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Mammalian Status of Mt. Cheomchalsan in Jindo, Korea

Hwa-Yong Shin[1], Hwa-Jin Lee[2], Woo-Yeol Kim[2], Hee-Nam Yoon[2], Jung-Hyo Lee[2], Jeong-Wook Ha[2,*]

[1]Department of Forest Environment & Resources, Chungnam National University, Daejeon 34134, Korea
[2]Division of Ecological Survey Research, National Institute of Ecology, Seocheon 33657, Korea

ABSTRACT

In order to analyze a status of animal in an area where has been became a land cause of Jindo Grand Bridge established on Jindo island area, mammal status in the biggest mountain in Jindo province, Mt. Cheomchalsan has been investigated for four times from May to October of 2016. According to the investigation, 5 orders, 9 families and 15 species of inhabitation was confirmed, and water deer (*Hydropotes inermis*), raccoon (*Nyctereutes procyonoides*), cat (*Felis catus*), and etcetera were dominant. Biodiversity and evenness index were likely to be high as 2.24 and 0.83, respectively and it is considered that favorable condition of natural ecosystem for inhabitation of mammalian is established. Meanwhile, since the cat designated as control species is confirmed as a dominant species, it is supposed that continuous management is necessary.

Keywords: mammalian status, Jindo, habitat identify, Mt. Cheomchalsan, Korea

INTRODUCTION

Ecological study characterizes nature of ecosystem in the given investigation region and be used as important data to suggest desirable direction, frame for conservation and restoration of ecosystem (Kim et al., 2006).

Jindo is the third largest island after Jeju Island and Geoje Island. Since the completion of the Jindo Bridge in 1984, the island has become an inland rather than an island, which is a special area located at the southern end of Korea and the marine environment of Jindo composed of 230 islands including great and small 45 inhabited islands and 185 uninhabited islands around the island.

Although there are more than 300−400 m of mountains such as Geumgolsan, Jiryeoksan, Yeogwisan, and Cheomchalsan within the main island, 'the second National Natural Environment Survey' (Ministry of Environment, 1998) and 'the third National Natural Environment Survey' (National Institute of Environment Research, 2012a, 2012b, 2012c, 2012d, 2012e, 2012f) were performed, an area with insufficient studies related to mammals.

This study was carried out to identify inhabitation status of mammal and habitat types to prepare the data for habitat conservation based on this with Cheomchalsan as the center.

MATERIALS AND METHODS

Investigation area and schedule

Cheomchalsan, the investigation area of this study is located between east longitude 126°18′55.3″−126°19′40.9″, north latitude 34°26′33.5″−34°27′07.2″ and located across the administrative districts of Uisinmyeon, Jindogun and Gogoonmyeon, Jindo-gun, Jeollanamdo.

The investigation was conducted in 20 times, four times from May to October, 2016, in the five areas (forest, paddy field, field/orchard, grassland/bare land, and water system) of mammalian habitat types around Cheomchalsan.

Investigation method

Field study combines direct observation and trace investigation (habitat traces, vegetation traces, footprints, feces, burrows, and hairs), walking on foot during the day time, identifying traces and populations seen, and for rodents,

*To whom correspondence should be addressed
Tel: 82-10-3833-7667, Fax: 82-41-950-5952
E-mail: hjwzone@nie.re.kr

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Sherman live trap was installed and the number of individuals was confirmed after capture.

During the field study, trace investigation was recorded capturing, observation, crying, cadavers, footprints, hair, food marks, burrows, breeding grounds and feces, after taking photographs, through baseline measurement, species identification was performed using Korean animal, plant illustrations (Won, 1967), Korean mammals (Yoon et al., 2004) and wildlife traces illustrations (Choi and Choi, 2007).

Analyzation of community

Biodiversity and evenness index were estimated based on the traces identified in five regions by habitat type. Biodiversity was calculated using the Shannon-Weaver function (Pielou, 1966) derived from the information theory of Margalef (1958). Evenness Index (E′) that index used describes the evenness of species composition within the community, using Pielou's (1975) equation. The populations collected and identified within each habitat type were recorded, thus community was analyzed.

RESULTS AND DISCUSSION

Distribution status

Mammals confirmed in this study are water deer (*Hydropotes inermis*), raccoon (*Nyctereutes procyonoides*), cat (*Felis catus*), mole (*Mogera wogura*), black-striped field mouse (*Apodemus agrarius*), leopard cat (*Prionailurus bengalensis*), otter (*Lutra lutra*), and etcetera, total 5 orders, 9 families, and 15 species were identified. Including the analysis of the second National Natural Environment investigation (Ministry of Environment, 1998; National Institute of Environmental Research, 2016) and the third National Natural Environment investigation (National Institute of Environmental Research, 2012a, 2012b, 2012c, 2012d, 2012e, 2012f) and analyzing. 5 orders, 10 families, and 21 species were identified.

Endangered Wildlife Class I, Natural Monument No. 330, Otter and Endangered Wildlife Class II, leopard cat were identified, and Endangered Wildlife I, fox (*Vulpes vulpes*) were identified through a hearing investigation and there is only an object being restored. Water deer, wild boar (*Sus scrofa*), and squirrel (*Tamias sibiricus*) were found in the forest areas of the whole country (Table 1).

Community analysis

The number of mammals identified in this investigation was 138 times, analyzing the frequency index, water deer was the most identified as 43 times (31.2%), followed by raccoon and cats for 18 times (13.0%) respectively, 13 times for moles (9.4%), and 10 times for mice (7.2%), respectively (Fig. 1).

Table 1. Habitat identified mammals around Mt. Cheomchalsan

Order	Family	Species	Survey results (habitat types)					1[a]	2[b]
			A	B	C	D	E		
Insectivora	Soricidae	*Crocidura lasiura*	–	–	–	–	–	○	–
		Crocidura suaveolens	–	–	–	–	–	○	–
	Talpidae	*Mogera wogura*	6	2	3	2	–	○	○
Carnivora	Canidae	*Nyctereutes procyonoides*	8	4	–	3	3	○	○
		Vulpe svulpes	–	–	–	–	–	○	–
	Mustelidae	*Lutra lutra*	–	–	–	–	4	○	○
		Mustela sibirica	3	–	–	–	–	○	○
	Felidae	*Prionailurus bengalensis*	3	–	–	1	–	–	–
		Felis catus	–	5	6	4	3	○	–
Artiodactyla	Suidae	*Sus scrofa*	3	3	1	–	–	○	○
	Cervidae	*Hydropotes inermis*	12	10	7	9	5	○	○
Rodentia	Sciuridae	*Sciurus vulgaris*	2	–	–	–	–	○	–
		Tamias sibiricus	3	–	–	–	–	○	–
	Muridae	*Myodes regulus*	–	–	–	–	–	○	–
		Apodemus agrarius	3	1	2	3	1	○	–
		Apodemus peninsulae	2	–	–	1	–	○	–
		Micromys minutus	–	–	–	–	2	○	○
		Mus musculus	–	–	–	–	–	○	–
		Rattus norvegicus	–	1	2	–	–	○	○
		Rattus rattus	–	–	–	–	–	○	–
Lagomorpha	Leporidae	*Lepus coreanus*	3	–	–	2	–	○	–
Total			5 order 10 families 21 species						

Habitat types of investigation: A, forest; B, paddy field; C, field/orchard; D, grassland/bare land; E: waterside.
[a]The second National Natural Environment investigation, The natural environment of Jindo (8–31): Mt. Cheomchalsan, Ministry of Environment (1998).
[b]The third National Natural Environment investigation, National Institute of Environment Research (2012a, 2012b, 2012c, 2012d, 2012e, 2012f).

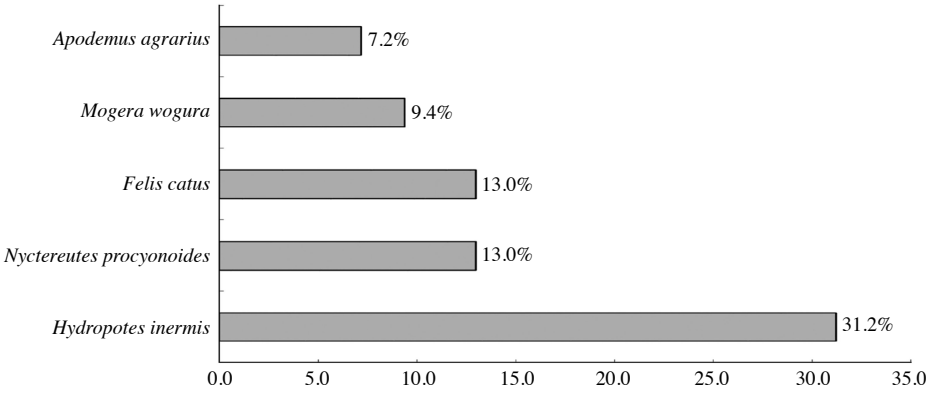

Fig. 1. Analysis of frequency index of habitat identified mammals.

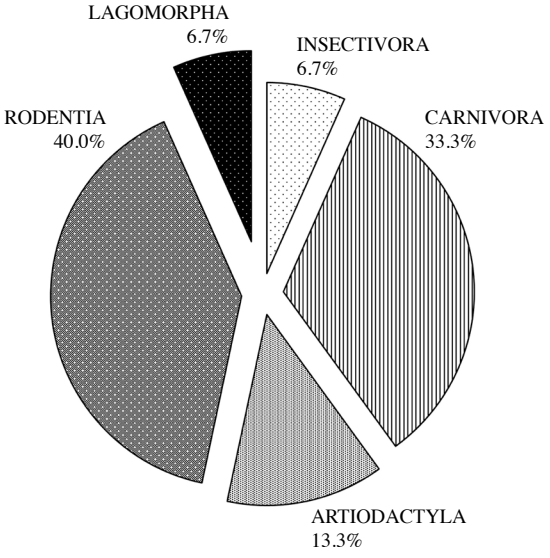

Fig. 2. Analysis of orders index of habitat identified mammals.

Categorized by order, the highest number of species was identified as six species of rodentia (40.0%), followed by five species of carnivora (33.3%), two species of artiodactyla (13.3%), and one species (6.7%) of insectivora and ragomorpha (Fig. 2).

The results of the analysis by the five habitat types (forest, paddy field, field/orchard, grassland/bare land, water system) were confirmed 48 times of traces in the forest and the water deer appeared highest in 12 times (25.0%), followed by raccoon in 8 times (16.7%), mole in 6 times (12.5%), except for that, weasel, leopard cat, wild boar, squirrel, black-striped field mouse in 3 times (6.3%) and manchurian wood mouse twice (4.2%). In the paddy field, total 26 times of traces were confirmed and water deer appeared highest in 10 times (38.5 %), followed by cats in 5 times (19.2%), raccoon in 4 times (15.4%), wild boar in 3 times (11.5%), mole twice (7.7%),

Table 2. Result of community analysis of habitat indentified rodents around Mt. Choemchalsan

	A	B	C	D	E
Biodiversity (H′)	0.67	0.69	0.69	0.56	0.64
Evenness (E′)	0.97	1.00	1.00	0.81	0.92

and black-striped field mouse, rat once (3.8%). A total of 21 traces were identified in the field/orchard and 7 times of the water deer (33.3%), 6 times of the cat (28.6%), 3 times of the mole (14.3%), 2 times of black-striped field mouse, rat (9.5%) and one time of wild boar (4.8%). A total of 25 traces were identified in grassland/bare land, and 9 times of water deer (36.0%), 4 times of cats (16.0%), 3 times of raccoon and black-striped field mouse (12.0%), 2 times of mole, (8.0 %), and one time of leopard cat, manchurian wood mouse (4.0%). A total of 18 traces were found in the water system, including in order of 5 times of water deer (27.8%), 4 times of otters (22.2%), 3 times of raccoon, cat (16.7%), 2 times of harvest mouse (11.1%), and 1 time of black-striped field mouse (5.6%). The species most frequently identified by habitat type were water deer, cat, raccoon, and mole, which were confirmed as highly adaptive species.

The legal protected species, leopard cat, was mainly identified in forests and grassland areas, where the supply of feedstuffs take up a large part in determining the habitat of the upper predator, with the density of rodents being higher than in other.

For otter, it is a species using water system as a habitat due to its ecological characteristics. It was also confirmed that it moved and inhabited in the water system around Cheomchalsan.

Analysis of biodiversity in 5 types of habitat by capturing rodents with Sherman live trap indicates high biodiversity and evenness were observed in paddy field, orchard and forest. This indicates there is a tendency for species and popu-

lation to be increased in areas with enough feed and biodiversity gets higher (Kasangaki et al., 2003) (Table 2).

Taken together, the biodiversity index indicates the forests and grassland/bare land, which are relatively environmentally friendly, have a high level of biodiversity, suggesting that they maintain an excellent ecosystem.

Overall analysis

This study was carried out 20 times from May 2016 to October 2016, four times each for 6 months in the areas of Hosinmyeon and Gogun-myeon, Jindo-gun, Jeonnam province. As a result of the investigation on five habitat types (forest, paddy field, field/orchard, grassland/bare land, water system), natural monuments and endangered wild species, otter and leopard cat, two species were confirmed and it has been confirmed leopard cat comes down to grassland as well as forest and does feeding activity. According to the habitat of various species. It is confirmed, according to the habitat of various species, Jindo is not so far from land and it is a region where human movement is high and has a land-like environment.

It is judged it has good conditions of natural ecosystem required for the habitat of mammals from habitat of various species in the forest.

In the present study, the poor thing is the domesticated wild cats, which are designated as the control species are confirmed as dominant species, thus it is necessary for continuous management of this species.

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