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## The First Record of Sucking Louse, *Neohaematopinus callosciuri*, Infesting Pallas Squirrels in Japan

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**ABSTRACT.** A species of sucking louse, *Neohaematopinus callosciuri*, was found for the first time in Japan. The species was found on an invasive species of squirrel, Pallas squirrel, *Callosciurus erythraeus*, in the Kamakura district, Kanagawa Prefecture, Japan. A total of 52 lice were obtained from 22 of 104 squirrels captured. The lice were about three times more prevalent in male squirrels than in females and were detected most frequently in the winter. As *N. callosciuri* has never been reported on wild animals in Japan, this species probably was introduced into Japan along with their host, Pallas squirrels.

**KEY WORDS:** *Callosciurus erythraeus*, louse, *Neohaematopinus callosciuri*.

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Pallas squirrel, *Callosciurus erythraeus*, is a species from Southeast Asia that was intentionally introduced into Japan in the early 1930s. They have established themselves in areas of Honshu island including 16 prefectures, primarily on Ohshima Island of Tokyo, in the Kamakura district of Kanagawa Prefecture and in Wakayama Prefecture, Japan [6]. In our present ectoparasite survey of Pallas squirrels in the Kamakura district, a species of sucking lice, *Neohaematopinus callosciuri* Johnson, 1959, was found infesting the squirrels [4]. This article aims to describe the first record and the epidemiological aspects of *N. callosciuri* in Japan.

Lice were collected from Pallas squirrels that were captured in the Kamakura district (35°21'N, 139°30'E) in the fall and spring from October 2001 to April 2003. The squirrels trapped were euthanized and then brushed on a white tray. The lice were retrieved with forceps immediately and stored in 70% ethanol. The specimens were cleared in potassium hydroxide solution and mounted on slides to identify the species with a microscope.

A total of 52 lice were recovered from 22 of 104 squirrels examined. Although almost equal numbers of male and female squirrels were captured, the male squirrels had approximately three times more lice than the females (Table 1).

The lice were identified following the description of Johnson [4]. All the lice were identified as *N. callosciuri* by the characteristics to have a tubercle on the venter of the basal antennal segment and the posteroapical prolongation, and by lacking a stout spinelike seta on the second antennal segment. The sternal plate was about as broad as long and its posterior margin was concave. The male genitalia was slender similar to those of the related species and the basal

apodeme was longer than paramere (Fig. 1).

Infestation rate were changed monthly during the period when data were available, October to May. The prevalence and intensity were maximum in the winter, especially in February, and the prevalence decreased in the autumn and spring (Fig. 2).

Currently, 31 species of *Neohaematopinus* occur almost exclusively in Holarctic and Oriental regions. *N. callosciuri* mainly infests squirrels such as the genus *Callosciurus*, the species *Lariscus insignis* and *Sundasciurus tenuis*, and also one species of Prosimii, the Slow loris, *Nycticebus coucang*. *N. callosciuri* is distributed across much of mainland Southeast Asia, including southern parts of the People's Republic of China, Borneo, and Taiwan [1, 2]. Although several lice species have been found on Sciuridae in Japan, they do not include *N. callosciuri* [3]. Comparing the lice in this report with *Enderleinellus kumadai* Kaneko, 1959, that was collected from the Pallas squirrels on Oshima Island [5], both species are obviously different in the characteristics. From the fact that no report has been published to date on *N. callosciuri* from wild animals in Japan, the louse would have been introduced along with Pallas squirrels. It is interesting that no *E. kumadai* were detected in this survey, in spite of the fact that some Pallas squirrel populations were originally introduced into the Kamakura district by way of Oshima Island.

Compared with the surveys showing that several species of lice infested a single species of squirrel, only one species of louse was detected in this survey [7, 8]. One reason for this limited ectoparasite fauna of *C. erythraeus* found in our survey could be attributed to the small number and conditions of Pallas squirrels at the time of their introduction to the Kamakura district, since small population subsets reduce the probability of parasites being introduced along with a host species [9]. Few reports were published on lice from Pallas squirrels, so we need to compare our findings with

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Table 1. Mean infestation level of louse, *Neohaematopinus callosciuri*, on Pallas squirrels in Kamakura district, Kanagawa Prefecture, Japan

Sex	No. squirrels examined	No. squirrels with lice	Prevalence (%)	Intensity range	Mean intensity
Males	51	16	31.4 <sup>a)</sup>	1–7	2.3 ± 1.5
Females	53	6	11.3 <sup>a)</sup>	1–5	2.5 ± 1.6
Total	104	22	21.2	1–7	2.4 ± 1.5

a) The prevalence differed significantly in males and females ( $P < 0.05$ ).

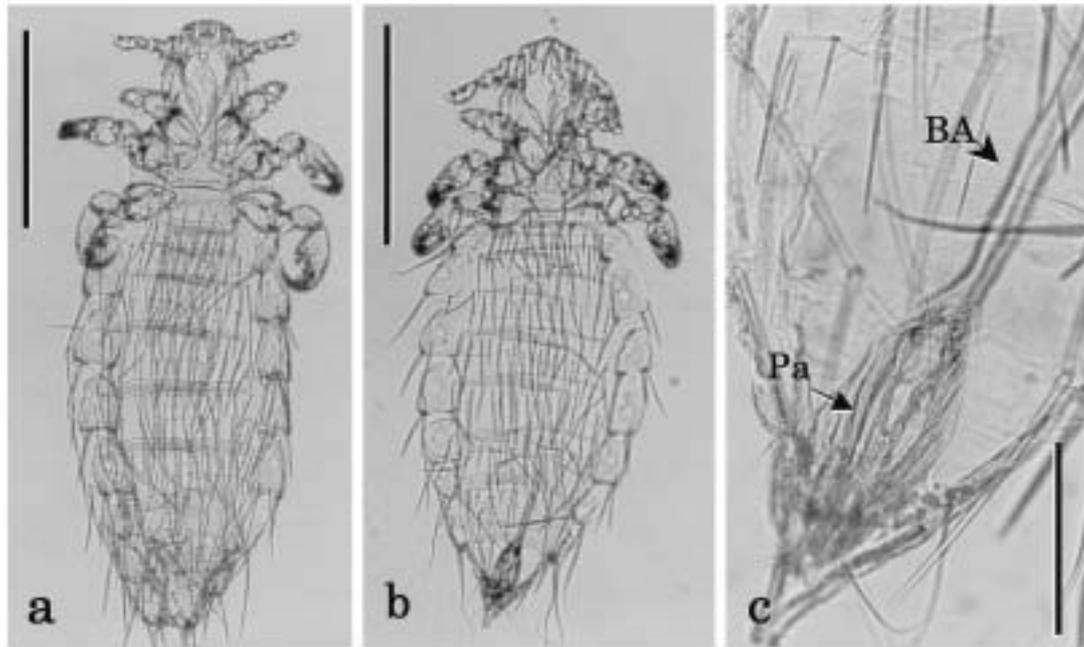


Fig. 1. *Neohaematopinus callosciuri*. a, Female (Bar = 500 µm). b, Male (Bar = 500 µm). c, Male genitalia (Bar = 100 µm). BA-Basal apodeme; Pa-Paramere.

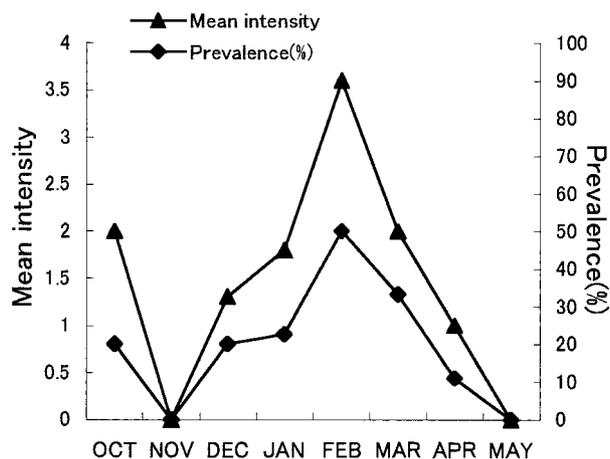


Fig. 2. Seasonal occurrence of louse, *Neohaematopinus callosciuri*, on Pallas squirrels in Kamakura district, Japan. The numbers of squirrels examined each month from October through May were 5, 21, 20, 22, 16, 9, 9 and 2, respectively.

other studies of lice on Pallas squirrels in their native ranges in order to see if our findings support the hypothesis.

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