Note

Human dermatitis caused by the flying squirrel’s flea, Ceratophyllus indages indages (Siphonaptera: Ceratophyllidae) in Hokkaido, Japan

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Abstract: This report describes human dermatitis that is caused by the bite of Ceratophyllus (Monopsyllus) indages indages (Siphonaptera: Ceratophyllidae) from the Siberian flying squirrel Pteromys volans orii in Hokkaido, Japan. This case represents the first description of human dermatitis caused by the bite of C. i. indages.

Key words: Ceratophyllus indages indages, ectoparasite, human dermatitis, Pteromys volans orii, Siberian flying squirrel, Siphonaptera

INTRODUCTION

Fleas (Siphonaptera) are small, bloodsucking or hematophagous ectoparasites that may transmit pathogens (Eisen and Gage, 2012). The cat flea, Ctenocephalides felis (Bouché), is the most common cause of flea-related dermatitis in humans in Japan (Ohtaki et al., 1999). Additionally, cases of humans bitten by bird fleas such as Ceratophyllus (Ceratophyllus) gallinae dilates Dudolkina (Miyamoto, 1993), C. (Ceratophyllus) garei Rothschild (Takahashi et al., 2000), and C. (Ceratophyllus) farreni chaoi Smit and Allan (Yamauchi, 2005) have also been sporadically reported. However, information on human dermatitis caused by fleas in wild mammals is extremely scarce in Japan.

Ceratophyllus (Monopsyllus) indages indages Rothschild (Siphonaptera: Ceratophyllidae) is widely distributed in the Palearctic region, and in Japan it has been recorded in Hokkaido, Honshu and Shikoku (Nakamura, 2016). Specimens of Ceratophyllus i. indages were collected from the body surfaces and nests of the Siberian chipmunk Tamias sibiricus (Laxmann), the Eurasian red squirrel Sciurus vulgaris orientis Thomas, and the Siberian flying squirrel Pteromys volans orii (Kuroda) in Hokkaido (Ono, 1958, 1965; Sakaguti, 1962). This report describes human dermatitis that is caused by the bite of C. i. indages from P. volans orii in Hokkaido, Japan.

The common and scientific names of host mammals follow Ohdachi et al. (2015).

CASE REPORT

The patient was a 25-year-old male postgraduate student living in Obihiro City, Hokkaido. He had been studying the ecology of wild Siberian flying squirrels in Obihiro City and had been capturing squirrels in the field one to three times each week since 2019. Before he touched squirrels, he applied an insect repellent (SARATECT Water Mist, Earth Corporation) to his skin to prevent fleas from landing, but he was still bitten by unidentified fleas about once a month.

On June 16, 2020, the patient worked in the laboratory with a handful of dead squirrels and nesting materials brought back from the field. About an hour later, he found a bloodsucking flea on his right wrist, so he collected the flea by attaching it to cellophane tape. Then, he photographed the flea with a digital camera (Tough TG-5, OLYMPUS).

The dead squirrels were juveniles found soon after death in a nest box on the university campus in Obihiro City. The capture method was conducted according to the guidelines of the Mammal Society of Japan and approved by the Hokkaido Government Tokachi General Subprefectural Bureau (No. 608).

The area that was bitten by the flea became swollen and itchy 2–3 days after the bite. The skin lesion from the flea bite was completely healed within three months. He did not go to a hospital, and no medical treatment for the flea bite was performed.

IDENTIFICATION

The flea (Fig. 1) was observed under a biological microscope (H550L, NIKON) while still attached to
C. felis. 

Canine fleas such as T. sibiricus, which is common in the Palaearctic region (Nakamura, 2016) and is common on the body surfaces and nests of T. sibiricus, P. volans orii, and S. vulgaris orientis, and P. volans orii in Hokkaido (Ono, 1958, 1965). Because hosts of C. i. indages are wild mammals, there is little opportunity for humans to come into contact with this flea via the host animals, and human bites by the flea are unlikely to occur. However, a large number of C. i. indages have been found in host nests that are also built near residential areas (Ono, 1965; Yamauchi et al., unpublished data), so attention should be paid to accidental flea bites through the nests.

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Discussion

There is a high probability that the patient had been bitten several times by C. i. indages during the course of his research of the Siberian flying squirrel, which would have established sensitization. Therefore, it is presumed that the itching and swelling occurred 2 to 3 days after the current bloodsucking (Natsuaki, 2013). To date, the patient had never been bitten by cat or canine fleas such as C. felis.

The male of C. i. indages shown in Fig. 1 was collected from the patient’s skin during blood sucking. Fresh blood was observed in the flea’s digestive tract, suggesting that the flea had ingested it from the patient. To the best of our knowledge, human dermatitis that is caused by the bite of C. i. indages had not been reported previously. Therefore, the present paper is the first report of human dermatitis by C. i. indages.

Ceratophyllus i. indages is widely distributed in the Palaeartic region (Nakamura, 2016) and is common on the body surfaces and nests of T. sibiricus, S. gallinae dilatata and T. sibiricus, P. volans orii, and S. vulgaris orientis, and P. volans orii in Hokkaido (Ono, 1958, 1965). Because hosts of C. i. indages are wild mammals, there is little opportunity for humans to come into contact with this flea via the host animals, and human bites by the flea are unlikely to occur. However, a large number of C. i. indages have been found in host nests that are also built near residential areas (Ono, 1965; Yamauchi et al., unpublished data), so attention should be paid to accidental flea bites through the nests.

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