

Case Report

TROMBICULOSIS IN CATS DUE TO *NEOTROMBICULA AUTUMNALIS* (ACARI: TROMBICULIDAE) LARVAE: THE FIRST REPORT IN ROMANIA

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ABSTRACT

Neotrombicula autumnalis is an arthropod that parasitises cats during the larval stage and induces pruritic dermatitis described as trombiculosis. This report describes the infestation of two cats with *N. autumnalis* mite larvae. Physical examination of both cats revealed cutaneous lesions on the ears, limbs (elbow, interdigital spaces) and around the nipples represented by erythema, papules, crusts and pruritus. Microscopic examination of skin scrapings revealed *N. autumnalis* larvae in both cats. To our knowledge, this is the first report of *N. autumnalis* larvae infestation in cats from Romania.

Keys word: cats, *Neotrombicula autumnalis*, trombiculosis.

INTRODUCTION

Neotrombicula autumnalis is a mite belonging to the family *Trombiculidae*. The larvae are ectoparasites of various wild and domestic animals and cause the disease called trombiculosis. In Europe, this disease shows seasonal activity, with most cases encountered during the end of the summer and fall (Cosoroaba, 2005; Curtis, 2012; Leon *et al.*, 2013). Infested animals present with a variety of clinical signs, including erythema, papules, vesicles, pustules, crusts, scales, hair loss and pruritus (from mild to severe) (Cosoroaba, 2005), and massive infestation can also cause neurological dysfunction, such as asthenia, limping and paresis of the hind limbs (Prosl *et al.*, 1985). The type of reaction caused by the bite of these arthropods depends on the level of infestation and pre-exposure to the same or related species (Burns, 2009). *N. autumnalis* is considered the most widely dispersed mite species belonging to the family *Trombiculidae* in Occidental Europe and can survive in a range of environmental conditions (Schöler *et al.*, 2006). Cat trombiculosis outbreaks produced by *N. autumnalis* larvae have been reported in Scotland (Nuttall *et al.*, 1998), Italy (Conegliani and Cavazzini, 1999; Leone *et al.*, 2013), Spain (MartiOllé *et al.*, 2011), Greece and Cyprus (Giannouloupoulos *et al.*, 2012).

Case report: During the period from October 2011 to November 2012, two cats with pruritic dermatitis lesions presented for evaluation at the Parasitology Clinic (Faculty of Veterinary Medicine Bucharest, Romania). The first case involved a long-haired Norwegian Forest cat that was 2 years old, female, sterilised, and lived in a rural region in Snagov (44°42'28"N, 26°10'24"E) located 40 km north of Bucharest. The second case

involved a Russian Blue cat that was 4 years old, female, and lived in a rural region in Pope ti-Leordeni (44°22'48"N, 26°10'12"E) located 9 km south of Bucharest. According to the history, both cats lived indoors but with outdoor access. The clinical exam revealed a good general status of both cats. In the first case, the dermatological exam noted bilateral focal erythema with small papules around the last mamelons (Fig 1), and the animal frequently licked the involved areas. Upon closer look at the peri-mamelonar area, we observed small, orange dots. The second case presented with multiple cutaneous lesions, including erythema, papules, scales and pruritus located at the base of the ear (Henry's pocket), right elbow, front right limb (the dorsal carpo-metacarpian region), inter-digital spaces and peri-mamelonar area. Skin scrapings were taken from both animals and spread onto a slide, and lactophenol was added for clarification. During the microscopic examination, orange mites with three pairs of long legs were observed (Fig 2). They were identified as *N. autumnalis* larvae based on the description provided by Cosoroab (2005). Both cats were treated with spot-on solution containing 6% selamectin (Stronghold®, Pfizer, Belgium) according to previous studies (Leone and Albanese, 2004; MartiOllé *et al.*, 2011). After two weeks, the animals were re-examined, and the cutaneous lesions showed signs of remission. The owners were advised to keep the cats inside the house to prevent re-infestation.

DISCUSSION

Trombiculid mites live free in nature and prefer biotopes with well-drained dump soil, where animals that serve as hosts for the larvae are found (Cosoroaba, 2005).

The life cycle represents a complete metamorphosis, and only the larval stages can infest animals (Curtis, 2012). The larvae do not have host specificity and infest a number of mammalian hosts (including humans) (Guarneri *et al.*, 2005; Parcell *et al.*, 2013), birds (that build their nests on the ground) (Literak *et al.*, 2008) and reptiles (Cosoroaba, 2005). Once on the host, the larvae penetrate the superficial layers of the skin with their chelicerae and inoculate saliva rich in proteolytic enzymes. These enzymes liquefy the cutaneous tissues of the host, which helps the larvae to feed through a feeding tube (stylostome) (Cosoroaba, 2005). After feeding (2-10 days), the larvae detach and fall to the ground, where they continue their life cycle by transforming into octopode nymphs and then adults. In contrast to larvae, nymphs and adults live free on the ground and feed on plant fluids, other arthropods and their eggs (Burns, 2010; Curtis, 2012).



Figure 1. Clinical photograph: case 1. Trombiculosis in a cat caused by *Neotrombicula autumnalis*. Note the inflammation of the skin around the nipples.



Figure 2. *Trombicula autumnalis*, larval stage (x100).

The cases described in this study showed similar features as those reported in previous studies regarding lesion type and location (Nuttall *et al.*, 1998; Cornegliani and Cavazzini, 1999; Giannouloupoulos *et al.*, 2012). Unlike other reports (Leone *et al.*, 2013), our findings show that the main symptom was pruritus, as the cats' owners reported intense licking of the infested areas. The pruriginous character of the lesions can be explained by the bite of the mites (mechanical action) and their type of feeding (the saliva is rich in proteolytic enzymes - irritative action). Previous investigations have shown that the saliva of many arthropod species contains active pharmacological agents (hyaluronidase, proteases, peptidases, phospholipases, histamine, etc.) that induce local or, if in sufficient quantity, systemic effects (Burns, 2009).

As a result of intense scratching and consequent licking, infested lesions can become infected, and complications may lead to pyodermitis (Burns, 2009). Indeed, previous studies have reported complex lesions and the presence of larvae clusters (MartiOllé *et al.*, 2011). Conversely, in both cases described herein, the cutaneous lesions had not spread extensively, although the second cases showed multiple lesion locations. For this reason, we believe both cases were recent infestations; the absence of secondary infections and the mild mite infestation further support this opinion.

In our cases, the distribution of the cutaneous lesions was concentrated on the ventral sides, corresponding to the length of short vegetation. This localisation is typical for trombiculosis (Nuttall *et al.*, 1998; Cosoroaba, 2005), and previous reports have shown that larvae living on the ground or on vegetation will climb up the host onto the body areas that are close to the ground (Guarneri *et al.*, 2005). As a result, lesions can appear anywhere on the body surface, although areas with thin skin, which is easier to penetrate, are more exposed (Cosoroaba, 2005). In addition to producing cutaneous lesions, larvae can also inoculate various pathogens during feeding. In particular, mites belonging to the *Trombicula* genus (Literak *et al.*, 2008), including *N. autumnalis* (Fernández-Sota *et al.*, 2001; Kampen *et al.*, 2004), are potential vectors for *Anaplasma phagocytophilum* and *Borrelia burgdorferi*. Transstadial transmission of infectious agents is also possible, such as with hard ticks. Because *N. autumnalis* larvae can infest humans either through direct contact with vegetation (Mircean *et al.*, 2008) or from pets (Guarneri *et al.*, 2005; Parcell *et al.*, 2013), these mites are important subjects for physician and veterinarian awareness.

Although the *N. autumnalis* mite is widespread in some regions and can adapt to a range of environmental conditions (Schöler *et al.*, 2006), its

presence in Romania is less known. Only the report by Mircean *et al.* (2008) described a trombiculosis outbreak on a farm located in the northwest part of the country where many animals (one horse, 23 bovines, two dogs) and their owner were infested. To our knowledge, this is the first report of *N. autumnalis* larvae infestation in cats in Romania, which makes our report an important addition to the scant literature on this topic. Neither of the cats in our study had left the country, which indicates that the infestation with *N. autumnalis* must have been autochthon. Climatic changes and animal movement from one region to another can contribute to the diffusion of these mites (Giannouloupoulos *et al.*, 2012), and the presence of small rodents (primary hosts for larvae mites) (Cosoroaba, 2005) facilitates mite population growth in new biotopes. Further epidemiological studies that can provide more information regarding the true prevalence of *N. autumnalis* are necessary because there are few data concerning trombiculid mite infestations.

In conclusion, in the present report we described the infestation of two cats with larvae of the mite *N. autumnalis*. Although rare, trombiculosis should be considered in cases where a dermatological disorder caused by ectoparasites is suspected in cats.

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