2025 Recap & Beyond

BIOWEBZINE

VOL. 14 2025 WINTER

SPECIAL ISSUE

From Books to Fields and From Research to Practice

Jung-un Park, Researcher in the Disease Monitoring Team at the National Institute of Wildlife Disease Control and Prevention (NIWDC)

BIODIVERSITY ISSUE

Land of Pause amid Long Winter Journey
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BIO NEWS

Latest Research and Patents

BIOWEBZINE

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Vol. 14

The National Institute of Biological Resources (NIBR)
National Institute of Wildlife Disease Control and Prevention (NIWDC)
National Institute of Ecology (NIE)
Nakdonggang National Institute of Biological Resources (NNIBR)
Honam National Institute of Biological Resources (HNIBR)
A Joint Newsletter

Biowebzine is where the National Institute of Biological Resources (NIBR) under the Ministry of Environment, the National Institute of Wildlife Disease Control and Prevention (NIWDC), the National Institute of Ecology (NIE), the Nakdonggang National Institute of Biological Resources (NNIBR), and the Honam National Institute of Biological Resources (HNIBR) gather together and dream of a future of harmonious coexistence of all living things. Let us get useful information and knowledge about biodiversity, ecosystems, and wildlife diseases in Korea from Biowebzine!

A Joint Newsletter, *Biowebzine*
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National Institute of Ecology (NIE)	nie.re.kr
Nakdonggang National Institute of Biological Resources (NNIBR)	nnibr.re.kr
Honam National Institute of Biological Resources (HNIBR)	hnibr.re.kr

Publication	National Institute of Biological Resources (NIBR)
Publisher	Ho Yu
Publication Date	December 2025
Editors	Seong Ryu, Young-zoo Kim, Jae-woong Hwang, Yeon-sun Choi, Min-ji Lee, Seung-jae Lee, Tae-im Kim, Hong-kyoung Jang
Translator	Hye-kyung Woo
Contents Planning and Producing	Qline

Special Issue

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Bio News

2025 Recap & Be

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At the end of the year 2025, we are reflecting on the circle of life. The blade of grass growing on the hillside and a wave rising in the sea are softly whispering to us about the events on Earth and directing our path while we keep moving forward. Even under the microscopes in the labs, in the plains, on the islands, and in the wind, we have recorded signals that the smallest of life is sending to us and those records have developed into exhibition, education, and the daily life of people. As such, the journey in 2025 is a diary of life written by everyone keeping their own places. And now, we ask ourselves upon closing the last chapter of the diary: "What will the life written in the next page of the diary look like?"

Writer: Editorial Team | Reviewer: NIBR

Find Huge Possibilities from Small Living Things

A Story That Nature Tells Us in 2025

The National Institute of Biological Resources (NIBR) has spent the year 2025 to reconsider the meaning of life. As the year which started with high expectation is coming to an end, we are going to reflect upon the most notable accomplishments the NIBR has made in the fields of research, education, and exhibition, examining each one individually.

The NIBR together with the Yonsei University research team confirmed that *D. chrysantha* extract has antiviral effects

Fight Against Viruses: Duchesnea chrysantha (Zoll. & Moritzi) Miq.

The NIBR's most notable research result in 2025 was the discovery of the antiviral effect of *Duchesnea chrysantha* (Zoll. & Moritzi) Miq. against food poisoning caused by norovirus infection, which repeatedly comes to us but is hard to prevent by frequent handwashing. However, Nature teaches us how to fight. A joint research team of the NIBR and Yonsei University discovered amazing antiviral capacity of *D. chrysantha* that can easily be found in the mountains. Being exposed to infected cells, the extract inhibited 97% of virus activities, and the survival rates of immune cells improved. After confirming through animal tests that the extract can reduce viruses in the intestines by 61%, the team applied for a patent on the antiviral composition comprising *D. chrysantha* extract.

This research proved that a common native plant can be an important clue to solving infectious diseases. In particular, as the extract can be a plant-based preventive measure against norovirus, which has no vaccines or cures, researchers both in Korea and outside are increasingly showing their interest in this area. The team has been analyzing the core active compounds of *D. chrysantha* and plans to review whether it can be applied to human body and whether it can be developed into functional health foods and food ingredients in the future.

Small Flapping of Wings That Can Change the World

The most meaningful biodiversity education result in 2025 started with the flapping of a bee's wings. Marking the World Bee Day on May 20, 2025, the NIBR opened an educational program about wild bee protection and biodiversity conservation for 115 classes of 27 elementary schools in the metropolitan area, Gangwon-do, and Chungcheongbuk-do from May to October, 2025. In class, participants learned bee ecology, the pollination process, and the

Marking the World Bee Day, the NIBR opened an educational program about wild bee protection and biodiversity conservation for elementary school students

possible impacts on the ecosystem if bees were to disappear.

Outdoor activities investigating ecological environments around their schools were included in the program, where children could experience how precious bees are while directly seeing and feeling. The lesson that a small living thing sustains the health of the Earth was delivered from the perspective of children. The participants understood the processes of how bees deliver pollen and save forests and crops and how such processes finally lead to food on our tables. At a time when a decrease in bee population has become a serious global issue due to the climate crisis, the program served as a good opportunity to realize the importance of balance of Nature and biological conservation.

The NIBR held a special exhibition titled Insects: Increasing or Disappearing

Insects: Increasing or Disappearing

The most noticeable exhibition held by the NIBR in 2025 is titled *Insects: Increasing or Disappearing*. It shows the two sides of environmental changes through these very small creatures on Earth—insects. It deals with stories about insects that are experiencing a rapid population decrease and those whose population has increased due to human activities.

The exhibition consists of three themed-sections: First, insects that have disappeared due to climate change and ecosystem destruction; second, survival strategies of insects in cities that live beside human beings; and third, the coexistence of insects and human beings, where visitors can experience how insects see the world by watching video clips together with actual specimens and images.

The exhibition conveys the message "A decrease in insects brings the demise of human beings," enlightening us about the important role of insects in balancing our ecosystem. The exhibition runs until July, 2026 and various events including a photo competition for citizens and the "Insects Expedition," which is a hands-on program for children.

See a Large Future from Small Creatures

Looking back, the NIBR has explored the endless possibilities of living things and shared their value with people in 2025. It discovered the potential of native plants through the *D. chrysantha* research, promoted environmental susceptibility of the future generations though education in biodiversity for children, and contemplated the relationship between human beings and Nature through the exhibition. In 2026, the NIBR plans to deepen native organism research and spread the knowledge on biodiversity with people. Seeing a large future from small creatures is the reason the NIBR exists.

Writer: Editorial Team | Reviewer: NIWDC

From Books to Fields and From Research to Practice

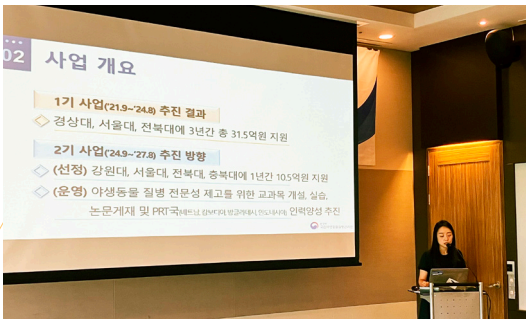
Jung-Eun Park, a Senior Researcher in the Wildlife Disease Surveillance Team at the National Institute of Wildlife Disease Control and Prevention (NIWDC)

Q. Please introduce yourself and what you do at the NIWDC.

I am Jung-Eun Park, a Senior Researcher in the Wildlife Disease Surveillance Team at the NIWDC. I am in charge of operating a project of the graduate school of wild animal diseases, strengthening the response system for wild animal diseases, and nurturing experts as per their relevant fields.

Q. What is the background and purpose of the project of the graduate school of wild animal diseases?

As diseases related to wild animals including African swine fever (ASF), avian influenza (AI), and severe fever with thrombocytopenia syndrome (SFTS) have repeatedly emerged, not only preventive measures but also experts equipped with deep understanding of ecology and capability of scientific analysis are needed now more than ever. To strengthen the expertise of personnel and research foundation in the field of wild animal diseases, which are weaker than those in the current livestock-centered disease prevention system, this project began according to the Wildlife Protection and Management Act and the Fourth Master Plan for the Protection of Wildlife. For the purpose of nurturing professionals in responding to wild animal diseases systematically by focusing on interdisciplinary learning and field training, each university has been operating convergence courses.



A researcher Jung-Eun Park is making presentation.

Doing an autopsy on a wild bear

Q. Which universities are in the project now and how are universities and students selected?

Currently, four veterinary schools of Kangwon National University, Seoul National University, Jeonbuk National University (Jeju National University consortium), and Chungbuk National University) participate in the project. The project manager selects graduate students from each university who are enthusiastic about wild animal disease research. Universities can apply for the project as per the periodic announcements made by the Ministry of Climate, Energy and Environment (MCEE) or the NIWDC. Participating universities are then selected by expert screening committees following a comprehensive evaluation of project plans, including education and research capabilities, infrastructure, curriculum plans and operational details.

Q. Please introduce the curricula.

The graduate school sets a curriculum that focuses not only on theoretical education but also on the practices on site to develop capabilities that are directly applicable to the fields. Students can learn basic theories including diagnosis of wild animal diseases, epidemiology, and ecology and experience the whole process of research and disease-responding practices via seminars, workshops,

The National Institute of Wildlife Disease Control and Prevention (NIWDC) is connecting research to the field standing at the forefront of wild animal disease responses. Jung-un Park, a researcher at the NIWDC, operates a graduate school project on wild animal diseases and is in charge of nurturing experts and providing political support for the purpose of setting up a more sustainable and science-based foundation for the response system of wild animal diseases in Korea.

Industry–academia–research institution projects, and field works. Seminars are for sharing the latest research trends and workshops are for enhancing capabilities on site by field training exercises, experiments, and analysis. Industry–academia–research institution projects are intensive programs that lead to participating in actual research projects and writing academic papers, while field works provide core experiences that link theories with the field by conducting the actual processes of monitoring, tests, and disease-responses at animal rescue centers.

Q. What are the strengths of this graduate school?

The biggest strength of this school is practice-centered education which closely connects classroom with the field. Its curriculum reflects not only animal diseases that are currently at issue including ASF and AI, but also the One Health approach that recognizes interconnectedness of human, animals, plants and environment. Furthermore, wild animal disease experts including professors, veterinarians, and government employees gather in workshops and seminars and share their experiences and knowledge with students. On-site classes together with various field organizations such as wild animal rescue centers are included as well.

Q. What are major achievements of the graduates after the first term and what kinds of changes do the second term program adopt?

A total of 84 students graduated from the first term program, 35 of those got jobs at relevant research institutes as experts and all of them earned meaningful results; the graduates participated in 12 industry–academia–research institution projects, published 48 papers, made 72 academic presentations, attended 117-subject classes and conducted 146 days of field study. In the second-term, we now have four universities as Kangwon National University has newly joined the program. In this term, convergence subjects based on the One Health approach are reinforced in addition to the previous programs that focus mostly on pressing diseases, so that a wider academic approach becomes possible.

Q. What do you think is the desirable direction of the graduate school in the future?

To respond to wild animal diseases well, not only diagnostic techniques but also ecological backgrounds and environmental causes of diseases should be comprehensively considered. In this regard, even though the graduate school currently runs a curriculum related to ecology, it plans to provide broader education by connecting related research areas such as biology and ecology more closely. And I hope that the graduates can grow into real experts equipped with both academic knowledge and field experiences and that talented personnel take the lead in nation-level responses to animal diseases. I also hope that more young researchers participate in this field and contribute to building healthy ecosystems where humans and Nature harmoniously coexist.

Workshop for Nurturing Experts on Wild Animal Diseases

Writer: Editorial Team | Reviewer: NIE

Doing Research Using AI and Spread Value of Ecology

Changes Made by the NIE in 2025

A screen image of Eco.AI System automatically identifying species

Protect Ecology and the Public with AI Technology Developed in Public-Private Collaboration

By actively using artificial intelligence (AI) technologies, the NIE opened a new possibility in the fields of wild animal protection and ecosystem monitoring. "Eco.AI System" is an autonomous sensing camera developed in collaboration with Sphere AX and KAIST, which can identify species by autonomously analyzing massive pictures of wild animals and organize the data. In particular, this system has a critical role in research on endangered species and enhances the efficiency of research by accurately identifying species of diverse wild animals such as mountain goat, boar, and deer. In addition, the NIE developed an AI-based road kill prevention system in collaboration with the Korea National Park Service and POSCO DX. This system can accurately detect animals approaching 150 meters ahead and show the warning message so as to prevent traffic accidents. These two AI-based projects are expected to greatly influence not only ecosystem protection but also public safety.

From Releasing to Monitoring: Efforts for Biodiversity Conservation

In 2025, the NIE has achieved meaningful results in the fields of endangered species restoration and habitat conservation. First of all, the NIE developed an identification diagnosis technology that can accurately distinguish between *Abies koreana* E. H. Wilson and *Abies nephrolepis* (Trautv. ex Maxim.) Maxim.—which look so similar that the differences between the two are barely recognizable to the naked eye—and applied for a patent recently. The technology, based on molecular markers, can identify more accurately similar coniferous trees, thus contributing to conserving alpine ecosystems that are being threatened by climate change.

Restoration projects for endangered species have been conducted as well. The NIE released 300 Seoul pond frogs *(Pelophylax chosenicus* (Okada, 1931)) to Okgu Park in Siheung-si after attaching identification equipment to them and investigated their ecological information. It also released *Haplotropis brunneriana* Saussure, 1888 for Uiseong-gun—devastated by a massive wild fire—to facilitate population recovery. The NIE also successfully made a Class I endangered plant, *Cypripedium guttatum* Sw., adapt to the habitats for the first time in Korea. In addition, the NIE transplanted 200 individuals of

A close investigation of the ecosystem of Dokdo, Spring 2025

In 2025, the National Institute of Ecology (NIE) has made efforts to spread the value of ecology by conducting diverse exhibition, education, and research activities and achieved meaningful results in the fields of ecology research, restoration projects, AI-based research and education, restoration of endangered species, and habitat restoration. Let us reflect on the major projects undertaken by the NIE in 2025 and the research results.

Pterygopleurum neurophyllum (Maxim.) Kitag. to Jungnangcheon Stream and tested the possibility of urban ecosystem recovery.
It also achieved some meaningful results in natural habitat investigation. Celebrating the 80th anniversary of the National Liberation Day of Korea, the NIE conducted three close investigations of the ecosystem of Dokdo and held a symposium in collaboration with Naver. Moreover, it discovered a new habitat of *Polyphylla laticollis manchurica* Semenov, 1900 in Yeoncheon and confirmed a breeding nest of *Aquila chrysaetos* (Linnaeus, 1758) in Mt. Hallasan for the first time in 77 years, gaining attention from academia.

Seoul pond frogs released to Okgu Park

Eco-Platform Seoul

Spreading Ecological Value Through Regional Hubs and Education

The NIE has spread ecological value to the country through its regional hubs. The NIE Eco-Platform Seoul located in the Seoul Children's Grand Park, for example, held an exhibition titled "Ecology through Famous Paintings" and implemented other urban ecological education programs, conveying the preciousness of Nature to citizens. Eco-Platform Sejong, located in the Sejong Lake Park, has grown into an ecological culture space where an exhibition using animal images from famous paintings, an aquarium, and an audio commentary system have been prepared. Furthermore, the NIE transformed Jongcheon Elementary School in Seocheon-gun, which was closed down, into an ecological education space for digital ecological education programs. "Future Environmental Exploration Education" for teenagers and university students includes hands-on programs about biodiversity conservation and genetically modified organisms (GMOs) and was selected as an excellent environmental education program by the Ministry of Climate, Energy and Environment.

A Promise for A Sustainable Ecological Future

Through 2025, the NIE has practiced ecosystem protection, promoted the importance of biodiversity conservation, and created ecological environment together with the public through diverse exhibitions and educational programs. From AI-based research to expansion of regional hubs and ecological education for the future generations, the NIE will do everything it can for biodiversity conservation and spread of ecological value. It will walk the path of coexistence with all the people who love ecology and Nature.

Writer: Editorial Team | Reviewer: NNIBR

10 Years with Freshwater Organisms: For a Sustainable Future

Special Exhibition: 10-Year Records on Freshwater Organisms

Celebrating the 10th Anniversary, the NNIBR is Reflecting on the 10-Year Journey It Has Made

For the NNIBR, 2025 is a meaningful year marking the 10th anniversary. Since its establishment in 2015, the NNIBR has discovered 3,263 species of freshwater organisms from rivers and wetlands, including new and unrecorded ones. It has also secured more than 620,000 pieces of specimens, strengthening its position as a center for freshwater organism research in Korea. In addition, as it applied for 148 patents and 44 cases of technology transfer, it established a foundation for bioresources to be used for industrial purposes.

The NNIBR published "10 Years History of the NNIBR," which documents its journey from the background of its establishment to what it has done and achieved in research, exhibition, and education since its inception in 2015. On June 17, 2025, the NNIBR held its 10th Anniversary ceremony under the theme of "10 Years with Freshwater Organisms and Toward a Sustainable Future" and shared its 10-year achievements, vision for the next 10 years, and reiterated the purpose of its establishment—securing sovereignty over freshwater organisms—once again. On the same day, a special exhibition titled "10-Year Records on Freshwater Organisms" was opened. It vividly shows the journey of the NNIBR through images, video clips, and real materials, reminiscing on its meaningful 10-year history.

Widen the Possibilities of Bioresources

The NNIBR has raised the possibilities of applied research and industrialization of freshwater organisms through its discovery of new and unrecorded species. For example, it discovered a biomaterial that can absorb highly concentrated carbon dioxide from freshwater microalgae and a microorganism that can transform fructose to allulose without genetic modification. In addition, it also discovered a new microorganism that can remove both heavy metals and organic pollutants from waste water at the same time, focusing on research that helps solve environmental problems in practice. The NNIBR has conducted studies on various biomaterials including a drug delivery agent using a diatom frustule (biogenic silica), an antioxidant material originating from a freshwater plant, and an antibiotic material of actinomyces, raising the potential of biomaterials for industrial use.

For better use of such research results, the NNIBR has created database of results so that they can be used by researchers and the industry. For example, the institution has published A *Catalogue of the FBCC: Useful Microalgae, and Catalogue of the FBCC: Useful Bacteria, Actinomycetes,* both of which contain taxonomical information as well as physiochemical characteristics, and these are the results of practical research data. Furthermore, it has also published *List of Freshwater Species in Korea,* which organized more than 23,000 freshwater organisms from among over 60,000 freshwater species in Korea, elaborating the foundation of national biodiversity management.

Traveling the Ecological Transformation Class

The Nakdonggang National Institute of Biological Resources (NNIBR) has kept the value of biodiversity through research and conservation of freshwater organisms, exhibitions, and education programs since its inception in 2015. For the NNIBR, the year of 2025 is a meaningful milestone to reflect on its past 10 years as well as prepare for the next 10 years. Let us share the new start of the NNIBR.

Teach and Learn Biodiversity with the Public

The NNIBR has held diverse exhibitions and conducted numerous education programs so that the public can understand and experience biodiversity. For example, it prepared a special exhibition called *Mystical Freshwater World* using 3D graphics and mixed reality (MR) technology—providing an opportunity to visitors to meet endangered freshwater species in a virtual ecological space and experience the importance of ecosystem conservation. It has made efforts to increase the availability of exhibition and education programs nationwide by operating traveling and online exhibitions and has developed seasonal events including a biodiversity day and a grand festival for children in which the whole family can participate.

As the biodiversity education programs are systematically customized according to the life cycle from preschoolers, students, and citizens to experts, everyone can choose the program suitable for their level. The NNIBR has widened educational opportunities by launching a "Teaching Equipment Lending Service," which is a year-round program to lend four teaching equipment that it independently developed to schools and organizations all over the country for free. As such, its exhibitions and education programs have developed into hands-on biodiversity platforms where citizens can experience and learn. Consequently, these events have become very popular, and more than 1.83 million exhibition visitors and 120,000 participants for education programs have been recorded.

Special Exhibition: Mystical Freshwater World

Annual hands-on events

Next 10 Years Toward the Future

For the NNIBR, the 10th Anniversary is not a simple celebration. Rather, it is a journey of the NNIBR and the public to keep the value of biodiversity together, and its results have paved the way to leap forward in the future. In this regard, the NNIBR will further strengthen expertise and publicity in the field of freshwater organisms and create a sustainable ecosystem where research, industry, education, and communication can create a virtuous cycle.

10 Years with Freshwater Organisms and Toward a Sustainable Future

Writer: Editorial Team | Reviewer: HNIBR

Record the Future of Ecology Where Climate Change is Occurring

During 2025, the Honam National Institute of Biological Resources (HNIBR) recorded how the ecology has changed according to the wave of climate change—from new organisms amid marine litter to the visitors of the sea of Moon Island, Jeju, and to lessons learned from the islands. Every small discovery has become a major path to protecting future ecology.

1.Megabalanus coccopoma (Darwin, 1854): An alien barnacle in the genus Megabalanus, found on an abandoned rubber slipper collected on the coast of Chujado, Jeju-si

2. Aspidelectra bihamata (Liu & Wass, 2000): A fouling bryozoan in the genus Canda found on an abandoned plastic fishing gear collected at Geomsan Port of Jeungdo, Sinan-gun. It attaches to the structures of fish farms

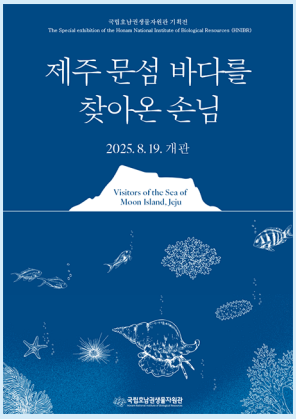
Visitors Hiding Behind Marine Debris

In 2025, the HNIBR discovered a new life from almost invisible areas. It investigated invertebrates attached to marine debris in the island and coastal areas and found two alien species for the first time in Korea. This investigation shows that marine litter is not simple pollutants; rather, it can be a medium where alien species move and settle. The HNIBR research team discovered a barnacle, *Megabalanus coccopoma,* from an abandoned rubber slipper collected on the coast of Chujado, Jeju-si, and a moss animal, *Aspidelectra bihamata,* was collected on Jeungdo, Sinan-gun, and both are known as tropical species. It will conduct research on the distribution and genetic characteristics of the aforementioned species to determine their origin and prepare the measures to prevent the spread of alien species. The research results, which found a new biological clue even from marine garbage, are meaningful for island and coastal ecosystem conservation and for securing biosovereignty.

Meet New Species Brought by Climate Change on Moon Island

In 2025, the HNIBR brought the ecological changes caused by climate change to its exhibition hall. By expanding its research data into the exhibition space, the HNIBR made visitors directly feel and experience the changes in organisms.

A small island near Seogwipo Port, Jeju-si, Moon Island, is the first place the subtropical marine species come and is home to various marine species such as soft corals, sea slugs, and clownfish. The research team confirmed 115 species including 39 cnidarians and 32 mollusks there; 18 species among them were categorized as potential domestically-unrecorded species. Most of them came riding the tropical ocean currents, implying that they were affected by climate change.



Special Exhibition: Visitors of the Sea of Moon Island, Jeju

The special exhibition, *Visitors of the Sea of Moon Island, Jeju,* was prepared based on its research results. With introducing diverse marine organisms through digital video clips, photos, and experts' interview the exhibition makes visitors directly feel and experience ecological changes brought by climate change. Moon Island, a small island near Seogwipo Port, is becoming a symbolic site for climate change and biodiversity conservation now.

Fish Exploration

Forest Visit Program

Learn in Nature and Grow with People

In 2025, education programs conducted by the HNIBR have moved Nature into the classroom. *Three Days and Two Nights of Great Expedition to Islands,* a stay style ecological education program for family participants that was newly launched this year, provides in-depth researching experiences as the HNIBR researchers themselves participate in this program.

For example, one of the classes was open on Bigeumdo and Dochodo in Sinan-gun, which are called Angel Islands. While walking around mudflats, salt ponds, forests, and beaches, the participants caught gastropods and crabs in the mudflat, observed the interaction among plants in the forests, understood the cycle of ecosystem by catching fish themselves, and experienced island ecology. In addition, a visit to the sites where the movie, *Jasaneobo,* was shot, a tea ceremony experience, and constellation observation were included. The participants commented that the field class together with the HNIBR researchers was the most impressive part.

In this regard, the HNIBR plans to expand ecological experience programs targeting islands and coastal areas so that citizens can have more experiences to learn and feel in nature.

See the Future in the Sea of Change

In 2025, the HNIBR responded to climate change and biodiversity conservation—the challenges of our time—encompassing the boundaries of research, exhibition, and education. From the research on alien species attached to marine litter, to the exhibition on Moon Island, and to the expedition program, the HNIBR has observed and recorded ecological changes together with the people, and spread the value of bioresources that connect the regions and the world. By conducting research that lead to big changes from a small creature, providing education delivered in the research fields, and preparing exhibitions allowing visitors to experience the changes, the HNIBR has been recording the future of ecology where climate change is actually happening.

The Beauty of Life Painted with Delicate Brushworks

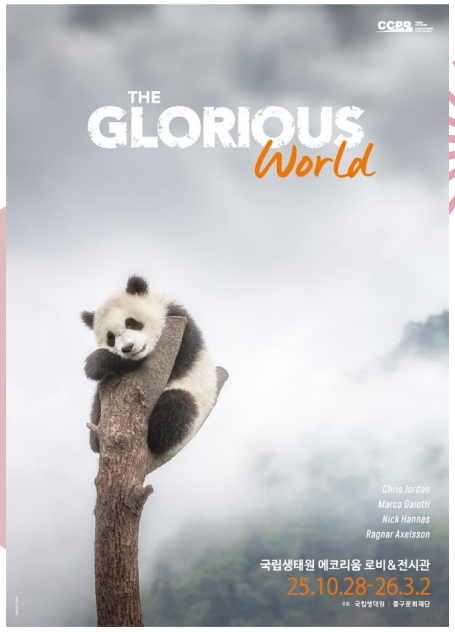
National Institute of Biological Resources (NIBR)

A Special Exhibition for the Awarded Works of the 20th Native Flora and Fauna Arts Contest

Date: October 24, 2025 April 30, 2026

Venue: Saengsaengchaeum Special Exhibition Hall at the NIBR, Seo-gu, Incheon

Even in a barely visible trace, texture of a feather, and the flow of a leaf vein, Nature is alive. And there are people who deliver such minute worlds onto canvas with their delicate hands. The NIBR is holding a special exhibition of 48 paintings awarded at the 20th Native Flora and Fauna Arts Contest. You can feel the breath of Nature and the beauty of life again on canvas. This exhibition consists of the pieces selected from among 815 pieces of art works received from May 12–August 29, 2025. Through an evaluation by 7 jury members, who are experts in biology and arts, 48 works, 12 pieces each from 4 groups comprising adults, high schoolers, middle schoolers, and elementary schoolers, were chosen. The exhibition of these paintings is being held at Saengsaengchaeum Special Exhibition Hall at the NIBR until April 2026. The works that were finally selected demonstrate exquisite brushworks and sharp observation, vividly delivering the essence of botanical and animal drawings, which share emotions through observation by depicting ecological characteristics and beauty of the species native to Korea.



Portraits of the Earth in the Memory of Arts Amid Rapid Changes

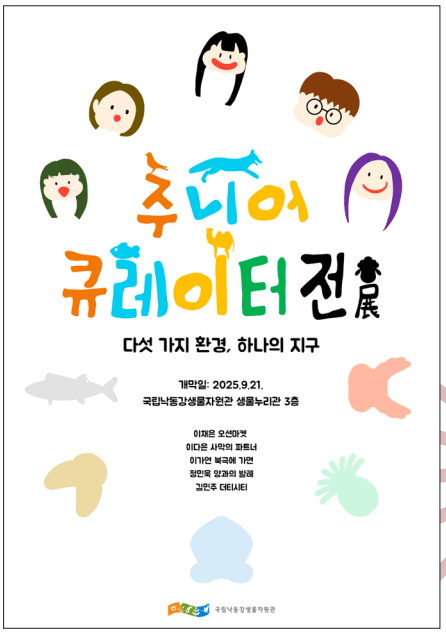
National Institute of Ecology (NIE)

A Climate Environment Photography Project: *The Glorious World*

Date: October 28, 2025–March 2, 2026

Venue: Lobby and Exhibition Hall at Ecorium, NIE, Seocheon-gun, Chungnam

The NIE is holding a special exhibition to reflect the changes of the earth and choices of human beings with the language of photography. A climate environment photography project, *The Glorious World,* under the theme of climate change, showcases the boundary between ecology and environment through arts. The exhibition invites more than 70 works of Ragnar Axelsson who elucidated on dwellers in the polar regions and unprecedentedly rapid climate change that they have to face, Marco Gaiotti who recorded endangered wild animals due to habitat destruction, Nick Hannes who raised questions about sustainability of democracy through artificial environments and consumption culture of Dubai, and Chris Jordan who created visual works dealing with massive consumption and environmental issues. Seeing the splendid civilizations built by human beings and the cracks hidden behind them at the same time and thinking about the paradox in the title, "The Glorious World," visitors will ponder upon the question of where we should head for.



One Earth Painted from Five Perspectives

Nakdonggang National Institute of Biological Resources (NNIBR)

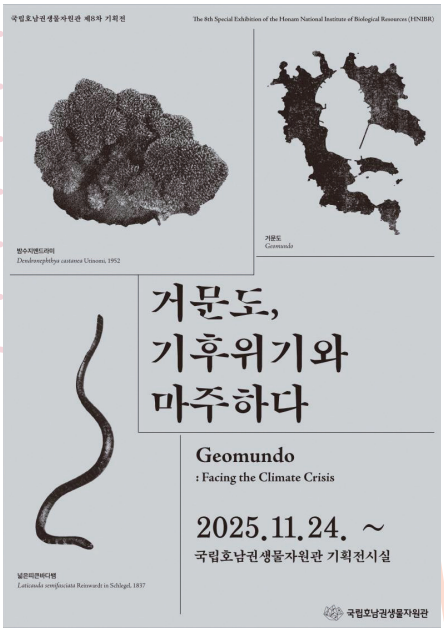
Junior Curator Exhibition – Five Environments, One Earth

Date: September 21–December 31, 2025

Venue: Third floor of the Exhibition and Education Building at the NNIBR, Sangju-si, Gyeongbuk

The NNIBR is holding a special exhibition about the story of coexistence on Earth told from the teenagers' point of view. *Junior Curator Exhibition – Five Environments, One Earth* is the first citizen participation exhibition of the NNIBR, planned by five junior curators under the theme of harmonious coexistence of animals and human beings living in five different climate environments. The ways that human beings live harmoniously with wild life in different environments has been freshly captured by teenagers' eyes, showing connectedness and balance of life in a delicate way.

At the exhibition hall, paintings and calligraphy works drawn by the junior curators are on display with taxidermized specimens, delivering each life's story more vividly. In addition, various experiences through a photo zone where visitors can become Inuit, sled dogs, and Valais Blacknose sheep, and a hands-on section where visitors can color their own postcards are also enjoyable. This exhibition contains the value of coexistence seen from the eyes of the future generations, and visitors can realize through the five different environment stories conveyed by five curators that everything is connected on Earth.



A Small Signal that *Laticauda semifasciata* and *Dendronephthya castanea* are Sending to Us

Honam National Institute of Biological Resources (HNIBR)

A Special Exhibition: *Geomundo: Facing the Climate Crisis*

Date: November 24, 2025–May 31, 2026 (It can be changed)

Venue: Exhibition Hall of the HNIBR, Mokpo-si, Jeonnam

A special exhibition, titled *Geomundo: Facing the Climate Crisis* and presented by the HNIBR, sees the changes in marine ecosystem caused by climate change through the window of "the waters off Geomundo." The waters off Geomundo, located between Yeosu and Jejudo, are affected first by climate change due to its geographic location. In 2023, *Laticauda semifasciata* appeared in the waters off Geomundo for the first time. And *Dendronephthya castanea,* which was considered to inhabit only the waters off Jejudo in Korea, was discovered near Geomundo, which is actual evidence of climate change. Their appearances are the warnings that climate change is already happening here, deep in our oceans. In this regard, the HNIBR desires to vividly deliver the symptoms of changes observed in the sea off Geomundo through this exhibition. Video clips, real specimens, and visualized marine data show at a glance how climate change has been reorganizing ecology and allow us to think together the future of our oceans that we should protect.

Writer. Ye-eun Moon (Qline)
— Photo: NIBR, Seosan Birdland

Land of Pause amid Long Winter Journey – Cheonsuman Bay Migratory Bird Sanctuary in Seosan

In the breeze over the reclaimed land, thousands of birds are flapping their wings. The migratory birds returning from a long journey to the north arrive at Cheonsuman Bay and rest their fatigued wings in the reed beds. Cheonsuman Bay is a very large resting place where sea, rice fields, and sky meet. As such, the winter of Cheonsuman is imbued with the flight of life.

Cheonsuman Bay where migratory birds are freely coming in flocks

A Resting Place for Winter Migratory Birds: Cheonsuman Bay

Even birds crossing the sea with strong flapping of wings need a place to rest. Cheonsuman Bay, a broad land, is like a midway spot during the long journey of birds flying from Northern Siberia or Manchuria to Southeast Asia. Winter migratory birds eat grains and fish and take some rest in the reeds here. A maximum of 300 species of winter birds—more than 150,000 individuals per day—visit Cheonsuman Bay every year. Above all, when Baikal Teals fly in massive flocks showing synchronized "aerial ballet" movements, it creates the most spectacular scenery. Other than that, a wide variety of winter migratory birds including bean geese, whooper swans, eagles, white spoonbills, storks, and hooded cranes come here every year.

Birds freely resting in flocks in Cheonsuman Bay make us feel at ease. In the middle of the trails, you can meet several bird observatories. Its walls are built with rice straw and visitors can watch the birds through the windows on the walls without bothering them. Wearing clothes with primary colors or making too much noise is prohibited so that birds are not frightened.

Thanks to the reclamation project of AB District in Buseok-myeon in Seosan-si of Chungnam from 1980, about 155 km2 of reclaimed lands and freshwater lakes were created in Buseok-myeon in Seosan-si of Chungnam. Since the 2000s, for wetland restoration and protection of migratory birds, steady efforts on ecosystem restoration through water-quality improvement have been made. The most representative effort is a project on feeding migratory birds. In this project, some crops are left deliberately in the fields during a harvest so that the migratory birds visiting Cheonsuman Bay can eat. Due to such efforts, Cheonsuman Bay has become an internationally known wintering site for migratory birds. As of now, 28 species of natural monuments and 10 endangered wild species live there.

Enjoy Birdwatching at Seosan Birdland

If you are interested in birdwatching, we recommend you to visit Seosan Birdland. Seosan City runs Seosan Birdland, an ecological park to protect the ecological value of Cheonsuman Bay, a world-class migratory bird sanctuary. Seosan Birdland has diverse indoor facilities including a migratory birds exhibition hall, a 4D exhibition hall, a nest observatory, and outdoor spaces including an open-air stage, an observation deck, and a forest playground. In early November 2025, it held the 14th Asian Bird Fair. The fair is the biggest event on birds in Asia and the theme this year was "Coexistence Between Wild Birds and Human Beings."

You can participate in a tour for watching migratory birds as well. During the 90-minute birdwatching tour, participants take a 20-seater bus and enjoy birdwatching along the course while listening to a professional guide's explanations. If you are interested in birdwatching, make a reservation. In addition, the Forest Ecological Experience program presents seasonal ecological observation. The theme of the program changes every season, based on birds that can be watched during a particular season.

A flock of eagles observed in Seosan Birdland

Migratory Birds Museum at Seosan Birdland where visitors can learn about the migratory birds that come to Cheonsuman Bay

Ganworam Hermitage

Ganworam is a hermitage floating in the ocean. In this small island, there is just one small hermitage—Ganworam. However, at low tide the sea is parted and Ganworam is connected to shore via a hidden walkway. Twice a day at high tide it is an island, but at low tide it is a part of land. This mysterious Ganworam is one of Seosan's nine famous scenic spots (Seosan 9 Gyeong) and a well-known sunset spot in Seosan.

It was built by the Great Monk Muhak, the monk to King Taejo of the Joseon Dynasty. The name of the hermitage is directly tied with Muhak himself as it is said Muhak became enlightened while meditating under the moon. This humble hermitage, which has Gwaneumjeon Hall, Sansingak, and Yongwanggak Shrines, a 250-year old spindle tree, and a Buddhist Bell Shrine, became famous after the Monk Mangong prayed for the independence of Joseon for one thousand days here. In fact, three days after he completed his prayer Joseon became independent.

When the sun is dipping into the deep blue ocean and the maple trees turn red, the scenery looks exactly like a quiet and peaceful landscape painting. How about looking back on the year of 2025 and relaxing yourself at Ganworam? Do not let your powerful flapping consume you too fast and make you exhausted.

Magnificent landscape of Ganworam Hermitage where the boundary between the sea and the sky is ambiguous

① Hooded Cranes

(Grus monacha)

A hooded crane is a Class II endangered wild species and a natural monument. It is all black, except for its white head and neck. It has a body length of about 100 cm and is relatively small compared to the cranes that visit our country. It mostly eats crops, roots of plants, and insects and lives in group around estuaries or farmlands. It breeds in Siberia, China, and Mongolia and spends the winter in Korea and Japan.

② Scaly-Sided Merganser

(*Mergus squamatus Gould*, 1864)

A scaly-sided merganser is a Class I endangered wild species and a natural monument. Its chest is white and on the flanks is a scaled pattern. Males have a long metallic greenish blue crest on their head. It has a red bill and the body length is about 57 cm. It mostly lives in fast-flowing clean freshwater areas including upper- and mid-rivers.

A Resting Place for Migratory Birds

Endangered Wild Birds Inhabiting Cheonsuman Bay in Seosan

③ Little Tern

(*Sterna albifrons* Pallas, 1764)

Little tern is a Class II endangered wild species and relatively small compared to other terns with about 25 cm of the body length. In summer, its upper head is black, cheeks and forehead are white, and legs are yellow. It breeds mostly in the sands of estuaries and reclaimed lands and eats different varieties of small fish. Recently, it was found on a construction site in Cheonsuman Bay, making headlines.

④ Stork

(*Ciconia boyciana* Swinhoe, 1873)

Stork is a Class I endangered wild species and a natural monument. The body length is about 110 cm and the whole body is white, but the wingtips are black. The bill and legs are black and the skin around the eyes is reddish. It eats mostly fish, frogs, and insects living in wetlands such as rivers, swamps, and paddy fields. It was distributed nationwide in the past, but now, only a small number of storks have been observed in artificial propagation places or conservation areas. It is a symbolic migratory bird in Cheonsuman Bay Migratory Bird Sanctuary.

Research

The National Institute of Biological Resources (NIBR)

First record of Buteo japonicus japonicus in the Republic of Korea

Two individuals of Eastern buzzard *(Buteo japonicus)*—one in 2022 and the other in 2024—were rescued in Busan and euthanized after being transported to the Busan Wildlife Medical Center. Genetic analyses on ND6, tRNA-Glu, ψCR (pseudo-control region) 821bp, and Chromo-Helicase-DNA binding (CHD) sex identification were performed using tissue samples from the individuals, confirming that they were female B. j. japonicus. The bird is mostly found in Japan, Russia, and Sakhalin and has never been confirmed in the East Asia Continent. The genetic distance value is 0.015 to its subspecies, *B. j. burmanicus*, which is a winter migrant in Korea, and has a genetic distance value of 0.010–0.031 to its allied species. The 2022 bird was an adult on 2022, while the 2024 bird was a juvenile (1st winter plumage) in appearance, and the external characteristics of the birds did not differ from those of *B. j. burmanicus*. These are the first record of *B. j. japonicus* in Korea and the research team suggested the name of subspecies as Buteo japonicus japonicus.

Cheong E.J., Kim D.W., Lee H.A., Lee Y.S., Kim Y.W., Jung S.H., Ryu H.S., Kang S.G. 2025. *First record of Buteo japonicus japonicus in the Republic of Korea. Korean Journal of Ornithology. 27(0): 00–00.*

National Institute of Ecology (NIE)

Habitat Characteristics of *A. coreana* and Prediction of its Potential Distribution

Aculamprotula coreana is a freshwater bivalve species, endemic to the Korean Peninsula and has a vital role in maintaining aquatic ecosystem health through filter feeding. Historically, it was widely used in the domestic pearl farming industry, but rapid industrialization, water pollution, and river development have led to habitat degradation and a significant population decline. Although currently designated as a Class I endangered species by the Ministry of Climate, Energy and Environment, research and conservation efforts remain limited. This study analyzes the habitat characteristics of A. coreana using occurrence data from 21 sites recorded between 1975 and 2022 and predicts its potential distribution using the MaxEnt model. Stream order, topographical features, and water quality parameters were used to evaluate habitat conditions, while 19 bioclimatic variables were applied to improve distribution prediction accuracy. The results show that A. coreana inhabits stable water environments in the mid to lower reaches of streams (orders 6–8) at elevations between 102 and 271 meters. The species is highly sensitive to turbidity-related factors such as biological oxygen demand, suspended solids, and total nitrogen, indicating that clean, stable water quality is essential for its survival. Among the bioclimatic factors, average summer temperature (BIO08) was identified as the most influential variable in predicting current distribution, suggesting that climate-driven increases in water temperature may be expanding suitable habitats. This study offers scientifically grounded insights into the species' ecological requirements and potential habitats, providing a valuable foundation for field-based validation, targeted habitat restoration, and the development of effective conservation strategies.

Soon Jik Kwon, Hong Geun Kim, Seung Pil Han, Yung Chul Jun, Yong Lak Jeon, Youngjun Park, 2025. Habitat characteristics and prediction of potential distribution according to *Aculamprotula coreana* (Martens, 1886) in the Republic of Korea. *Proceedings of the National Institute of Ecology of the Republic of Korea* (PNIE), Vol. 6(3): 109 118. https://doi.org/10.22920/PNIE.2025.6.3.109

Nakdonggang National Institute of Biological Resources (NNIBR)

A Study on the Efficacy of Xanthone O-glucoside Isolated from *Iris Setosa* to Inhibit *Naegleria fowleri*

Primary amoebic meningoencephalitis (PAM), caused by *Naegleria fowleri*, is a life-threatening disease, and the urgent need for effective new drugs is highlighted by the suboptimal efficacy and toxicity of current treatments. This study identified a natural compound, DX (3,5-Dihydroxy-8-methoxy-1-O-β-D-glucopyranosyl xanthone), isolated from *Iris setosa*, that shows potent anti-amoebic activity. DX demonstrated a low IC50 value of 55.37 μM against N. fowleri with negligible toxicity to C6 glial cells. DX induced apoptosis-like programmed cell death in amoebae, characterized by DNA fragmentation, increased caspase-3 activity, and mitochondrial dysfunction. It also disrupted the actin cytoskeleton and effectively protected glial cells from *N. fowleri* phagocytosis. In conclusion, the selective anti-amoebic activity of DX positions it as a promising candidate drug or a supplemental compound for developing and optimizing treatments for PAM.

Lê, H.G., Hwang, B.S., Choi, J.S., Jeong, Y.T., Võ, T.C., Cho, M., Hong, Y., Kim, J.H., Oh, Y.T., Na, B.K. A xanthone O-glucoside isolated from Iris setosa Pall. ex Link exhibits promising anti-amoebic activity against the brain-eating amoeba *Naegleria fowleri*. Phytomedicine, 147, 157199.

Honam National Institute of Biological Resources (HNIBR)

The HNIBR confirmed that *Zanthoxylum schinifolium* extracts promoted adipocyte differentiation and improved glucose metabolism

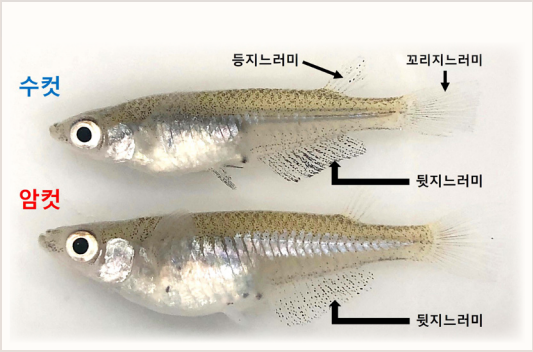
The HNIBR confirmed that the leaf and twig extracts of *Zanthoxylum schinifolium* (ZS)—a native plant in Korea—can promote adipocyte differentiation and improve metabolic functions. According to the cell experiment, ZS extracts significantly promoted adipocyte differentiation and increased the level of peroxisome proliferator-activated receptor gamma (PPARγ), which has a key role in controlling glucose metabolism and adipogenesis. In particular, the leaf extract enhanced adipogenesis without inducing cytotoxicity, attributed to the inhibition of C/EBP homologous protein (CHOP) and stimulation of mitotic expansion. The HNIBR research team also confirmed that the several active compounds in ZS have high binding affinity for the full-agonist ligand-binding domain of PPARγ, illustrating that the extracts could emerge as novel antidiabetic drug candidates.

Jiseok Lee, Bo-Ram Kim, Kyeoungtae Park, Eunbin Kim, Jin-Woo Jeong, Jung Jin Kim, Sung-Suk Suh, Jong Bae Seo, 2025. *Zanthoxylum schinifolium* extracts enhance 3T3-L1 adipocyte differentiation via CHOP inhibition and PPARγ activation. *Animal Cells and Systems*, in press.

The NIBR discovered Oryzias latipes does mating responding to a hormonal signal for the first time in Korea. The result can be used for freshwater ecosystem conservation.

The NIBR confirmed for the first time in Korea that male *Oryzias* latipes can recognize females with a high sex hormone level (estrogen) and mate with them. The NIBR research team has been conducting a species conservation study since 2024, and, in 2025, it studied the behavioral characteristics of organisms. As a part of this study, the team conducted an experiment to reveal the characteristics of mating behaviors of *O.latipes* by putting female and male individuals separately in a water tank with a divider. The results showed that when males could not visually recognize females but the waters they were in could flow through, the males could locate females with a high estrogen level in 20 s and showed courtship behavior. However, when the waters they were in were divided, they did not show such behavior.

In general, most fishes respond to visual signals including a male's bright, vibrant coloration and mating dances, and only some species whose eyes were degenerated in the process of adjusting to darkness, such as catfish and lamprey, respond to hormones and find their mates. Therefore, it is extremely rare that *O.latipes,* who has big eyes with good eyesight, finds its mate after responding to a hormone. This is the first study that confirms this fact. More specifically, the research discovered that *O. latipes* perceives hormone as an important signal for mating, and it can be easily affected even by hormone analogues introduced from the outside. The research team plans to conduct a follow-up study to reveal various ways of fishes sending signals for mating. Based on the findings, there is a possibility to help control endangered or alien species.



Native *O.latipes* used in the research
Black markings on the anal fin of male *O.latipes* get darker during the spawning season

The NIBR launched a facial cleanser developed with a state-owned patent on native plant extracts.

The NIBR launched a facial cleansing product in September 2025 after it transferred the technologies developed based on its research that confirmed anti-inflammatory and skin whitening effects of plants in the genus of *Cyperus*. Plants in the genus of *Cyperus* have been regarded as weeds because they are easily found at the roadsides or the gaps on the pavement and grow well even where soil is not sufficient. The NIBR research team conducted research to validate the usefulness of native species and found that *Cyperus* extract can decrease the production of nitrogen oxide (NO)—a major cause of skin inflammation—by up to 90%. The extract can also inhibit production of melanin, which makes skin tone darker by more than 65%. The research opens a possibility for extracts of the plants in the genus *Cyperus* to be used for skin anti-inflammatory and whitening cosmetics.

The research result was registered as a state-owned patent in November 2022, and, in May 2023, the NIBR transferred the technology to a cosmetics company, Fulcos. Fulcos then developed a facial cleansing product using the *Cyperus* extract. This product was officially launched in September 2025 and was introduced at the 2025 Jecheon Korean Medicine and Natural Product Industry EXPO at Jecheon Oriental Medicine Expo Park (in Jecheon-si, Chungcheongbuk-do) from September 20–October 19, 2025 and at the Mega Show 2025 at the Korea International Exhibition Center (KINTEX); (in Ilsanseo-gu, Goyang-si) from November 13–16, 2025. Based on this achievement, the NIBR plans to discover the value of diverse native species and use it more actively for industrial purposes.

Power-type facial cleanser containing extracts of *Cyperus* nipponicus Franch. & Sav. and *Cyperus* microiria Steud

The NIWDC conducted an empowerment education for personnel in the organizations related to wild animal avian influenza.

The NIWDC conducted an empowerment education for personnel in the organizations related to wild animal avian influenza (AI) for two days from September 18. Highly pathogenic avian influenza (HPAI) occurred in 43 wild birds in Korea during the last winter season (2024–2025), which is approximately 2.3 times higher than the season before that (19 cases). As such, HPAI occurs every year. In particular, in March 2025, HPAI infection in leopard cats, a wild mammal, was detected for the first time in Korea, demonstrating that the virus can possibly jump to mammals, including human beings in Korea. Therefore, preemptive monitoring of wild animals becomes important.
Against this backdrop, this education program was organized for employees in the Ministry of Climate, Energy and Environment (MCEE), Ministry of Agriculture, Food and Rural Affairs (domestic animals), Korea Disease Control and Prevention Agency (humans), Ministry of Public Administration and Security, and local governments to promote a deeper understanding of diseases and enhancing responding capabilities. The program consisted of two parts: In Part I, the MCEE and the NIWDC made presentations on (i) policy direction and monitoring plans for wild birds in winter and (ii) investigation of wild mammals and how to respond. In Part II (the second-day session), external experts delivered various AI-themed lectures including (i) responding measures against AI occurrence in other countries, (ii) prevention and management of human infections, and (iii) monitoring wild bird droppings in winter. Based on this education program, the NIWDC, together with local governments and other relevant organizations, plans to do its best to minimize the occurrence of AI this winter.

Publicity materials about guidelines on the process of reporting dead wild animals

Holding an international conference for enhancing international capabilities to fight against wild animal diseases.

The NIWDC held an International Conference on Wild Animal Diseases to discuss how to advance the wild animal disease response system and strengthen global collaboration on November 27–28, 2025 at the Kensington Resort Seogwipo, Jeju. With the aim of stopping the spread of diseases between wild animals, human beings, and livestock and reinforcing responding measures against new infectious diseases, the conference hosted not only Korean experts but also experts from Vietnam and Japan.
In this conference, Le Van Phan, a professor at the National University of Agriculture in Vietnam, gave a presentation on “Update on African Swine Fever (ASF) Outbreaks in Vietnam (2019–2025)—Insights and Lessons Learned.” In addition, three Japanese experts including Shimoda Hiroshi, a professor at Yamaguchi University in Japan, shared their recent research results including the following: (i) viruses from various animals, analysis of the dynamic of fever (classical swine fever (CSF)); (ii) the effects of bait vaccination in wild boar population in Japan; and (iii) how tick-associated viruses affect fitness in ticks.
In addition, as research results achieved by the students at the graduate school of wild animal diseases (Kangwon National University, Seoul National University, Jeonbuk National University, and Chungbuk National University) sponsored by the NIWDC were also introduced, the conference provided opportunities for nurturing experts and expanding research foundation.
Furthermore, through this conference, many Asian experts in wild animal diseases gathered and discussed how to improve national disease prevention capabilities and solicit international collaborating responses.

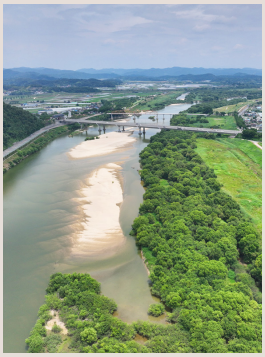
International Conference on Wild Animal Diseases

The NIE developed a carbon absorption factor based on willow species in inland wetlands.

The NIE announced that it will develop a carbon absorption factor this year based on willow species to increase the accuracy of calculation of the quantity of carbon absorption in inland wetlands. Last year, the NIE developed a carbon absorption factor for Salix pierotii Miq. and applied it as a new factor. This year, expanding the target plant to *Salix triandra* subsp. Nipponica, the NIE is expediting the development of a calculation system for the quantity of carbon absorption in riparian forests, which has not been done yet. The NIE carbon absorption research team plans to quantify carbon absorption capability of *Salix triandra* subsp. Nipponica by conducting field investigation and analysis and use the results for registering the national inventory emission factors.

This year, field investigation has been conducted at five locations—Namhangang River (Yeoju), Geumgang River (Buyeo), Yeongsangang River (Naju), Namgang River (Sancheong), and Nakdonggang River (Dalseong).

Chang-suk Lee, President of the NIE, said, "Based on the research, we will provide actual figures of carbon absorption amount of inland wetlands and raise accuracy of the national inventory emission factors," adding, "With keeping the value of future coexistence the NIE will scientifically support wetland conservation and preservation policies and achieving the nationally determined contribution (NDC)."



Riparian forest by Namgang River, Uiryeong-gun

Riparian forest by Gyeseongcheon Stream, Changnyeong-gun

The NIE released eight commemorative medals of endangered species with collaboration with the Korea Minting and Security Printing Corporation (KOMSCO)

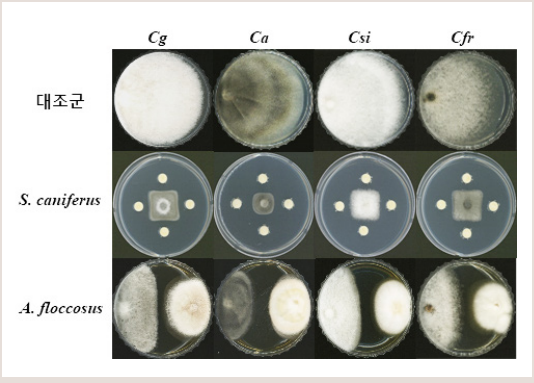
In September, the NIE released eight commemorative medals of endangered species in collaboration with the KOMSCO. The medals aim at commemorating domestic endangered wild species due to nature- or man-made threats, including climate change and environmental pollution, and raising awareness regarding the importance of protecting them These medals are designed by a group of artists with savant syndrome under the message of "Live Together," meaning that human beings and Nature should live harmoniously together.

On the medals are eight familiar species—*Elaphe schrenckii, Charonia lampas, Mauremys reevesii, Naemorhedus caudatus, Gymnopleurus (Gymnopleurus) mopsus, Strix aluco Linnaeus, Eremias argus, and Pteromys volans aluco*—from among the 282 designated endangered wildlife under the Wildlife Protection and Management Act. These card-shaped medals are of two types: one made of 1g of gold (Au) with a purity of 99.99% and the other made of 5g of ultra-fine silver (Ag) with a purity of 99.99%, both of which are guaranteed by the KOMSCO. You can buy one at the KOMSCO's shopping mall (www.koreamint.com), currency sales shops, the Hyundai Home shopping mall (www.hmall.com), Hyundai Department online store, the Naver Smartstore, Shinsegae Department online store (www.ssg.com), and the online shopping hall of Hwadong Co. Ltd., and more.

Commemorative medals released in collaboration with the KOMSCO, the NIE, and artists with savant syndrome

The NNIBR discovered antifungal compounds against anthracnose

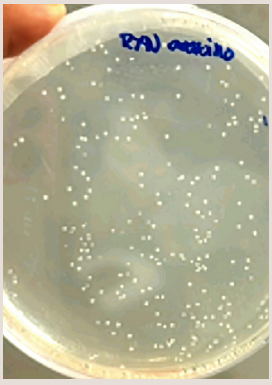
The NNIBR discovered freshwater microorganism strains and new antifungal compounds which can contain anthracnose from the freshwater environments in Korea, including Anyangcheon Stream. The NNIBR research team has conducted a study to discover source materials originating from freshwater fungus as bioproducts for crop protection since 2021 and has secured useful freshwater fungus and continuously developed crop protection products by using the research results.
Through the research, the NNIBR discovered two strains, *Aspergillus floccosus* and *Streptomyces caniferus*, which have antifungal activity against *Colletotrichum* sp. The research showed that the two strains can restrict the mycelium growth of *Colletotrichum* sp. by more than 70%. It also confirmed that treating the two strains on pepper seedlings distinctively improves their growth—the length and the thickness of the stems increased by more than 30%, proving that the strains can promote crop growth.
Based on these results, the NNIBR applied for a patent in October. The NNIBR also confirmed *Edenia* sp., a strain discovered in Anyangcheon Stream in March 2019, has antifungal activity against anthracnose. The research team conducted a follow-up study and discovered two antifungal peptide-based compounds with a new structure produced by Edenia sp. and continued an empirical study to develop eco-friendly crop protection products against anthracnose by using the compounds.

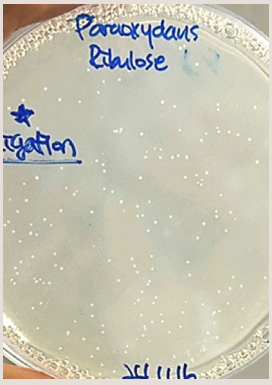


Antifungal activity of freshwater microorganism against anthracnose

The NNIBR laid the foundation for producing a low-sugar sweetener, allulose, by using not genetically modified microorganisms.

The NNIBR announced in August that it successfully discovered microbial strains that can convert fructose to allulose, a low-sugar sweetener, without genetic modification. Considering most microorganisms cannot efficiently produce allulose in the natural condition, many food companies use allulose produced using genetically modified strains for production efficiency. However, as introduction of a comprehensive labeling system for genetically modified organisms (GMOs) has been discussed in earnest, the demand for non-GMO strains in the food industry in Korea has skyrocketed.
From the microorganism resources that it possessed, the NNIBR selected five strains that can produce allulose, purified the enzymes for synthesis of allulose, and conducted a functional analysis. Based on the encouraging findings, it has applied for patents on a microorganism in the *Microbacterium arabinogalactanolyticum* species and a microorganism in the *M. paraoxydans* species.
The research team confirmed that the enzymes originating from the strains are more active even at 70 and higher compared to other previously known enzymes and excellent in allulose conversion rate. Given that this research established the basis for the development of allulose production technology by using natural microorganisms that are not genetically modified, it is expected that it will contribute to strengthening global competitiveness of domestic sugar substitute materials in the future.


Microbacterium arabinogalactanolyticum



Microbacterium paraoxydans

A miracle of 3.5% of Korean Territory: Islands have 36% of native species in Korea.

The HNIBR launched a project for investigation and discovery of native species in island and coastal areas and confirmed a total of 22,084 native species inhabiting the Korean islands. Previously, the Department of Island and Coast Biodiversity of the HNIBR had confirmed 19,237 species through its project to make a list of island species from 2021 to 2024; this year, by discovering an additional 2,847 species, this project has recorded 22,084 native island species.

Even though the total island area in Korea is 3,547 km2, comprising about 3.5% of the total land area of Korea, the species inhabiting the islands take up 36% of the total native species in Korea (to date, 61,230 species have been discovered), showing that the islands are a treasure trove of biodiversity and a critical research target area. Major habitants there are 6,683 species of insects, 3,273 species of bacteria, 3,006 species of vascular plants, and 2,501 species of invertebrates (except insects). In addition, there are many species on the islands that are important in biodiversity conservation: 148 endangered wild species that live only in island and coastal areas, including *Cicindela (Abroscelis) anchoralis*; 486 Korean indigenous species, including *Pseudostellaria palibiniana var. gageodoensis*, which naturally grows on Gageodo; and 92 climate-sensitive biological indicator species, which are sensitive to climate change, including *Tetraclita* japonica.

Based on the research findings, the HNIBR has prepared an infographic about Korean island biodiversity to spread awareness regarding the value of island biodiversity. You can see the infographic on the HNIBR website (www.hnibr.re.kr). This infographic was also made into a poster and distributed.

Infographic Poster: Biodiversity of Korean Islands

A Special Exhibition for Experiencing the Meaning of Biodiversity: Painting Hopes amid the *Climate Crisis*

The HNIBR is holding a hands-on exhibition, Painting Hopes amid the *Climate Crisis*, where visitors can interact with endangered species in the *climate crisis* era and experience the meaning of biodiversity. Paintings by special class students at Mokpo Jeil Girls' High School, Hampyeong Hakdari High School, and Haenam Technical High School filled the exhibition hall. Living organisms in the paintings employing AI motion technology are so full of life that they seem alive, stimulating visitors' imagination. In the opening ceremony on September 18, 2025, the student painters came and introduced their works, and visitors also enjoyed sand paintings.

The students who experienced "the moment when my imagination turns into an exhibition" have become the protagonists of the exhibition. This exhibition was first introduced at the 2025 Net Zero EXPO (Busan Exhibition & Convention Center) in September and 1,954 visitors attended. Visitors are deeply impressed by the paintings, saying, "I didn't expect I could feel climate change such vividly." This exhibition traveled to the Korean National Garden Culture Center located in Damyang, Jeollanam-do (September 14–31, 2025) and will be there in Jeollanam-do Office of Education Nature Exploration Center (November 1, 2025–Jan. 31, 2026) located in Jangseong, Jeollanam-do. In 2026, it will travel nationwide. The students' paintings are a special sense capturing climate change as well as sending a message to future generations. The HNIBR plans to prepare the upcoming exhibitions to discuss climate change with the public and encourage them to take climate actions.

Opening Ceremony of *Painting Hopes amid the Climate Crisis*

20회 기념 자생 동·식물 세밀화 특별전

기후에너지환경부 국립생물자원관

생생채움

빛으로 세밀화 표현하다

2025. 10. 24. 금

국립생물자원관 생생채움 기획전시실 II

eISSN 2951-2867

biowebzine.com

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