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Small mammals and a frog found in the stomach of a Sakhalin Taimen *Hucho perryi* (Brevoort) in Hokkaido

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Huchen or taimen *Hucho* spp. are known to be the largest fresh-water salmonids. Juvenile *Hucho* mainly feed on insects, spiders, and crustaceans but become piscivorous as they grow (Holcík et al. 1988). In addition to fish, it has been reported that *H. hucho taimen* in Siberia have eaten a range of terrestrial vertebrates including lemmings *Lemmus* sp., chipmunks *Eutamias* sp., squirrels *Sciurus* sp., and a snake rf. *Gloydius brevicaudus*, and have consumed semi-aquatic vertebrates such as muskrat *Ondatra zibethica* and ducklings (Anatidae) (Nishio 1941; Kirillov 1972; Sigunov 1972). There is also a remarkable record from Europe where a *H. h. hucho* attempted to swallow a puppy *Canis familiaris* but choked (Kvet 1961).

In Hokkaido, Sakhalin, and coastal regions of Primorye, the Sakhalin taimen *H. perryi* (Brevoort) is present. As other *Hucho* species, *H. perryi* mainly eats arthropods when young and fish when older (Kimura 1966; Gritsenko et al. 1974; Kawamula 1983; Nakano 1992). Gritsenko et al. (1974) reported that in Sakhalin 12–15% of the diet of *H. perryi* that were more than 30-cm long, consisted of unidentified murid-like rodents. Yamashiro (1978) also reported that unidentified rodents were included in the diet of *H. perryi* in Hokkaido. However, there have been no records of mammals identified to the species level as prey of *H. perryi*. In this note, we report on the stomach contents of a *H. perryi* in Hokkaido, which contained several small mammals and a frog.

Materials and methods

On 23rd September 1997, one *H. perryi* (sex unknown) was captured while using a "sade-ami" or "chasing net" (a small one-man seine net on a frame) in Poronai River, an upper tributary of Sarufutsu River system, northern Hokkaido, during an environmental assessment survey. It measured 48.9 cm in total, with a body length of 43.6 cm. The river width at the capture site was approximately 5 m and many logs and branches had accumulated in the water at the site. The capture site was amidst riparian forest consisting mainly of *Alnus hirsuta* and *Salix* spp. with forest floor cover of *Sasa kurilensis* and various succulent herbs. The weather had been fine for several days prior to the capture date, and the river level was lower than average. When dissected, the fish was found to have a full stomach, but almost nothing in the intestines. After dissection, the body and stomach contents were first preserved in 10% formalin, then the stomach contents were further investigated. The specimen is held at Ecotech Co. and the stomach contents at the Institute of Low Temperature Science, Hokkaido University.

Results and discussion

Examination of the stomach contents revealed that not only were most specimens well preserved (Fig. 1, Table 1), but that they were also identifiable to species. Three shrew species, *Sorex unguiculatus* Dobson, *S. caecutiens* Laxmann, and *S. gracillimus* Thomas, three murid species, *Clethrionomys rufocanus* (Sundevall), *Apodemus speciosus* (Temminck), and *A. argenteus* (Temminck), and a frog *Rana pirica* Matsui were identified (Table 1).

In total the taimen had consumed 11 individual small mammals and a frog. In Siberia, Sigunov (1972) found a *H. h. taimen*, which contained 42 lemmings *Lemmus* sp., at a time when the local lemming population was high. Sigunov (1972) also reported 14 squirrels *Sciurus* sp. from a taimen stomach. Although the taimen of the presetnt report ate only 11 indivisuals, the present case appears to be the first record of a *Hucho* eating six

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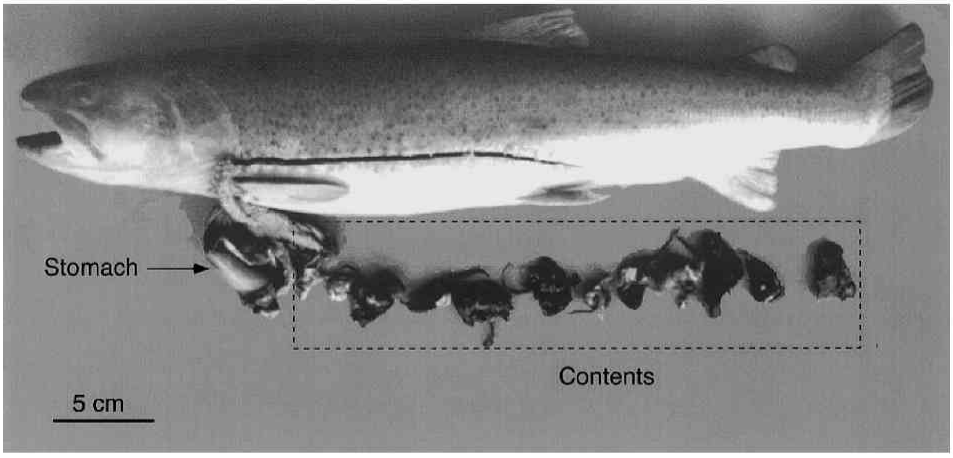

Fig. 1. A Sakhalin Taimen *Hucho perryi* captured in northern Hokkaido and its stomach contents.

Table 1. Contents of a Sakhalin taimen *Hucho perryi* stomach in northern Hokkaido.

content no.	species	age	sex	condition
Mammal				
1.	*Sorex unguiculatus*	adult	female	body well preserved but hair absent
2.	*Sorex unguiculatus*	young	unknown	body well preserved
3.	*Sorex caecutiens*	young	unknown	only posterior part of the body, hair present
4.	*Sorex gracillimus*	adult	female	body well preserved
5.	*Sorex gracillimus*	adult	female	body well preserved
6.	*Sorex gracillimus*	adult	female	body well preserved
7.	*Sorex gracillimus*	adult	female	body well preserved but hair absent
8.	*Sorex gracillimus*	young	unknown	only posterior part of the body, hair present
9.	*Clethrionomys rufocanus*	young	unknown	body well preserved but feet half digested
10.	*Apodemus speciosus*	young	unknown	body fragmented, hair present
11.	*Apodemus argenteus*	young	unknown	body well preserved
Anuran				
12.	*Rana pirica*	adult	unknown	fragmented skelton and muscle

different species of small mammals at one time.

The discovery raised the question: "how did the taimen eat various terrestrial mammal species at once?" In the case reported by Sigunov (1972), of overcrowded lemmings swimming across a river, taimen were easily able to prey on numerous lemmings in a short time. However, in the present case, shrews and rodents were not overcrowded, and the river was low, thus these various small mammals were unlikely to have been washed downriver in a flood. It is possible that they might have been swimming across the river voluntarily and were eaten as they did so. Shrews and rodents frequently visit the water's edge, and will cross streams by way of fallen logs (S. Ohdachi pers. obs.). It is possible that the taimen somehow sprang out of water to attack the small mammals as they visited the water's edge or crossed the river on logs.

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