16.4% of camels more than 10 years old and 25.4% in camels less than 5 years old which indicate the high incidence in camels aged in 5-10 years. (Hussain *et al.*, 2012). Symptoms of the mange included intense pruritis, exudative dermatitis, parakeratotic scaly crust formation, alopecia and dark thickened skin. Fissures developed in the crust and underlying epidermis resulting in hemorrhages. Emaciation, debilitation, anemia and subcutaneous edema were common signs in mangy camels (Kumar *et al.*, 1992; Amer *et al.*, 2006). Infestation commences at areas of thin skin: the head, base of the neck, mammary gland, prepuce and flank. The head becomes affected rapidly in every case,for the animal uses its teeth to scratch affected areas. The incubation period is 2-3 weeks (Higgins, 1983). The invasive phase is characterized byerythema and numerous small vesicles, accompanied by intense pruritis. About two weeks after the first sign, the affected regions of skin have lost theirhair, becoming reddened and moist. Lesions may become generalised after 20-30days. Later the skin becomes dry and hard, with folds forming in the neck, around jointsand on the thighs, itchiness is less pronounced, this is the hyperkeratosis stage. During development of mange, itchiness distracts the animals from eatingso that they often become emaciated. Deceits sores may develop, as well as secondary infections, particularly with pyogenic bacteria. The specific lesions are confined to the integument and comprise hyperkeratosis, anemia, general loss of productivity and bodyweight (Higgins, 1983). Myiasis mayresult at these sites of abscessation or, especially in screw worm areas, as aresult of bleeding from attachment sites. Corneal ulceration can result fromattachment of a tick to the eyelid margin, the cornea may be scratched dueto the head being used to rub an irritable leg area with tick attached (Bakht *et al.*, 2003). The object of this study were, to determination of prevalence of mange in camels lesions, identification the factors that could contribute the occurrence of the mange disease during summer season, at Taif region, KSA.

MATERIALS and METHODS

Animals of the study: The research was done at Taif governorates, samples were collected from the abattoir, markets yards and the herds found in several locations randomly. The research began on 1st of May 2012 and finished on 30th September 2012. The samples were collectedeach month separately, so the total samples were 600 during the 5 month which time of research, for the detection of mange. The samples were noted for age,lesions location.

Skin sample: Samples for diagnosis of Demodectic mange lesions,most of the cases in which skin is thickened, white to gray heavy crusts with moist dermis beneath, complete hair loss and itching. The samples were gathered by remove excess hair that impedes proper scraping and interferes with collection of epidermal debris, deep skin scrapings (until capillary blood oozing). The average area scraped was 6-8 cm^2. Collected the scrapings in sterile screw cab containers and preserved in adequate amount of 10% potassium hydroxide or Sodium hydroxide, the

samples were transferred to lab. In ice boxes. In the lab., the samples heated until the solution became homogenized and left to be cool, centrifuged at 1500 rpm/min for 5 minutes, a drop of the feculence is examined on the slide microscopically (Charles and Robinson, 2006).

Data Analysis: The data which were recorded during the study period were entered into Microsoft excel sheet. Data were summarized and analyzed using SPSS version 16 computer program. Data were analyzed using Epi Info version 6 statistical software and for further compared using Chi-square test at critical probability of $p<0.05$.

RESULTS

Table 1: The Prevalence of the mange infections in camels

Month	May 2012	June 2012	July 2012	August 2012	September 2012	Total
No. examined	120	105	130	110	135	600
No. infected	38	39	51	37	35	200
Percentage	31.7%	37.1%	39.2%	33.6%	26%	33.3%

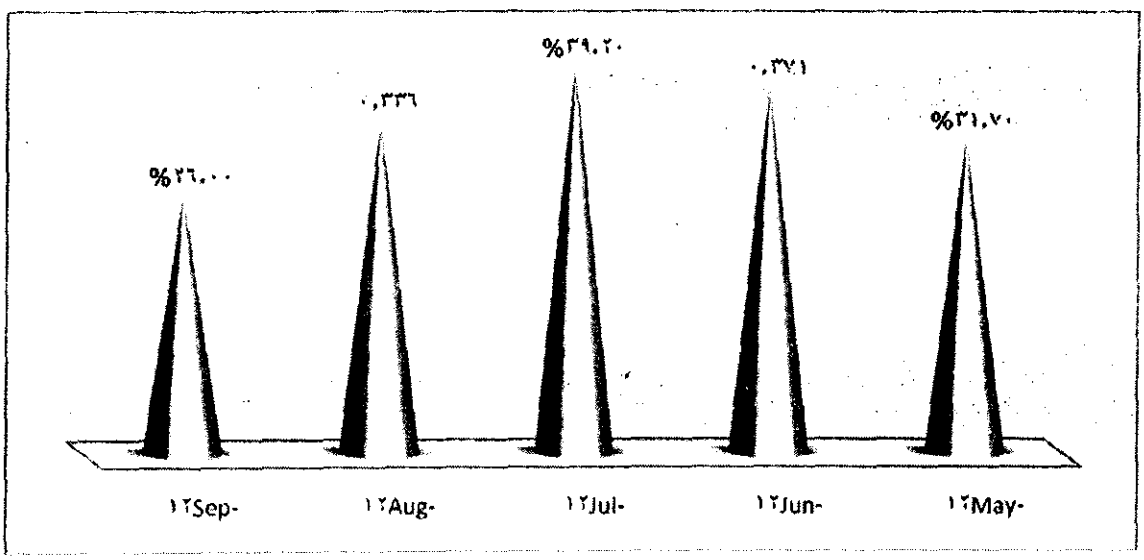

Diagram (1) : The Prevalence of the mange infections in camels

Table 2: The Prevalence of the mange infections according the age of camels

Age	4-5 yrs.	5-6 yrs.	6-7 yrs.	7-8 yrs.	Total
No. infected	38	61	58	43	200
Percentage	19%	30.5%	29%	21.5%	

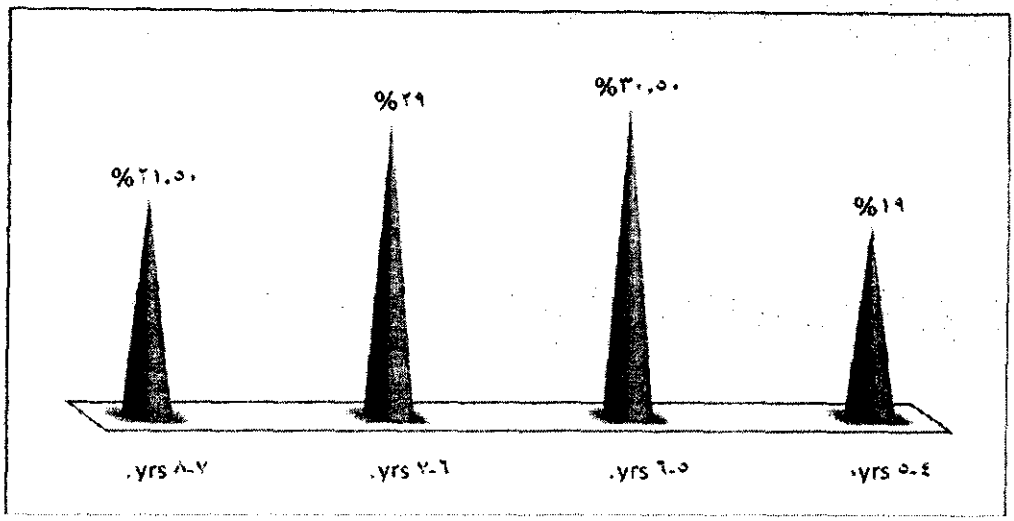

Diagram (2) : The Prevalence of the mange infections according the age of camels

Table 3: The Prevalence of the mange infections according the site of infections

Site	Head	Neck	Back	Lambs	Axilla	Tail
Percentage	16.8%	29.4%	14.1%	8.5%	5.3%	1.9%

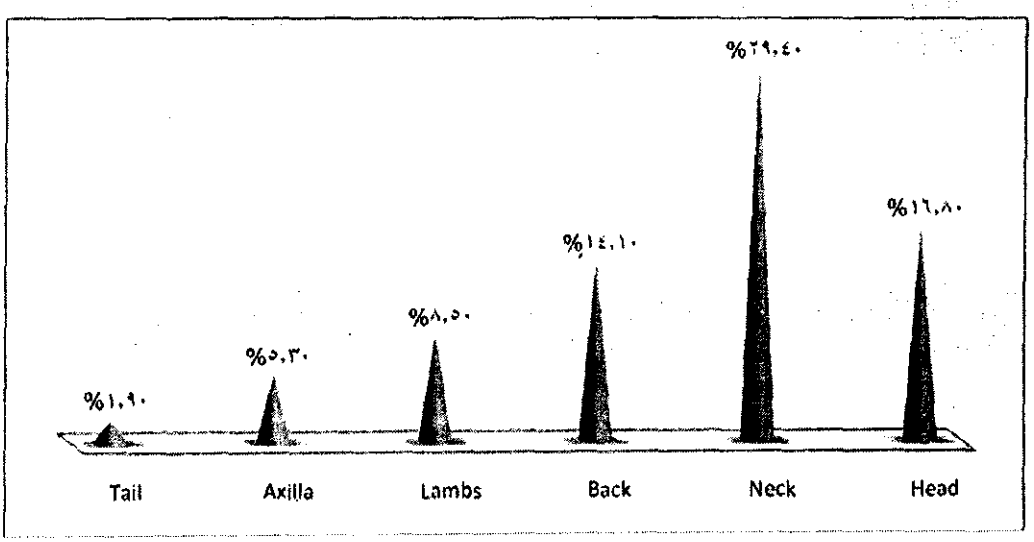

Diagram 3: The Prevalence of the mange infections according the site of infections

The samples (no. = 600) were collected from (4-8 yrs.) ages of camels, had been sampled by skin scrapings to find out the demodectic mange which tested for the present of demodex mites.

The Table (1) shows the skin examination infected bydemodex mites, the infection was in 200 camels as 33.3%, the infections affected about more than one third of the camels, the distribution of infection was on the months of May, June, July, August and September 2012 as 31.7%, 37.1%, 39.2%, 33.6% and 26% respectively.

The more infections appeared in June, July and August, but July was the highest month for infection, that was the top of summer. During May and September the infections trended to be in lower than the others months due to lowering in temperature.

Table (2) shows all ages were involved in infection with demodectic mange but more commonly in camels at age (4-8 yrs.), the degree of infection founded in 4-5yrs., 5-6 yrs. 6-7 yrs. And 7-8 yrs., as 19%, 30.5% 29% an 21.5% respectively. The high infection recorded in age between (5-7 yrs.).

Table (3) shows the sites of lesion were in head, neck, back, lambs, axilla and tail as, 16.8%, 29.4%, 14.1%, 8.5%, 5.3% and 1.9%. The more affected area were neck, back and head nearly in affections, then lambs and axilla, the tail was the lowest region for infection.

DISCUSSION

Class of skin diseases caused by parasitic mite (Mange, 2010). Thus, mange was a term used to describe mite-associated skin disease in livestock (Mange, 2012). Since mites belong to the arachnid subclass Acari (also called Acarina), another term used to describe mite infestation was Acariasis. Parasitic mites that cause mange in mammals embed themselves either in skin or hair follicles in the animal, depending upon their genus. Sarcoptes spp. burrow into skin, while Demodex spp. live in follicles. Sarcoptic mange in camels caused by Sarcoptesscabieivarcameli was considered to be one of the most serious, contagious, zoonotic and debilitating disease affecting both dromedary, Arabian and Bactrian camels (Singh and Veer, 2005). The 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. Infection starts on the head region then spreads to the neck and the rest of the body (Higgins, 1983).

The inection of demodex mites, was 33.3%, the infections affect about more than one third of the camels, all ages are involved in infestation with demodectic mange but more commonly in camels in age (4-8 yrs.), All ages are involved in infestation with demodectic mange, the degree of infection foundin 4-5yrs., 5-6 yrs. 6-7 yrs. And 7-8 yrs., as 19%, 30.5% 29% an 21.5% respectively,the high infection recorded in age between (5-7 yrs.). At Al-Qadissiya, Al-Najaf & Al-Muthanna samples were carried out to detect the mange, they present 2.3% of the total inspected camels. Demodectic mange was diagnosed in 58.2% of camels ranged in 5-10 yrs. old, 16.4% of camels more than 10 yrs. old and 25.4% in camels less than 5 yrs. old which indicate the high incidence in camels aged in 5-10 yrs. (Hussain *et al.*, 2012).

The infection by mange in camels was 8.8% in KSA (El-Bahy *et al.*, 2008). In spite of the fact that mechanization had greatly supplanted camels quality as beasts of vurden (Fahmy *et al.*, 1998). At ill, they was very dear in KSA because they was recognized as an important wealthy patrimony resources from the ancestors (Abdally, 2008). Camels were considered as hard and tough animals which can tolerate the harsh climate and extremes of temperature encountered in the desert (Abdally, 2008; Fahmy *et al.*, 1998). Demodex spp. had been reported on Dromedaries in Iran, it affected the eyelids of 15% of camels (Rak and Rahgozar, 1975). Demodex spp. was isolated from camels exhibiting mange in Kenya (Bomstein, 1995). Demodex spp. commonly occurs in llamas and alpacas in Bolivia (Sqire, 1972).

Mange infection affects these important animals and reduced their prices and causes huge losses of these wealthy patrimony resources. Sarcoptic mange infection was a serious problem in many parts of the world passing a serious threat to animals health (Dorn *et al.*, 1986; Higgins, 1985; Melaku and Gibreah, 2001; Kumar *et al.*, 1992; Pegram and Higgins, 1992; Radostits *et al.*, 2000; Walker, 1994). Sarcoptic mange was regarded as one of the most prevalent and serious camel diseases (Lodha, 1966; Higgins, 1983). Myasis was often ranked second in importance to all the disorders in dromedary camels (Pegram and Higgins, 1992). Mange can be generally regarded as a chronic debilitating condition with high morbidity and low mortality (Fowler, 1998). The disease "SarnaSarcoptica" was previously widespread in North American (Rosychuk, 1989). Any Camelid regardless may be affected by S. scabiei (Nayel and Abu-Samra, 1986). However, the infection was more prevalent in younger camels (Rathore and Lodha, 1973). It was often cited that animals in poor condition are more prone to infection (Lodha, 1966; Higgins, 1986).

However, this was controversial as others report that animals in a very good condition can also become infected (Nayel and Abu-Samra, 1986). The distribution of infection was on the months of May, June, July, August and September 2012 as 31.7%, 37.1%, 39.2%, 33.6% and 26% respectively. The more infections appeared in June, July and August, but July is the highest month for infection, that is the top of summer. During May and September the infections trended to be in lower than the others months due to lowering in temperature. There were conflicting opinions regarding the seasonality of the disease, a quiescent phase usually coinciding with winter (Pegram and Higgins, 1992), higher incidence in the winter (Lodha, 1966; Rathore and Lodha, 1973; Nayel and Abu-Samra, 1986; Higgins, 1986), on the other hand it was found a higher prevalence in KSA during the hot summer months bySarcoptic mange which was endemic in Al-Najaf governorate in Iraq with 25.9% percentage (Al-Romehi, 2000). Young dromedaries were more susceptible to infection. (Zahler *et al.*, 1998; Gabaj *et al*, 1992).

The sites of lesion in head, neck, back, limbs, axilla and tail as, 16.8%, 29.4%, 14.1%, 8.5%, 5.3% and 1.9%. The more affected area is neck, back and head nearly in affections, then lambs and axillarepectivily, the tail is the lowest region for infection. Infestation commences at areas of thin skin: the head, base of the neck, mammary gland, prepuce and flank. The head becomes affected rapidly in every case, for the animal uses its teeth to scratch affected regions. The

incubation period is 2-3 weeks (Higgins, 1983). The main sites of lesions in examined camels were neck, head, and dorsum with no lesion on the hump, which was concedes with results obtained by Pegram and Higgins, 1992.

CONCLUSION

This study on mange disease of camels atTaif, KSA has shown that it could be of major importancein the region of Taif, where infected animals werein poor condition. The study also showed increase percentage of infection during summer season 2012, the infections and lesions suggesting mange are widespread.

A study of mange opened the relation between the skin infection and increasing of weather temperature, it would also prove valuable to limit the deterioration in skin disease like mange which occurs during the summer season. This was not be easy in regions because it affect the livestock and loose camels quality. The preventive methods areavailable in certain countries, and their use as dietary supplements would help to overcomethe mange disease conditions which predispose an animal for control.

ACKNOWLEDGMENTS

The researchers are grateful to all staff in farms, markets and abattoir for collecting the samples for this study. The researchers also thank laboratory staff in preparing the samples for estimation during the study.

REFERENCES

Abdally, M. (2008): Species of ticks on camels and their monthly population dynamics in Arar city, KSA. Assiut Vet. Med. J., 54:117-127.

Al-Romehi, M. (2000): Survey and treatment study on mange disease for Arabia camels in Nsgaf Governorate, Baghdad Uni. Internal and preventive Med. Br.Alkadsiah Vet. Med. 11(1):15-20.

Amer, A.; Abou El-Ela, A. and Ratib, H. (2006): Some Hemato-biochemical studies on Sarcoptic mange infested camels before and after treatment by doramectin at Assiut governorate. Proceedings of the international scientific conference on camels, 9–11 May 2006, KSA. Pp: 686–691.

Bakht, B.; Arshad, I. and Muhammad, R. (2003): Production and management of camels, Part III., Uni. Agr. Faisalabad.

Bomstein, S. (1995): Skin diseases of camels in: Camel keeping in Kenya. Ed. Evans, J.O., S. Piers Simpkin& D.J. Atkins. Range Manugment H & book of Kenya 3(8):7-13 .

Charles, M. and Robinson, E. (2006): Diagnostic Parasitology for veterinary technicians. Diagnosis of parasitism of the skin. 3rd edition, Mosby Elsevier. China.

Dorn, H.; Hamel, H. and Stendel, W. (1986): The efficacy of flumethrin (Bayticol) against multihost cattle ticks in South Africa field conditions. Vet. Med. Rev., 2: 147-157.

El-Bahy, M.; Omer, O. and Al-Sadrani, A. (2008): Temperature difference and parasite infection at Qassim region, KSA. Research J. Parasitology 3(4): 114-122.

Fahmy, M.; El-Sayed, M. and Ezzeldein, N. (1998): A caricidal efficacy of Dectomax (Doramection) on ticks and mite natural infestation among camels (Camelus dromedaries) in Egypt. Vet. Med. J. Giza, 46(4): 66-73.

Fowler, M. (1998): Medicine & surgery of South American Camelids. Iowa State University Press, Ames. USA .

Gabaj, M.; Beesley, W. and Awan, M. (1992): A survey of mites on farm animals in Libya. Ann. Trop. Med. Parasitol. 86: 537-542.

Higgins, A. (1983): Observations on the diseases of the Arabian camel (Camelusdromedarius) and their control (A review). Vet. Bull. 53: 1079-1089.

Higgins, A. (1985): The camel in health and disease. 4. Common ecto-parasites of camel and their control. Br. Vet. J., 141: 197-215.

Higgins, A. (1986): Common ecto-parasites of the camel & their control. In: A.J. Higgins (ed.): The Camel in Health & Disease. Bailli and re, Tindall& Cox, London.

Hussain, M.; Habasha, F. and Faraj, M. (2012): Demodectic mange in Iraqi camels. Al-Qadiaiya J. Vet. Med. Sci., 11(1):1-5.

Kumar, D.; Raaisinghani, P. and Manohar, G. (1992): Sarcoptic mange in camels: A review. Proceedings of the 1st International Camel Conference, Feb. 2-6, Newmarket Press, UK., pp: 27-32.

Lodha, K. (1966): Studies on Sarcoptic mange in camels (Camelusdromedarius). Vet. Rec. 79:4143 Merriam-webster.com. 2010-08-13. Retrieved 2010-11-14 .

Melaku, F. and Gibreah, F. (2001): A study on the productivity and diseases of camels in Eastern Ethiopia. Trop. Anim. Health Product., 33: 265-274.

Nayel, N. and Abu-Samra, M. (1986): Sarcoptic mange in the one-humped camel (Camelusdromedarius). A clinico-pathological and epizootiological study of the disease and its treatment. 1. Arid Environ. 10: 199-211.

Pegram, R. and Higgins, A. (1992): Camel ecto-parasites: A review. Proceedings of the 1st International Camel Conference, Feb. 2-6, Newmarket Press, UK., pp: 67-78.

Petrowski, M. (1998): Chorioptic mange in an alpaca herd. In: Kwochka, K.W., T. Willemse and C. von Tscharner (eds.): Advances in veterinary dermatology. Vol. 3. Proceedings of the Third World Congress on Veterina y Dermatology. Edinburgh, Scotl&, 11-14 Sept. 1996. Pp:450-451.

Radotits, O.; Gay, C.; Blood, D.; Hinchcliff, K. and Gay, C. (2000): Veterinary Medicine: A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses. 9th Ed., WB Saunders, London, pp: 309-330.

Rak, H. and Rahgozar, R. (1975): Demodectic mange in the eyelid of domestic ruminants in Iran. Bull. SOC. Pathol. Exot. 68: 591-593.

Rathore, M. and Lodha, K. (1973): Observation on Sarcoptic mange in camels (Camelusdromedarius). Indian Vet. J. 50: 1083-1088.

Rosychuk, R. (1989): Llama dermatology. Vet. Cline. North Am. Food Anim. Pract. 5: 203- 215.

Severe mite, (2012): Caused mange in wild bears 2012.

Singh, A. and Veer, M. (2005): Parasitic zoonosis.1st Ed. Poimer publication, Jaipur, India.

Sqire, F. (1972): Entomological problems in Bolivia. PANS. 18: 249-268.

Walker, A. (1994): The Arthropods of humans and domestics animals. Chapman and Hall, London, pp:179-210 .

Werner, G.; Porsch, G.; Ilchmann, G. and Hiepe, T. (1989): Exploratory studies on the efficacy of Bayticol Pour-on in sheep, cattle & camels in the People's Republic of Mongolia. Vet. Med. Rev. 60: 40-42.

Wernery, U. and Kaaden, O. (2002): Infectious diseases in camelids, 2nd revised & enlarged edition. Blackwell Wissenschafts-Verlag GmbH Kurfiirstendamm 57, 10707 Berlin.

Zahler, M.; Essig, A.; Gothe, R. and Rinder, H. (1998): Genetic evidence suggests that Psoroptes isolates of different phenotypes, host & geographic origins are conspecific. Int. 1. Parusitol. 28: 1713-1719.

دراسة مدي ارتباط حدوث الاصابة بمرض الجرب في الابل خلال الموسم الصيفي بمنطقة الطائف، المملكة العربية السعودية

شريفة مصطفى محمد صبره ، محمد سالم الحربى ، منير مصطفى البشعان

تم جمع ٦٠٠ عينة جلدية من الابل بعمر (٤-٨ سنه) خلال الفترة من اول شهر مايو الي اول شهر سبتمبر لعام ٢٠١٢. تم فحص العينات لوجود demodex mites. بينت عينات الجلد وجوده في ٣٣،٣% من العينات. كان توزيع الاصابة في الشهور مايو، يونيو، يوليو، اغسطس، سبتمبر ٢٠١٢ كالتالي: ٣١،٧%، ٣٧،١%، ٣٩،٢%، ٣٣،٦% و ٢٦%. الاصابة بكل اعمار الابل توزعت نسبة وجود الاصابة كالتالي ٤-٥سنه، ٥-٦ سنه، ٦-٧ سنه و ٧-٨ سنه بنسبة ١٩%، ٣٠،٥%، ٢٩% و ٢١،٥%. اعلي نسبة اصابة كانت في الابل ٥-٧ سنه. اماكن الاصابة تشمل الراس، الرقبة، الظهر، القوائم، الابط والذيل بنسبة ١٦،٨%، ٢٩،٤%، ١٤،١%، ٨،٥%، ٥،٣% و ١،٩%. اكثر اماكن للإصابة كانت الرقبة تليها الظهر، الراس، القوائم، الابط بينما كان الذيل اقل الاماكن اصابة.