

*Short Communication*

## A SURVEY ON *SARCOPTES SCABIEI* VAR *CANIS* INFESTATION IN DOG IN GUWAHATI, ASSAM, INDIA

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**ABSTRACT:** Dogs suffer from various skin infections caused by a variety of pathogens including mange mites. Scabies caused by *Sarcoptes* mites result in skin affections ranging from intense scratching, redness, and prurities to the death of the dog due to toxemia and septicemia. The present study was conducted to investigate the prevalence of *Sarcoptes* mite infestation in dogs in and around Guwahati, India. A total number of 582 dogs were undertaken in the study. The overall prevalence of *Sarcoptes scabiei* var. *canis* infection in dogs was found 1.89% (11/582). Histopathological study revealed vacuolation, degenerative changes, and necrosis in the epidermal layer of the mite-affected skin area along with the presence of a cross-section of mites in the mange-affected skin.

**Keywords:** *Sarcoptes scabiei* var. *canis*, Skin scraping, Histopathology.

Dogs as like as other animals are attacked by different arthropod parasites which intern causes various types of dermatological problems [1]. The skin and hair coat act as an indicator of the general health of the dog where a smooth, shiny, and glossy coat reflects healthy skin. The arthropods mainly cause irritation, hair loss, and destruction of skin layers and can also act as a source of secondary infection to the host. However, some of them can also act as a vector for various diseases. Mange is a contagious skin condition caused by a variety of mange mites burrowing in or living in the skin of the host resulting in hair loss, pruritic and dermatitis, etc. [2]. Among them, mange caused by *Sarcoptes* sp. mites is called scabies and it infects many animal species [3, 4].

Initially, these conditions may be localized but became generalized later due to the rapid multiplication of the mites in that area. This leads a constant irritation to the dogs which results in intense scratching, redness, and prurities. If it is not treated early it may lead to the death of the dog due to toxemia and

septicemia. Among the skin-related parasitic diseases, sarcoptic mange appears to be the most important because of its veterinary and public health significance in tropical and subtropical countries of the world [5]. Sarcoptic mange which is caused by *Sarcoptes scabiei* var. *canis* is one of the most common pet-related zoonoses which become a major concern for pet practitioners [6]. Poor immunity and malnutrition favor the survival and multiplication of the mites. Factors like stress, overcrowding, poor nutrition, cold weather, and immune suppression predispose the animal to the disease [7, 8]. *Sarcoptes* mites burrow deep into the epidermis creating tunnels of up to 1 cm in length in which they feed and reproduce leading to inflammation and severe pruritus, loss of hair, excoriation, marked thickening and proliferation of the epidermal layer of the skin. Earlier, sarcoptes mite infestation in dogs has been reported in Assam as well as several states in India [9, 10, 11]. However, no systematic study on sarcoptes mite infestation in dogs has been conducted recently in Guwahati, Assam. Therefore, the present

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study was designed to explore the prevalence of Sarcoptes mite infestation in dogs in and around Guwahati, Assam, India.

### **The study**

The skin scrapings were collected from dogs which were brought to the Veterinary Clinical Complex (VCC), College of Veterinary Science, Assam Agricultural University, Khanapara, different hospitals, NGOs, and Private clinics in and around Guwahati, Assam. The laboratory works were conducted at the Department of Parasitology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam.

### **Selection of animals and collection of samples**

The present study was conducted on dogs that were suffering from various dermatological problems with a history of either alopecia, itching, erythema, scales, crusts, papules, pustules, or comedones. Skin scrapings were collected from 582 dogs belonging to different breeds, age groups (below 1 year and above 1 year age group), sex, and categories (stray dogs, pet dogs, and working dogs) (Table 1) for determining the prevalence of *Sarcoptes scabiei* var. *canis* mites following the procedure mentioned by [12]. For collecting the skin scraping, hair around the lesions was clipped gently. After that the skin was grabbed between the thumb and forefinger and was scraped in the same direction several times with the help of a blunt scalpel dipped in liquid paraffin. Scraping was continued until there was a slight oozing of blood from dermal capillaries. Scraped material thus collected was transferred to airtight vials containing 70% alcohol and brought to the laboratory for identification of mites. The scraped areas were applied with antiseptic ointments to prevent the occurrence of secondary bacterial infection.

### **Examination of skin scraping for identification of mites**

The collected individual scraping materials were taken into a test tube added with 10% potassium hydroxide (KOH) solution (1:3) and heated to boil as per routine laboratory procedure. Then the scraping materials were centrifuged at 1500rpm for 3 minutes and the supernatant was discarded. The sediments were then taken on a clean glass slide, covered with a cover slip, and examined under a compound microscope

(X100 and X400) for identification of mites as described by [13].

### **Histopathology of the *Sarcoptes scabiei* var. *canis* affected skin**

A histopathological study was conducted on skin biopsies collected from the skin which were positive for Sarcoptic infestation. The skin biopsy samples were processed for the paraffin embedding method as described by [14]. The affected area was gently cleaned with 70 percent alcohol. After having allowed it to air dry, the site was desensitized with a local anesthetic solution (Lignocaine hydrochloride, 1-2%), subcutaneously [15]. A punch biopsy instrument (5 mm diameter "Bakers" biopsy punch) was placed on the desired skin area and the skin was drilled into the tissue with rotary motion in one direction applying moderate pressure [16, 17]. The punch was then withdrawn and the circular piece of skin was snipped off by a sterile scalpel while holding the punch piece of skin with plain forceps. The wound was closed with one skin suture. The biopsy of the skin thus obtained was preserved in a 10 percent formalin solution. The paraffin sections of 6-8  $\mu$ m thickness were cut and stained by routine Delafield's Haematoxylin and Eosin staining method to study the histopathological changes.

### **Results and discussion**

#### **Prevalence of *Sarcoptes scabiei* var. *canis* infestation**

The study revealed that, out of 582 dogs examined, 11 dogs were found positive for *Sarcoptes scabiei* var. *canis* infestation with an overall prevalence of 1.89% (Table 1, Fig. 1b). Similar prevalence of Sarcoptes was also recorded in Turkey [18] and in Patna, Bihar, India [19]. However, the prevalence rate in the present study was found to be less compared to the findings of [20] in Chennai, India, and more compared to the findings of [21] in Assam, India. The variation in the present findings might be due to variations in the geographical localities, climatic conditions, available veterinary services, and differences in the sample collection method.

The breed, sex, age, season, and category-wise prevalence of Sarcoptes mites are presented in Table 1. The prevalence of *Sarcoptes scabiei* var. *canis* was recorded only in 4 breeds in the present study. The highest prevalence was recorded in German shepherds (7.24%), followed by Pugs (2.22%), Labrador retrievers (1.81%), and Mongrels (1.19%), respectively.

**Table. 1. Breed, sex, age, season and category wise prevalence of *Sarcoptes scabiei* var. *canis* in dogs.**

Parameters	Number	No. positive	Prevalence (%)
<b>Breeds</b>			
Mongrel	252	3	1.19
German shepherd	69	5	7.24
Labrador retriever	110	2	1.81
Pug	45	1	2.22
Spitz	48	0	0.00
Golden retriever	18	0	0.00
Doberman pinscher	16	0	0.00
Cocker spaniel	10	0	0.00
Pomeranian	08	0	0.00
Bull mastiff	06	0	0.00
<b>Sex</b>			
Male	291	07	2.40
Female	291	04	1.37
<b>Age Group</b>			
Young (<1 year)	226	06	2.65
Adult (>1 year)	356	05	1.40
<b>Season/Month</b>			
Pre monsoon	136	1	0.793
Monsoon	226	3	1.26
Post monsoon	90	1	1.04
Winter	130	6	4.72
<b>Categories</b>			
Pet dogs	329	02	0.60
Stray dogs	166	08	4.81
Working dogs	87	01	1.14

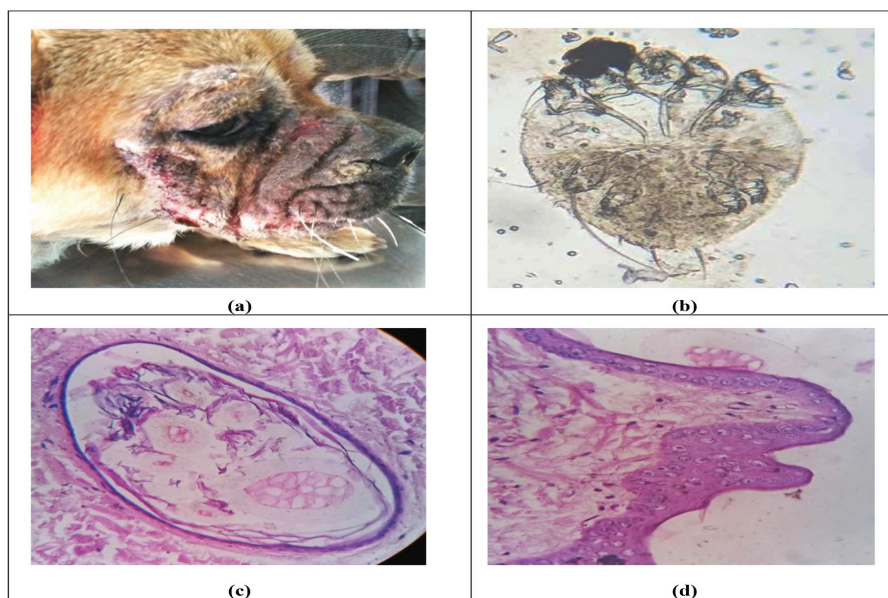
Statistically, the prevalence of *Sarcoptes scabiei* var. *canis* in different breeds was found significant ( $p < 0.05$ ). The highest prevalence observed in German shepherds and Labrador might be because these dogs were mostly used for outdoor activities like training, and forensic and detective purposes by the police and military forces and hence are more susceptible to acquiring external parasites.

Sex-wise the prevalence of mites was non significantly ( $p > 0.05$ ) higher in males (2.40%) than female dogs (1.37%). The results were similar to those reported by [22, 23, 24] who have also found more prevalence in males respectively.

It was revealed that the age of the dog affected mite infestation. The prevalence of *Sarcoptes scabiei* var. *canis* infestation was significantly ( $p < 0.05$ ) higher in the young (below 1 year) group (2.65%) as compared to the adult group (1.40 %).

Seasonally, the prevalence rates of *Sarcoptes* mites infestation were recorded significantly ( $p < 0.05$ ) higher in winter (4.615%) followed by monsoon (1.327%), post-monsoon (1.11%) and pre-monsoon (0.735%) season respectively in our present study.

It is evident from Table 1 that a significantly ( $p < 0.05$ ) higher prevalence rate of Sarcoptic mange was recorded in stray dogs 4.81% followed by working 1.14% and pet dogs 0.60%, respectively in our study.

**Fig. 1. Photographs of *Sarcoptes scabiei* var. *canis* infection in dogs.**

[(a): Sarcoptic mange infestation in the face of a dog showing erosion and thickening of skin; (b): Ventral view of a *Sarcoptes scabiei* var. *canis* Mag. X400; (c): Photomicrograph of dog skin showing cross section of mite in the hair follicle. H&E stain. Mag. X 400; (d): Photomicrograph of dog skin showing hypertrophy of the epidermal cells due to thickening of the epidermal layer. H&E stain. X 400].

### Gross and histo-pathological changes in the skin

The present study revealed that the gross pathological changes in the mite-affected skin by dermatitis appeared rough and thickened. There was alopecia due to intense itching along with sloughing of the superficial layer of skin (Fig. 1a). Histo-pathological changes revealed vacuolation along with large numbers of infiltrating cells (lymphocytes) in the epidermis of the mite-infested skin. The epidermal layer was detached from the dermis. Remnants of hair follicles showed hyperplastic cortical layer indicating ectoparasitic invasion. Cross sections of mites were found in the hair follicle which underwent dilatation (Fig. 1c). The surrounding follicles were also dilated. The infected hair follicles showed degeneration and necrosis. At certain places the cells of the epidermal layer showed hypertrophy and hyperplasia leading to thickening of the epidermal layer (Fig. 1d). Similar findings were also found by [25, 26, 27].

### Conclusion

It is concluded from the present study that, a considerably low rate of Sarcoptic mite infestation in dogs was observed in the study area of Guwahati. Though sarcoptic mange has zoonotic importance, a thorough investigation of different accounts of mites in dogs including therapeutic management was necessary. Studies revealed that males under 1 year of age, German shepherds, and stray dogs are more prone to infestation in the winter season, so special care and management attention should be paid to this matter. Any skin lesions or dermatitic conditions should always be investigated carefully and treated after proper diagnosis only.

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