

### List of Dissertation Abstract (Department of Natural Environment)

Name	Supervisor	Title	Abstract
Aono Minto	Fumito Koike	Behavior of mid-sized urban mammals against boundary fences	There are many boundary fences in urban landscapes, however, their effects on urban mid-sized mammals have not yet studied. I investigated behaviors by camera traps. <i>Nyctereutes procyonoides</i> hardly climbed over the fences. On the other hand, <i>Paguma larvata</i> climbed over the fences most frequently among detected mammals, and climbed over even above the fence-hole. <i>Procyon lotor</i> and <i>Felis catus</i> were intermediate. <i>P. lotor</i> climb over the fences after the holes which they passed through frequently were closed.
SUZUKI TOSHIYUKI	YAMAMOTO SHINJI	Sr,Y trace element analysis of apatite in zircon using FE-EPMA. -Improved analytical methods for Hadean micro-apatite -	The early geological environment of Earth, often considered a water planet, has been extensively studied in the field of geosciences, yet its exact origins remain unknown. Numerous dating, isotopic, and trace element analyses have been conducted on a variety of thick ancient zircon and apatite. Of particular interest is the estimation of the amount of SiO <sub>2</sub> in the host rock, achieved through the Sr and Y concentrations of apatite in zircons. An improved method for determining trace elements in micro-apatite within zircons, utilizing EPMA , was employed to better understand the origin of apatite in Jack Hills clastic zircons. Mantle-type zircons with high total rock SiO <sub>2</sub> content suggest the possible existence of a large continent that intersected with the plume around 3.6 billion years ago.

Suzuki Miho	Sasaki Takehiro	Destination-explicit analysis of tourist satisfaction and its determinants in major Japanese national parks	This study conducted destination-explicit analysis of Japan's national parks to identify factors enhancing visitor satisfaction, crucial for sustainable tourism. Surveying visitors' demographics, motivations for visit, and satisfaction levels via an online questionnaire across three national parks, we categorized 117 tourist spots and examined their influence on satisfaction using ordinal logistic regression. Results revealed significant effects of visitors' socio-demographic attributes, such as gender, and tourist destinations' protection levels on satisfaction. This study offers detailed insights into national park visitors and factors shaping their satisfaction, contributing to a deeper understanding of visitor experiences and aiding in the promotion of sustainable tourism.
Sekine Sawako	Oikawa Hiroki	Associations of flagship species with living things that are symbols of the community: Facts about birds chosen as symbols by local governments in Tokyo and surrounding areas.	The purpose of this paper is to clarify some aspects of the actual status of living things designated as symbols of local governments (hereinafter referred to as "symbol species"), and to organize and analyze the selection state, selection process, and examples of utilization of "birds," one of the symbol species categories, in local governments in Tokyo and surrounding areas. We also examined whether symbolic species have the function of increasing interest in and participation in conservation activities, and discussed the relationship between local biodiversity conservation and symbolic species.

Takano Yu	Sasaki Takehiro	Contributions of urban greenspace types to the subjective well-being before and during COVID-19	This study investigated the relationship between urban green space type (parks, street trees, etc.) and the subjective well-being before and during the COVID-19 pandemic. The results revealed urban green space types that influence the subjective well-being before and during the COVID-19 pandemic, respectively. Not merely being green, but the type of urban green space is also an important factor influencing well-being.
Tekeuchi Rie	Sasaki Takehiro	Fifty-year dynamics of forest ecosystem functions following soil-scarification practices: comparing natural regeneration and monospecies planting	Some practices are conducted to make secondary forest similar to natural forests, however there are still few studies that quantify the long-term recovery process of natural regeneration and plantation. This study focused on the ecosystem multifunctionality (EMF) and compared the effects of 50-year dynamics of EMF. The results showed that EMF of plantation forest was not similar to that of natural forests, while the natural regeneration, particularly belowground EMF was tended to be similar. It was suggested that further long-term research is needed to determine whether the vegetation in natural regeneration forest is close to natural forests.

Tanaka ryu	Yamamoto Shinji	Experiments on separation and recovery of very small amounts of heavy minerals in peridotite using a Wilfley table	A new heavy mineral separation method using a Wilfley table was investigated for the purpose of highly efficient separation and recovery of ultra-trace heavy minerals such as zircon and baddeleyite in peridotite. In order to determine the optimal flow rate, vibration frequency, and other parameters, repeated separation experiments were conducted using peridotite. The optimal conditions were as follows: vibration table angle of 7 degrees in the front-back direction and 0.5 degrees in the left-right direction; vibration frequency of 300 strokes/minute; water volume of pipe 1: 11.25 l/m, pipe 2: 10.25 l/m; and grain size of <50 $\mu\text{m}$ . Three zircon particles were successfully recovered from 400 g of peridotite, a 37.5-fold improvement over the conventional method.
Naka Minagi	Takehiro Sasaki	Successional development of soil fungal community on a glacier foreland in The High Arctic.	The importance of below-ground microbes in ecological succession has become widely accepted in recent years. Although soil fungi play a vital role in regulating multiple ecosystem functions such as nutrient cycles, plant growth, and carbon budget, evidence is still limited for shifts in soil fungal community structure in the High Arctic. Our study addressed this knowledge gap by investigating soil fungal communities undergoing primary succession in a well-vegetated glacier foreland on Ellesmere Island in the Canadian high Arctic. To assess the fungal succession trajectory, I established two plots near the edge of the glacier and five plots on glacier moraines that differed in time after deglaciation along the Arklio Glacier foreland ecosystem (chronosequence approach). Using DNA metabarcoding, we assessed the richness of fungal Operational Taxonomic Units (OTUs) and their dissimilarity. Fungal OTU richness showed nonlinear variation during primary succession, with the greatest in the mid-successional stage. These dynamics occurred regarding the changes in community composition from the early to later successional stages, driven by changes in the community assembly process. Especially, it was revealed that the soil fungal communities were influenced by soil pH and the plant communities in the late successional stages. These results indicate that ecosystem development can change the fungal community structure as well as the community assembly process.

Nishino Yutaro	Ryoji Wani	The factor of assemblage of Baculites, a Crataceous heteromorph ammonite	Calcareous concretions containing numerous Baculites, a heteromorph ammonoids, collected from the Upper Cretaceous Yezo Formation in the Haboro area, Hokkaido, quantitatively analyzed. The results of this study revealed that (1) the calcareous concretions were formed at a site not far from the habitat of Baculitids, and (2) concentrated parts within the concretions by a single deposition event can be recognized by vertical changes of shell concentrations. Both dead shells of baculitids that had settled on the seafloor and the baculitids that had inhabited around the area were flowed together and buried as a dense mass.
Hayashi Kaho	Sasaki Takehiro	Species diversity effects on tree leaf litter decomposition in a changing climate	Leaf litter decomposition is influenced by traits, climate, and species diversity. However, only a few studies have compared these factors. The objective of this study was to clarify how traits and species diversity affect litter decomposition under varying environmental conditions. Using the litter-bag method, we found that the traits had the greatest influence on decomposition. Among them, the complementarity and selection effects also differed depending on the species composition and environment, resulting in differences in degradation mechanisms.

Miyakoshi Mariko	Hiratsuka Kazuyuki	Screening of plant activators derived from natural products.	Our laboratory has developed a non-destructive evaluation of gene expression induction activity using transgenic Arabidopsis transfected with a fusion gene of the PR-1a gene promoter, a marker gene in the salicylic acid pathway, and firefly luciferase, a luminescent gene, using an increase or decrease in luminescence as an indicator. We have developed a high-throughput screening system. Six compounds derived from natural products selected by this system were investigated for a detailed comparative study of gene expression, and for their control effects against pathogens and the presence of growth inhibition by compound treatment.
Muraoka Seshin	Wani Ryoji	Estimation of life style of desomoceratid ammonoids using oxygen isotopic ratios	By analyzing $\delta^{18}\text{O}$ of three fossil shells of Desmoceras latidorsatum, the seawater temperature of the surrounding area where they were living at that time was reconstructed. The estimated seawater temperature of the septa was higher than that of the outer shell. This suggests that the septal $\delta^{18}\text{O}$ have been affected by changes in the salinity of the extrapallial fluid during the process of draining cameral fluid from chambers. One specimen showed $\delta^{18}\text{O}$ lower than the other specimens in the early growth stages, suggesting that this specimen lived in an area with higher freshwater inflow.

Moriwaki Tomomasa	Nakamura Tatsuo	Separation and quantitative detection of thiol compounds using composite nanoparticles of iron oxide and gold	Glutathione (GSH) is present in the body and has been reported to be associated with various diseases. Therefore, a highly sensitive and selective detection technology for GSH is required. In this study, we prepared composite nanoparticles of iron oxide and gold, adsorbed GSH in an analyte sample, collected it by magnetic separation, and evaluated a system to detect and quantify GSH by MALDI-TOF-MS using the ionization ability of the particles.
QI YULAN	Takehiro Sasaki	Changes in plant functional traits driven by grazing and climate in Mongolian grasslands	<p>Aridity plays a significant role in shaping plant communities by serving as a powerful environmental filter, influencing species presence or absence, as well as vital ecosystem processes like primary productivity and nutrient cycling. The combined effects of increasing aridity and grazing are complex and have profound implications for the vulnerability of dryland ecosystems. Consequently, there is an urgent need to comprehensively study how ecosystems respond to the aridity and grazing.</p> <p>The study of plant functional traits is crucial in understanding how plants adapt to environmental changes, survive, and reproduce. Research in this area helps us predict and interpret plant responses to various environmental stresses, thereby guiding management and practices in fields such as agriculture, ecology, and biodiversity conservation.</p> <p>Our study primarily explores the effects of grazing disturbances and aridity changes on plant functional traits within grassland ecosystems. The study sites were selected along a gradient of aridity in Mongolian grasslands. Each site was divided into grazing and fenced groups. The Fenced groups at each site had an average establishment duration of thirty years. Regarding the selection of plant functional traits, we measured and analyzed four key characteristics: plant height, leaf toughness, specific leaf area (SLA), and leaf dry matter content (LDMC), to assess their responses to aridity. Additionally, we also calculated and analyzed the Functional Diversity Index (FDis) to examine how increasing aridity and grazing disturbances impact inter-specific diversity. This study reveals the significant effects of grazing disturbances and aridity on plant functional traits within grassland ecosystems.</p>

PHONGSA DUANGMANY	Maiko Kagami	The Role of Chytrids on Decomposition of Large Algae ( <i>Staurastrum dorsidentiferum</i> and <i>Micrasterias hardyi</i> ) in Lake Biwa	Chytrid fungi, major organic decomposer in Lake Biwa were examined how they utilize inedible algae ( <i>Staurastrum dorsidentiferum</i> and <i>Micrasterias hardyi</i> ) by using 3 years samples observation and incubation experiment under light and dark conditions. The result showed that <i>Micrasterias</i> was mainly colonized in the deep layer while <i>Staurastrum</i> was infected all layers. Besides, the chytrid performed better under dark condition rather than light condition. In addition, chytrid grew better in the dark, even without algal cells, indicating that light itself inhibited the chytrid growth. Our results suggested that light affected the chytrids growth, which influenced the material decomposition in the deep layers.
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