



PREVALENCE AND PATHOLOGY OF DEMODECTIC MANGE IN STRAY DOGS IN BANGLADESH

M. M. Islam*, S. S. Khanam, S. M. H. Rashid and M. N. Islam

Department of Pathology and Parasitology, Faculty of Veterinary and Animal Science, Hajee Mohammad Danesh Science and Technology University, Dinajpur-5200, Bangladesh.

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ABSTRACT

A total of 20 stray dogs were collected from Dinajpur district, Bangladesh from the period of March, 2009 to February, 2010 for investigating the prevalence and pathology of demodectic mange in stray dogs. The experiment was based on direct examination of the skin, skin scrapings and histopathological examination. The overall prevalence of demodectic mange was found 65% in stray dogs. The stray dogs up to one year of age were more susceptible to infection (71.42%). The infection rate of demodectic mange was comparative higher in females (72.73) than male (55.56). The highest prevalence of the disease was found in winter season (75%) followed by summer (60%) and rainy season (57.14%). The clinical features of demodectic mange were characterized by alopecia, scale or crust formation, skin thickening, pruritus, erythema and wrinkling of skin. The cutaneous lesions were mostly localized in head, limbs and abdominal skin. Histopathologically, section of mites was found within the hair follicle along with hyperkeratosis in the epidermis. In skin scrapings, demodectic mites were detected.

Key words: Demodectic mange, pathology, prevalence, stray dogs

INTRODUCTION

Demodectic mange is a severe parasitic skin disease of dog caused by an overpopulation of the follicular mite of various *Demodex* species. *Demodex canis* is the main causative agent of canine demodicosis (Scott *et al.* 2001). Canine demodicosis can be classified as either juvenile or adult in onset depending on the age of the dog when the skin lesions first appear; both forms may be generalized or localized (Saridomichelakis *et al.* 1999). The clinical presentations of demodectic mange are local or diffuse alopecia, erythema, scale or crusts associated with popular or pustular dermatitis (Shipstone 2000). The condition progresses until large areas of the body affected and the animal shows alopecia and thickened and wrinkled skin with a 'mousy' odour (Soulsby 1982). Transmission to the new born puppy is achieved by direct contact with the bitch during the first few days after birth (Scott *et al.* 2001). The factors which permit the development of demodectic mites are not known but they are associated with cell mediated immunity defects (Corbett *et al.* 1975).

The aim of the article presented here was to describe the prevalence in relation to age, sex and season and

pathological findings in stray dogs of demodectic mange in Bangladesh.

MATERIALS AND METHODS

The study was carried out from March, 2009 to February, 2010 in Dinajpur district, Bangladesh. A total of 20 stray dogs were collected from Dinajpur district, Bangladesh while they euthanized by the municipal authority as a rabies control programme during the different seasons of the year. The experiment was based on direct examination of the skin, skin scrapings and histopathological examination. Skin scrapings were taken from the suspected areas by using sterilized scalpel until oozing for recovery of mites. The scrapings were heated gently by adding 10% potassium hydroxide and examined under microscope (Hendrix and Robinson 2006). The skins were collected during post mortem examination and preserve in 10% neutral buffered formalin. The collected samples were subjected for histopathological study as per standard protocol (Luna 1968). The dogs were categorized based on their age as puppy (0-12 months) and adult (up to one year). On the basis of climatic conditions the year was divided into three seasons. Summer season was considered from March

*Corresponding author: Md. Mominul Islam, Department of Pathology and Parasitology, Hajee Mohammad Danesh Science and Technology University, Dinajpur-5200, Bangladesh, e-mail: momindvm@gmail.com Cell phone: +88-01741713264

to June, rainy season from July to October and winter from November to February.

RESULTS AND DISCUSSION

Grossly, most of the stray dogs were presented with one or more cutaneous lesion (Table 1). The most common clinical signs were observed alopecia, skin thickening, scale or crusts, erythema, pruritus and seropurulent discharges. These finding were similar to the description given by Jekl *et al.* (2006) who reported alopecia, pruritus, erythema, scale formation and hyperpigmentation in a dog due to demodicosis. Whereas, Sischo *et al.* (1989) described fleabite allergic dermatitis, skin cancer, pyoderma, seborrhea, allergy, demodectic acariasis (demodicosis), sarcoptic acariasis as a common skin diseases in dog. However, Chen (2008), described skin lesion due to demodectic mite as alopecia and scaling on the ventral aspects of the chest, all four limbs, the ventral aspect of the neck and around the eyes in stray dogs in South Korea.

The sites of the cutaneous lesions were variable in stray dogs (Table 2). The cutaneous lesions were present in one or two different sites or throughout the whole body. These finding were in agreement with the findings of Pin *et al.* (2006) who detected variable site of cutaneous lesion in mange mite infestation. Eleven (11) stray dogs out of 20 were female and nine (9) were males. The females (72.73%) had higher rate of infestation of demodectic mites than males (55.56%) (Table 3). This finding varied from the report of Chee *et al.* (2008) who recorded comparatively higher incidence of ectoparasites in males (50.5%) than females (38.8%) in dogs. Whereas, Solanki *et al.* (2007) and Nayak *et al.* (1997) described that there was no significant influence of sex on the prevalence of demodicosis in dogs. In stray dogs, higher prevalence of demodectic mites were recorded in adult (71.42%) than puppy (50%) (Table 4). These finding was similar with the description given by Solanki *et al.* (2007); Nayak *et al.* (1997) and Soulsby (1982). Solanki *et al.* (2007) and Nayak *et al.* (1997) stated that dogs up to one year of age were more susceptible to demodectic mange than others in India. Soulsby (1982) stated demodicosis was evident after 3-9 months in dogs. Whereas, Chee *et al.* (2008) reported that the young stray dogs were more commonly affected than older one in South Korea. On the other hand, Rahman *et al.* (2009) documented slightly higher prevalence of demodectic mite in adults with other arthropods infestation in cat in Bangladesh.

In this study, the highest number of stray dogs affected in winter season (75.0%) followed by summer (60.0%) and rainy season (57.14%) (Table 5). This finding dictated that there is seasonal influence of demodectic mange in stray dogs. These

finding were supported by the findings of Kalyan *et al.* (2005) who reported higher prevalence of mite infestation in winter season in dogs. However, Solanki *et al.* (2007) stated that highest prevalence canine demodicosis in dogs was found in the month of March.

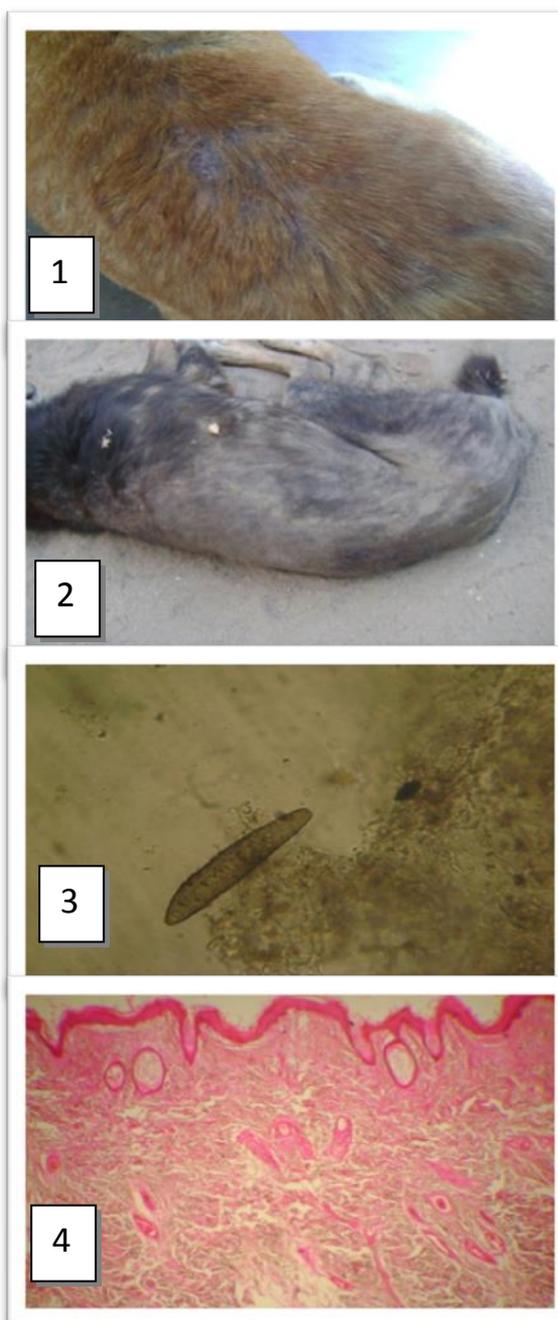


Figure 1. Alopecia and pruritus on the skin of stray dogs due to demodectic mange infestation. **2.** Alopecia and scale/crusts formation throughout the body due to infestation of demodectic mite. **3.** Section of skin of stray dog. Cross section of demodectic mite was present within the hair follicle. Marked hyperkeratosis was also present in the epidermis (H & E stain, 10x). **4.** Demodectic mite in skin scrapings.

Table 1. Clinical features of demodectic mange in stray dogs in Bangladesh

Case	Clinical Features					
	Alopecia	Pruritus	Skin thickening	Erythema	Scale/Crust	Seropurulent discharge
1	+++	0	++	0	++	0
2	++	+	+	0	+	++
3	+++	++	++	+	+++	+
4	+++	+	+++	0	+	0
5	0	0	0	+	0	+
6	++	+	0	0	0	0
7	++	0	+	0	+	0
8	+++	+	++	+	++	0
9	+	0	0	0	++	+
10	++	0	+	++	0	0
11	+++	+	+	0	++	0
12	+++	++	++	0	+	+
13	+	0	0	+	0	0
14	+	0	0	+	+	++
15	+	++	+	0	+	0
16	+	+	0	+	+	0
17	++	0	+	0	++	0
18	0	+	0	+	+	+
19	+	+	+	+	0	0
20	++	0	+	0	++	0

*0 = absent; + = mild; ++ = moderate; +++ = marked/severe

Table 2. Showing the site of cutaneous lesion in stray dogs

Case	Site
1	Abdominal skin
2	Head
3	Dorsum, legs
4	Left flank
5	Shoulder, Head
6	Neck, abdomen
7	Legs, shoulder
8	Abdominal skin
9	Legs, neck
10	Dorsum, Hind limb, thigh
11	Neck, Shoulder
12	Head, Abdominal skin
13	Whole body
14	Scrotum, Legs
15	Dorsum, Abdominal skin
16	Neck
17	Legs, thigh
18	Abdominal skin, head
19	Neck, legs
20	Legs

Table 3: Sex wise occurrence of demodectic mange in stray dogs

Sex of dogs	No. of dogs	No. of positive dogs	Prevalence (%)
Male	9	5	55.56
Female	11	8	72.73
Total	20	13	65.0

Table 4: Age wise occurrence of demodectic mange in stray dogs

Age of dogs	No. of dogs	No. of positive dogs	Prevalence (%)
Puppy (<12 months)	6	3	50
Adult (>one year)	14	10	71.42
Total	20	13	65.0

In skin scrapings, the elongate demodectic mites were present in 13 cases (65.0%) among the 20 stray dogs (Figure 4). Mahato *et al.* (2005) and kalyan *et al.* (2005) reported 10.56% and 35.7% demodectic mange in dogs, respectively. On the other hand, Malmasi *et al.* (2009) identified *Demodex canis* by microscopic examination in skin scrapings. Whereas, Chen (2008), detected both *Demodex canis* and short

tailed demodectic mite from the skin scrapings in dogs. Histopathologically, the cross sections of mite were present within the hair follicle. Marked hyperkeratosis was also revealed along with the follicular mite (Figure 3). This finding is similar to that of Soulsby (1982). Casewell *et al.* (2008) detected demodectic mite in histologic section, characterized by mural folliculitis, suppurative folliculitis and furunculosis and nodular dermatitis in dogs.

Table 5. Season wise occurrence of demodectic mange in stray dogs

Name of the seasons	No. of dogs	No. of positive dogs	Prevalence (%)
Summer (March to June)	5	3	60.0
Rainy (July to October)	7	4	57.14
Winter (Nov. to Feb.)	8	6	75.0
Total	20	13	65.0

CONCLUSION

The present study dictated that the demodectic mange is highly prevalent in stray dogs in Bangladesh. It is also provided the age, sex and seasonal influence on demodectic mange in stray dogs. This study would obviously help to know the load of demodectic mange in stray dogs and certainly assists in diagnosis of disease. But the present study only investigates the prevalence and pathology of demodectic mange in stray dogs. So, a more detail and extensive study is essential to investigate the ectoparasitic prevalence, etiological agent and public health significant of stray dogs in Bangladesh.

REFERENCES

Caswell JL, Yager JA, Parker WM and Moore PF. 1997. A Prospective Study of the Immunophenotype and Temporal Changes in the Histologic Lesions of Canine. *Veterinary Pathology*. 34:279-287.

Chee JH, Kwon JK, Cho HS, Cho KO, Lee YJ, Abd El-Aty AM and Shin SS. 2008. A Survey of Ectoparasite Infestations in Stray Dogs of Gwang-ju City, Republic of Korea. *Korean Journal of Parasitology*. 46(1):23-27.

Chen C. 1995. A short-tailed demodectic mite and *Demodex canis* infestation in a Chihuahua dog. *Veterinary Dermatology*. 6(4): 227-229.

Corbett R, Banks K, Henriches D and Bell T. 1975. Cellular immune responsiveness in dogs with demodectic mange. *Transplant. Proc.* 7:557-559.

Hendrix CN and Robinson E. 2006. *Diagnostic Parasitology for Veterinary Technicians*. 6th edn., Mosby Inc, Elsevier. pp 252-253.

Jekl V, Hauptman K, Jeklova E and Knotek Z. 2006. Demodicosis in nine prairie dogs (*Cynomys ludovicianus*). *Veterinary Dermatology*. 17(4):280-283.

Kalyan S, Borthakur SK and Girin K. 2005. Incidence of mange mite infestation in dogs - A report. *Journal of Veterinary Parasitology*. 19(2):71-74.

Luna LG. 1968. *Manual of Histologic Staining Methods of the Armed Forces Institute of Pathology*. 3rd edn., Mc Graw Hill Book Co., New York.

Mahato S, Baksi S and Chakrabarti A. 2005. A note on generalized demodicosis in canines. *Indian Veterinary Journal*. 82(7): 794

Nayak DC, Tripathy SB, Dey PC, Ray SK, Mohanty DN, Parida GS, Biswal S, and Das M. 1997. Prevalence of canine demodicosis in Orissa (India). *Veterinary Parasitology*. 73(3-4):347-52.

Pin D, Bensignor E, Carlotti DN and Cadiergues MC. 2006. Localised sarcoptic mange in dogs: a retrospective study of 10 cases. *The Journal of Small Animal Practice*. 47(10):611-4.

Rahman SA, Islam MJ, Begum N, Ali MA and Bari ASM. 2009. Prevalence and pathology of arthropod infestation in domestic and stray cats in Bangladesh. *Bangladesh Journal of Veterinary Medicine*. 7(1):287-292.

Saridomichelakis M, Kourinas A and Papalogiannakis E. 1999. Adult onset demodicosis in two dogs due to *Demodex canis* and short tailed demodectic mite. *The Journal of Small Animal Practice*. 40: 529-532.

Scott DW, Miller WM and Griffin CE. 2001. Parasitic skin diseases. In: Muller and Kirk's *Small Animal Dermatology*, 6th edn. Philadelphia: W.B. Saunders Company: 423-516.

Shipstone M. 2000. Generalised demodocosis in dogs, clinical perspective. *Australian Veterinary Journal*. 78:240-242.

Sischo WM, Ihrke PJ and Franti CE. 1989. Regional distribution of ten common skin diseases in dogs. *Journal of American Veterinary Medical Association*. 195(6):752-6.

Solanki JB, Hasnani JJ, Patel DM, Patel PV and Raval SK (2007). Canine demodicosis in Anand. *Journal of Veterinary Parasitology*. 21(1): 13-18.

Soulsby E JL. 1982. *Helminths, Arthropods and Protozoa of Domesticated Animals*. 7th edn., Bailliere Tindall., London. pp. 35-740