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CASE REPORT

A Case Report of a 12-Year Old Boy Infested with Poultry Red Mites, *Dermanyssus gallinae* (Acari: Mesostigmata), Acquired from his Syrian Hamster

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ABSTRACT

The poultry red mite *Dermanyssus gallinae*, known as the primarily ectoparasite of laying hens and synanthropic birds (e.g. pigeons), can also bite humans, causing Red-Mite Dermatitis (RMD) with untypical symptoms of erythematous maculo-papular rash and urticaria-like lesions. In this study, we present the first case of RMD diagnosed in a 12 year old boy, resulting from bites of poultry mites derived from his pet hamster. The results show that the potential risk of human exposure to *D. gallinae* mites in the urban environment, is associated not only with the nesting and roosting feral pigeons in direct vicinity of human apartments, but may also result from the holding of hamsters. Since this hamster had no contact with other animals, we assume that its bedding was contaminated with *D. gallinae*, and played a role of the major source of these mites for the host and then the child. In conclusion, even if pet animals are rather accidental hosts for *D. gallinae*, effective measures to monitor and avoid cases of mite-dermatitis in urban dwellers require: (i) correct morphological identification of mite species, (ii) finding the sources of mite infestations, (iii) the removal of abandoned nests of their hosts, (iv) thorough disinfestation. Further eco-epidemiological research is urgently needed to identify non-avian host species including pet animals and mechanisms facilitating spreading of *D. gallinae* in urban environments.

Introduction

The cosmopolitan *Dermanyssus gallinae* (De Geer, 1778) is a temporary nocturnal blood-sucking ectoparasite known primarily as the poultry red mite with a length of about 1 mm. Despite its name, it can also infest other wild and synanthropic birds and mammalian hosts such as cats, dogs, rabbits or small rodents including those species keeping in pet stores [1-3]. Blood-feeding time of *D. gallinae* on its host, lasts up to an hour and repeats every 2-4 days. Mites parasitize generally at night, while in the daylight, they hide in bird nests, litter, cracks and crevices of cages or cracks inside building. In the case of strong invasion, they

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induce significant stress among the laying hens, resulting in severe anemia, visible lesions on the breast and legs, weight loss of birds and even death [3]. This zoonotic mite species may also bite humans, causing Red-Mite Dermatitis (RMD) with symptoms of localized itchy rash. In Europe, most human cases are associated with occupational exposure to mite-infested poultry in large industrial or rural farms. Although, RMD is considered an occupational illness among poultry workers, city-dwellers having contact with *Dermanyssus* infested feral pigeons or swallows 'nest, may also suffer from mite-bites [4,5]. In this case, the resting and bird breeding places located on roofs, window sills, balconies, in air-conditioning boxes and attics of private and public buildings, may serve as *D. gallinae* natural reservoirs Furthermore, infestations observed in companion animals, indicate that *D. gallinae* may develop or at least feed upon hosts other than birds [1]. Therefore, RMD cases pose serious dermatological and diagnostic problems among populations living in urban areas [6,7]. In our report, we describe a case of RMD in a 12-year old boy, caused by poultry red mites derived from his Syrian hamster.

Case Report

In November 2014, a 12-year old boy suffered from severe itching and parents noticed many skin lesions on his forearms and neck, which looked like urticaria, but they could not find any reasons for these mysterious changes (Figure 1). The family doctor after the boy's medical examination recognized these itchy skin lesions as allergic reactions and recommended treatment with antihistamines. A week after this examination, parents again noticed new skin changes on the child's body. During a thorough inspection of the room, the father noticed on the surface of the desk, on the walls and in the cage with a Syrian hamster many tiny, moving red-brown and gray small spiders. He collected these crawling spiders and put them in a tiny plastic jar containing 70% alcohol and delivered to the Department of Animal Morphology Adam Mickiewicz University. The morphological identification of these tiny spiders under the light microscope was carried out by acarologists. The analysis revealed the presence of immature and adult *D. gallinae* mites, so the father knew the main reason. The second medical examination of the boy was conducted by an alergologist in Center of Allergology in Poznań. The child still suffered from pruritus observed on his hands, shoulders, forearms, back of neck, legs with itching escalating during evening hours. The biting sites displayed erythematous maculo-papular rash and urticaria-like lesions. The alergologist conducted a detailed medical history, and information about *D. gallinae* mites detected in the boy's room, largely facilitated the correct diagnosis of RMD. The boy must have been repeatedly attacked by chicken mites for at least a few weeks, so the main recommendation of both the allergist and the acarologists was the urgent removal of the hamster cage from the child's room and perform disinfestation with pyrethroids. Two weeks after removing of the cage, the parents observed regression of RMD symptoms. According to our speculations, the source of these mites was the hamster, that occupied the cage placed on the boy's desk. Strong invasion of mites led to the death of the animal. Since the hamster had no contacts with other animals, mites might have come from contaminated bedding infested with different developmental stages of *D. gallinae*, including eggs. The father remembered that he bought the hamster bedding made from paper and hay in a new pet shop. This type of bedding is an excellent material for nesting hamsters to sleep and delve into it, and is absorbent for urine, so it must be replaced regularly. The boy removed soiled bedding, but instead of putting it in a plastic bag, threw it directly into a basket under the desk, that was a suitable place to lay eggs and continue the reproduction cycle of *D. gallinae.*

Figure 1 Skin lesions of red mite dermatitis in a 12 year old boy after bites of *Dermanyssus gallinae*: on the shoulder (a), and under arms (b).

Discussion

People inhabiting urban areas have frequent contacts with pets and synanthropic animals such as birds (mostly pigeons) and small rodents. These animals can harbor rich fauna of ectoparasites, including the poultry mite *D. gallinae*, the etiological agent of red mite dermatitis [7]. In this report, we

showed that the potential risk of human exposure to *D. gallinae* mites in urban environment, is associated not only with nesting and roosting feral pigeons in direct vicinity of human apartments, but may also result from the holding of hamsters. It should be noted that literature data on cases of mite-dermatitis associated with the possession of mite-infested pet rodents are very scarce. Lucky AW, et al. [8] described two cases of pruritic papules due to *D. gallinae* mites, that had infested gerbils. Furthermore, a hamster infested by tropical rat mites *Ornithonyssus bacoti*, was their source for its owner who was diagnosed with rat mite dermatitis [9]. Rat mite dermatitis was also reported in a patient who had contact with laboratory mice [10]. To our best knowledge, we present the first case of RMD resulting from bites of poultry mites derived from a pet hamster. Furthermore, since the hamster had no contact with other animals, we assume that its bedding was contaminated with *D. gallinae*, and played a role of the major source of these mites for the host and then the child. It is noteworthy that in urban agglomerations, where human contacts with *D. gallinae* mites appear to be scarce and even unknown, this non-specific dermatitis may remain unrecognized or misdiagnosed. Cases of RMD may also be mistaken with allergic contact dermatitis, scabies *Sarcoptes scabiei* (Sarcoptidae), pediculosis induce by *Pediculus humanus corporis*, bites of tropical rat mites *Ornithonyssus bacoti*, with pigeon ticks *Argas reflexus* (Argasidae), infestation with larvae of chigger mites (Trombiculidae), bites of *Cheyletiella* mites or bed bugs *Cimex lectularius*[9,11,12]. Since this epizoonosis is currently an increasing medical and veterinary problem in urban environment [13], its reliable diagnosis requires the close cooperation between veterinary parasitologists/acarologists and dermatologists or allergologists. It is important since clinical manifestations can persist

for a long time in the absence of a correct diagnosis. An additional medical threat of *D. gallinae* to human health is the suggested ability of these mites to serve as vectors for blood-borne pathogens. Bacterial pathogens known to cause Lyme disease and Q fever were isolated from *D. gallinae* mites, which were responsible for the outbreaks of RMD among city dwellers in Italy [14]. In conclusion, even if pet animals are rather accidental hosts for *D. gallinae*, effective measures to monitor and avoid cases of mite-dermatitis in urban dwellers require: (i) the correct morphological identification of mite species, (ii) finding the sources of mite infestations, (iii) the removal of abandoned nests of their hosts, (iv) thorough disinfestation. Further eco-epidemiological research is urgently needed to identify non-avian host species including pet animals and mechanisms facilitating spreading of *D. gallinae* in urban environments.

References

1. Di Palma A, Leone F, Albanese F, Beccati M. A case report of Dermanyssus gallinae infestation in three cats. Vet Dermatol. 2018 Apr 30. doi: 10.1111/vde.12547. Epub ahead of print. PMID: 29708634.
2. Kowal J, Nosal P, Niedziółka R, Kornaś S. Presence of blood-sucking mesostigmatic mites in rodents and birds kept in pet stores in the Cracow area, Poland. Ann Parasitol. 2014;60(1):61-4. PMID: 24930247.
3. Sparagano OA, George DR, Harrington DW, Giangaspero A. Significance and control of the poultry red mite, Dermanyssus gallinae. Annu Rev Entomol. 2014;59:447-66. doi: 10.1146/annurev-ento-011613-162101. PMID: 24397522.
4. Haag-Wackernagel D, Bircher AJ. Ectoparasites from feral pigeons affecting humans. Dermatology. 2010;220(1):82-92. doi: 10.1159/000266039. Epub 2009 Dec 11. PMID: 20016127.
5. Sioutas G, Minoudi S, Tiligada K, Chliva C, Triantafyllidis A, Papadopoulos E. Case of Human Infestation with Dermanyssus gallinae (Poultry Red Mite) from Swallows (Hirundinidae). Pathogens. 2021 Mar 4;10(3):299. doi: 10.3390/pathogens10030299. PMID: 33806588; PMCID: PMC8001604.
6. Barlaam A, Puccini A, Caiaffa MF, Di Bona D, Macchia L, Giangaspero A. Dermanyssosis in the Urban Context: When the One Health Paradigm Is Put into Practice. Pathogens. 2022 Nov 23;11(12):1396. doi: 10.3390/pathogens11121396. PMID: 36558730; PMCID: PMC9782833.
7. Cafiero MA, Camarda A, Circella E, Santagada G, Schino G, Lomuto M. Pseudoscabies caused by Dermanyssus gallinae in Italian city dwellers: a new setting for an old dermatitis. J Eur Acad Dermatol Venereol. 2008 Nov;22(11):1382-3. doi: 10.1111/j.1468-3083.2008.02645.x. Epub 2008 Apr 1. PMID: 18384564.
8. Lucky AW, Sayers C, Argus JD, Lucky A. Avian mite bites acquired from a new source--pet gerbils: report of 2 cases and review of the literature. Arch Dermatol. 2001 Feb;137(2):167-70. PMID: 11176688.
9. Creel NB, Crowe MA, Mullen GR. Pet hamsters as a source of rat mite dermatitis. Cutis. 2003 Jun;71(6):457-61. PMID: 12839256.
10. Fox JG. Outbreak of tropical rat mite dermatitis in laboratory personnel. Arch Dermatol. 1982 Sep;118(9):676-8. doi: 10.1001/archderm.1982.01650210056019. PMID: 7114872.
11. Kavallari A, Küster T, Papadopoulos E, Hondema LS, Øines Ø, Skov J, Sparagano O, Tiligada E. Avian mite dermatitis: Diagnostic challenges and unmet needs. Parasite Immunol. 2018 Aug;40(8):e12539. doi: 10.1111/pim.12539. Epub 2018 Jun 29. PMID: 29878381.

12. Mathison BA, Pritt BS. Laboratory identification of arthropod ectoparasites. Clin Microbiol Rev. 2014 Jan;27(1):48-67. doi: 10.1128/CMR.00008-13. PMID: 24396136; PMCID: PMC3910909.

13. Cafiero MA, Viviano E, Lomuto M, Raele DA, Galante D, Castelli E. Dermatitis due to Mesostigmatic mites (Dermanyssus gallinae, Ornithonyssus [O.] bacoti, O. bursa, O. sylviarum) in residential settings. J Dtsch Dermatol Ges. 2018 Jul;16(7):904-906. doi: 10.1111/ddg.13565. Epub 2018 Jun 22. PMID: 29933524.

14. Raele DA, Galante D, Pugliese N, La Salandra G, Lomuto M, Cafiero MA. First report of Coxiella burnetii and Borrelia burgdorferi sensu lato in poultry red mites, Dermanyssus gallinae (Mesostigmata, Acari), related to urban outbreaks of dermatitis in Italy. New Microbes New Infect. 2018 Feb 22;23:103-109. doi: 10.1016/j.nmni.2018.01.004. PMID: 29692913; PMCID: PMC5913367.

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