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The Current status of the cooperative research on the biodiversity in North-East Asia

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Abstract

In this paper, the cooperative research on the biodiversity conservation in North-East Asia is introduced. This research was initiated by National Institute of Biological Resources (NIBR) in 2012. The bilateral MOU and following MOA had been signed between NIBR and National University of Mongolia (NUM) in 2012, whereas those had been signed between NIBR and Institute of Zoology, Chinese Academy of Science (IOZ, CAS) in 2013. Details of the cooperative research based on those were presented.

Key words: biodiversity conservation, Institute of Zoology (Chinese Academy of Science), Korean endangered species, National Institute of Biological Resources, National University of Mongolia

INTRODUCTION

Since the Convention on Biological Diversity was set in 1993, the interest and concern on the conservation of Earth Ecosystem have been grown steadily over the decades. National Institute of Biological Resources (NIBR), Korea was established in 2007 to accommodate this agenda and has initiated the bilateral cooperative research programs with Chinese and Mongolian partners since 2012.

Here, the details of the cooperative research between NIBR and National University of Mongolia (NUM) in 2012 (NIBR 2012), as well as that between NIBR and Institute of Zoology, Chinese Academy of Science (IOZ, CAS) in 2013 were presented (NIBR 2013).

COOPERATIVE RESEARCH BETWEEN NIBR AND NUM

Mongolia is one of the land-locked countries with a total land area of 1.6 million square kilometers, located in the heart of Central Asia between 41°35′ to 52°06′ N latitude and 87°47′ to 119°57′ E longitude. It borders Russia to the north and China to the south, east, and west. Mongolia's geographical location results in a harsh continental climate, characterized by sunny days; long and cold winters; low precipitation; and large annual, seasonal, monthly, and diurnal fluctuations of air temperature. Mongolia is one of the world's highest countries with over half of the total land belonging to more than 1,400 m above sea level. This territory includes a variety of ecosystems such as the Siberian taiga forest, the Gobi desert, the Altay Mountains, and the Central Asian steppe. These unique ecosystems provide habitats for a number of plant and animal species, some of which are locally or globally threatened.

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The number of species endemic to Mongolia is low compared with tropical countries, but the unique eco-regions found in the country coupled with relatively low human activity have resulted in an important assemblage of fauna and flora. Mongolia's relatively intact ecosystems support a number species that are now endangered or extinct in neighboring countries such as China, Russia, Republic of Korea, and Japan. These include several species of cranes. The number of species in Mongolia and the knowledge on their distribution and status have both grown in the last decades, with the known number of vascular plants increasing by about 130 species between 1998 and 2008, and over 170 species of insects discovered between 1995 and 2008. According to Mongolia's Fourth National Report on implementation of the Convention on Biological Diversity (CBD), Mongolia is home of more than 13,000 species of insect, more than 3,000 species of vascular plants, 76 species of fish, six species of amphibians, 21 species of reptiles, 472 species of birds, and 138 species of mammals.

However, biodiversity is declining in both numbers and species; habitats and ecosystems are degrading from year to year. Particularly, human-induced factors such as urbanization, settlements, farming and agricultural farming have become the main causes of biodiversity loss and ecosystem destruction of habitats. A number of projects were implemented in the field of biodiversity conservation under the international or national funding agencies. Within this framework, a wide variety of efforts have been organized, including seminars, training workshops in order to improve knowledge dissemination, awareness raising, and capacity building activities for environmental management and protection.

Given above reasons, the School of Biology and Biotechnology, National University of Mongolia (SBB-NUM) and National Institute of Biological and Resources (NIBR), Korea, have developed a cooperative project for investigation and research on the wildlife and plants in Mongolia. The bilateral cooperation between NIBR and SBB-NUM will provide a scientific basis for the development of strategic programs, management, protection, and conservation. As per agreement stipulated in the Memorandum of Understanding between NIBR and SBB-NUM, SBB-NUM is entitled to be supported for the Biodiversity Research Program and Establishment of Joint Long Term Ecological Research Station in Mongolia. Here it is proposed to strengthen the capacity of Biodiversity Research at the National University of Mongolia.

Objectives of the cooperative research

(1) To establish the Korea-Mongolia Biodiversity Research Cooperation Center at the National University of Mongolia.
(2) To develop a Joint Biodiversity Research Program. It will focus on proper scientific documentation and records that are essential for compiling biodiversity data. Scientific collections will be made and kept securely in two independent locations, i.e., NIBR and SBB-NUM, for further scientific study and sustainable use of biological resources.
(3) To establish the Joint Long Term Ecological Research Station at the NUM Forest Research and Training Center for effective biodiversity conservation study in Mongolia.

The research contents

(1) Investigation of plant species and vegetation status.
(2) Investigation of fauna.
(3) Establishment of joint LTER station to study biodiversity and conservation of the endangered species in both countries.

Methods

(1) Investigation of plant species and vegetation status.
- Survey, collect plant specimens and obtain digital plant images.
- Identification of families, genus, and species.
- Establish list of plant species.
- Acquisition of voucher plant specimens and their deposit at the NIBR and SBB-NUM.

(2) Investigation of fauna.
- Survey, collect samples and obtain digital images.
- Identification of species.
- Establish a list of animal species.
- Acquisition of voucher specimens and their deposit at the NIRB and SBB-NUM.

(3) Establishment of joint LTER station to study biodiversity and conservation of the end angered species in both countries.
- Construction of the Joint Long Term Ecological Research Station at the NUM Forest Research and Training Center.
- LTER Plot design and Species selection for research.
- Data acquisition and processing equipment and facility setup.

Results of the project

Most of the budget was devoted to establishment and construction of building of Mongolia-Korea Biodiversity Research Field Station at the Forestry Research and Training Center of the National University of Mongolia which is located in Udleg, Batsumber soum, Tuv province, Mongolia. Other activities shown on yearly plan had being completed as planned.

Two field investigations had being organized under the framework of the joint project at two different sites including:

- Udleg, Batsumber, Tuv province (48°15′42″ N; 106°50′ 56″ E).
- Binder soum, Khentii province (48°34′57″ N; 110° 39′ 52″ E).

During 2013-2014 field research, we have collected in total 4,181 specimen consisting of 1,637 species (including duplications). In terms of joint research team, we have collected the following number of species and specimen:

- Herbaceous plants (874 specimen from 298 species).
- Insects (2017 specimen of 276 species from Order of Lepidoptera and Diptera).

Two graduate students, Lkhagvadorj Khureltsetseg (in PhD course), Iderzorig Badmaanyambuu (in MSc course) from College of Agriculture and Life Sciences, Kyungpook National University had their field research on their thesis at the Udleg station, NUM within 3 months (from June to September, 2014). They have conducted monitoring research on investigation on insect community in respect to the vegetation and investigation of pollinator insect species in Mongolia.

They have collected the following number of species and specimen for 2013-2014 terms:

- Herbaceous plants (73 specimen from 73 species).
- Insects (1,290 specimen of 1,063 species from Orders of Lepidoptera and Diptera).

COOPERATIVE RESEARCH BETWEEN NIBR AND IOZ, CAS

Both countries, China and Korea, share the same biogeographic ecosystem, and their natural environments are similar to each other. The biodiversity in the region therefore needs to be monitored throughout country barrier, especially those species of endemic status. It is important to notice the recent climate changes in North East (NE) Asia and its impact in insect biodiversity in the region. In order to conserve the biological resources in both countries, the survey and monitoring steps in North East Asia are proposed.

By establishing the network of research regarding the endangered species and endemic species in both countries, the conservation of those species can be achieved with more certainty. Furthermore, reintroduction of endangered species in one country to the other by international cooperation will strengthen the common goal of safeguarding the biological resources in the region.

Objective of the cooperative research

(1) Establishing the monitoring system on the target species of importance (endangered species, endemic species, etc.).
(2) Building the cooperative research network on biological resources in both countries.

The research contents

(1) Survey on the distribution of the target species in Korea and China.
(2) Case study on the distribution and basic ecology of Korean endangered species in North-East China (ex. *Callipogon relictus*, *Parnassius bremeri*, etc.).
(3) Case study on the NE Asian endemic species (ex. Some species of Coleoptera and Lepidoptera).

Methods

(1) Survey on the distribution of the target species in Korea and China.
   - Holding meetings, seminars, and symposium.
   - Survey, collecting, and exchanging sample resources.
   - Suggest some insect resources with scientific, social, political, and economic values.
   - Suggest a preliminary future plan of the research on the valuable insect resources.
(2) Case study on the distribution and basic ecology of Korean endangered species in North-East China.
   - Investigation of the current status of Korean endangered species in NE China.
   - Survey, collecting, and exchanging samples.
   - Interview local specialist for the species.
   - Publishing a report and articles in national and international journals.
   - Planning the future research plan.
(3) Case study on the NE Asian endemic species.
   - Hold meetings.

- Investigation of the NE Asian endemic species.
- Survey, collect, and exchange samples.
- Publishing a report and articles in national and international journals.
- Planning the future research plan.

Expected results of the project

(1) Building the cooperative research network on biological resources in both countries.
(2) Establishing the system to conserve local endangered species in both countries.
(3) Getting distribution data on the target species.

CONCLUSION

The cooperative research between NIBR and NUM in 2012 as well as that between NIBR and IOZ, CAS, in 2013 had been successfully initiated. The research output would be shown in a couple of years. It would be a significant step forward since the enactment of Nagoya Protocol in October, 2014 (NIBR 2014).

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