Difference in the Efficiency of Four Types of Rodent Traps¹

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In the field survey of small mammals, various types of traps are used for collection of living or killed animals. Studies on population or other ecological subjects of restricted species are performed by any adequate type of trap. It is usually expected that the results obtained by the same type of trap will show the same degree of efficiency at various times and in various areas of the field survey; consequently, the obtained results can be compared.

On the other hand, it is well known by researchers of this field that different species are caught in different types of traps. This species-specific capture characteristic of particular types of traps seems to be an important factor in the faunistic study of rodents and other small mammals. Some earlier information was reported on trap efficiency in rodent surveys in Japan (OTA and HASEGAWA, 1950; MAEDA and TANIGUCHI, 1977; NAKATA, 1979; MAEDA and OTSUKA, 1983 and others).

A field study was undertaken by the author to compare the efficiency of 4 trap types for some species of small mammals.

STUDY AREA AND METHOD

The study was carried out at a grassland on Kahoku-gata reclaimed land, Ishikawa Prefecture,

along the Japan Sea coast of central Japan, during 1976–1985. Environmental conditions in the area were described in a previous paper (OHGUSHI, 1985). Trappings were performed 4–8 times each year and the four trap types used in the survey were as follows:

Cage trap (steel; size, 25 × 15 × 30 cm)

Sherman trap (tin plate; size, 7 × 8 × 25 cm)

Snap trap (steel; size, 15 × 8 cm)

Panchu trap (a snap trap made of plastic; size, 15 × 10 cm)

Fish rissole was used as bait in the cage, sherman and snap traps and walnut in the panchu trap. These traps were set in 7 sampling plots arranged along a main road running through the centerline of the reclaimed land. Five cages, 10 sherman and 5 snap or panchu traps were set in each plot. Conditions of the plots were recorded in the previous paper (OHGUSHI, 1985).

RESULTS AND DISCUSSION

During the study period, 696 individuals belonging to 5 small mammal species were trapped in Kahoku-gata by the 4 trap types (Table 1). All species except *Apodemus* were collected in all sampling plots and seemed to be exposed to all types of traps. The results indicate:

(1) *Microtus montebelli* and *Mus mollossinus* were collected by sherman, snap and panchu traps, but the catch of *M. montebelli* in a cage trap was rare.

(2) *Rattus norvegicus* was collected by cage, snap and panchu traps.

(3) *Apodemus speciosus* was trapped by cage and sherman traps with a few caught in the cage trap.

(4) *Crociodura dsinezumi* was collected only by sherman trap.

Table 1. Number of animals trapped by 4 trap types in Kahoku-gata during 1976–1985

Species	Trap type			
	Cage (1,199)	Sherman (3,750)	Snap (1,326)	Panchu (1,247)
<i>Microtus montebelli</i>	1	73	54	22
<i>Mus mollossinus</i>	0	341	38	14
<i>Rattus norvegicus</i>	48	0	54	8
<i>Apodemus speciosus</i>	1	8	0	0
<i>Crociodura dsinezumi</i>	0	34	0	0

(): total number of traps used.

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Fig. 1. Frequencies of 5 small mammal species caught by 4 trap types in Kahoku-gata during 1976-1985.

Fig. 2. Frequencies of 5 small mammal species caught by 4 trap types in Kahoku-gata before and after the commencement of cultivation on reclaimed land.

Table 2. Comparison of catchability among 4 trap types for 4 small mammal species at Kahoku-gata area

Species	Trap type			
	Cage	Sherman	Snap	Panchu
<i>Microtus montebelli</i>	—	+	++	+
<i>Mus molossinus</i>	—	++	+	+
<i>Rattus norvegicus</i>	++	—	++	+
<i>Crocidura dsinezumi</i>	—	++	—	—

++: most effective.

+: moderately effective

—: not effective.

The total number of traps used in the 10 year period is also shown in Table 1. Figure 1 shows the number of individuals in each species per 100 trap-nights caught by each trap type.

From the results, it is considered that the cage trap is effective only for *Rattus norvegicus*, while the sherman trap is appropriate for almost all species except *Rattus*. The latter seems to be most suitable for *Mus* and *Crocidura*. Snap and panchu traps are better to attract *Microtus*, *Mus* and *Rattus*. No decision can be drawn for *Apodemus* because of its small sample size.

OTA and HASEGAWA (1950) reported that the cage trap is suitable for *R. norvegicus* and the snap trap for *R. rattus*. MAEDA and TANIGUCHI (1977) found some differences between the catching efficiencies of snap, sherman and panchu trap for *Clethrionomys rufocans bedfordiae*. GROMADZKI and TROJAN (1971) also compared three different methods for estimating population density on *Microtus arvalis* and concluded that the digging-out technique was best means. These results suggest that some differences in catch efficiency were observed between the trap types and the reason

seems to be the specific character of a rodent species.

For the last 10 years, the grassland in the study area has been cultivated for field and pasture. Because of this environmental change, changes in the fauna especially the disappearance of *R. norvegicus*, were observed (OHGUSHI, 1985). This resulted in some changes in trapped species as shown in Fig. 2. Individuals of *Rattus* trapped by cage and snap traps decreased remarkably, while individuals of *Mus* trapped by sherman and *Microtus* by snap trap increased. This seems a result of the disappearance of *R. norvegicus* after 1980 (OHGUSHI and SANO, 1982; OHGUSHI, 1985). The trap types effective in catching the various rodent and insectivore species, however, were basically the same before and after the environmental change.

CONCLUSION

The results show that there are differences in the efficiency of trap types for the three species of rodents and one insectivore caught. Types of traps successful in the catching of each species are summarized in Table 2 and will be helpful in the field census methods for small mammals.

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Differences of Susceptibility in Rice Varieties to the Whitebacked Planthopper, *Sogatella furcifera* HORVÁTH (Homoptera: Delphacidae)¹

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The whitebacked planthopper, *Sogatella furcifera* HORVÁTH, (WBPH) is known as one of the most injurious pest insects of rice in South and Southeast Asia. However, in Japan it has been regarded not

so injurious an insect as the brown planthopper, *Nilaparvata lugens* STÅL. After immigrating into a paddy rice field, *N. lugens* produces brachypterous females and the population density increases exponentially, resulting in "hopper burn" (KISIMOTO, 1965). WBPH in Japan had been believed to cause damage only in young rice plant. Recently, there have been several reports on damage by WBPH near the heading time of rice plant (HARA and SAITO, 1984; MURAKAMI and KANDA, 1984). Damage has been observed on such varieties as "Musashikogane" which is a variety resistant to rice stripe disease, "Suweon 258" a high-yielding variety, and "British Honduras" (HARA and SAITO, 1984; OKADA, personal observation), all varieties recently cultivated in Japan. Since the damage caused by WBPH will vary with fertilization,

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