



2026
AUTUMN

Special Issue

Island Biodiversity Investigation:
Accumulating Uncharted Records

Biodiversity Issue

Yesan in Autumn: The Village
of Returning Storks

Bio News

Latest Research and
Patents

생물지키

2026 AUTUMN

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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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The Picture Take

Signs of Change Confirmed
The Pieces Are Starting to Fall into Place

es Shape

A full-page background image showing a landscape at sunset. The sun is low on the horizon, creating a strong orange glow and lens flare. In the background, there are rolling mountains. The middle ground is filled with a dense forest of dark green trees. The foreground is dominated by a field of tall, golden-brown grasses that are blowing in the wind.

The findings accumulated through years of documentation and observation are shaping new standards for ecosystem conservation. In the Autumn 2026 issue, we explore how the insights drawn from these efforts are reshaping the way we see ecosystems and the systems designed to protect them.

Dokdo and Ulleungdo: Building a Record of the Unknown

Accumulated Data: Dokdo Biodiversity is Also Updated Now



Q. What does a biodiversity investigation of Dokdo and Ulleungdo mean?

A. A biodiversity investigation of Dokdo and Ulleungdo is vital for accurately identifying organisms living here and now and for accumulating such records consistently. Meticulously documenting and preserving current biodiversity for future generations through steady investigation is most fundamental and crucial to understanding biodiversity conservation and the natural history of Dokdo and Ulleungdo.

Q. What was your recent critical focus when conducting biodiversity investigations on Dokdo and Ulleungdo?

A. While investigating multiple taxonomic groups, our recent focus has shifted toward uncovering the diversity of invertebrates living around Dokdo and its adjacent islands. Dokdo has a very small land area that limits the space available for plants and insects to live. Continuous investigations have identified a significant portion of commonly observed species. Conversely, marine invertebrates, which spend most of their lives in the sea, are distributed across diverse habitats, such as rocky substrates, intertidal and subtidal zones, and seaweed colonies around Dokdo and its near



Dictyota haenyeosa (Previously Unrecorded Species in Dokdo)



Dendrophyllia cribrosa (Endangered Wildlife Class II)

by islands. Therefore, we expect that many undiscovered species remain to be found.

Q. What kinds of key features of Dokdo's biodiversity have you discovered through your investigations?

A. Based on the survey results conducted by the Ministry of Climate, Energy and Environment, the number of confirmed species on Dokdo was 656 in 2014. After launching full-scale biodiversity research on Dokdo in 2015, we published the first Dokdo Species List, compiling existing literature data to feature a total of 1,422 species. Even after that, through ongoing field investigations and literature data, we secured records of about 1,000 additional species that were confirmed to inhabit Dokdo, continuously updating the Dokdo Species List. This shows that Dokdo is an active research site where new biodiversity data continue to accumulate.

In 2014 656 species were confirmed on Dokdo.

In 2015 The Dokdo Species List was published.
1,422 species were included

As of 2026 A field investigation was conducted with a literature review.
Approximately 1,000 species were also confirmed

Q. You have been conducting not only biodiversity investigations but also genomic and genetic diversity analyses. What does genomic analysis tell us?

A. Because Dokdo and Ulleungdo are oceanic islands that were never connected to the mainland, genomic information is vital for understanding where species came from and how long they have been separated from other groups in other regions. Even identical species can form unique genetic traits that differ from groups living on land or on other islands after long-term isolation on an island. Genomic information helps us trace how these species arrived, moved, and spread and understand the process of creating island

Research on the biodiversity of Dokdo and Ulleungdo is never complete with a single investigation. Only when small records across rough seas are steadily stacked does an island's ecosystem finally reveal its true form. The National Institute of Biological Resources (NIBR) continuously investigates the biodiversity in Korea and accumulates species lists and genetic diversity information. Let us follow the story of senior researcher Tae-Seo Park, who describes Dokdo as "a place that is hard to visit, but that I want to visit again."

biodiversity. Above all, we have focused on the research to analyze genetic diversity of the groups on Ulleungdo and Dokdo for native species conservation. By doing so, we evaluate whether the groups maintain enough genetic diversity and how they differ from groups in other regions, and intend to prepare scientific foundation for longer-term conservation and management.

Q. How are the research results used?

A. These research findings are used to create and execute policies related to Dokdo, including the Master Plan for the Sustainable Use of Dokdo. For example, once distribution ranges and major habitats of a certain species are identified, this information can be used to review how the investigation and equipment installation and use occurring in these areas impact the ecosystem. Furthermore, checking on distribution and its changes to native, rare, and alien species helps decide which species need protection or continuous observation and prepare customized management plans.

Species lists also serve as baseline data for policymaking and management. Comparing past and present lists reveals new or missing species, so potential changes in biotas can be tracked. However, because a single survey cannot confirm changing trends, it is essential to accumulate long-term verifiable data, including specimens, photos, and habitat information.

Q. Please share your unexpected discovery?

A. My most memorable discovery in Dokdo was *Dendrophyllia cribrrosa*. I had just finished my last dive and was staying at a depth of about 5 meters for decompression before surfacing. While waiting for about 3 minutes and looking around, I caught a faint glimpse of something unusually yellow through the murky water. Wondering, "What could that be?" I snapped a few pictures with my small camera and thought to myself that I should check it out again during the next survey.

Upon checking, it appeared to be *Dendrophyllia cribrrosa*, a Class II endangered wild species. Ultimately, I cancelled my next schedule and headed back to Dokdo the following

day. When I went down into the water myself, it wasn't just a small colony. It was spread out widely along the underwater bedrock. A single flash of yellow accidentally found turned out to be the exact moment we discovered a new habitat in Dokdo.

It was especially memorable because it was such an unexpected discovery. This experience truly showed how important it is in research to not only follow the planned investigation but also to meticulously examine every tiny clue encountered on site.

Q. What is the most important aspect of future investigations?

A. Research on Dokdo is not about one quick result. Rather, its true value comes from repeating the same surveys over time and building a long record. In the case of research on Dokdo, starting new studies is necessary. However, what is more important is maintaining current research without interruption. I hope to continue studying biota and genetic diversity on Dokdo to leave records for future generations to understand how the Dokdo ecosystem changes.

Watch the Video to Learn More

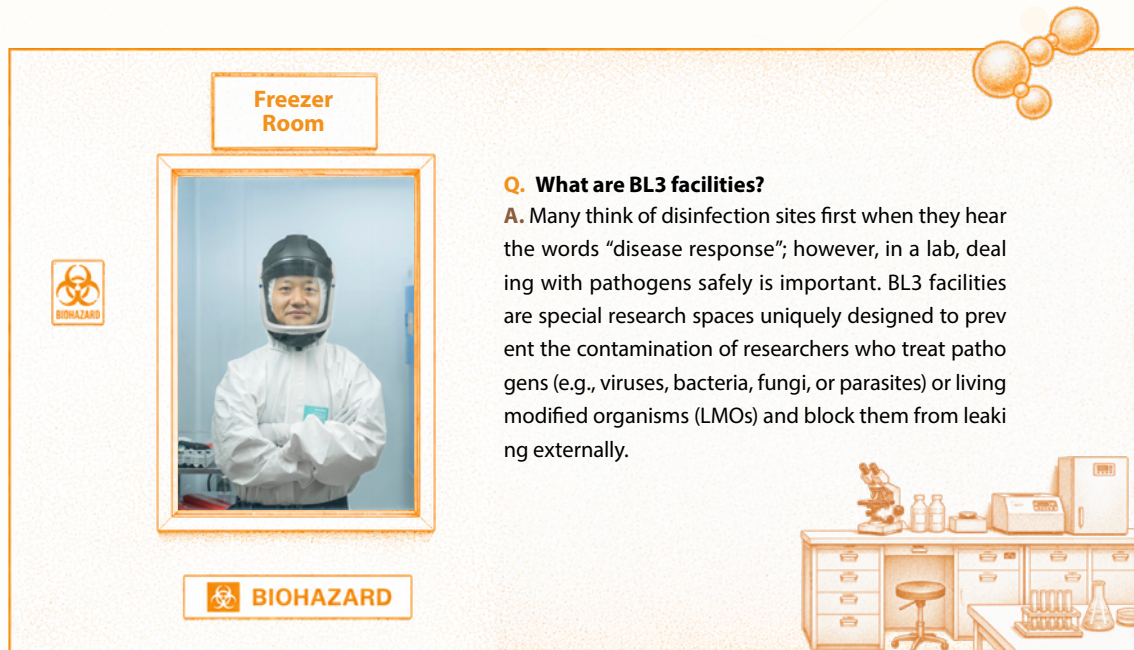
https://youtu.be/PP_lt7Xfg6s?si=GMrkz7ZYF0owl3NC



A Secret Lab Unraveling the Mysteries of Disease

Everything About Biosafety Level 3 (BL3) Laboratories

Dealing With Pathogens



Q. What are BL3 facilities?

A. Many think of disinfection sites first when they hear the words “disease response”; however, in a lab, dealing with pathogens safely is important. BL3 facilities are special research spaces uniquely designed to prevent the contamination of researchers who treat pathogens (e.g., viruses, bacteria, fungi, or parasites) or living modified organisms (LMOs) and block them from leaking externally.

Q. I heard that numerous steps should be taken to enter the facilities, similar to a secret lab in the movies.

How do actual BL3 facilities operate?

A. It isn't the exact same as the movies; however, the basic idea is similar. Because entering facilities means going into a contaminated area, workers must be protected. First, they should leave their clothes and items in the changing room and change into special work clothes. Next, they should put on two pairs of gloves, a full body suit, and a respirator—that is, a powered air-purifying respirator (PAPR) or a mask-type respirator. Then, they should walk through an airlock ed double door designed using an air pressure difference. Exiting, however, is about environmental protection (preventing leakage) because it involves leaving a contaminated area. When leaving after work, workers should first remove their outer gear with a higher risk of contamination in order, from their gloves to their full body suit. They should finish disinfecting and showering completely before exiting to a clean area.

Q. What is the secret to blocking pathogen leakage from facilities?

A. First secret is negative pressure. Under the principle that “what's inside stays inside,” entire facilities keep lower pressure than their outsides all the time. In other words, the inside of the building keeps sucking air from the outside, similar to a huge vacuum. Thus, even if the air-lock is open, the contaminated air inside cannot leak. Only the clean air outside can flow, which is an easy law of physics.

The second secret is a high-efficiency particulate air (HEPA) filter. The air sucked inside due to negative pressure must leave anyway at some point. However, if untreated air exits, it can spread pathogens. Therefore, the air inside facilities can exit only through high-performance HEPA filters, which can filter out more than 99.97% of submicroscopic virus particles.

Researchers never know what pathogens hide in specimens before research begins, because they may contain airborne viruses. Biosafety Level 3 (BL3) facilities are designed to control such invisible dangers safely. How do BL3 facilities operate and protect society? We heard about this from researcher Ji-Soo Kim.

Q. Are researchers strictly prohibited from any actions in facilities?

A. The most important rule is that all work should take place only inside biosafety cabinets. If researchers open a container with specimens outside the cabinet or leave it open while crushing or mixing, the aerosol generated during the work might contaminate the lab.

The second most important issue is that everything—equipment, machines, gloves, disposable gowns, and waste that makes contact with specimens—should be sterilized before moving outside. Objects possibly contaminated by pathogens should not be taken to clean areas until they complete an autoclaving process or physical/chemical inactivation (e.g., bleach or UV rays) inside facilities.

Q. How are contaminated wastes treated?

A. All contagious waste produced in BL3 facilities should be sterilized to completely remove biological activation before being discharged. This process should be accomplished using an autoclave that can destroy even microbial spores.

When discharging the vapor produced during sterilization, a HEPA filter should be used to prevent aerosols that might contain pathogens from leaking. Discharged wastewater should be collected in a separate tank and then treated with chemical inactivation.

To verify whether the sterilization process was completed successfully, a regular biological indicator organism is tested using *Geobacillus stearothermophilus* spores, a heat-strong biological indicator.

Accordingly, waste from BL3 facilities is transferred to the final disposal company only after its biological hazards are eliminated and converted into general medical waste, following the principle “Sterilization inside the containment zone first and discharge afterward.”

Q. What does “locking risks inside labs” mean to society?

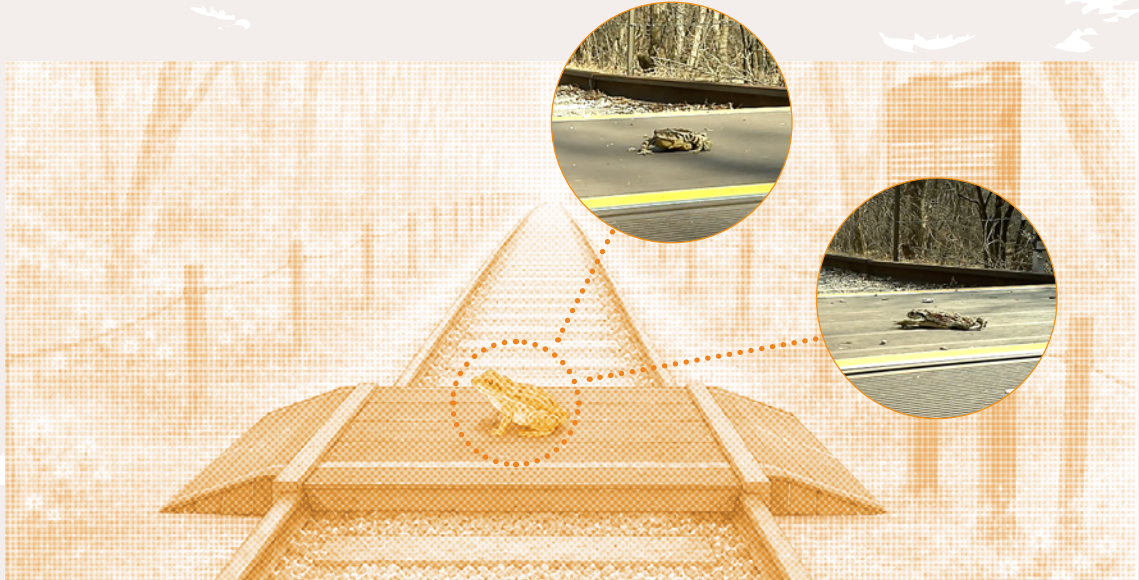
A. “Tying up risks inside controlled spaces and labs” implies a practical firewall. It physically isolates risk factors and prevents them from spreading to society.

Only when safe isolation spaces are prepared can researchers identify and study unknown pathogens without fear of infection. All in all, BL3 facilities are the most reliable safety system that protects the biosafety of our society and the stability of our ecosystem by safely controlling dangerous pathogens inside manageable areas.



A Toad Has the Right of Passage, Though

A Small Crossing for Wildlife in Yongyangbo Wetland, Cheorwon



A Famous Sight for Humans, but a Tough Course for Toads

Cheorwon Yongyangbo is a wetland located within a civil access control zone. Thanks to long-term restrictions on access and development, the natural environment remains well preserved. Streams, shallow ponds, grasslands, and willow colonies blend together, providing a home for diverse life forms, including plants and insects, as well as other kinds of animals, such as birds, mammals, amphibians, and reptiles. In particular, shallow pools formed by fluctuating water levels in Yongyangbo are vital spawning grounds for toads and *Rana uenoi*, a species also known as “true frogs.”

Yet, something unexpected appeared in the middle of the vast wetland where various organisms live—a railroad cutting through Yongyangbo. A remnant of the Geumgangsan electric railroad that once connected Cheorwon and Mt. Geumgangsan, this track has been transformed into a walking trail, allowing visitors to Yongyangbo Wetland to walk along the old train tracks and take memorable photos. However, while this path offers a nostalgic journey for humans, it has unexpectedly become an obstacle for small wild animals in the area.

Easy to Enter, Hard to Escape

Researchers reviewing a conservation and restoration project at Yongyangbo Wetland faced an unexpected sight during one of their field investigations—numerous toads trapped inside railway structures, unable to escape. Furthermore, a single inspection of an area spanning just about 500 meters revealed four dead toads. Among these, two were found isolated together, seemingly in the middle of migration in preparation for the breeding season. According to local site officials, this was not an isolated incident. The rescue of toads and softshell turtles trapped on the railroads, along with the retrieval of dead ones, had been a recurring issue.

The problem they have identified is that while the animals can easily get on the tracks, they had difficulties getting off due to the height differences of the railway structure. A ledge that a human could easily cross becomes a barrier that toads and softshell turtles can barely overcome. It is no different from a wall suddenly appearing right in the middle of the path; they must travel between their breeding grounds and natural habitats. Yet, eliminating the railway, currently being used as a walking trail, was not an option. Thus, they must find a way to reconnect the blocked path for wildlife while leaving the paths used by humans intact.

A toad was found trapped on a railway. While humans can easily cross this part of the tracks, it seems to be an impassable wall for toads. At Yongyangbo Wetland, Cheorwon, such accidents occur repeatedly. However, in recent years, special ecological passages—also known as crossings for wildlife—have been installed along the old railways in the area. Let us hear the story of how these small creatures' right to safe passage was restored in the middle of busy "roads" for human beings.

A Railway Crossing Built at a Toad's Eye Level

The solution was unexpectedly simple: instead of removing the railroads, why not create a way for animals to cross them? Eco-corridors at Yongyangbo Wetland are not typical overpass or tunnel structures one might imagine. Instead, parts of the railway structure were modified into gentle slopes, allowing wildlife to cross the railroads freely. These "railway crossings" were indeed designed specifically for small animals. In particular, the ramps were built with a slope of 30 degrees or less and a width of at least 2 meters. They also feature a two-way structure so that any animal entering the tracks can safely escape from either side. Notably, this modification did not require major changes at all; the designers simply lowered parts of high barriers to add additional pathways. Now, people can keep using the trail just as before, while new exits have been opened on a path that was once blocked for small wild animals. Thus, on a single railway, paths for humans and wildlife now lie side by side.

Toad Crossing Caught on Camera

Now that the pathways have been created, are wild animals actually crossing them? To find out, researchers installed unmanned sensor cameras at 10 different points along the railway to monitor wildlife movement. Soon enough, the cameras began capturing these long-awaited moments: Toads and softshell turtles were seen crossing the railroads using the eco-corridors, and even small, young ones were spotted using the same pathways. Even when no humans were watching, these tiny crossings were constantly being used by little travelers.

According to local officials, isolated or dead toads and softshell turtles were frequently found inside the railway structures in the past. However, no such cases have been reported since the installation of the eco-corridors. The research team plans to continue monitoring the unmanned sensor cameras until around October of this year to systematically verify what kinds of roles the eco-corridors actually play in such an environment. As such, at Yongyangbo Wetland, alternative pathways for wild animals have been created alongside the path for humans.

RESEARCH NOTE

Eco-Corridor Thoughts by the Researcher

Q. Can't frogs cross the railroads?

A. Frogs with great jumping ability sometimes leap directly over railroad structures. However, this does not mean that they do not use eco-corridors. In fact, unmanned sensor cameras have captured frogs moving back and forth across the tracks along these gentle-sloped pathways. Sometimes they leap right over, and at other times they use the pathways. Even when crossing the same railway, we can see that they move in different ways, depending on the mobility of their species or their individual capacity.

Q. How can animals know where the crossing is and find their way to it?

A. The truth is that they do not consciously look for it. They simply happen upon a point to cross while moving and use it naturally. This is why the location of an eco-corridor is so critical. At Yongyangbo Wetland, the pathways have been strategically placed around areas where amphibian and reptile movements are expected to be high, especially considering their breeding sites and habitat environments.



An SOS From the Poisonous Herb of Socrates

Water Hemlock Rescued From the Verge of Extinction



Water hemlock is a spine-chilling plant, even at the mention of its name. It is poisonous, but now, it is an endangered plant that desperately needs our help. How has water hemlock become a species to protect? And why are we trying to save this unfamiliar plant?



Successfully Propagated Water Hemlock

A Raw Material of Poison? Water Hemlock:

A Fearful Plant

There is a plant that can be fatal if you forage and consume it, misidentifying it as water celery in spring: water hemlock. You can vaguely imagine how deadly toxic it is, given that the poison the Greek philosopher Socrates took actually originated from a plant in the genus *Cicuta*. The leaves and stems of young water hemlock resemble those of edible water celery; however, they are different plants. All the parts of water hemlock have a deadly poison, *Cicutoxin*, so accidental ingestion leads to a severe risk of death.

Surviving From the Ice Age But Collapsing Before Climate Change

Such a dreadful plant, water hemlock is now designated a Class II Endangered Wildlife Species in Korea. This northern plant has survived long since the Ice Age. In Korea, it lives in cool, high-altitude wetlands such as Daegwallyeong and Hoengseong in Gangwon-do, making the Korean Peninsula its southernmost limit of survival.

Sadly, as Earth warms, indiscriminate development has destroyed its habitats and wetlands. The plant is rapidly disappearing. To protect water hemlock, the Ministry of Climate, Energy and Environment designated it a Class II Endangered Wild Species in 2005.

Waking Sleeping Seeds and Reproducing Life

The NNIBR actively takes the initiative to protect disappearing water hemlock. However, the process is not easy because the seed germination conditions of wild water hemlock are extremely tricky. Hence, the research team developed a “dormancy-breaking technology” to wake the seed and prevent it from falling into a deep sleep.

They found a magic-like formula to make stubborn seeds sprout together using low-temperature treatments and plant growth regulators (hormones) and finally succeeded in artificial propagation.

Why Save a Poisonous Plant?

Many ask us, “Why not let the plant disappear because it is fatal to humans?” However, the ecosystem is similar to Jenga, a game with lots of stacked blocks. The single removal of one block could cause the entire tower to collapse.

Water hemlock is one of the essential components maintaining wetland ecosystems, serving as a habitat for diverse living organisms, including insects. Just as many other plants benefit us through antibacterial properties, whitening agents, and pharmaceutical ingredients, the unique toxic substances that water hemlock contains may hold the potential to be developed into future biomaterials.

Seeds of Hope That Can Save More Lives

The success of the artificial propagation of water hemlock means more than saving a single plant. The knowledge and data gained through this research will serve as a powerful foundational technology to rescue other endangered freshwater plants from losing their habitats.

No life in nature exists without reason. Now all of us must answer the cry for help that water hemlock sends by keeping wetlands healthy and conserving biodiversity. To ensure that the various lives around us can cohabitate for a long time, the NNIBR’s researchers will continue to do their best.

RESEARCH NOTE

Thoughts on the Water Hemlock by the Researcher

Q. Isn't a place dangerous if a lot of water hemlock is blooming?

A. Surprisingly, it is not. If you find a wetland where water hemlock blooms in clusters, that means the wetland is healthy. Water hemlock is a representative freshwater plant that grows well in undamaged ecosystems, mostly near wetlands and reservoirs. Researchers consider the plant an indicator species that demonstrates the overall health of wetlands.

Q. Can lab-grown water hemlock be reintroduced to the wild?

A. The artificial propagation of water hemlock can serve a dual purpose: restoring natural habitats and enhancing public awareness on the conservation of endangered species. For example, in collaboration with the Korea Gas Corporation, 20 individuals of artificially propagated water hemlock were transplanted to its Headquarter in Daegu last July. It is anticipated that this will allow the employees and visitors to experience endangered species more closely, thereby fostering deeper consideration for biodiversity preservation.



Transplanting 20 Water Hemlock Plants
at the Korea Gas Corporation Headquarters

Frogs Know the Island's Secret

Island's Time Hidden in the Genes of Frogs

A Delicate Indicator of an Ecosystem That Reads Environmental Changes

Persistent environmental changes are sent as silent signals through the reactions of living organisms. It is known that 17 species of frogs inhabit Korea; however, little research has studied island frogs. The HNIBR has systematically investigated amphibians inhabiting 263 Korean islands for five years since 2021 and tracked the signals sent by the ecosystem. The HNIBR research team selected frogs for its research subject because they are so sensitive to changes in environments including temperature that they serve as an important indicator organism that demonstrates how environments change. Because frogs are cold-blooded animals that change their bodies' temperatures with their surroundings. Each frog species prefers different environmental factors and microhabitats, meaning that if you find a certain frog, you can deduce multiple environmental conditions of where it lives. In other words, an investigation of how frogs are adapted to and distributed in isolated areas provides critical information about the health of an ecosystem and its responses to environmental changes.

A Five-Year Study Assembled the Pieces of an Ecosystem's Puzzle

The HNIBR's expansive investigation of diverse islands in Korea confirmed the presence of 12 frog species on 156 islands—approximately 60 percent of the islands surveyed. The species found on the greatest number of islands was *D. japonica*—recorded on 143 islands, including Aphaedo and Sinjido—followed by *P. nigromaculatus*—recorded on 113 islands, including Dolsando and Changsundo. *D. suweonensis*, a Class I Endangered Species, had the most restricted distribution, confirmed on only one island along the West Coast. In addition, *K. borealis* and *P. chosonicus*, Class II Endangered Species, were identified on some islands along the Middle and Northern West Coast and South Coast. One of the most meaningful results is that the team newly identified 32 islands—including Sonjukdo and Yuldo—as frog habitats that have never been officially reported. This strong signal depicts the biodiversity of an island ecosystem that could never be captured by a one-time investigation. Even in barren and isolated island areas, ecological environments where amphibians can survive are continuously maintained. Based on data accumulated throughout the five-year study, the puzzle of the biodiversity of island ecosystems begins to be assembled. This will serve as useful data for establishing “island-tailored” conservation strategies and management policies that reflect the unique characteristics of islands with diverse habitat conditions beyond the current uniform management approach that focuses mostly on inland areas.

Frogs inhabiting 156 islands



D. japonica



143 islands



Pelophylax nigromaculatus



113 islands



Endangered Wild Species



Kaloula borealis

12 islands



Pelophylax chosonicus

5 islands



Dryophytes suweonensis

One island

Frogs are key indicator species, which are the species highly sensitive to environmental changes. Over the past five years, the HNIBR has investigated frog species across Korea's islands and has recorded traces of ecological changes. Consequently, it discovered new habitats and confirmed that island frog species geographically isolated for a long time had unique genetic traits. Let us examine the changes in island ecosystems revealed by the small moves of an amphibian and consider how to conserve them.

Signals of Isolation and Evolution Told by Genes and the Island's History

Not only the simple distribution of species but also the history of massive changes that ecosystems have experienced are clearly recorded in frogs' genes. In-depth analyses of different genetic structures between *D. japonica* and *Bombina orientalis* demonstrated geographic differences (island vs. terrestrial). Both species inhabit several islands, including Geoje-do, and revealed genotypes distinct from those in terrestrial areas, suggesting that island frogs may have developed independent genetic traits through long-term geographic isolation.

The genetic information of living organisms is similar to a time capsule that can track the island formation process and geological changes. During the Ice Age, tens of millennia ago, sea levels were more than 100 meters lower than today's levels. Most of the current West Sea and South Sea were land, and the Korean Peninsula, China, and Japan were connected as one mass. Subsequently, as the climate warmed and sea levels rose, the region separated into islands. Living organisms were isolated and independently evolved and distributed in a unique way. Examples are the frog species living on the Korean West and South Sea islands. In contrast, volcanic activities in the ocean created Ulleungdo and Dokdo in the East Sea. However, human activity is thought to have introduced *P. nigromaculatus* to Ulleungdo, not natural isolation, which is a quite interesting comparison.



Genetic analysis of *Bombina orientalis*



Field investigation on island frogs

Assembling the Puzzle of the Ecosystem Toward Conservation

This five-year island amphibian study served as an opportunity to scientifically highlight the value of neglected island ecosystems. It discovered 32 habitats and revealed distinct genetic patterns in the frogs inhabiting islands that diverged from their inland counterparts. This strongly suggests that the conservation of island ecosystems is significant not only for species diversity but also for genetic aspects.

As long-term biota investigations and genetic research combine, previously unknown or fragmented signals of ecological changes finally start falling into one big picture. The signals of traces that ecosystems have firmly endured and their responses to environmental changes have been received. We will do our best to interpret the subtle signals that our ecosystem sends through continuous research activities in the future.





Surprising Neighbors Met in Cities! Renewed Children's Saengsaengchaeum

National Institute of Biological Resources (NIBR)

Opening Hours: 9:30 a.m. to 5:30 p.m.
(Closed on Mondays, January 1st, and the day before & of Seollal and Chuseok)

Venue: Saengsaengchaeum Special Exhibition Hall at the NIBR

Information: www.nibr.go.kr

The NIBR officially reopened its exhibition hall for children, Children's Saengsaeng Chaeum after a major renovation. The updated hall doubles the size of the previous space and features three themed zones focused on urban biodiversity: Discovery, Understanding, and Empathy. Through 12 interactive, hands-on exhibitions, visitors can explore a total of 95 different species, helping them discover and learn about the diverse wildlife that coexists with us throughout our cities.

In the Discovery Zone, visitors can use their fingertips to feel the rough tongue of a leopard cat, the soft fur of an otter, and

the unique skin of a green frog, while also listening closely to the sounds of urban birds and insects. The Understanding Zone offers hands-on activities like building artificial hives for wild bees, finding the right food for wildlife, planting digital plant seeds, and birdwatching experience. Finally, in the Empathy Zone, visitors can select words and drawings to build a collective ecosystem on a massive screen, visualizing a world where humans and nature live together. Come see, hear, and touch to discover urban wildlife in a whole new way!



In This Forest, a Koala Lives, with an Ecosystem We Should Protect Together

National Institute of Biological Resources (NIBR)

A Special Exhibition on Ecosystem Conservation

Date: Until December 2026

Venue: Mediterranean Biome in the Ecorium at the NIE

The NIE is hosting a special exhibition on ecosystem conservation Green Hope, Please Save the Koala's Forest! until December 2026 at the Mediterranean Biome in the Ecorium. This exhibition illustrates how animals and plants are closely connected through the relationship between eucalyptus forests and koalas. The exhibition hall showcases large eucalyptus trees as well as woody plants that koalas eat and other Australian plants. A koala sculpted from a dead eucalyptus tree in the Mediterranean Biome also catches the eye. By following the life of a koala, visitors naturally reali

ze that the crisis of a single creature connects to the survival of forests and the entire ecosystem. This exhibition explores global ecological crises, such as habitat destruction and climate change-induced wildfires, prompting reflection on how we can live in harmony with nature.



Evolution's Journey: From Different Paths to Our Closest Companions

The NNIBR is hosting a special exhibition, Dogs and Cats: Two Roads Diverged. This exhibition tells how canines and felines split from a common ancestor about 50 million years ago and chose different ways to survive and evolve in an interesting way.

At the exhibition, visitors can learn about the flow of evolution while viewing more than 20 taxidermy specimens of canines and felines, including tigers, cheetahs, wolves, and arctic foxes, along with an evolutionary tree. Visitors also can touch skeleton specimens and snout/tongue figures, as well as experience the traits of each animal, including

Nakdonggang National Institute of Biological Resources (NNIBR)

A Special Exhibition: Dogs vs Cats: Two Paths of Carnivores

Date: July 28, 2026–May 30, 2027

Venue: Special Exhibition Room, third floor of the Exhibition and Education Building at the NNIBR

cooperative hunting and night vision. An amusing experience is also prepared in which artificial intelligence matches visitors with lookalike animals.

With following the evolutionary stories of canines and felines, who have walked distinct paths through history, visitors can rediscover the profound value of the companionship on animals and reflect on the true meaning of coexistence between humans and animals.



One Day Is Enough: Island Ecotour

Honam National Institute of Biological
Resources (HNIBR)

Island-Themed Class

Dates: September–October 2026 (twice)

Venue: Saengmul–Saenggeul Island School (including Jindo)

Reservation: <http://hnibr.re.kr/>

One Day Experiencing the Islands is a one-day island-themed class operated by the HNIBR. Participants visit island and coastal areas and learn the value of bioresources and the importance of biodiversity while experiencing nature and culture.

Centering on the HNIBR-designated Saengmul–Saenggeul island schools, diverse experience programs emphasize natural environments, including the characteristics of each region. Participants can learn the ecological characteristics of each habitat environment and region in easy and interesting ways while observi

ng organisms in mud flats, making dried Laver, and exploring forests.

In the first half of 2026, it was held in Wando and Hampyeong, and it will expand its target areas to include Jindo in September and October. Let's embark on a special ecotour this autumn with One Day Experiencing the Island and learn local ecology and culture by seeing and experiencing the unique nature each island has.

Yesan in Autumn: The Village of Returning Storks



A large bird slowly flaps its wings over a field where the autumn sunlight is shining softly.
With its distinct white body and black wings, the stork spreads its wings and glides gracefully
across rice paddies, streams, and reed fields touched by the wind.
Once gone from us, storks now fly once again throughout the skies of Yesan, Chungnam.





©Seong-hee Nam

The Season Settles Upon the Golden Fields

As the sun dips into the horizon, the fields slowly turn a golden hue. A breeze sweeps through the rice paddies awaiting harvest, casting long shadows over the shallow waters. The warm daytime air gradually cools as the sun—with its bright yellow and red hues—begins to set far beyond the mountain foothills.

At the very moment when day and night intersect, a lone stork slowly takes flight from afar. Cutting through the sky with its wide wings, it circles over the rice paddies and surrounding areas, adding gentle movement to the quiet landscape. Here, it is quite common for storks to fly back and forth between the paddies, wetlands, and rivers several times a day, searching for food while exploring here and there.

The autumn field is a livelier space than one might think. It is a place where many lives thrive, with insects flying between rice ears, while frogs and numerous other small creatures move below the ridges. Storks also stay here because such living things exist. As such, the autumn landscape of the countryside is not completed simply by the ripening of rice crops. The landscape does not just include rice fields, wetlands, rivers, and forests where storks fly but also small living things that have thrived and lived interconnected lives for a long time to finally create a single landscape. In this way, countless living things pass through the seasons together under the same sky.

An Ecosystem Revives Where Rice Paddies and Waterways are Connected

Yesan—where the Yedangho Lake, the Muhancheon Stream, and vast farmlands connect—features small wetlands and water channels everywhere. Water lingers in harvested paddies for a while, and flowing streams surround reeds and bushes. This place seems ordinary at a glance, but it is actually a vital feeding and resting ground for storks.

As storks walk slowly in shallow waters on long legs, looking for food, small fish, such as loach and carp, are also swimming in the water. At the same time, frogs and aquatic insects live nearby on rice field ridges and wetlands. They all stay here because of the abundant food available and because it provides them with a safe resting place.

However, a healthy ecosystem cannot be preserved with the survival of just one species, such as the stork. Only when countless living things—from small fishes, insects, and frogs to reeds and grass—continue to live in interconnected ways can storks thrive in this area. A wetland is not simply a space where water stagnates but a home where diverse lives find food, seek shelter, and prepare for the next generation.

Wings Coming Back in the Wind

Storks in Korea typically have bodies with a length of one meter and wingspans of over two meters. Their distinct appearance, featuring white bodies, black wings, long red legs, and black bills, can easily catch the eye. When a stork flies high in the sky and spreads its wings wide, the body length is about the same as that of two adults stretching their arms.

The biggest feature of a stork is its graceful flight. Instead of flapping its wings all the time, it rises high in the air using the updraft and then glides slowly, making wide circles in the air. It can go up to hundreds of meters high on clear days and fly with its long neck and legs stretched out, confidently riding the wind.

At the same time, a stork has an entirely different charm when staying on the ground. Even though it is large, it walks slowly and calmly. It carefully treads its path step by step with its long legs but swiftly opens its large wings and flies away fast when it senses danger. It rarely makes a sound; instead, it clatters its bill to communicate with others.

During the breeding season, storks build large nests with diameters of up to two meters on tall trees or artificial nesting towers. Each nest, made of branches or grass, sometimes grows larger each year as new materials are added. From flying in the sky to building nests and raising chicks, a stork is a special bird that has drawn considerable attention for a long time.



©Dong-sun Kim



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©Seung-min Lee

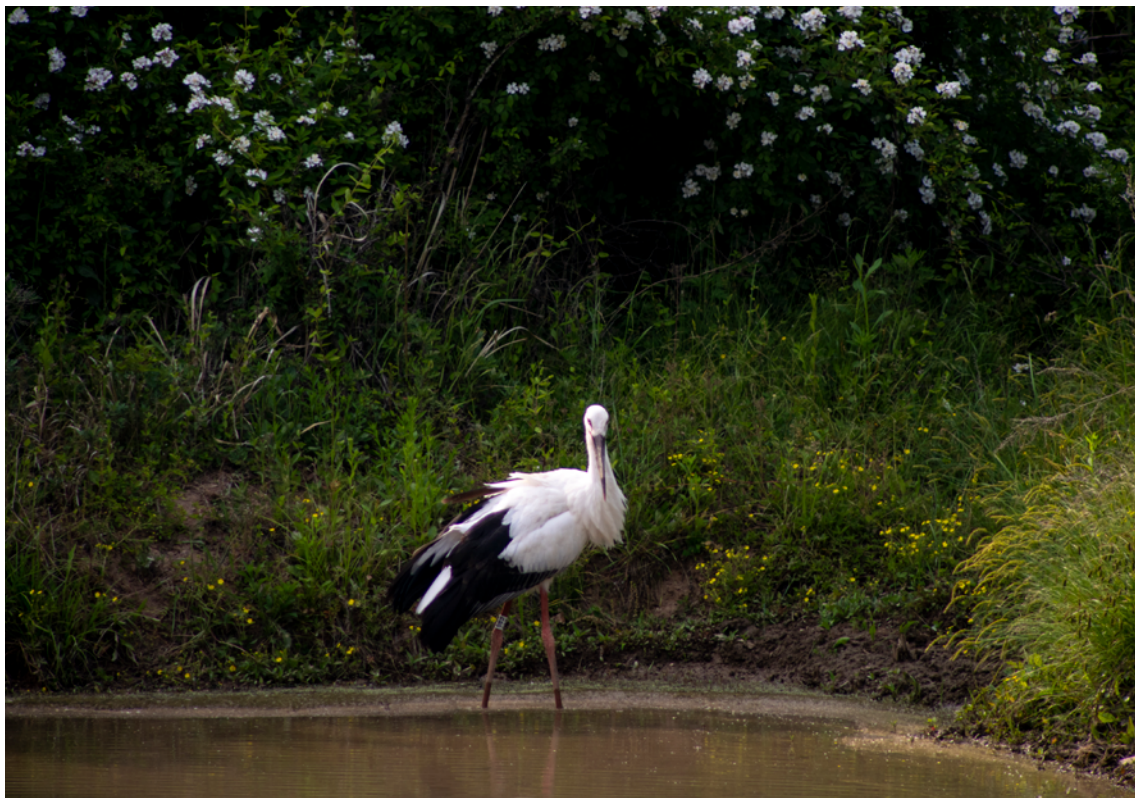
Walking Slowly in the Autumn Landscape

Walking slowly around Yesan Stork Park and Yedangho Lake, you might naturally melt into the beautiful autumn landscape of Yesan. As storks slowly fly over wide fields, wetlands, and waterways, visitors can stop walking to watch and admire them. Storks disappeared in Korea for a while, but thanks to the local restoration project and the residents' long-lasting efforts, they have now returned to Yesan. To coax them into coming back, many people sought various ways, such as employing eco-friendly farming practices, to harmoniously coexist with nature while tending their rice paddies and wetlands. Consequently, a single stork's return has become a symbol of hope that once-damaged ecosystems have started to revive.

Today, Yesan Stork Park goes beyond protecting storks. It has now become a place to show how people and nature live together. While visitors look at the storks and admire them, they can also realize how animals, rice fields, streams, and wetlands connect naturally. While children learn the value of life, adults ruminate the value of nature by recalling the old scenes of the Korean countryside.

Storks flapping their wings and taking flight over Yesan's autumn fields lasts only a brief moment; however, the resonance of the scenery lingers in our memory for a very long time. Autumn in Yesan, where storks returned, quietly tells the story of how precious the landscape created together by humans and nature truly is.

©Won-jun Park



Where Storks Stay Has Become a Tourist Destination

The landscapes where storks live are more diverse than we think. Where wide plains, wetlands, rivers, and lakes meet, different scenes unfold each season. Rice paddies under autumn sunlight, gently flowing streams with rising water fog, and reed fields swaying in the wind are all home to storks.



©Hyung-hak Kim

A Special Day at **Korea's Only Stork Park**

Yesan Stork Park is a place where visitors can observe storks up close while enjoying various exhibitions and hands-on activities. The park features the Stork Culture Center, several outdoor observation areas, and walking trails. At the Stork Culture Center, visitors can explore the ecology of storks and the domestic restoration process through exhibition materials and video clips. In the outdoor observation areas, visitors can watch storks in their natural habitats, gracefully walking on

their long legs while searching for food. Walking along the trails to explore different parts of the Park is also highly recommended. Depending on the season, visitors might see storks either flying across the sky or wandering around the place, making it an ideal spot to spend time while enjoying everything the Park has to offer, including exhibitions, stork watching, and walking along natural trails.

Upo Wetland in Changnyeong, Gyeongnam: An Ecological Place Where Swamp and Field are Connected

Upo Wetland, the largest inland wetland in Korea, is an ecological sanctuary where various migratory birds and wildlife live together. During late autumn and winter, visitors can closely observe many species of birds, such as storks, whooper swans, and eagles. Because it consists of spanning swamps, reed beds, and nearby farmlands, Upo Wetland offers an ideal environment for migratory birds to feed and rest. In early mornings, when water fog is rising, one can see various birds swimming on calm waters and other migratory birds circling overhead.



Suncheonman Bay in Jeonnam: A Landscape Made by River and Wetland

Suncheonman Bay Wetland is an ecological space that features vast reed beds and mudflats. It is often visited by various birds, such as storks, hooded cranes, and black-faced spoonbills, because of the endless reed beds and spanning mudflats that provide them with rich food and a safe shelter. As the tides rise

and fall amid the constantly changing landscape of Suncheonman Bay, birds spend the season while finding food and taking a rest. Especially at sunset, flocks of birds flying up under a red sky present us with a special moment that can only be experienced at Suncheonman Bay.

NIBR

Investigation of the Anti-inflammatory Activity of *Camellia japonica* Flower-Derived Lactic Acid Bacterium Exosomes and Their Application in Hair Loss Reduction Shampoo

This study was conducted to investigate the anti-inflammatory activity of *Leuconostoc mesenteroides* DB1, a novel lactic acid bacterium isolated from the native *Camellia japonica* flower, and to evaluate its potential for industrial application as a functional cosmetic product. The NIBR researchers isolated and identified the novel lactic acid bacterium from the *C. japonica* flower and analyzed the biological activity of exosomes produced by the strain. The findings were developed into a hair loss reduction shampoo through patent application and technology transfer.

The analysis revealed that the lactic acid bacterium exosomes inhibited the production of nitric oxide (NO) and the pro-inflammatory cytokine IL-6—both typical inflammatory triggers—by over 90%. Additionally, the exosomes demonstrated low cytotoxicity and excellent anti-inflammatory activity, confirming their potential for use as materials to improve various inflammatory diseases.

The NIBR applied for a patent on this technology in 2024 and subsequently transferred it to a domestic cosmetics company. In turn, the company developed a hair loss reduction shampoo containing the identified lactic acid bacterium exosomes. Hence, this study goes beyond merely identifying the functions of native bioresources; it is also evaluated as a typical example of technology commercialization that led directly to a patent and product commercialization.

Ji, W. J., & Kim, D. S. (2026). *Leuconostoc mesenteroides* DB1 isolated from *Camellia japonica* flowers and anti-inflammatory composition using exosomes thereof (KR Patent No. 10-2026-0062261). Korean Intellectual Property Office.

HNIBR

Identification of a Novel Bacterium (*Hahella aquimaris*) Isolated from the Seawater of a Shrimp Aquafarm that Produces Prodigiosin

This research proposes a novel species of the genus *Hahella* that produces prodigiosin, a type of microbial pigment. Prodigiosin is a red pigment known to exhibit various antibiotic activities, including anticancer, antibacterial, and algal destruction. The HNIBR research team analyzed the phylogenetic, genomic, and phenotypic characteristics of the HNIBRBA332^T strain, which was isolated from the seawater of a white leg shrimp aquaculture farm located in Jindo, Jeollanam-do, Korea.

The strain was subsequently identified as a novel species belonging to the genus *Hahella* and was named *Hahella aquimaris* sp. nov. HNIBRBA332^T is a Gram-negative, aerobic, rod-shaped, monotrichous bacterium that can produce red pigment. Phylogenetic analysis based on 16S rRNA gene sequences indicated that it shares 95.3%–99.9% sequence similarity with existing *Hahella* species. Whole-genome analysis further revealed that the genome size of HNIBRBA332^T was 7.2 Mbp, with a GC content of 59.5%. The gene cluster involved in prodigiosin biosynthesis was identified in the whole genome, and prodigiosin production was confirmed via spectrophotometry.

Shin, S. Y., Seo, H., Jeon, Y., Kang, H., Song, H. S., Han, S. I., Song, J. (2026) *Hahella aquimaris* sp. nov., a bacterium producing prodigiosin isolated from aquaculture seawater. *Antonie van Leeuwenhoek*, 119, 7.

NNIBR

Biological Recovery Technology of Valuable Metals from Waste Secondary Battery Black Powder Using the FBCC-F2629 Strain of the Freshwater Microorganism *Aspergillus luchuensis*

With the recent increase in the production and supply of electric vehicles and energy storage systems (ESS), the demand for core minerals for battery production, such as lithium, nickel, and cobalt, has skyrocketed. As Korea relies heavily on imports for most of its major minerals, including lithium, securing resources through waste battery recycling has become increasingly important. In this regard, since 2025, the NNIBR has been searching for microorganisms capable of efficiently recovering valuable metals, such as lithium, from waste battery black powder.

As a result, the NNIBR research team discovered the *Aspergillus luchuensis* FBCC-F2629 strain, a microorganism that has shown higher metal recovery performance than the conventional sulfuric acid (H₂SO₄) treatment method. In experiments using the culture fluid of this strain, up to 90.3% of the lithium in the waste battery black powder was recovered. This level is approximately 9%–23% higher than under sulfuric acid treatment conditions. To enhance the feasibility of technology commercialization, the research team is currently developing a valuable metal recovery technology using organic acids produced by microorganisms. Through this effort, it is expected that industrial sites facing difficulties in setting up microbial cultivation facilities will be able to utilize the related technology more easily.

Ryu, B. G., Mun, H. Y., Han, K. I., Hwang, Y. J., Lee, J. C., Kim, L. W., & Oh, Y. T. Eco-friendly Bioleaching of Valuable Metals from Spent Lithium Battery Black Powder Using Freshwater Fungus *Aspergillus luchuensis* FBCC-F2629 (KR Patent No. 10-29912899). Korean Intellectual Property Office.

NIE

Management of the Invasive Halophyte *Spartina anglica* at Dongmak-ri Tidal Flat on Ganghwado

Coastal tidal flats are highly productive, yet vulnerable to invasive and easily dispersed intertidal plants. First identified at Dongmak-ri, Ganghwado, in 2012, *Spartina anglica*, a globally notorious invasive halophyte, has since formed the largest colony in Korea. Due to vegetative reproduction through rhizomes, it has spread rapidly, resulting in its distribution area increasing by approximately 9.2 times between 2015 and 2020. Consequently, this rapid expansion converted open mudflats into vegetated salt marshes, leading to a significant decline in the species' richness and diversity, as well as in the density of native benthic communities.

From 2016 to 2020, efforts to achieve physical removal by mowing and manual labor, among others, were implemented, but they failed to stop the spread of *S. anglica*. Thus, from 2021, underground tillage was conducted repeatedly twice a year—every May and August before seed formation—to cut and fragment the rhizome network. As a result, the distribution area of *S. anglica* decreased from 55,447 m² to approximately 250 m² in 2024, achieving a removal efficiency of over 99%.

This case demonstrates that continuous and repeated removal of the rhizomes is effective in managing *S. anglica*. Furthermore, ongoing monitoring and preventive management are essential to prevent its re-spread and the occurrence of new invasions in tidal flats.

Lee, S. S., Lee, S. I., Choi, D., & Yu, H. (2026). Invasion and Management of the Invasive Halophyte *Spartina anglica* at Dongmak-ri on Ganghwa Tidal Flat, South Korea. *Proceedings of the National Institute of Ecology of the Republic of Korea*, 7(3), 133–141.

NIWDC

A Repeated and Delayed Homologous Challenge Study Evaluating the Durability of Protection Induced by the Live Attenuated ASF Vaccine Candidate ASFV-G-ΔI177L/ΔLVR

In areas where African Swine Fever (ASF) is endemic, there is a high possibility of repeated exposure to the virus after vaccination. Most existing studies have only evaluated initial protective efficacy through a single challenge inoculation post-vaccination, resulting in a lack of data that could support durable protection under repeated exposure conditions. To address the problem, this study evaluated the long-term immunity persistence and protective efficacy of the ASFV-G-ΔI177L/ΔLVR vaccine in a repeated-challenge environment. The experiment, which consisted of three experimental groups* and two control groups (positive and negative), aimed to comprehensively evaluate clinical symptoms, body temperature, survival rate, viremia, viral shedding, antibody responses, and cytokine changes.

The results showed that all vaccinated groups had a 100% survival rate even after repeated or delayed challenges, with no fever or clinical symptoms of ASF. Conversely, all animals in the control groups developed high fevers and clinical symptoms following the challenge inoculation, ultimately leading to mortality. Additionally, ASF-specific antibodies formed post-vaccination remained at high levels for at least 12 weeks and were stably maintained despite repeated challenges. Furthermore, the vaccinated groups exhibited very low levels of viremia and viral shedding after the challenge, confirming that the vaccine effectively suppressed the replication of the pathogenic virus.

Zheng, X., Kim, Y., Choi, S. A., Lee, S. J., Shin, S. P., Lee, S. Y., Kim, W., Moon, S. C., Shin, Y., Kim, D. S., Shin, B. C., Choi, S., Sung, J. Y., Kim, G., Jheong, W., & Sur, J. H. (2026). A Repeated and Delayed Homologous Challenge Study Evaluating the Durability of Protection Induced by the Live Attenuated ASF Vaccine Candidate ASFV-G-ΔI177L/ΔLVR. *Vaccines*, 14(7), 561.

A Clue to Reducing Hair Loss Discovered from *Camellia japonica* Flowers

After identifying the anti-inflammatory effects of lactic acid bacteria isolated from native *Camellia japonica* flowers, researchers from the NIBR successfully commercialized them into a hair loss reduction shampoo by transferring the technology to a cosmetics company. The NIBR research team found that the exosomes extracted from the culture fluid of lactic acid bacterium inhibited the production of nitric oxide (NO) and cytokine IL-6—both typical inflammatory triggers—by more than 90%.

The exosomes of the lactic acid bacterium *Leuconostoc mesenteroides* are known as nanoparticles containing various bioactive substances, such as proteins and nucleic acids. Incidentally, the bacterium is also used in kimchi fermentation. The NIBR applied for a patent on this technology in 2024 and transferred it to a cosmetics company, Baogen Co., Ltd., in 2025. Combining it with its own proprietary technology, Baogen developed a hair loss alleviation shampoo containing these lactic acid bacterium exosomes and officially released it to the market.

According to the NIBR, this achievement is an exemplary case of technology commercialization encompassing national bioresource patent application, technology transfer, and product launching. It plans to continue expanding the strategic discovery and applied research of bioresources to generate tangible results that the public can experience.



Hair loss reduction shampoo containing the lactic acid bacterium exosomes

A Summer Break Where Biology Meets Art: Launching the 'Saengsaeng Summer School'

In celebration of this year's summer vacation, the NIBR conducted the "Saengsaeng Summer School," an experience program for children and their families, at the Saengsaengchaeum Special Exhibition Hall located at the NIBR from July 28 to August 16. Integrating the concepts of "biodiversity" and "arts," this summer school program consisted of subprograms, including hands-on exhibitions, exhibition commentaries, lectures from researchers, and cultural art performances, thus allowing visitors to experience the value of nature and life using their five senses.

For instance, at the Mother-of-Pearl Atelier, visitors viewed shells and mother-of-pearl artworks and were given the chance to create their own artworks. Meanwhile, the Seed Atelier offered free postcards containing native wildflower seeds and cultivation methods. In addition, the program featured exhibition lectures by docents; interactive talks featuring fish, mammal, and insect researchers; biodiversity-themed theater and dance performances; and AI animation production workshops.

Through this program, the NIBR aimed to provide a platform where children and their families could naturally experience the importance of biodiversity and to help them make special summer vacation memories where living organisms and art come together.



A poster of the Saengsaeng Summer School

Establishing an Integrated Biosafety Net Connecting Wildlife, Humans, and Livestock

From June 18 to 19, the NIWDC hosted the 2026 Korea Biosafety Conference in Jeju-do to respond to the challenges of climate change and the expansion of new biotechnologies, as well as to strengthen national biosafety management capabilities. This conference is Korea's largest biosafety academic and policy exchange event, jointly participated in by five institutions representing the fields of wildlife, humans, livestock, and marine life. Its aim is to establish a biosafety cooperation system from an integrative (One Health) perspective.

Due to the recent increase in risks brought about by exposure to wildlife-derived pathogens and the more complex transmission paths of infectious diseases due to climate change, the importance of integrated biosafety management encompassing wildlife, humans, and livestock has increased. Accordingly, this conference shared the latest trends in biosafety policies, laws, and systems, and discussed safety operational principles, cutting-edge technologies, and field research experiences for high-risk pathogen research facilities. Additionally, awards were presented to individuals who contributed to raising the standards of national biosafety.

Through this event, the NIWDC aimed to strengthen inter-ministerial cooperation, enhance the safety of the wildlife disease research environment, and elaborate on national biosafety management policies.



A poster for the 2026 Korea Biosafety Conference

Establishing an Integrated Biosafety Net Connecting Wildlife, Humans, and Livestock

The Graduate School for Wild Animal Diseases, jointly operated by Kangwon National University, Jeonbuk National University, Jeju National University, Chungbuk National University, and Seoul National University, held the 2026 Wild Animal Disease Specialist Training Workshop in Sejong on July 10. Around 100 veterinary students from across the country gathered to share knowledge on key current issues in the wild animal disease sector, including alien wild animal management, wild animal disease surveillance, zoo and exotic animal clinical experiences, and international academic exchanges.

The workshop focused on the key challenge of smuggled and abandoned exotic wild animals disrupting ecosystems and introducing novel diseases into the country. In particular, as growing numbers of exotic pets are abandoned, animal shelters have become more overcrowded. Aside from congestion, abandoned exotic animals can also cause ecosystem disruption, such as the hybridization between *Mauremys sinensis* and native Korean Reeve's turtles. Among other activities, the research team introduced early detection methods to identify the introduction and spread of invasive species, using molecular genetic technologies, such as mtDNA and eDNA.

Additionally, the NIWDC introduced its wild animal disease surveillance system, which focused primarily on highly pathogenic avian influenza (AI) and severe fever with thrombocytopenia syndrome (SFTS).

The Institute explained that it has strengthened the "One Health" system, which collaboratively manages the health of humans, animals, and the environment, through specific measures, such as wild bird and mammal surveillance, as well as joint epidemiological investigations with related government ministries. Furthermore, the NIWDC emphasized the importance of prevention-oriented disease management and regular surveillance.



2026 Wild Animal Disease Specialist Training Workshop

Successful Artificial Propagation of the Entire Life Cycle of *Abroscelis anchoralis*

Recently, the NIE announced its successful completion of the artificial propagation of *Abroscelis anchoralis*, a Class I endangered wild species, spanning its entire life cycle from egg to imago. Through this achievement, the Institute has secured the core technology required for ex-situ conservation and population restoration. *A. anchoralis* is a predatory beetle that inhabits the firm sand beaches of Korea's west coast and serves as a representative indicator organism that reflects a healthy coastal ecosystem. However, due to a decrease in habitat driven by sea-level rise caused by climate change and coastal development, its distribution is currently limited to a few restricted areas, including Taean in Chungnam and Shinan in Jeonnam. Since 2023, the NIE has been conducting propagation and restoration research in these areas. Last year, the Institute successfully secured 150 larvae from three wild female imagoes and effectively achieved indoor overwintering. In May 2026, it obtained F2 generation larvae from 28 artificially propagated imagoes, successfully establishing a complete artificial propagation system in which several generations continuously cycle within a rearing environment. Notably, the F2 generation represents the offspring produced from the F1 generation, which was born in this rearing environment. This achievement is highly significant, as it secures a stable population from ex-situ conservation. In cooperation with the Korea National Park Service, the NIE has also reintroduced 442 artificially propagated F1 larvae into their natural habitats in Taean and Shinan since 2024. The Institute aims to continue its restoration efforts until the West Coast populations fully recover their health. Furthermore, it plans to share its established artificial propagation technology with relevant organizations and even the private sector to promote the conservation of endangered.



1. Female *Abroscelis anchoralis*, moving on the shoal on the West Coast
2. Female *Abroscelis anchoralis* (profile)
3. Artificially propagated female *Abroscelis anchoralis*

The 3rd Endangered Wildlife of the Month Painting Contest

The NIE is hosting the 3rd Endangered Wildlife of the Month Painting Contest to raise social awareness regarding biodiversity and increase public interest and participation in the preservation of endangered wildlife. Any individual residing in Korea aged 15 and older can participate in this contest.

The contest is open to artworks featuring themes related to the 249 endangered wildlife species, divided into two categories: "scientific illustration (original art)" and "digital illustration." All participants must submit artworks that reflect the ecological characteristics and habitats of the species depicted, including full-body views, detailed partial views, and scale bars. The final winning entries will be selected through an evaluation based on accuracy and realism conducted by a panel of expert judges, as well as online voting that is open to the public.

A total of 24 winning entries will be selected, with total prize money amounting to 15 million won. Specifically, the Grand Prize winner will be awarded the "Minister of Climate, Energy and Environment Award," along with a cash prize of 3 million won, while cash prizes will also be distributed to recipients of the Top Excellence, Excellence, Encouragement, and Honorable Mention awards.

The final winning pieces are scheduled to be used in exhibitions and the production of promotional materials for the "Endangered Wildlife of the Month" project to be implemented in 2027.



A poster of the Endangered Wildlife of the Month Painting Contest

Publication of Guidelines for the Cryopreservation of Freshwater Microalgae for Long-Term Preservation

The NNIBR has recently published "Guidelines for the Cryopreservation of Freshwater Microalgae," a free guidebook outlining various methods for the stable, long-term preservation of freshwater microalgae, along with its e-book version.

While microalgae are highly valuable bioresources utilized in various fields, including food, pharmaceuticals, cosmetics, animal feed, and environmental purification, the traditional subculturing method carries the risk of contamination and characteristic alterations. Consequently, the need for a standardized, long-term preservation technology has been steadily raised.

This guidebook details techniques for stably maintaining cellular characteristics in ultra-low temperature environments of -80°C or below -150°C. It also covers methods for selecting cryoprotective agents deemed suitable for each microalgae species, identifying optimal freezing conditions, and accurately determining experimental procedures. The NNIBR plans to provide the guidebook for free through its website, as well as use it as a textbook for microalgae specialist training courses, encouraging researchers to apply these technologies on-site. It is anticipated that the publication of this guidebook will serve as an opportunity to promote widespread long-term microalgae preservation technology across research fields and industries, while strengthening the foundation for nurturing specialists in the field.



Guidelines for the Cryopreservation of Freshwater Microalgae

Expanding Technology Sharing in the Bioindustry by Opening Unused Patents

To reduce the burden of private companies aiming to develop technologies and to support their technology commercialization efforts, the NNIBR implements a technology-sharing project that transfers the unused patents it owns either free of charge or for a nominal fee. This project aims to assist early-stage startups in securing technology and commercializing products by opening up patents held by public institutions. Currently, a total of 16 patents are available to the public through the National Intellectual Property Trading platform.

For example, the NNIBR recently transferred its patent for an "antioxidant composition using *Persicaria amphibia* extract" to a new startup, Hyunryong. This technology leverages the antioxidant effects of *P. amphibia*. Then, based on the patented technology, Hyunryong developed a cleaning detergent that produces less skin irritation and is suitable for long-term usage based. The company aims to officially launch the product in the second half of 2026. This example of technology transfer is anticipated to increase the utilization of unused patents and contribute to strengthening the technological competitiveness of private companies. In the coming months, the NNIBR plans to continually expand its technology-sharing initiatives to promote the broader dissemination of its proprietary technologies to the private sector and ultimately revitalize the Korean bioindustry.



Persicaria amphibia (©NNIBR)

Exploring Island Biodiversity with Citizen Scientists

Since 2022, the HNIBR has operated the “Island Wildlife Exploration Team,” in which citizen scientists and experts observe and record organisms together. This year, in celebration of World Migratory Bird Day, the Institute once again conducted an exploration with citizens to investigate biodiversity across island areas. Through these efforts, the HNIBR continues to raise awareness of the value of island biodiversity and expand public participation, while also supporting national bioresource investigations and conservation activities.

A total of 35 citizen scientists interested in four taxonomic groups, namely birds, insects, plants, and amphibians/reptiles, participated in this survey, and the team identified a total of 383 species, including 130 birds, 34 insects, 215 plants, and 4 amphibians/reptiles. Notably, Class I Endangered Wild Species, including *Egretta eulophotes* and *Haliaeetus albicilla*, and 10 legally protected species, including *Accipiter soloensis*, *Accipiter gularis*, *Falco peregrinus*, and *Pandion haliaetus*, were discovered. Apart from utilizing the findings from this expedition as base data to understand long-term trend shifts in island biota, the HNIBR intends to continuously expand its biodiversity conservation activities in collaboration with citizen scientists.



1. Island Wildlife Exploration Team (Division of Biodiversity Inventory)_1
2. Island Wildlife Exploration Team (Division of Biodiversity Inventory)_2
3. *Emberiza aureola*, Class II Endangered Wild Species
4. *Muscicapula cyanomelana* observed during the joint investigation

A Five-Year Investigation on Island and Coastal Organisms Discovered 310 Species of New and Unrecorded Bacteria

As a result of a five-year survey conducted since 2021 across approximately 100 domestic islands and coastal areas, the HNIBR has discovered a total of 310 native bacterial resources, including 13 new species and 297 unrecorded species. With the aims of confirming the diversity of microorganisms inhabiting island and coastal ecosystems and securing national biological resources, the HNIBR research team analyzed diverse environmental samples, including seawater, marine sediments, halophytes, and soil.

Since 2023, the institute has expanded its investigation scope to remote, hard-to-access islands, such as Gageodo, Chujado, and Eocheongdo, by utilizing its eco-friendly research vessel, “Seom Nurim.” Among the newly discovered bacterial resources, several strains were confirmed to have high potential for industrial applications, including useful substance production and plant growth promotion.

The unrecorded bacterial species *Zooshikella harenae*, which the Institute discovered on Yuldo in 2025, was confirmed to produce prodigiosin, a red pigment known for its antimicrobial, anticancer, and immunomodulatory properties. Additionally, *Roseibium salinum*, isolated from the roots of halophytes on Gohado, demonstrated nitrogen-fixing capabilities, thereby showing strong potential for applications in eco-friendly agriculture.

The HNIBR plans to utilize these survey results as base data for island and coastal biodiversity research and for the expansion of the national species inventory.



Field investigation in island and coastal areas
by using the Institute's eco-friendly research vessel, Seom Nurim

필요한 생물소재, 연구에 활용하세요

야생생물 소재은행 분양 안내

국가야생생물소재은행

분양 가능 소재

보유현황 : 292,140점



추출물



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분양 가능 소재

보유현황 : 15,155점



천연물



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