Notes on trombiculid mites from Teuri Island in northwestern Hokkaido, Japan

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Abstract: Collections of trombiculid mites were carried out on Teuri Island in northwestern Hokkaido, Japan. A total of 200 trombiculid mite larvae belonging to three genera and five species (Neoshoengastia shiraii, Leptotrombidium pallidum burnsi, Leptotrombidium intermedium, Neotrombicula tamiyai, Neotrombicula teuriensis) were collected from seabird nests and field rodents. Of these, 195 mites were found in the soil of Cerorhinca monocerata nests and the most abundant species was N. shiraii (n = 175), followed by L. pallidum burnsi (n = 18). These two species are known to infest birds. C. monocerata was considered to be an important host for these trombiculid mites on this island. This is the first report on trombiculid mites from Teuri Island.

Key words: trombiculid mite, fauna, seabird nest, Cerorhinca monocerata, Teuri Island, Hokkaido

INTRODUCTION

Trombiculid mites have previously been collected from soil samples in seabird nests in Japan (Suzuki, 1977, 1979; Takahashi et al., 1998). Teuri Island, a small inhabited island in the Sea of Japan in northwestern Hokkaido, Japan, supports breeding colonies of eight seabird species, including the largest colony of Cerorhinca monocerata (Pallas) in the world (Osa and Watanuki, 2002). Since no studies on trombiculid mites from the island have been published to date, we conducted a survey of trombiculid mites on this island.

MATERIALS AND METHODS

Teuri Island (44°22’ N, 141°19’ E), located 28 km west of the town of Haboro in northwestern Hokkaido (Fig. 1), has an area of 5.5 km² and a total coastline of 12 km. The highest point on the island is 185 m above sea level and a human population of 382 (April 2011 Census).

Of the eight species of seabirds that have been reported to breed on the island, the population of C. monocerata was estimated at 286,000 pairs in 1994 (Miyazaki, 1995; Osa and Watanuki, 2002). Soil samples were col-
lected near the breeding colonies of *C. monocerata* on 27 June 1997, and then on six occasions from 25 April to 5 August 2000 near Akaiwa in the southwest of the island. In addition, soil samples were collected near a colony of breeding *Larus crassirostris* Vieillot at Kannonzaki in the west of the island on 17 June 2000. Trombiculid mites were recovered from these soil samples (more than 30 kg) using Tullgren funnels.

Further, field rodents were examined for parasitic trombiculid mites. Sharman live traps were set in the Akaiwa area on 17 June and in the Kannon area on 18 June 2000. Small mammals that were captured were sacrificed and examined macroscopically for any larvae, which were then removed with some skin. The samples were placed in small vials and detached larvae were mounted on slides with Hoyer’s solution.

**Results and Discussion**

A total of 200 trombiculid mite larvae belonging to three genera and five species were collected (Table 1). Of these, 195 mites were collected in the soil of *C. monocerata* nests. Of the mites collected, *Neoschoengastia shiraii* Sasa et Sato (n = 175) was the most abundant, followed by *Leptotrombidium pallidum burnsi* (Sasa, Teramura et Kano) (n = 18), *Neotrombicula tamiyai* (Philip et Fuller) (n = 1) and *Neotrombicula teuriensis* Takahashi, Takahashi et Misumi (n = 1). *N. shiraii* and *L. pallidum burnsi* are known to infest birds (Sasa, 1956; Asanuma, 1959). *C. monocerata* was considered to be an important host for these trombiculid mites on this island. *L. pallidum burnsi* (n = 1) was also collected at the breeding site of *L. crassirostris*, and *Leptotrombidium intermedium* (Nagayo, Mitamura et Tamiya) (n = 4) was found on *Myodes rufocanus* (Sundevald).

*N. shiraii* has primarily been collected from birds, e.g. *Monticola solitarius* (Linnaeus), *Turdus cardis* Temminck, *T. chrysolaus* Temminck, *Coturnix japonica* Temminck et Schlegel, *Phasianus colchicus* Linnaeus and from the soil of seabird nest holes (Sasa and Sato, 1953; Sasa, 1956; Asanuma, 1959; Uchikawa et al., 1985; Suzuki, 1977; Fujisaki et al., 1991; Takahashi et al., 1998). *N. shiraii* was originally collected from *M. solitarius* and described as a new species (Sasa and Sato, 1953). However, based on differences in the dorsal setal formula (DSF) between *N. shiraii* collected from *M. solitarius* (DSF = 2, 10, 8, 6, 4, 2 = 40 (38–44)) and mites found on pheasants (DSF = 2, 12–19, 10–11, 8–10, 4–10, 4–6, 2–4 = 58–68), Sasa (1953, 1956) recommended that in order to clarify whether the mites infesting pheasants belonged to a separate mite species or a subspecies of *N.*

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**Table 1. Species and numbers of larval trombiculid mites collected on Teuri Island, Hokkaido, Japan.**

<table>
<thead>
<tr>
<th>Species</th>
<th>Nest soil of <em>Cerorhinca monocerata</em></th>
<th>Nest soil of <em>Larus crassirostris</em></th>
<th>Body surface of <em>Myodes rufocanus</em> (13)*</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Neoschoengastia shiraii</em></td>
<td>175</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Leptotrombidium pallidum burnsi</em></td>
<td>18</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><em>Neotrombicula tamiyai</em></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Neotrombicula teuriensis</em></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Leptotrombidium intermedium</em></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>195</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

* No. of rodents examined
**shiraii.** The DSF of specimens collected from the nest soil of *C. monocerata* was 2, 9–12, 8–10, 8–10, 6–8, 4, 2 = 40–44 (n = 10), which was the same as that of the *N. shiraii* paratype. In addition, specimens collected from the soil in the nest tunnels of *Calonectris leucomeelas* (Temminck) on Oshima-Ohshima Island located 360 km southwest of Teuri Island (Fig.1) (Takahashi et al., 1998) were examined and had a DSF of 2, 10–12, 8–10, 8–10, 6–8, 4, 2 = 40–46 (n = 9). Taken together, these results suggest that detailed morphological comparisons are required to clarify whether the mite specimens collected from pheasants are distinct species from *N. shiraii.*

Nineteen *L. pallidum burnsi* specimens were collected in the soil samples of *C. monocerata* (n = 18) and *L. crassirostris* (n = 1) nests. This subspecies of *Leptotrombidium pallidum* (Nagayo, Miyagawa, Mitamura et Tamiya), which was originally reported from Hachijo Island (Sasa, 1956), has also been collected on Nansei Islands (Suzuki, 1977), Danjo Islands (Suzuki, 1979), Oshima-Ohshima Island (Takahashi et al., 1998), Mikurajima Island, Kanmurijima Island, Oomorijima Island (Takahashi et al., unpublished data) where it is considered to infest birds. The subspecies differs from *L. pallidum* in the number of dorsal setae (Sasa, 1956); based on the DSF of 2, 10, 10–11, 8, 8, 4, 2 = 44–45 (n = 8), the specimen collected in this study was identified as *L. pallidum burnsi.* Detailed morphological observations under a scanning electron microscope revealed several distinct differences between the dorsal setae and sensillae in *L. pallidum burnsi* and *L. pallidum pallidum* (Takahashi et al., 1999). Clarifying whether *L. pallidum burnsi* is a distinct species from *L. pallidum pallidum* is considered very important from an epidemiologic point of view as *L. pallidum pallidum* is one of the most important vectors of tsutsugamushi disease in Japan.

*N. tamiyai* primarily infests small mammals, but instances of infestations in birds and reptiles have also been reported (Tamiya, 1962). In particular, heavy infestations have been reported in *M. rufocanus* and *Myodes rutilus* (Pallas) in Sapporo, Hokkaido (Nakata, 1976). *L. intermediate* has been collected from several locations in Hokkaido and is the most abundant mite species collected on *M. rufocanus* (Sasa and Ogata, 1953; Tamiya, 1962; Kitaoka et al., 1973; Nakata, 1976). Since *M. rufocanus* is the only field rodent on Teuri Island, the occurrence of *N. tamiyai* and *L. intermediate* on the island is likely to be related to the distribution of this vole.

*N. teuriensis* was collected on the island for the first time in the present study and recently described as a new species by Takahashi et al. (2012). Only the single specimen has been collected up to the present and it is unclear the distribution and biology of this species.

**References**


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