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Title	A survey of small terrestrial mammals in southern Sakhalin, conducted in 1994 and 1995
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Citation	Wildlife Conservation Japan, 2(1), 17-21
Issue Date	1996
Doc URL	https://hdl.handle.net/2115/68328
Type	journal article
File Information	1_KJ00003136947.pdf

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Association of Wildlife and Human Society

Wildlife Conservation Japan 2 (1) : 17−21, 1996

A survey of small terrestrial mammals in southern Sakhalin, conducted in 1994 and 1995

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Abstract We conducted a survey of small terrestrial mammals by collecting samples from nine locations in southern Sakhalin, during the summer months of 1994 and 1995. Target animals included both murid and soricid species. "Panchu" kill traps and pitfall traps were used to capture animals. Most murid species captured were *Apodemus peninsulae*, *Clethrionomys rutilus*, and *C. rufocanus*. In addition, an individual of *Myopus schisticolor* was collected. Soricid species captured include *Sorex gracillimus*, *S. unguiculatus*, *S. caecutiens*, and *S. daphaenodon*.

Key Words: mammalian fauna, murid, Sakhalin, soricid, species

Introduction

Faunal studies produce valuable information which is essential for proper management and conservation of a region. Sakhalin Island, located just north of Hokkaido, is a key region to consider in order to identify the origin of mammalian fauna of the Japanese islands (Ota & Kobayashi, 1984; Dobson, 1994), especially that of small terrestrial mammals in Hokkaido. Many collection records are available for small mammals in Sakhalin (e.g., Stroganov, 1957; Voronov, 1974, 1992; Krivosheev, 1984; Dolgov, 1985; Okhotina, 1991; Yoshikura, 1991); however, there is disagreement on the distributions of *Microtus oeconomus* and *Clethrionomys rex* (= *C. sikotanensis*, Imaizumi, 1960) in Sakhalin (Yoshikura, 1991; Abe et al., 1994). Thus, more surveys of various regions are necessary to complete the record of small mammalian fauna found in Sakhalin. In addition, there is little information available about habitat types and numerical relationships among species, which are critical in designing conservation plans. The purpose of the present study was to conduct a survey of small mammals (mainly murids and soricids) in southern Sakhalin, and to give some notes about their habitat uses and numerical relations.

We thank Drs. K. Ito and M. Yano for organizing the expedition, Dr. N. I. Onischenko for giving us information and permission to collect specimens, Mr. E. Tada and his sons for guiding us in the field, and Ms. C. B. Angeli for revising

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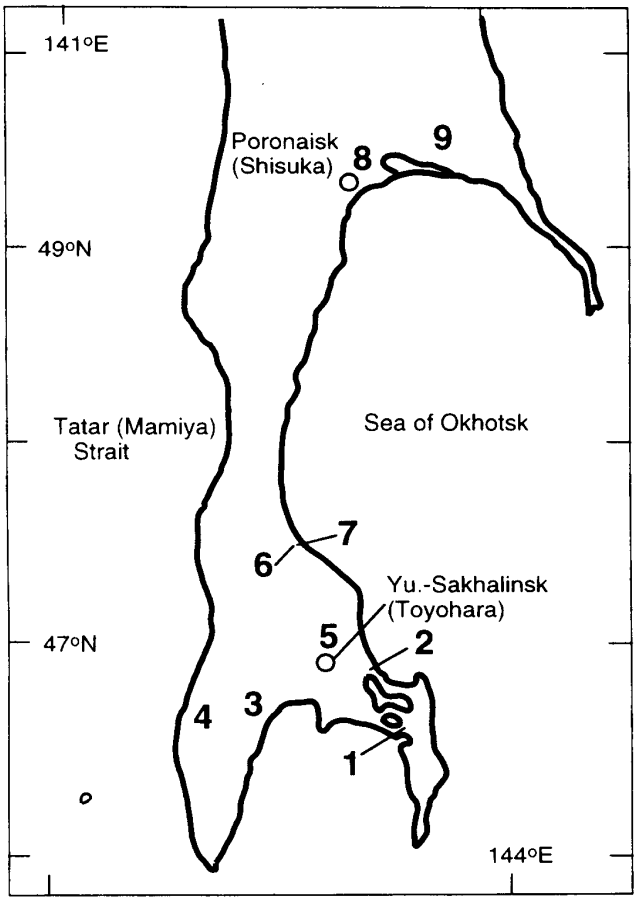

Fig. 1. Map of southern Sakhalin. Numbers indicate collection locations.

English. This study is part of the survey of Sakhalin's natural environments conducted during 1994 and 1995, aided by Pro Natura Foundation, Japan (Shizenhogo Josei Kikin).

Materials and Methods

Animals were collected from nine locations on the island of Sakhalin (Fig. 1) during the summer months of 1994 and 1995. Descriptions of the locations and collection date are as follows: (1) a *Picea glehnii* forest with an ericaceous understory north of Busse Lake (46°35'17"N, 143°14'52"E), 9-10 August 1994; (2) a monospecies forest of *Larix gmelini* west of Okhotskoe Village (46°51'44"N, 143°00'38"E), 6-7 August 1994; (3) a mature forest of *Abies sachalinensis* with *Sasa senanensis* as an understory, near Urodzainoe Village (46°47'14"N, 142°21'55"E), 5-7 August 1994; (4) a steeply sloped mixed forest of *A. sachalinensis*, *Picea jezoensis*, *Sorbus commixta*, and *Betula ermanii* with *Sasa kurilensis* as an understory, near the Nevel'sk Pass (46°44'42"N, 142°01'18"E), 5-6 August 1994; (5) a secondary forest of *Salix* spp., *Alnus japonica*, and *Populus maximowiczii* near a ski area in Yuzhno-Sakhalinsk (46°57'29"N, 142°40'29"E), 29-30 July 1994; (6) a dry riparian forest of *L. gmelini*, *Pinus pumila*, and *Sorbus sambucifolia* with an ericaceous understory and sandy loam soil near the mouth of the Naiba River (47°26'20"N, 142°45'00"E), 17-20 August 1995; (7) a wet grassland near the mouth of the Naiba River (47°26'20"N, 142°45'00"E), 17-20 August 1995; (8) a riparian forest dominated by *Salix sachalinensis* with clay loam soil west of Poronaisk (49°13'44"N, 142°44'35"E), 30 July-3 August 1994; (9) a secondary forest of *L. gmelini*, *P. jezoensis*, and *Betula ermanii* with a moss covered floor and coarse gravelly soil in Trudovoe Village (49°28'48"N, 143°19'13"E), 1-3 August 1994.

Pitfall traps (plastic cup; 8.0-cm diameter opening and 13.5-cm deep) and "panchu" plastic kill traps (M type, Nihon Trap Kenkyujo, Osaka) were set at each trap site (no pitfalls were set at locations 2 and 5). Water was poured into the pitfall traps and no bait was used, while "panchu" traps were baited with peanuts or sunflower seeds with peanut paste. Twenty five to 55 pitfall traps were set at 5-m intervals, and 30-52 "panchu" traps were set at 5 to 10-m intervals.

Results and Discussion

Species captured at the nine locations are listed in Table 1. Comparison between small

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Table 1. Results of small mammal collection in southern Sakhalin in 1994 and 1995. Location numbers correspond to collection sites in Figure 1.

Location	Traps	Trap nights	Species and number of animals captured
1	Pit	30	*S. gracillimus* 3y; *M. schisticolor* 1y; *C. rutilus* 1y; (*Lacerta vivipara* 1)[*1]
	Pan	60	*C. rutilus* 5m, 5f, 21y; *C. rufocanus* 1m, 1f, 2y
2	Pan	30	*A. peninsulae* 1y; *C. rutilus* 1m, 3f, 3y; *C. rufocanus* 2y
3	Pit	50	*S. unguiculatus* 6y; *S. gracillimus* 1y
	Pan	80	*A. peninsulae* 1y, *C. rutilus* 2f, 1y; *S. unguiculatus* 1y
4	Pit	20	*S. unguiculatus* 8y; *S. gracillimus* 1m, 1f, 1y
	Pan	30	*A. peninsulae* 1m, 1 sex unknown adult; *C. rutilus* 1f
5	Pan	40	*A. peninsulae* 2f; *C. rutilus* 1f; *R. norvegicus* 2 sex unknown adults, 5y; *Mus musculus* 1y
6	Pit	135	*S. caecutiens* 1y
	Pan	135	none[*2]
7	Pit	165	*S. caecutiens* 1y; *S. gracillimus* 2m; *S. daphaenodon* 3y
	Pan	156	*R. norvegicus* 2y
8	Pit	160	*S. unguiculatus* 1y; *S. gracillimus* 3m
	Pan	90	*A. peninsulae* 2m; *C. rufocanus* 1f
9	Pit	145	*S. unguiculatus* 1y; *S. caecutiens* 6y; *C. rutilus* 2y
	Pan	100	*C. rutilus* 1m, 2f, 1y; *C. rufocanus* 1f; *Tamias sibiricus* 1?[*3]

[*1] Lizard species. [*2] Many *Tamias sibiricus* were observed and some traps were lost, which may have resulted in the loss of specimens to predators. [*3] Sex and age unknown because of damaged body. Pit, Pitfall; Pan, panchu trap; m, adult male; f, adult female; y, subadult. Abbreviation for genus names are: *A.* = *Apodemus*, *C.* = *Clethrionomys*, *M.* = *Myopus*, *R.* = *Rattus*, and *S.* = *Sorex*.

mammalian faunae of southern Sakhalin and Hokkaido is discussed. *Apodemus peninsulae*, which is the only *Apodemus* species inhabiting Sakhalin, occurred in various habitats of southern Sakhalin (Table 1). In Hokkaido, however, its main habitats are open land or shrubs, where sympatric *Apodemus speciosus* is rare (Abe, 1975). We identified all specimens of the genus *Clethrionomys* except for *C. rutilus* as *C. rufocanus*, because they possessed the simplex form of the third upper molar (Imaizumi, 1960; Abe et al., 1994). No complex form (*C. rex* or "*C. sikotanensis*" type) was captured in the present study. *Clethrionomys rutilus* numerically dominated over *Clethrionomys rufocanus* in Sakhalin (Table 1), while the latter species is dominant in most habitat

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types in Hokkaido, with the exception of coniferous forests with a closed crown (Abe, 1975). In addition, body size of *C. rutilus* in Sakhalin was larger (head and body for adults, 107.5 mm ±8.28 (SD), N = 21) than those occurring in Hokkaido (88.5 mm, Imaizumi 1960), and was more similar in size to that of *C. rufocanus* (117.8 mm in Hokkaido, Imaizumi 1960; 120.1 mm ±5.92, N = 4 in Sakhalin). *Sorex gracillimus* was the most abundant shrew species and was captured in many of the locations surveyed (Table 1), which is similar to other surveys conducted in northern Hokkaido (Ohdachi & Maekawa, 1990; Ohdachi, 1995 for revised data). Although *Sorex unguiculatus* was the most abundant at locations 3 and 4, it was rare or absent at all other collection sites (Table 1). By contrast, this shrew species is a common and abundant soricid in most habitat types of Hokkaido (Ohdachi & Maekawa, 1990). It is worthy to note that the forest floor of the habitats where *S. unguiculatus* was the most abundant in Sakhalin was covered with *Sasa* bamboo, which is rare in Sakhalin but ubiquitous in Hokkaido.

Myopus schisticolor and *Sorex daphaenodon* were captured in the present survey. These species are absent from Hokkaido. Murid and soricid species that have previously been recorded on Sakhalin Island (Yoshikura, 1991; Voronov, 1992) but were not captured in the present study include: *Microtus sachalinensis*, *M. fortis*, *Sicista caudata*, *Sorex minutissimus*, *S. isodon*, and *Neomys fodiens* (*S. tundrensis* has been recorded on Moneron Island, but not on the main island of Sakhalin). Among them, the only species which is known to inhabit both Sakhalin and Hokkaido is *S. minutissimus*. *Microtus oeconomus* and *Clethrionomys rex* (or *C. sikotanensis*) whose distributions in Sakhalin are controversial (Yoshikura, 1991; Abe et al., 1994) were not collected in the present study.

This preliminary survey suggests that the niche of some species may differ between Sakhalin and Hokkaido and that ecological replacement may have occurred (e.g., *C. rufocanus and C. rutilus*; *A. peninsulae* and *A. speciosus/A. argenteus*). Information on habitat types of species inhabiting Sakhalin was also documented. However, this information is still not enough. For studies not only of the origin of Japanese mammalian fauna and community ecology, but also for conservation biology, more intensive surveys of the Sakhalin fauna must be conducted.

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南サハリンにおける陸棲小型哺乳類の採集記録，１９９４・１９９５年

サハリン（樺太）南部において陸棲小型哺乳類の採集を１９９４年および１９９５年の夏期に行なった。捕獲にはパンチュウトラップとピットホールトラップを併用し、ネズミ類とトガリネズミ類を主な捕獲対象とした。ネズミ類では、ハントウアカネズミ（*Apodemus peninsulae*）、ヒメヤチネズミ（*Clethrionomys rutilus*）、タイリクヤチネズミ（*C. rufocanus*）が主に捕獲され、このほかに日本には生息しないモリレミング（*Myopus schisticolor*）などが採集された。トガリネズミ類では、カラフトヒメネズミ（*Sorex gracillimus*）、オオアシトガリネズミ（*S. unguiculatus*）、バイカルトガリネズミ（*S. caecutiens*）、アカバトガリネズミ（*S. daphaenodon*）が捕獲された。

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