Prevalence of Sarcopes scabiei Infection in Pet Dogs in Southern China

Yi-Zhou Chen, 1 Guo-Hua Liu, 2,3 Hui-Qun Song, 2 Rui-Qing Lin, 1 Ya-Biao Weng, 1 and Xing-Quan Zhu 2,3

1 College of Veterinary Medicine, South China Agricultural University, Guangzhou, Guangdong 510642, China
2 State Key Laboratory of Veterinary Etiological Biology, Key Laboratory of Veterinary Parasitology of Gansu Province, Lanzhou Veterinary Research Institute, Chinese Academy of Agricultural Sciences, Lanzhou, Gansu 730046, China
3 College of Veterinary Medicine, Hunan Agricultural University, Changsha, Hunan 410128, China

Correspondence should be addressed to Xing-Quan Zhu; zhuxingquan@caas.cn

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Little is known about the prevalence of S. scabiei infection in pet dogs in China. In the present study, the prevalence of S. scabiei infection in pet dogs in Guangzhou, southern China, was investigated between January and December, 2009. A total of 3,977 pet dogs admitted to animal hospitals were examined for the presence of S. scabiei using a parasitological approach. The average prevalence of S. scabiei infection in pet dogs is 1.18% (95% confidence interval (CI): 0.85–1.52%). The prevalence of S. scabiei was higher in winter (1.42%; 95% CI: 0.29–2.55%), summer (1.39%; 95% CI: 0.83–1.96%), and autumn (1.1%; 95% CI: 0.53–1.68%) than in spring (0.63%; 95% CI: 0.02–1.25%). Furthermore, the prevalence of S. scabiei was the highest in Pekingese (21.88%; 95% CI: 7.55–36.2%), followed by Papillon (5.26%; 95% CI: 0–11.06%) and Bichon Frise (3.19%; 95% CI: 0–6.75%). The results of the present investigation indicate that S. scabiei infection is prevalent in pet dogs in Guangzhou, China, which provides relevant “baseline” data for conducting control strategies and measures against scabies in this region and elsewhere in China.

1. Introduction

Scabies is an emerging or reemerging infectious disease caused by the mite Sarcopes scabiei that threatens globally human and animal health [1]. It is estimated that about 300 million people worldwide are currently infected with S. scabiei [2]. There is a general agreement that S. scabiei from humans and animals represents a single species [3, 4]. S. scabiei can also infect animal hosts, including cat [5], giraffe [6], pig [7], raccoon dog [8], rabbit [9], sheep [10], serow [11], and wolf [12], leading to major economic losses [13]. Scabies is a major problem in dogs, for example, approximately 20% of dogs in some regions of the Korea experiencing S. scabiei [14]. The mite can invade many different body parts of dogs and can cause erythema, papules, lichenification, scales, crusts, and alopecia [15].

Although the prevalence of S. scabiei infection in pet dogs has been reported in some countries [16, 17], little is known about the prevalence of S. scabiei infection in pet dogs in China [18–20]. Moreover, these preliminary pilot surveys showed that S. scabiei is highly prevalent in pet dogs in China. Therefore, the objective of the present investigation was to examine the S. scabiei prevalence in pet dogs in Guangzhou, southern China. The results should provide a foundation for the control of S. scabiei infection in pet dogs in this region and elsewhere in China.

2. Materials and Methods

2.1. Examination of Pet Dogs for the Presence of S. scabiei and Data Collection. From January to December, 2009, a total of 3,977 pet dogs admitted to animal hospitals in Guangzhou, Guangdong province, southern China, were examined for the presence of S. scabiei (Table 1). Before sampling, pet dogs were subjected to clinical examination to determine their health status. Information about each pet dog, such as age, medical history, sex, breed, and weight, was collected. All pet
2.2. Statistical Analysis. The data were analyzed statistically using the PASW Statistics 18 (IBM Corporation, Somers, NY, USA); 95 % confidence intervals (CI) are given. The value of $P < 0.05$ differences between levels within factors and interactions was considered to be statistically significant.

### Table 1: Seasonal prevalence of *Sarcoptes scabiei* in pet dogs in Guangzhou, southern China.

| Season | No. examined | No. positive | Prevalence (%) |
|--------|--------------|--------------|----------------|
| Spring | 633          | 4            | 0.63           |
| Summer | 1652         | 23           | 1.39           |
| Autumn | 1269         | 14           | 1.1            |
| Winter | 423          | 6            | 1.42           |
| Total  | 3977         | 47           | 1.18           |

dogs, from which *S. scabiei* were examined, were handled in strict accordance with good animal practice as defined by the relevant national and/or local animal welfare bodies, and all animal work was approved by the appropriate committee. The presence of *S. scabiei* was detected by microscopic examination of deep skin scraping, plucked hairs, and skin biopsy. Identification of *S. scabiei* was conducted by morphological criteria and site of predilection [13].

#### 3. Results and Discussion

The overall prevalence of *S. scabiei* in pet dogs in Guangzhou, southern China, was 1.18% (95% CI: 0.85–1.52%) (Table 1). The prevalence in female pet dogs (1.23%) was slightly higher than that in male pet dogs (1.15%) (Table 1). The *S. scabiei* prevalence was higher ($P > 0.05$) in winter (1.42%), summer (1.39%), and autumn (1.1%) than in spring (0.63%) (Table 1). The prevalence of *S. scabiei* in pet dogs of less than 1 year old (1.15%) was higher than in pet dogs of other age groups (Table 2). Furthermore, the prevalence of *S. scabiei* was the highest in Pekingese (21.88%; 7/32) and Pekingese (1.18%) was detected by microscopic examination of deep skin scraping, plucked hairs, and skin biopsy. Identification of *S. scabiei* was conducted by morphological criteria and site of predilection [13].

### Table 2: Prevalence of *Sarcoptes scabiei* infection in pet dogs of different age groups in Guangzhou, southern China.

| Age     | No. examined | No. positive | Prevalence (%) |
|---------|--------------|--------------|----------------|
| <1 yr   | 2007         | 27           | 1.35           |
| 1–5 yr  | 1486         | 16           | 1.08           |
| >5 yr   | 484          | 4            | 0.83           |
| Total   | 3977         | 47           | 1.18           |

in lower temperatures [2]. Furthermore, the more frequent incidence in moist season might be because these conditions are favorable for mite reproduction.

The present study revealed that the prevalence of *S. scabiei* in pet dogs of less than 1 year old was higher than in pet dogs of other age groups, suggesting that young pet dogs appear to be more susceptible to *S. scabiei* than adult pet dogs. This is most likely due to their constant exposure to carrier mothers/owners because scabies is transmitted by direct person-to-person body contact. Furthermore, the prevalence of *S. scabiei* was the highest in Pekingese (21.88%; 7/32) although it is not popular as pet dogs in China. However, high prevalence in Pekingese poses a significant health risk for humans because the dog scabies can be transmitted to humans [23, 24].

#### 4. Conclusion

In summary, the results of the present survey indicate that *S. scabiei* infection is prevalent in pet dogs in Guangzhou, southern China, but this severe situation has received little attention in the past. Therefore, it is imperative to take integrated control strategies and measures to prevent and control *S. scabiei* infection in pet dogs in this region and elsewhere in China. To our knowledge, this is the first comprehensive report of *S. scabiei* prevalence in pet dogs in China.

#### Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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#### References

[1] P. Daszak, A. A. Cunningham, and A. D. Hyatt, “Emerging infectious diseases of wildlife—threats to biodiversity and human health,” *Science*, vol. 287, no. 5452, pp. 443–449, 2000.

[2] U. R. Hengge, B. J. Currie, G. Jäger, O. Lupi, and R. A. Schwartz, “Scabies: a ubiquitous neglected skin disease,” *The Lancet Infectious Diseases*, vol. 6, no. 12, pp. 769–779, 2006.

[3] J. Heukelbach and H. Feldmeier, “Scabies,” *The Lancet*, vol. 367, no. 9524, pp. 1767–1774, 2006.
[4] S. Alasaad, D. Soglia, V. Spalenza et al., “Is ITS-2 rDNA suitable marker for genetic characterization of Sarcoptes mites from different wild animals in different geographic areas?” Veterinary Parasitology, vol. 159, no. 2, pp. 181–185, 2009.

[5] R. Malik, K. McKellar Stewart, C. A. Sousa et al., “Crusted scabies (sarcoptic mange) in four cats due to Sarcoptes scabiei infestation,” Journal of Feline Medicine and Surgery, vol. 8, no. 5, pp. 327–339, 2006.

[6] S. Alasaad, D. Ndeereh, L. Rossi et al., “The opportunistic Sarcoptes scabiei: an new episode from giraffe in drought-suffering Kenya,” Veterinary Parasitology, vol. 185, no. 2–4, pp. 359–363, 2012.

[7] E. Goyena, R. Ruiz de Ybáñez, C. Martínez-Carrasco et al., “On the aggregated nature of chronic Sarcoptes scabiei infection in adult pigs,” Veterinary Parasitology, vol. 192, no. 1–3, pp. 301–306, 2013.

[8] N. Kido, M. Itabashi, M. Takahashi, and M. Futami, “Epidemiology of sarcoptic mange in free-ranging raccoon dogs (Nictereutes procyonoides) in Yokohama, Japan,” Veterinary Parasitology, vol. 191, no. 1-2, pp. 102–107, 2013.

[9] J. Millán, R. Casais, M. Delibes-Mateos et al., “Widespread exposure to Sarcoptes scabiei in wild European rabbits (Oryctolagus cuniculus) in Spain,” Veterinary Parasitology, vol. 183, no. 3–4, pp. 323–329, 2012.

[10] S. Rahbari, S. Nabian, and A. R. Bahonar, “Some observations on the neglecting web of the incomprehensibly emerging and re-emerging Sarcoptes mite,” Infection Genetics and Evolution, vol. 17, pp. 253–259, 2013.

[11] D. Xhaxhiu, I. Kusi, D. Rapti et al., “Ectoparasites of dogs and cats in Albania,” Parasitology Research, vol. 105, no. 6, pp. 1577–1587, 2009.

[12] I. E. Aydingöz and A. T. Mansur, “Canine scabies in humans: a case report and review of the literature,” Dermatology, vol. 223, no. 2, pp. 104–106, 2011.

[13] T. A. Morsy, M. E. Bakr, M. M. Ahmed, and M. M. Kotb, “Human scabies acquired from a pet puppy,” Journal of the Egyptian Society of Parasitology, vol. 24, no. 2, pp. 305–308, 1994.