

## A Record of *Ornithonyssus bacoti* from Pet Rabbit (Lionhead rabbits, *Oryctolagus cuniculus*) in Korea

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**Abstract :** *Ornithonyssus bacoti* or so-called tropical rat mite has a wide host range which includes wild rodents and small mammals. The mite is known to bite humans and cause irritation. But the case reports are few in pet rabbits. Two Lionhead rabbits (*Oryctolagus cuniculus*) were referred to the local animal hospital, and many mites were detected on the body. Mites were identified as *O. bacoti* by the scanning electron microscopical study. This communication describes the first record of pet rabbits affected with *O. bacoti* in Korea.

**Key words :** *Ornithonyssus bacoti*, Lionhead rabbit, *Oryctolagus cuniculus*.

### Introduction

Several types of mites are found on animals and/or in their environment. Mesostigmata is a suborder of highly mobile mites, class Arachnida, subclass Acari. *Ornithonyssus bacoti* is a blood-sucking ectoparasite occurring on gerbil, hamster, mice, rat and various other mammals, but the brown Norway rat (*Rattus norvegicus*) and black roof rat (*Rattus rattus*) are the primary host species (8,9). The tropical rat mite is found in various parts of the world and has been associated with pruritic and erythematous skin reactions in human (3,4,8). The case reports of *O. bacoti* as a cause of human dermatitis have been reported in many other parts of the world (3,4,5). The mite also acts as the intermediate host for *Litomosoides carinii*, a filarial nematode of rodents and has been transmitted by the rat mite experimentally, including murine typhus, rickettsial pox, tularemia, plague, coxsackievirus, and Q fever (10,12).

Although the record of *O. bacoti* infesting a pet hamster (*Mesocricetus auratus*) has been reported in the UK, there are few reports in the pet rabbits (6). This case report describes the first record of *Ornithonyssus bacoti* infesting a pet rabbit (*Oryctolagus cuniculus*) in Korea.

### Case

Two Lionhead rabbits, 6-week-old, were purchased at a local pet shop and referred to the local animal hospital without clinical signs. However, many mites were detected on the

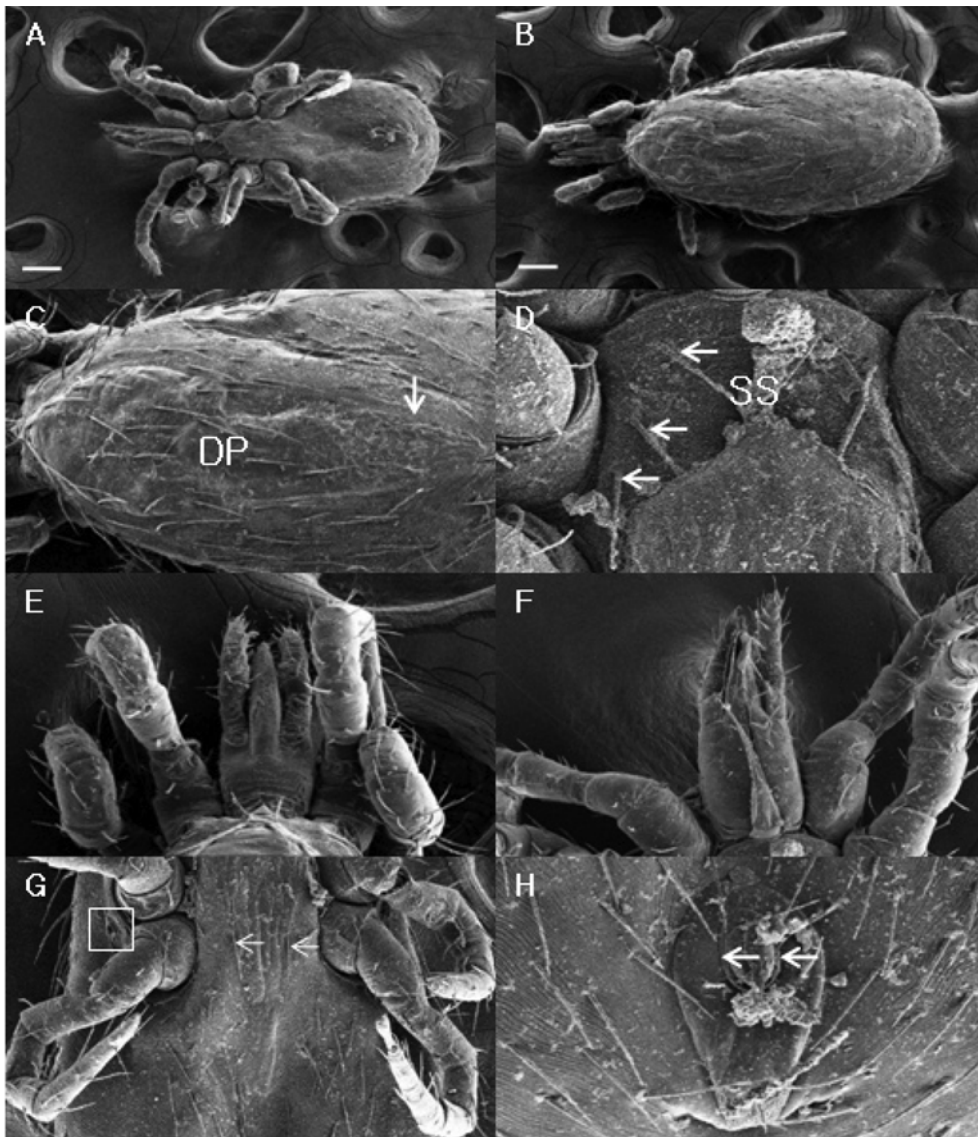
bodies. Mites were collected from the rabbits, and fixed with 70% alcohol. For the scanning electron microscopical study, mites were fixed 2.5% glutaldehyde solution and 1% osmic acid, dehydrated and coated with gold. Based on the classification scheme by Tayler *et al.* (11), mites from rabbits were subsequently identified as *O. bacoti*.

*O. bacoti* has following characteristics; the examined female mites are 0.8-1 mm long. The prosoma bears the chelicerae, pedipalps and four pairs of walking legs (Fig 1A, E and F). The chelicerae have no teeth and have a spur on the distal segment of the pedipalp (Fig 1E, F). A single pair of stigmata lies lateral and outside between the coxae of the third and fourth legs (Fig 1G). A lot of setae are scattered on the dorsal and ventral surface of the idiosome (Fig 1A, B). Females have a single dorsal plate dorsally and have sternal, ventral, and anal plate (or shield) ventrally (Fig 1. C, D and G). The dorsal plate is diamond shape and it gradually tapers off to a blunt point. The dorsal plate setae are the same size as those on the adjacent body surface (Fig 1C). The sternal plate has three pairs of setae, the anterior pair being on the anterior margin of the plate, the third pair being between the bases of the second pair of legs (Fig 1D). The posterior margin of sternal plate is concave. The narrow tapering genital plate with a pair of ventral plate setae follows the sternal plate between legs. The anus is on the anterior half of the egg shaped anal plate (Fig 1H).

### Discussion

Mesostigmata, as the name implies, relates to the position of the respiratory openings (stigmata) on the body and pro-

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**Fig 1.** SEM finding of female *O. bacoti*. (A) The ventral view. (B) The dorsal view. (C) Dorsal plate (DP). The dorsal plate is showing the gradually narrowing (arrow). (D) Sternal shield (SS). Three pair of sternal plate setae (arrow). (E) Dorsal view of gnathosoma. (F) Ventral view of gnathosoma. (G) Stigmata (square) and a pair of ventral plate setae (arrow). (H) Anal plate and anus (arrow). Bar = 100  $\mu$ m.

vides a convenient way of distinguishing the four suborders of parasitic importance. Mesostigmatid mites have stigmata located above the coxae of the second, third or fourth pairs of legs (11). In our study, a pair of stigmata is located dorsolaterally to the third and the fourth pairs of legs.

Dermanyssid mites of particular medical interest are *O. bacoti* (tropical rat mite), *Ornithonyssus sylviarum* (northern fowl mite), *Dermanyssus gallinae* (chicken mite), and *Liponissoides sanguineus* (house mouse mite) (9,13). Other mesostigmatid mites of the genera *Laelaps*, *Echinolaelaps*, *Eulaelaps*, *Haemolaelaps*, *Haemogamasus* infect various rodents, including rats. In all cases of mesostigmatid infestation, it is prudent to determine whether the nests of wild birds or wild rodents may be the ultimate source of these parasites because unless these nests are removed, reinfection rapidly occurs (7).

In family Dermanyssidae, *L. sanguineus* is distinguishable from *O. bacoti*, *O. sylviarum* and *D. gallinae*, because *L. sanguineus* has two dorsal plates and the anterior plate is 10 times as large as the posterior and the three species have a single dorsal plate. The sternal plate has three pairs of setae in all four species (2,9).

In general, *O. bacoti* resembles *D. gallinae* and *O. sylviarum*. The three species may be differentiated by morphology as follows. The posterior margin of the dorsal plate of *D. gallinae* is roughly straight, but it is narrowly rounded in Genus *Ornithonyssus*; the anal opening of *D. gallinae* is located at the posterior end of anal plate, whereas it is located at the anterior half of the anal plate in *Ornithonyssus* species; the anal plate of *D. gallinae* is not oval in shape but it is egg shape in *O. bacoti*; the dorsal plate setae are more

numerous and as long as or slightly longer in *O. bacoti* than *O. sylviarum* and *O. bursa* (1,11); and in the female *O. bacoti*, the dorsal plate lacks the sudden narrowing seen in that of *O. sylviarum* and the third pair of sterna setae is inserted on the shield between the bases of the second pair of legs rather than just behind it as in *O. sylviarum* (6,11).

The tropical rat mite is found in various parts of the world. In most cases, the mite is recognized only when it attacks human. The information is poorly available for distribution and occurrence of *O. bacoti* on pet rodents in worldwide. In recent, *O. bacoti* has been reported from all continents except the Arctic and the Antarctic regions as a parasite of wild, commensal, and laboratory rodents or human (3,4,5,8). Fox *et al.* (6) reported *O. bacoti* infesting a pet hamster boarded at a local pet shop. In the present case, the rabbits might contact with an infested animal in the pet shop, and this is the first report on parasitic infection of *O. bacoti* in pet rabbits in Korea.

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## 애완토끼 (Lionhead rabbit, *Oryctolagus cuniculus*)의 집쥐응애 기생 증례

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**요 약** : 집쥐응애는 야생 설치류와 소동물에 포함하여 넓은 숙주 영역을 갖고 있으며 인체도 공격할 수 있다. 그러나 애완동물에서의 기생 증례 보고는 매우 적다. 동물병원에 내원한 애완토끼에서 다수의 응애를 관찰하였고 주사전자현미경을 적용하여 집쥐응애로 동정하였다. 이는 우리나라 애완토끼에서 집쥐응애 기생증례의 첫 번째 보고이다.

**주요어** : 집쥐응애, 애완토끼.