Name	Supervisor	Title	Abstract
CAI ZHI	Ishikawa Masahiro	A study of CO ₂ fluid inclusions in ultra-high temperature metamorphic rocks from Napier Complex, East Antarctica	The Napier Complex is a region that experienced ultrahigh- temperature metamorphism exceeding 1100°C approximately 2.5 billion years ago, and it is believed that CO ₂ -rich fluid inclusions were trapped under these extreme conditions. However, since the fluid inclusions captured under such conditions are minute, analyzing their isotopic composition by using mass spectrometry is challenging. Therefore, in this study, we estimated the carbon isotopic composition of CO ₂ by using Raman spectroscopy. We verified the effectiveness of this method with different regions and rock types and attempted to identify the characteristics and origin of metamorphic fluids from that time. The analysis results suggest that these fluids are likely a mixture of mantle-derived CO ₂ and subducted marine carbonates.
Aoike Yuta	Hiratsuka Kazuyuki	Development of plant pathogen detection methods using bioluminescence reporter system	In this study, I attempted to develop an ELISA system using a bioluminescent reporter that fuses protein A and firefly luciferase. The IgG-binding domain of protein A was improved to enhance sensitivity and specificity, and blocking agents and plates in the ELISA system were optimized to reduce background. Detection of purified TMV-OM and its infected leaves was tested, and it was confirmed that it was more specific than commercially available HRP-conjugated secondary antibodies.

List of Dissertation Abstract (Department of Natural Environment)

Name	Supervisor	Title	Abstract
Akagi Rena	Hiratsuka	Studies on the resistance-inducing	BIK1 gene is induced early when plants are infected by
	Kazuyuki	activity of new compound that induces	pathogens and is involved in the induction of broad-spectrum
		BIK1 gene expression	resistance. I used a high throughput system with transgenic
			Arabidopsis seedlings transformed with a BIK1 promoter-
			luciferase fusion gene and obtained a novel compound that
			showed gene expression induction activity different from that
			of previously reported compounds. The new compound showed
			activity in inducing the expression of not only biotic stress
			response genes, such as salicylic acid and jasmonic acid
			pathways, but also abscisic acid responsive genes involved in
			abiotic stress, supporting its high potential as a new plant
			biostimulant.
Osugi Wataru	Koike Fumito	Carp populations in urban canals and	While carp have a significant impact on the ecosystem, it is not
		the effects of human feeding	uncommon for citizens to feed the carp in urban canals. In this
			study, we investigated carp populations, feeding conditions,
			and the effects of feeding on carp by recording the distribution
			and size of fish and the presence or absence of feeding at each
			location in urban irrigation canals. The results showed that carp
			were locally distributed at feeding sites, and compared to the
			size distribution in other rivers, the urban canal formed a
			population structure with a deficit of small and medium-sized
			individuals.

Name	Supervisor	Title	Abstract
Orishikida Yuhi	Sasaki	Effects of woody plant encroachment	Woody plant encroachment (WPE) into subalpine moorlands
	Takehiro	associated with decreasing snow depth	threatens plant diversity, which supports ecosystem functions
		on the diversity and trait composition	like carbon sequestration. Identifying the drivers of WPE is
		of subalpine moorland plant	crucial for conservation. This study examined environmental
		communities	factors influencing WPE in Japan's subalpine moorlands.
			Results showed that WPE progressed in areas with shallower
			snow depth and closer to the moorland edge. While WPE
			reduced species richness, grasses with taller height and higher
			leaf dry matter content increased, suggesting the coexistence of
			competitive species with woody plants. These findings
			highlight the key role of snow depth and moorland edge
			proximity in driving WPE and altering plant diversity.
Kushida Tatsuya	Ishikawa	Glacier Retreat and Climate Change of	The Aletsch Glacier in Switzerland is rapidly shrinking, and
	Masahiro	Switzerland's Aletsch Glacier: Time	melting due to albedo reduction and rising surface temperatures
		Series Data Analysis Using GIS and R	has become a problem. The results of this study indicate that
			glacier melting due to these factors is progressing not only at
			the glacier terminus but also in the upstream snow area.
			Especially near the snow line, the surrounding exposed rock
			and surface are hotter, and the glacier melting may further
			progress due to higher temperatures and increased solar
			radiation.

Name	Supervisor	Title	Abstract
Kon Taiyo	Koike Fumito	Human impacts on three tiger beetle species on sandy beaches	Coastal tiger beetle populations are declining due to human activities. This study investigates the effects of environmental factors on three tiger beetle species inhabiting the coastal areas of Ishikawa Prefecture: Abroscelis anchoralis punctatissima, Cicindela sumatrensis niponensis, and Cicindela elisae elisae. The results indicate that the two species restricted to coastal habitats, Abroscelis anchoralis punctatissima and Cicindela sumatrensis niponensis, are negatively affected by coastal protection works, beach width, and distance from rivers, while Abroscelis anchoralis punctatissima is additionally affected by traffic pressure. In contrast, Cicindela elisae elisae, which is not restricted to coastal habitats and can adapt to diverse environments, is only negatively affected by coastal protection works.
Saito Naoki	Wani Ryoji	Systematic Revision of <i>Tessarolax</i> (Aporrhaidae; Gastropoda; Mollusca) from the Cretaceous of Hokkaido and southern Sakhalin	This study is a systematic revision of the aporrhaid gastropod genus <i>Tessarolax</i> based on 32 specimens from the Cretaceous of Hokkaido and southern Sakhalin. Four species, including one new species, were identified, and the overall shell characters of T. japonica and T. acutimarginata, which were known only from fragmentary specimens, were first time clarified in detail. In addition, this study shows that T. bullardi from the West Coast of North America is a junior synonym of T. japonica, and that <i>Tessarolax</i> evolved and diversified in parallel on both the eastern and western sides of the North Pacific since the Turonian.

List of Dissertation Abstract (Department of Natural Environment)

Name	Supervisor	Title	Abstract
Suzuki Sohma	Hiratsuka	Development of novel artificial	Gene-specific transcriptional regulation contributes to the
	Kazuyuki	transcription factors using LISCL	efficient production of useful materials in plant cells. By using
		subfamily GRAS proteins	CRISPR technology, it is possible to regulate the transcription
			level of target genes by binding the effector protein fused to
			Cas9 to specific DNA sequences via sgRNA. GRAS protein
			named "LISCL" derived from Lilium longiflorum acts as a
			transcriptional activator during gametogenesis. In this study, I
			examined domains derived from LISCL subfamily to develop
			novel artificial transcription activators that provide high level
			transgene expression.
Takaesu Reina	Nakamori	From seashore to freshwater? The	I found a seashore species of springtail (Collembola),
	Taizo	origin of Archisotoma utinomii	Archisotoma utinomii (Isotomidae), in the shore of a freshwater
		(Collembola: Isotomidae) from Lake	lake, Lake Biwa. The aim of this article is to clarify the origin
		Biwa	of A. utinomii from Lake Biwa. The phylogenetic tree was
			constructed, and the halotolerance of A. utinomii was
			investigated to estimate its origin. The results indicate that A.
			utinomii from Lake Biwa originated from the seashore of
			Wakayama.

Name	Supervisor	Title	Abstract
Nakasai Karin	Kagami Maiko	Assessment of organic matter decomposition using cotton strips in a dam lake	It is important to understand the decomposition process of organic matter because a large amount of terrestrial-derived organic matter flows into aquatic environment and affects water quality. The cotton-strip assay allows for the comparison of decomposition under different environmental conditions by using a standardized substrate. This helps in understanding the factors that influence organic matter decomposition. However, there are few examples of its application to lakes, and the factors and processes that affect decomposition are unknown. In this study, we evaluated organic matter decomposition at different locations and depths in a lake to clarify the factors that affect decomposition by various factors. The results showed that light directly inhibited decomposition, but when the concentration of Chl.a on cotton was increased by light, the fungal community, mainly Chytridiomycota, increased and decomposition was promoted, and that water temperature and nematodes were also factors that promoted decomposition. These results suggest that biofilm production promotes decomposition and that aquatic fungi are important for decomposition.
Nagata Kento	Nakamori Taizo	Interspecies Comparison of Conglobation in Pill Bugs	Conglobation, a characteristic of terrestrial isopods called "pill bugs," is generally considered to be used for defense, dryness, and low-temperature measures, but research on conglobation has been conducted only on Armadillidium vulgare, which is widely found around the world. In this study, we observed Conglobation and other behaviors in four species of Pill Bugs with different ecology and morphology by applying quantitative stimuli that are thought to induce Conglobation, and made an interspecies comparison of Conglobation.

List of Dissertation Abstract (Department of Natural Environment)

Name	Supervisor	Title	Abstract
Nozawa Yohko	Hiratsuka	Studies on novel compounds that	High temperature stress is one of the environmental stresses
	Kazuyuki	impart thermostability to plants and	that affect plants. High temperature stress inhibits plant growth
		their response to high temperature	and causes agricultural damage worldwide. Compounds that
		stress	impart thermostability to plants are one way to avoid high
			temperature stress. In this study, we searched for compounds
			that induce heat resistance by transgenic of Arabidopsis
			harboring a fusion gene of heat shock protein gene and firefly
			luciferase reporter, and characterized candidate compounds.
Hida Motoki	Ogata Shinichi	Basic research on the construction of a	In this study, an acute toxicity test will be conducted using silk
		system for the evaluation of neurotoxic	worms. In recent years, there has been a growing movement to
		substances using silk worms	regulate the use of vertebrate animals for experiments from the
			viewpoint of animal welfare. This situation has necessitated the
			use of alternative methods to animal testing. Among these, in
			vitro testing methods have achieved a great deal of success, but
			in vivo testing methods have not been so successful. We
			therefore conducted tests using silk worms and neurotoxic
			substances to confirm the suitability of silk worms as animal
			models.

Name	Supervisor	Title	Abstract
Fujinaka Tatsuya	Ishikawa Masahiro	Seismic Velocity Structure off the Kumano Basin, Nankai Trough by Seismic Refraction Survey	The distribution of low-frequency earthquakes and tremors in shallow areas in the Kumano-nada is not uniform (Takemura et al.,2023), and the factors for their distribution remain unclear.In 2022, the Japan Agency for Marine-Earth Science and Technology conducted a refraction and wide-angle reflection seismic survey using a seafloor seismometer to clarify the relationship between inactive areas of low-frequency earthquakes and structures around the Kumano-nada coast. The purpose of this study is to clarify the structure of the margins of the area of very low-frequency earthquakes and tremors in the Kumano-nada from the newly acquired structure data, and to discuss the structural characteristics of the area of slow earthquake occurrence in conjunction with the previous studies. The present study suggests that the distribution of slow earthquakes does not necessarily coincide with the shape of the oceanic crust, and that the shape of the oceanic crust alone is not sufficient to fully explain the distribution of slow earthquakes.
Miyazoe Tatsuya	Oikawa Hiroki	The Potentials and Challenges of Land Acquisition for Nature Conservation: An Analysis of the Enactment Process of the Ichikai Town Ordinance in Tochigi Prefecture	In March 2024, Ichikai Town in Tochigi Prefecture enacted a unique ordinance allowing land acquisition to protect the endangered birds, SASHIBA. While land acquisition had been implemented only in exceptional cases before, it was codified into an ordinance as a formal rule. This study investigates the enactment process through meeting proceedings and stakeholder interviews. Currently, there are no plans for land acquisition, and operational challenges remain. However, this ordinance could provide a framework for progressive conservation policies in the town.

List of Dissertation Abstract (Department of Natural Environment)

Name	Supervisor	Title	Abstract
Muro Miune	Shimode Shinji	Reproductive ecology of neustonic pontellid copepods in Sagami Bay, Japan	Pontellid copepods primarily inhabit just below the ocean surface, where its environment is usually harsh due to highly fluctuating water temperature and salinity, as well as intense UV radiation. This study aimed to elucidate the reproductive ecology of pontellids by conducting egg production experiments on 17 species from 5 genera collected in Sagami Bay, Japan. Their egg production rate results, diel differences in spawning behavior, the relationship between egg size and body size, and carbon investment per egg showed species- specific reproductive strategies within the family. Furthermore, the results also revealed that the pontellids have a relatively r- strategic tendency compared with other copepod families.
Yamamoto Tomoki	Koike Fumito	Relationship Between Light Attraction Behavior and Urbanization: A Case Study of Trypoxylus dichotomus septentrionalis	This study investigated whether increasing artificial light at night (ALAN) due to urbanization reduces the light-attracting behavior of Trypoxylus dichotomus septentrionalis. Specimens were collected from 12 sites in Kanagawa Prefecture, each with different ALAN intensities, and their attraction to light was assessed. The results showed no significant variation in attraction related to ALAN intensity, suggesting weaker selective pressure compared to moths in previous research. However, sex-based differences were evident, as females were more strongly attracted than males. Overall, this study indicates that the evolutionary influence of ALAN on light-attracting behavior may differ among insect groups, underscoring the need to consider species-specific traits.

Name	Supervisor	Title	Abstract
Wada Takuma	Hiratsuka	Transcriptional regulation of plant	Among the secondary metabolites synthesized in plants, there
	Kazuyuki	genes related to secondary metabolite	are useful substances that can be applied as raw materials for
		synthesis by dCas9/sgRNA system	pharmaceuticals. To achieve highly efficient production of
			secondary metabolites, it is necessary to control the
			transcription of the genes involved in their synthesis. In this
			study, we used the dCas9/sgRNA system, a type of artificial
			transcriptional control method, to control the transcription of
			genes related to the synthesis of the secondary metabolites
			anthocyanins and indole glucosinolates, and conducted
			verification toward achieving highly efficient production of
			secondary metabolites.
Chen Ziyan	Sasaki	Abundance and diversity of ground-	This study examined the effects of different mowing regimes
	Takehiro	dwelling arthropods driven by different	on the diversity and abundance of ground-dwelling arthropods
		mowing regimes in Satoyama forests	in Satoyama secondary forests. Mowing intensity (mowing
			height 0cm, 10cm), frequency (once, twice per year), and leaf
			litter removal were evaluated. Results showed that leaf litter
			removal significantly reduced arthropod abundance, which
			positively correlated with plant diversity. In the initial stage of
			management, mowing intensity had little effect, but higher
			mowing frequency led to a decline in abundance. This study
			provides scientific evidence for sustainable Satoyama
			management.