

Cheyletiella yasguri Smiley, 1965 (Acarina: Cheyletiellidae) infestations in six puppies in Kocaeli province of Turkey, and successful treatment with selamectin

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Abstract: Cheyletiellosis is a highly contagious infestation caused by *Cheyletiella* mites, particularly in pets. This clinical case report was performed to give information about canine cheyletiellosis in 45-days-old Poodle puppies showing mainly pruritus and dandruff symptoms. Mites were detected in stereo microscopic examination of hair and skin scraping samples collected from dogs brought to a private veterinary clinic in Kocaeli province of Turkey. All collected materials were preserved in eppendorf tubes containing 70% ethanol and sent to the parasitology laboratory for species identification. Mite preparations for microscopic examination were prepared, and the species causing infestations in puppies was identified as *Cheyletiella yasguri*. This case is the first canine cheyletiellosis report in Kocaeli province of Turkey, and also the first *C. yasguri* infestation in Poodle breed dogs in Turkey. Symptoms of pruritus and dandruff were successfully resolved in a short time with the single dose spot-on formulation of selamectin administration, as well as routine combing of puppies and environmental cleaning. The number of studies on *C. yasguri*, which can cause infestations in humans, is limited in Turkey. Considering the increase in human dermatitis cases caused by *Cheyletiella* species, it is concluded that more comprehensive studies on the prevalence of cheyletiellosis in pets are required.

Key words: Cheyletiellosis, *Cheyletiella yasguri*, Poodle, selamectin, Kocaeli

1. Introduction

Cheyletiellosis, which is colloquially known as walking dandruff or *Cheyletiella* dermatitis, is a nonseasonal highly contagious ectoparasitic dermatosis caused by *Cheyletiella* mites (Acarina: Cheyletiellidae) living on the skin surface of animals and humans [1,2]. The most important species causing cheyletiellosis for humans and animals are *Cheyletiella parasitivorax* Megnin, 1878, *Cheyletiella blakei* Smiley, 1970 and *Cheyletiella yasguri* Smiley, 1965. It has been considered that *C. parasitivorax*, *C. blakei* and *C. yasguri* mainly cause dermatosis in rabbits, cats and dogs, respectively [1,3]. However, it has been reported that the host specificity of *Cheyletiella* spp. is not very high, and they can cause infestation in different animal species [4,5]. In addition, all three species have zoonotic significance and may cause severe dermatitis characterized by pruritic papular lesions in humans [6–8].

Cheyletiella mites feeding with lymph and other tissue fluids on the skin are large (270–540 µm) and motile, and form pseudo-tunnels in the superficial epidermis of hosts [9,10]. These mite infestations cause clinical symptoms in pets, especially in young animals such as kittens and

puppies. The infested puppies' clinical signs can be variable from a mild nonsuppurative dermatitis to severe scaling, erythema, pruritus and papules. An inflammatory response commonly characterized by an exfoliative dermatitis may also occur. The dry scale is the most prominent clinical signs of cheyletiellosis, and it can be severe on the dorsum of affected dogs. Alopecia and secondary skin infections can occur in case of severe infestation or chronic illness. Crusty lesions at the tip of the pinnae resembling to the scabies lesions can be seen in some dogs [4].

Cheyletiellosis has no sex and breed predilection. However, the disease is frequently encountered in Cocker Spaniels. Weakness and unhygienic raising conditions make also dogs more vulnerable to the infestations [2,4]. The disease is usually caused by asymptomatic carrier animals subsequently incorporated to the shelters or households. Because *Cheyletiella* mites can easily transmit from one dog to another dogs [2].

There are several studies concerning cheyletiellosis in animals in Turkey, but most of them are related to *C. parasitivorax* and *C. blakei* [11–14]. There are also studies reporting *Cheyletiella* dermatitis in humans in Turkey

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[8,15,16]. However, information on *C. yasguri* infestation of dogs in Turkey is scarce, except one study conducted almost forty years ago in İstanbul province [17]. The main purpose of this study was to emphasize the significance of *Cheyletiella* mites as etiological agents in six pruritic Poodle puppies from Kocaeli province of Turkey and the successful treatment of infestations with selamectin.

2. Case history

Six 45-days-old Poodle puppies (2 male, 4 female) out of nine dogs raising together and showing itching and dandruff symptoms were brought to a private veterinary clinic in Kocaeli province of Turkey in September 2020. The puppies were clinically examined, and dandruff was observed, especially on the dorsum (Figure 1). Hair samples and skin scrapings obtained from the puppies were microscopically examined. As a result of stereo microscopic examination, motile mites between dandruff and hairs were detected. In addition, a faecal examination was also routinely performed, and mites were also detected in faeces of the puppies.

The collected materials were placed into eppendorf tubes containing 70% ethanol and sent to the Parasitology Laboratory of the Faculty of Veterinary Medicine of Selçuk University for the identification of mite species. The materials taken into petri dishes were examined under a stereo zoom microscope, and *Cheyletiella* spp. (n: 32) and mite eggs attached to the hairs were observed. Eight of the *Cheyletiella* mites were become transparent

in 10% potassium hydroxide (KOH) for 12 h by checking periodically. The mites were then rinsed in distilled water for 2 h and transferred to 70% and %99 ethanol, respectively. After one day storing in each alcohol series, *Cheyletiella* mites were mounted on slides using Canada balsam. *Cheyletiella* mites were identified as *Cheyletiella yasguri* Smiley, 1965 (Figure 2) under a light microscope (Leica DM1000) by using relevant literature [4,5].

Cheyletiella mites can be easily distinguished from other mites thanks to their strong hooked-shaped pedipalps and comb-like structures at the tip of their legs (Figure 3). In other parasitic mites, there is a sucker or claw-like structure instead of that. The waist-like narrowing at the midriff is also characteristic for *Cheyletiella* species [5]. The most important morphological structure used to identify *Cheyletiella yasguri* is a heart-shaped or Y-shaped sensory organ, namely solendo, which can be seen on the dorsal side of genu I (Figure 4). It is used to differentiate *C. yasguri* from other members of *Cheyletiella* genus. This organ is conical in *C. blakei* and global in *C. parasitivorax* [4,18].

The puppies and three other adult dogs were treated with spot-on formulation of selamectin (Stronghold 6%, Zoetis, Parsippany, NJ, USA). The solutions in 0.25 mL tubes containing 15 mg of active ingredient were applied on the skin surface between the shoulders of dogs on the initial part of the neck. The owner of the animals was advised that dogs should be combed in the days after treatment. Besides, all dogs were isolated from their



Figure 1. A Poodle puppy infested with *Cheyletiella yasguri* and dandruff on its dorsum (original).

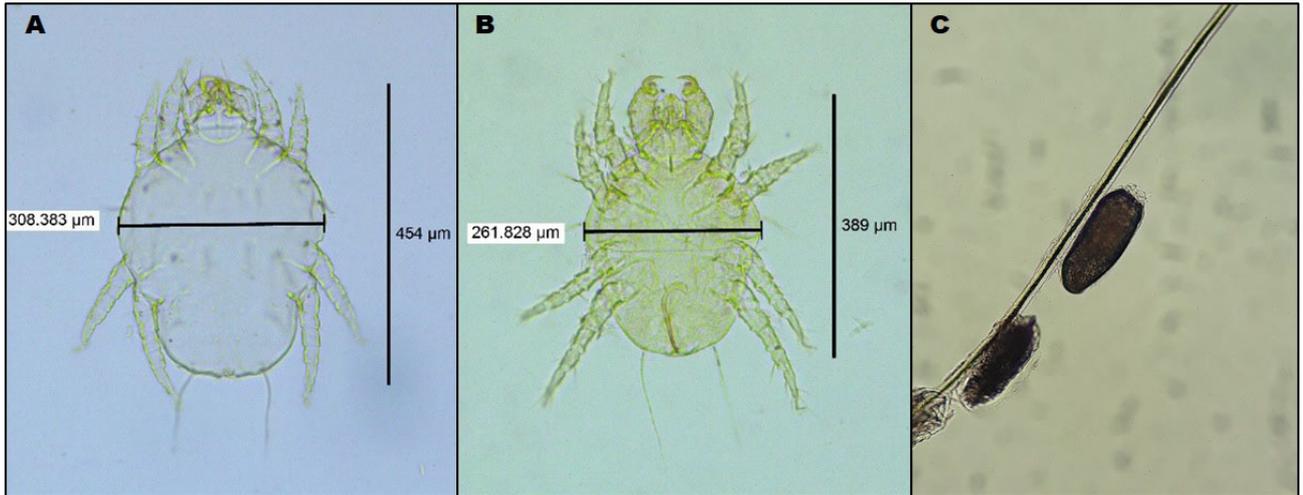


Figure 2. *C. yasguri*: female, dorsal (A), male, ventral (B), and eggs glued on a hair (C) (original).

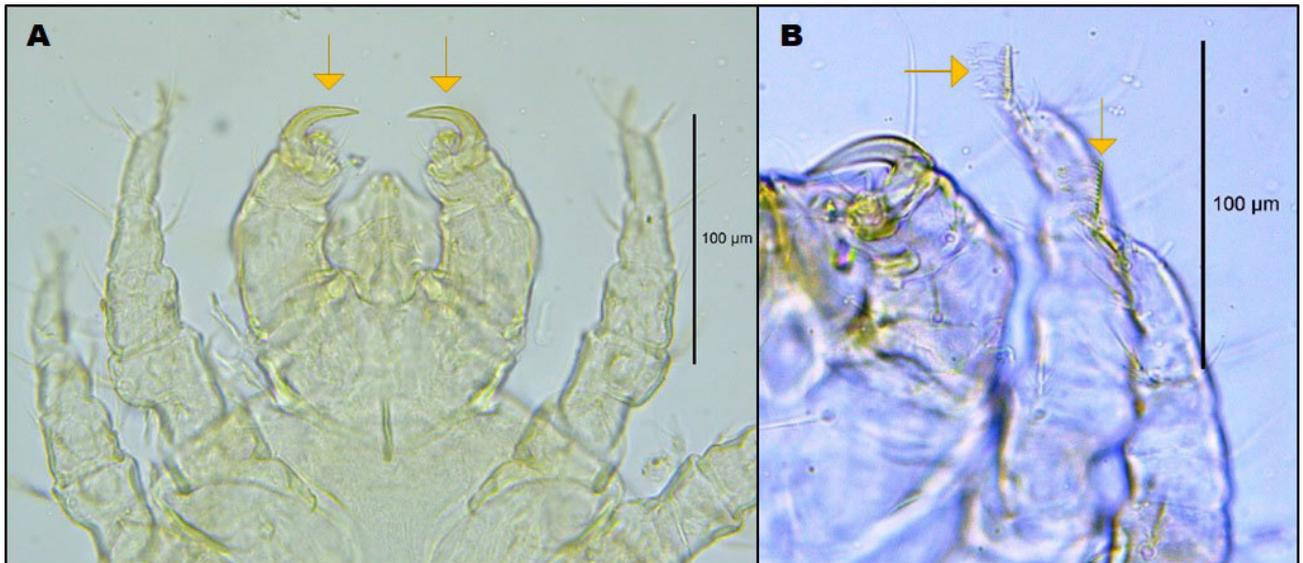


Figure 3. Hooked-shaped pedipalps (A) and comb-like structures at the tip of their legs (B) (original).

households, and all pens of the household were cleaned using hot water. After these applications, no mites were found in dogs in control on the 15th day after treatment. However, a second drug administration was performed 28 days after the first administration.

3. Discussion and conclusion

Cheyletiella dermatitis is an important mite infestation that is closely related to human medicine as well as veterinary medicine due to their quickly transmit ability to from animals to humans, especially to the owners of the animals [2,19]. *Cheyletiella* mites cause dermatosis with or without pruritus commonly on the dorsum of the animals. Mild to severe scaling/dandruff, hair loss,

crusting, erythema, itching, rashes, redness and papules are the most prominent signs of the infested animals [4]. These mites can also cause severe skin irritation, rashes, itching and papular lesions in humans [7,8]. Among pet animals, cheyletiellosis is mostly encountered in kittens, puppies and rabbits [4]. *Cheyletiella* mites were reported in cats [11,12,14,19,20], rabbits [13,18,21,22, 23] and humans [15,16] in the studies conducted in Turkey. However, the number of study on canine cheyletiellosis is scarce. *Cheyletiella yasguri* infestations were detected in six 45-days-old Poodle puppies living in the same household in the current study. To date, cheyletiellosis caused by *C. yasguri* in a 6-months-old dog was reported in only one study in İstanbul province of Turkey almost forty years ago



Figure 4. *Cheyletiella yasguri*, heart-shaped sensory organ on genu I (original).

[17]. Apart from the study conducted by Tüzer [17], the literature review indicates that no *C. yasguri* infestation was reported in dogs or any other mammals in Turkey. This study reports *C. yasguri* infestations in six puppies for the first time in Kocaeli province of Turkey. It is thought that *Cheyletiella* infestations in dogs may be caused by an asymptomatic carrier dog coming from outside or living in the same household. It should be kept in mind that phoretic transmission by insects may play a role in the spread of infestation [24].

Cheyletiella yasguri infestations have been reported in some dog breeds such as Cavalier King Charles Spaniel, Cocker, Terrier, Miniature Poodle and Whippet in Austria, India, Iran and Canada [9,25–27]. Miller et al. [4] stated that canine cheyletiellosis is frequently seen in Cocker Spaniel dogs. *Cheyletiella yasguri* infestations were detected in Poodles in this study. In the study conducted by Tüzer [17], data about the breed of the dog were not stated. Therefore, this is the first case study reporting *C. yasguri* infestations in the Poodle breed dogs in Turkey.

Human *Cheyletiella* dermatitis cases are mostly due to contact with infested pets [4,19]. Some studies reported that mites causing infestations in animals could simultaneously cause dermatological problems in the owners of the animals [8,11,20]. This situation can be solved by effective treatment of animals, spontaneously. In this study, *C. yasguri* infestations were detected in six

Poodle puppies, but there were no complaints about mite infestation from the owners of the animals.

Although the treatment of canine cheyletiellosis is troublesome in the households harbouring many dogs, the treatment process is generally successful in households where fewer dogs live together. To effectively eliminate *Cheyletiella* mites, the infested dogs and all in-contact dogs should be treated. In some cases, environmental treatment may even be required depending on the severity of the infestation and the number of dogs in the household [2–4]. A variety of systemic and topical ectoparasitic drugs are used to treat and control cheyletiellosis in dogs [2]. Moxidectin, ivermectin, selamectin and milbemycin oxime are commonly used macrocyclic lactones against cheyletiellosis in animals. Pyrethroids and fipronil have also been commonly used for this aim [3,5]. In the literature, the efficacy of milbemycin oxime [28], fipronil [29], ivermectin [19, 25] and selamectin [30] against canine cheyletiellosis was previously indicated. Selamectin has been used against feline cheyletiellosis in Turkey [14]; however, there is no report on the use of this acaricide in canine cheyletiellosis. In the present study, the puppies and three other adult Poodle dogs in the same household were successfully treated with spot-on formulation of selamectin (Stronghold 6%, Zoetis). *Cheyletiella yasguri* mites were eliminated by single dose selamectin administration with regular combing of the animals and environmental cleaning with hot water.

In conclusion, *Cheyletiella yasguri* infestation was detected in six puppies for the first time in Kocaeli province of Turkey. It was also detected in Poodle breed of dogs for the first time in Turkey. Since the epidemiology of *Cheyletiella* mite infestation among dogs is scantily known in Turkey, more comprehensive studies concerning mite infestations in dogs are required. The high number of human *Cheyletiella* dermatitis cases in Turkey have recently increased the significance of this subject as well [8,15,16].

Acknowledgments

All procedures were performed following the ethical guidelines of the Experimental Animals Production and Research Center Ethics Committee of Veterinary Faculty of Selçuk University (Decision number: Suvdamek-2021/29).

Conflict of interest

The authors declare no conflict of interest.

References

1. Ghubash R. Parasitic miticidal therapy. *Clinical Techniques in Small Animal Practice* 2006; 21: 135-144. doi: 10.1053/j.ctsap.2006.05.006
2. Tait J. Cheyletiellosis. In: Horne K, Schwassmann M, Logas D (editors). *Small Animal Dermatology for Technicians and Nurses*. Hoboken, NJ, USA: Wiley Blackwell; 2020. pp. 139-146.

3. Curtis CF. Current trends in the treatment of Sarcoptes, Cheyletiella and Otodectes mite infestations in dogs and cats. *Veterinary Dermatology* 2004; 15: 108-114. doi: 10.1111/j.1365-3164.2004.00362.x
4. Miller WH, Griffin CE, Campbell KL. Muller and Kirk's Small Animal Dermatology. 7th ed. St. Louis, MO, USA: Elsevier; 2013.
5. Saari S, Nareaho A, Nikander S. Canine Parasites and Parasitic Diseases. London, United Kingdom: Academic Press; 2019.
6. Brandrup F, Andersen KE, Kristensen S. Infestation in human and dogs with the mite Cheyletiella yasguri Smiley. *Ugeskrift for Laeger* 1979; 141 (15): 1015-1017.
7. Keh B, Lane RS, Shachter SP. Cheyletiella blakei, an ectoparasite of cats, as cause of cryptic arthropod infestations affecting humans. *The Western Journal of Medicine* 1987; 146: 192-194.
8. Miman Ö, Dik B. First report of cheyletiellosis due to the skin mite Cheyletiella parasitivorax Megnin, 1878 in a human in Turkey. *Elyns Journal of Microbes* 2018; 2 (1): 105.
9. Wagner R, Stallmeister N. Cheyletiella dermatitis in humans, dogs and cats. *British Journal of Dermatology* 2000; 143: 1097-1131. doi: 10.1046/j.1365-2133.2000.03869x
10. Mullen GR, Durden LA. Medical and Veterinary Entomology, Vol. 2. Amsterdam, Netherlands: Elsevier; 2009. pp. 434-435.
11. Kurtdede A, Alkan Z, İlhan T. Treatment of cheyletiellosis with ivermectin. *Veterinary Journal of Ankara University* 1994; 41 (2): 275-279 (in Turkish with an abstract in English). doi: 10.1501/Vetfak_0000001559
12. Gülanber A. A case of cheyletiellosis in a cat in İstanbul, Turkey. *Journal of the Faculty of Veterinary Medicine İstanbul University* 2003; 29 (1): 71-75.
13. Dik B, Uslu U. Ectoparasites of hares (*Lepus europaeus* Pallas) in Konya province, Turkey. *Turkish Journal Veterinary and Animal Sciences* 2018; 42: 65-72. doi: 10.3906/vet-1706-19
14. Korkmaz UF, Gökpınar S. Cheyletiellosis in cats and its treatment with selamectin drop. *The Journal of Faculty of Veterinary Medicine Erciyes University* 2018; 15 (3): 276-278 (in Turkish with an abstract in English). doi: 10.32707/ercivet.477346
15. Emre S, Yağlı S, Metin A, Kılıçarslan A, Demir Pektaş S. Cheyletiella blakei dermatitis. *Türkderm* 2011; 45 (4): 213-215.
16. Turan H, Turan A, Çoban G, Gönen İ. Cheyletiella dermatitis: a case report. *Klimik Journal* 2012; 25 (3): 127-129 (in Turkish with an abstract in English). doi: 10.4274/turkderm.37132
17. Tüzer E. A case of cheyletiellosis on a dog. *Journal of the Faculty of Veterinary Medicine İstanbul University* 1983; 9 (2): 107-116 (in Turkish with an abstract in English).
18. Barros-Battesti DM, Bassini-Silva R, Jacinavicius FC, Andre MR, Ochoa R et al. New record of Cheyletiella parasitivorax (Megnin, 1878) (Thrombidiformes: Cheyletidae) from Brazil with an illustrated key to species for the genus. *Brazilian Journal of Veterinary Parasitology* 2020; 29 (2): e018819. doi: 10.1590/S1984-29612020016
19. Behera SK, Shah N, Prasad H, Sarma K. An unusual case of cheyletiellosis in a Persian cat and its therapeutic management. *Journal of Parasitic Diseases* 2019; 43 (3): 534-536. doi: 10.1007/s12639-019-01115-5
20. Dinçer Ş, Karaer Z. The first report on Cheyletiella blakei Smiley, 1970 (Acari: Cheyletiellidae) on a cat in Turkey. *Veterinary Journal of Ankara University* 1985; 32 (2): 250-257 (in Turkish with an abstract in English).
21. Aksın N, Aksın NE. The prevalence of ectoparasite on wild rabbits in Elazığ region. *Turkish Journal of Parasitology* 2002; 26 (1): 67-70 (in Turkish with an abstract in English).
22. Coşkunserçe G, Akdeşir E, Kaya G, Coşkun ŞZ. Severe sarcoptic mange and cheyletiellosis in a New Zealand rabbit and its treatment with high dosage of ivermectin. *Uludağ University Journal of the Faculty of Veterinary Medicine* 2012; 31 (2): 63-66.
23. Hajipour N, Zavarshani M. Ectoparasites and endoparasites of New Zealand white rabbits from north west of Iran. *Iranian Journal of Parasitology* 2020; 15 (2): 266-271.
24. Bochkov A. A review of mites of the parvorder Eleutherengona (Acariformes: Proostigmata)- permanent parasites of mammals. *Acarina* 2009; Suppl. 1: 1-149.
25. Paradis M, Villeneuve A. Efficacy of ivermectin against Cheyletiella yasguri infestation in dogs. *Canadian Veterinary Journal* 1988; 29: 633-635.
26. Shin SS. A case report of Cheyletiella infestation on a Whippet dog in Korea. *The Korean Journal of Parasitology* 1996; 34 (4): 264-271. doi: 10.3347/kjp.1996.34.4.267
27. Ghazani MHM, Karami AR, Dolgharisharf J, Khajeh M, Najafian K. A case report of Cheyletiella infestation on a Terrier dog in Tabriz, Iran. *Journal of Animal and Veterinary Advances* 2008; 7 (10): 1204-1206.
28. White SD, Royschuk RAW, Fieseler KV. Clinicopathologic findings, sensitivity to house dust mites and efficacy of milbemycin oxime treatment of dogs with Cheyletiella spp. infestation. *Veterinary Dermatology* 2001; 12: 13-18. doi: 10.1046/j.1365-3164.2001.00208.x
29. Chadwick AJ. Use of a 0.25 per cent fipronil pump spray formulation to treat canine cheyletiellosis. *Journal of Small Animal Practice* 1997; 38: 261-262. doi: 10.1111/j.1748-5827.1997.tb03364.x
30. Mueller RS, Bettenay SV. Efficacy of selamectin in the treatment of canine cheyletiellosis. *Veterinary Record* 2002; 151: 773. doi: 10.1136/vr.151.25.773