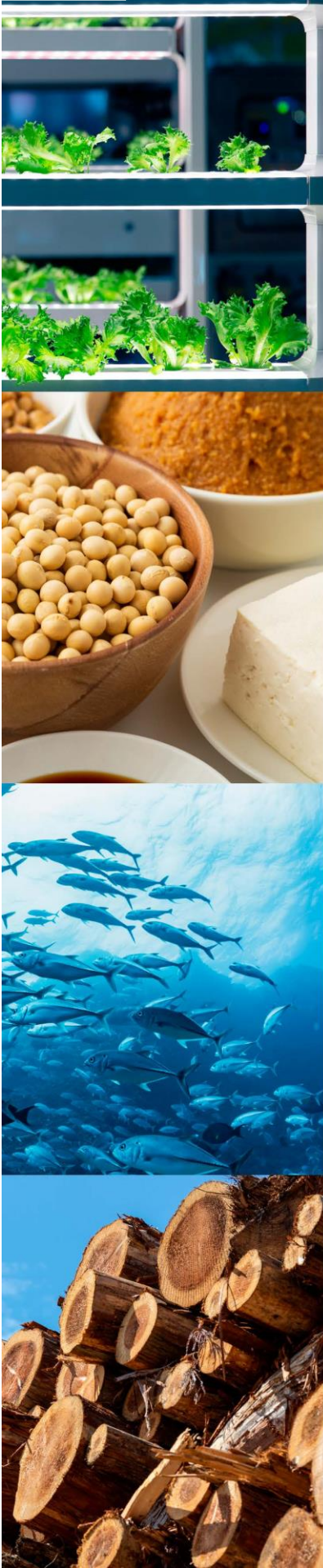


Mar. 2024 Edition



Field for

The new form of
industry-academia-government collaboration

Knowledge

Integration and Innovation

Compilation of Implementations in Society

Greetings from the Chairman

The Field for Knowledge Integration and Innovation® introduces knowledge, technology, and ideas from other fields into agriculture, forestry, fisheries and food industries, and it is an initiative that aims for open innovation through industry-academia collaboration. The main body, the Field for Knowledge Integration and Innovation® Council of Industry-Academia-Government Collaboration (hereinafter, the Council), was formed in 2016 with a diverse range of participants from agriculture, forestry, and fishery businesses; private companies; universities; and public research institutes. This year marks the 8th year, and there are over 4,500 members, who have established around 170 R&D Platforms with lively activities underway across the country.

The results of activities of Council members have widely contributed to society in various ways, such as the creation of new cultivars and brands, the development and sale of new agricultural materials and Foods with Functional Claims, the establishment of JAS standards, and the release of production manuals for agricultural goods.

The 5-year period beginning in 2021 is considered the Council's second activity term. In order to encourage more implementations of research achievements in society, the Council supports member activities such as business and product creation.

Additionally, we request the ongoing understanding and support from members as we lead Council activities to create further innovations in order to respond to important policy challenges proposed by the government, such as the Strategy for Sustainable Food Systems, MIDORI, which was enacted in May 2021 by smart agriculture, forestry, fisheries and food industries and the Ministry of Agriculture, Forestry and Fisheries; activities to encourage the exportation of domestic agriculture, forestry, fishery and food products; and measures to ensure the stability of the food supply. We are sincerely looking forward to the participation of new members.

July 2023

Council of Industry-Academia-Government Collaboration,
Field for Knowledge Integration and Innovation®
Chairman MATSUYAMA Asahi

The Field for Knowledge Integration and Innovation in numbers

4794: The number of members in the Council of Industry-Academia-Government Collaboration

Members with an interest in industry-academia-government collaboration and open innovation participate in the Council. Primary producers, universities, national research institutes, corporations, local governments, and groups from fields outside of agriculture, forestry, fisheries and food industries also participate.

In order to encourage the creation of new relationships, we provide both online and in-person opportunities for members to get to know each other, discuss ideas, and promote activities.

176: Number of R&D Platforms

Collaborations among Council members that span beyond organizations, fields, and regions on open activities such as collaborative research and development to create new products and businesses are called R&D Platforms.

604: Research Consortiums

Research Consortiums are closed groups within R&D Platforms for achieving concrete research and development.

36: Number of examples of research results being implemented in society

This compilation introduces 36 examples of social implementation achieved by the Platforms.

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Biotechnology-based Business Creation

Social implementation of medialess strawberry cultivation system (NFT hydroponics)



Development of stable production method that solves challenges in medialess strawberry cultivation (hydroponics), which has been avoided by producers due to unstable cultivation.

In medialess strawberry cultivation (hydroponics), the difficulty of managing cultivation is attributed to instability in the environment of the root, e.g., root browning. This has prevented widespread. To solve this problem, there is a need for technology to be developed that optimizes and stabilizes the cultivation environment, in response to the growth of the strawberry plants.

A platform was created with the cooperation of seven groups from industry, academia, and government: Toyohashi University of Technology, Osaka Metropolitan University, NARO Kyushu, Okinawa Agricultural Research Center, Nagasaki Agricultural and Forestry Technical Development Center, Mie Agriculture Lab, M Hydroponic Research Co. Ltd., and Sanshin Metal Working Co. Ltd. Under the direction of Kotaro Takayama, this platform engaged in research and development on three themes: (1) development of a medialess cultivation system that achieves higher yields through lower cost, less work, and multiple stages; (2) demonstrations cultivating Yotsuboshi and Koiminori with this system; (3) stable growth and larger yields using high-precision plant phenotyping* technology.

M Hydroponic Research Co. Ltd. and Sanshin Metal Working Co. Ltd. developed and implemented the cultivation and control systems. The results were evaluated, and in October 2022, both companies successfully implemented the system in society for the first time by delivering a 20 a medialess strawberry cultivation system in Aichi Prefecture. (Announced in the Chunichi Shimbun on October 14, 2022)

* This research was adopted to establish medialess strawberry cultivation technology based on high-precision phenotyping as a research program on development of innovative technology, and was performed from 2020 to 2022.

Corresponding Platform

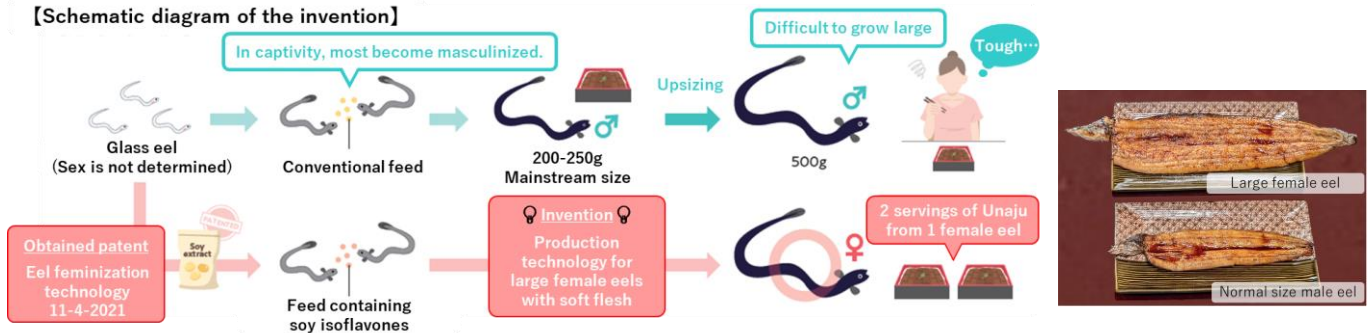
Sustainability-04: Smart/Megascale Plant Factory R&D Platform

Contact

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Development of technology to feminize eels and produce flavorful, large female eels



With conventional farming methods, the meat of male eels gets tougher as they increase in size. This technology feminizes eels to achieve eel production to ensure soft, delicious meat at larger sizes.

[Background of development]

Eel farming relies on 100% natural resources for seedlings (shirasu eels), and there was a need to increase the distribution size in order to effectively use the materials. Males are primarily used (about 95%) in farming, and as they get larger, the meat gets tougher. The meat of female eels remains soft and delicious even as the eels get bigger, but there was no technology for producing female eels for consumption.

[Research results]

Technology was developed to feminize the eels by providing feed that contains soy isoflavones before the eel's sex is determined. Feed that uses this technology is now available for sale. The large female eels grow larger than males and have a notably soft meat and high fat content despite their size.

[Patent acquisition]

A patent was obtained for an eel feminization induction method, eel breeding method, eel feminizing agent, and eel feed on November 4, 2021 (patent number JP6970992).

[Social implementation]

The goal is full-scale social implementation in January 2024 with the start of limited sale of large female eels produced through demonstration tests at an eel farm.

Corresponding Platform

Sustainability-07 Innovation creation platform for aquaculture industries

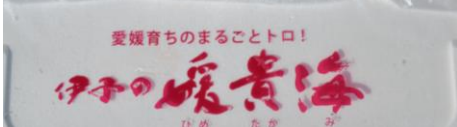
Contact

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- Kyoritsu Seiyaku Corporation, Vaccine Development Department (Tel: 029-872-3361)

Creation of full-lifecycle farming industry for suma, the new face of popular tuna types



The full-body chutoro fattiness is as good as bluefin tuna sushi and sashimi!



Suma *Euthynnus affinis*

Family of small tuna from southern region



10,000 fish

Seedling production and shipping plan in Ehime



Expansion of commercial farming and completing plans

Instead of bluefin tuna, which requires natural seedlings, we attempted to commercialize full-lifecycle farming of suma, a type of small tuna with flavor that rivals the bluefin.

Tuna species are popular as a food ingredient around the world, and bluefin tuna farming is conducted in Japan. However, most operations use wild juveniles and young fish as seedlings, and the commercial spread of “full-lifecycle aquaculture”, which manages from egg to adult, is at a standstill. Therefore, believing that the full-lifecycle aquaculture of fish with a delicious tuna flavor would become popular, we began efforts in 2012 to fully cultivate “kawakawa (suma in Japanese), *Euthynnus affinis*,” a small southern tuna species. We started seedling production in 2014 and succeeded in early spawning induction in April of the following year, two months earlier than in the wild. In 2016, we achieved full-lifecycle aquaculture using the 2014 seedlings as parents. Since then, we have continued full-lifecycle aquaculture in combination with the selection of superior broodstock, and we have currently assigned the strain name “Nansui No.1”. For the commercial production, 100% of the seedlings are provided by this strain. There is a norm to shift towards artificial pellet feed-based farming, making aquaculture more sustainable and in line with the SDGs.

Now, kawakawa's recognition and popularity are rising rapidly, and the industry is reaching a phase of expansion. Looking to the future, we are advancing the introduction of quality assessment technology and new breeding techniques, a first for fish, similar to those used for vegetables and fruits. We aim to create kawakawa that are more delicious and easier to cultivate.

Corresponding Platform

Sustainability-07 Innovation creation platform for aquaculture industries

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Commercialization of masu salmon farming in Kamaishi Bay, Iwate Prefecture



Farming fish tank for masu salmon



Unloading of farmed masu salmon at a fish market

Converting the unstable fishery pattern of concentrated chum salmon fishing to a sustainable and stable production system by adding salmon farming through the Sanriku Farming Industrialization Platform's industry-academia-government collaboration project.

- The Kamaishi Bay is an important bay and as such has numerous regulations. It was difficult to get started, but we used breeding management technology from Iwate University, and our activities are a unified effort in the region. Therefore, in 2020, we were the first to catch farm-raised masu salmon in Kamaishi, and in 2022, we succeeded in commercialization as the local fishery cooperative succeeded in gaining territorial fishery rights.

- A masu salmon promotion consortium was also established as a subordinate organization within the platform, and it is creating a local fish brand under the registered trademark Kamaishi Hamayuri Masu Salmon as a way to stimulate the local economy.



Masu salmon are used for Kamaishi's hometown tax and thank-you gifts

Corresponding Platform

Sustainability-11 Sanriku Farming Industrialization Platform

Contact

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Adopting the Strategy for Sustainable Food Systems, MIDORI to agricultural material – thoroughbred compost (Microbiome control method to control pest/disease and increase yield)

Zenkoku-Nougyou-Shinbun issued on August 11, 2023. page 1



The product displayed at a DIY store in Ibaraki Prefecture. Selling well with despite a higher price point compared to others



While disease, insect damage and yield loss have been seen as barriers to organic farming, the use of thoroughbred horse manure, an underutilized resource in the region, has gained the support of organic farmers.

Thoroughbreds are subject to doping inspections and are given significantly fewer antibiotics and other medications compared to other livestock, therefore, their manure is high quality and organic. However, it was seen as a potential cause for water pollution in Lake Kasumigaura. In order to turn this situation and to make it effective for practical agriculture, we overcame challenges such as the need for a short composting period (patent number JP6427823: short-term manure manufacturing method) and adjustments to the carbon ratio, and we launched the product in FY2019 under the brand name of Thoroughbred Miho. This has resulted in less disease and pest infestation without the use of chemical fertilizers and pesticides, and increased yields, and has gained the support especially from the organic farmers.

Corresponding Platform

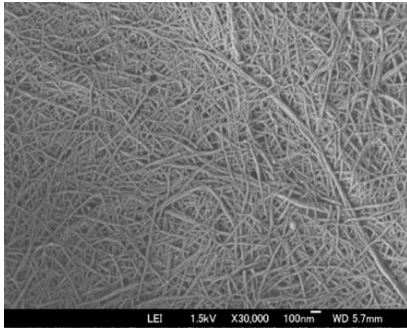
Sustainability-16 R&D Platform for Improving Soil to Improve the Quality of Agricultural Products and Increase Yields

Contact

For English readers, Peony Garden Tokyo
<https://peonygardentokyo.com/> K.K. Leaf (Japanese page)
<https://kkleaf.com/>
 Producer: Dr. Hiroichi Seki seki@kkleaf.com
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New High-Performance Chitin Nanofiber Material Derived from Discarded Crab Shells

Various health care effects and commercialization



New material manufactured from crab shells chitin nano fiber



Sold by Marine Nano-fiber chitin nano fiber, a functional raw material



Cosmetics that incorporate the chitin nano fiber Kani Danomi

Chitin nanofiber, a new material derived from crab shells, was developed in Tottori, Japan's largest crab farming area. A surprisingly wide variety of functions have been discovered, leading to the creation of new health care products.

We are working to make effective use of crab waste, a specialty of Tottori Prefecture. Using patented technology, chitin, the main ingredient of crab shells, is reduced to a very fine powder and transformed into a new material, chitin nanofiber. Compared to conventional chitin powder, it is easier to handle and to make product prototypes. It is also easy to use as a sample material for research, and an amazing variety of biological applications have been discovered. They can be applied to the skin (wound healing, inflammation relief, hair growth, moisturizing, barrier function), eaten (diet, adult disease prevention, gastrointestinal care), and spread on plants (growth promotion, immune activation). To promote this new material derived from discarded crab shells and its various uses, we established Marine Nanofiber, a university start-up company. Products shipped from factories in the prefecture use this functional material, and health care products such as cosmetics and hand creams are already on the market. The usefulness of the material has also been recognized, with shares being transferred to a chemical company. The company is working to create new local industries, make effective use of food waste, promote people's beauty and health, and improve yields of agricultural products.

Corresponding Platform


Sustainability-17: Chitin Nanofiber R&D Platform

Contact

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Marine Nano-fiber Co. Ltd., <https://www.marine-nf.com/>

Development of new biostimulant primarily composed of micronutrients



Strong Liquid

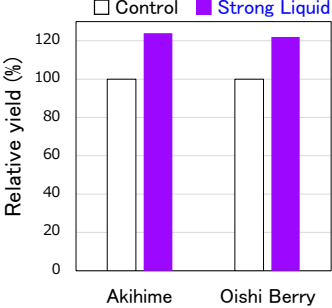
Tolerance to drought



Water Strong Liquid

Strong Liquid applied to tomatoes


Increases yields



Crop	Control (%)	Strong Liquid (%)
Akihime	100	120
Oishi Berry	100	120

Strong Liquid applied to strawberries

Increases plant resistance



Water Strong Liquid

We developed an innovative material by focusing on the benefits of micronutrients on growth and the improved defensive response that they create while overcoming the disadvantages of each

- Strong Liquid (nickname: Storiki) was registered as a liquid compound fertilizer with micronutrients in 2020. (Manufactured by: Katakura & Co-op Agri Corporation)

Micronutrients are necessary for plant growth, and they increase resistance to various stressors. However, in line with their name, micronutrients are only required in trace quantities. Therefore, excessive quantity and concentration can have a negative effect on growth, etc. Strong Liquid has a suitable concentration and balanced compound of micronutrients, namely manganese, boron, iron, copper, and zinc, as well as betaines that increase resistance to environmental stress. By applying Strong Liquid to the surface of a leaf, you can effectively replenish micronutrients as well as improve photosynthesis, metabolism, and growth. In addition to facilitating growth, it is also useful for growing crops that are resistant to environmental stress.

- Put on the market: April 2021
- Main patents for Strong Liquid

(1) Patent number JP6713117 (2) Patent application JP2020-080169

Corresponding Platform

Sustainability-21 R&D Platform for Innovative Production Technology for Agricultural Products based on Plant Activation

Contact

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Technology to rapidly identify functional molecules in foods composed of a vast number of different molecules

So far, identification was not easy
Food molecules A huge number

Our core technology

- SAR information
- Comprehensive analysis
- Rapid identification!**

Discovery of novel functional molecules

Novel Mechanism finding

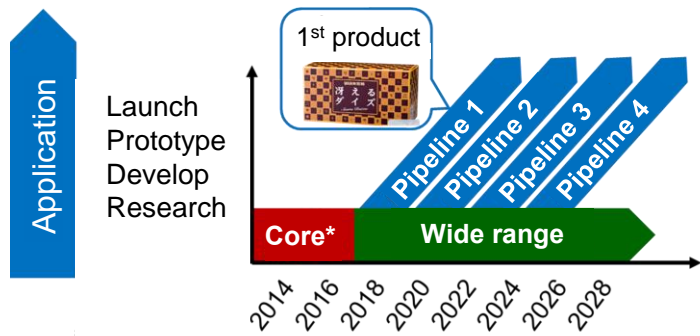
The identification of functional molecules in foods composed of a huge number of many different molecules has been a difficult challenge, but we have solved this problem with our core technology

Example 1.
 Functional food application by collaboration with food company

Soy protein development and launch (2020)

Example 2. Clinical application

Establishment of a start-up for drug development (2017).
 Phase 1 completed.



Our technology allowed the rapid development of new functional foods and innovative pharmaceuticals. It can be used with any foods, and we are developing many new materials.

*Japanese Science and Technology Research Promotion Program for Agriculture, Forestry, Fisheries, and Food industry

Eat-Tech from Japan aimed at solving global problems such as global aging and climate change

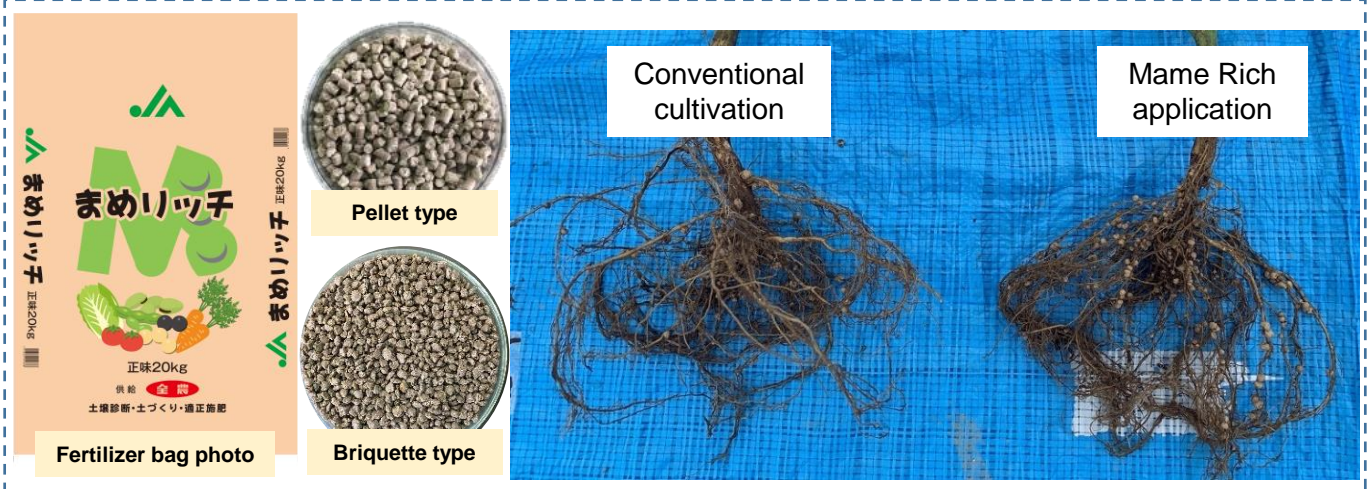
Corresponding Platform

Sustainability-22: R&D Platform for Creating New Markets by Next-generation Food Development

Contact

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Development of Mame Rich, a special fertilizer that helps stabilize soybean yields by improving the soil microbiome



Soybean yields may be low due to soil-borne diseases in Japan. Application of the special fertilizer "Mame Rich" improves soil microflora and stabilizes soybean yields.

[Background of development] Soil-borne diseases were considered a factor in lower soybean yields in Japan. In particular, there is no effective control technology for red crown rot caused by *Calonectria illicicola*. On the other hand, there are some fields where soybean yields are high and there are few soil-borne diseases even after continuous soybean cultivation for more than 20 years. Dr. Sato of Akita Prefectural University succeeded in isolating three bacteria strains that suppress the growth of *Calonectria illicicola* from the specialized dry chicken manure that was used on the fields. He also succeeded in isolating *Cunninghamella*, which grows quickly on a medium, from the soil of a different field.

[Characteristics] The microorganisms mentioned above were cultured and mixed with chicken manure compost, zeolite, and rice bran to make pellets and briquettes, which named "Mame Rich". Application of "Mame Rich" improves soil chemical and biological properties, and reduces soil-borne diseases as a secondary effect. In addition, application of "Mame Rich" promotes root nodulation in soybean and stabilizes soybean yield.

[Put on the market] 2020

[Patent information] - Materials that reduce soil-borne diseases (patent number: JP6878751)

- Materials to reduce soil-borne diseases of soybean (unexamined patent application JP2023-41152)

[Related website] - <https://www.asahi-agria.co.jp/fertilizer/bio>

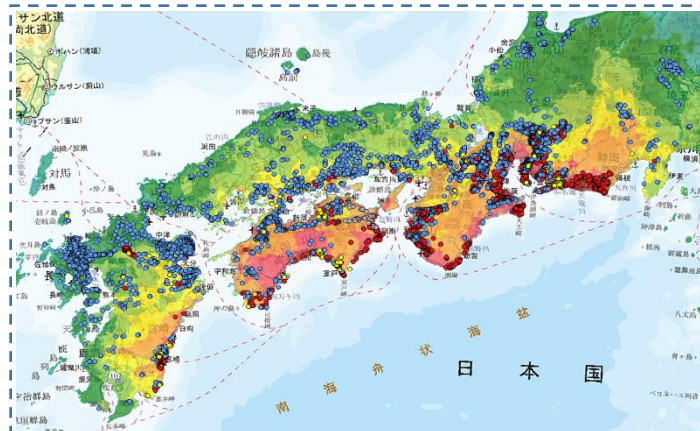
Corresponding Platform

Sustainability-24 R&D Platform for the Biological Control of Soil-borne Soybean Diseases

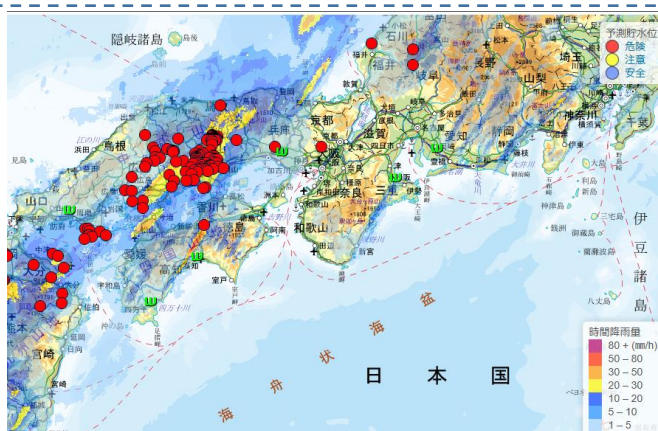
Contact

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Disaster prevention support system for irrigation pond to predict risk and share disaster information during earthquakes and heavy rain



Hazard prediction in preparation for earthquakes along the Nankai Trough



Hazard prediction due to heavy rain in July 2018

Hazard prediction of pond, and disaster information of pond based on local inspections are shown on a map screen risk levels (red, yellow, blue and so on.) .

This system is used by national and local government staff responsible for ponds as a disaster prevention and mitigation measure during earthquakes and heavy rain.

During large earthquakes such as the Great East Japan Earthquake and disasters resulting from heavy rain such as the Northern Kyushu Flood and heavy rain in July 2018, ponds were destroyed, causing widespread damage in areas downstream. There was no way to quickly share predictions on pond destruction and disaster information.

Therefore, in order to prevent disasters caused by ponds during earthquakes and heavy rain, we developed the Disaster prevention support system for irrigation pond, a system that provides predictive information in real time on the danger of a pond and that quickly provides disaster information on local ponds to relevant parties.

This system entered use by the Ministry of Agriculture, Forestry and Fisheries in FY2020.

YouTube
Disaster prevention support system for irrigation pond



Inquiries and manual



Technical details



* This research was performed with the support of the Cabinet Office's Cross-ministerial Strategic Innovation Promotion Program (SIP) for achieving more resilient disaster prevention and mitigation functions

Corresponding Platform

Sustainability-25 R&D Platform for Achieving Resilience and Sustainable Management of Agricultural and Rural Infrastructure

Contact

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Development of rearing equipment for dairy cows that conforms to animal welfare standards



Grooming brush equipment for calves used in demonstration for verification (left) and pamphlet draft flyer for retail use (right)

New calf suckling bucket (left) that ensures a suckling time equivalent to the time when the mother and calf are together (conventional feeding ends in about 2 minutes) and suckling example (right)

Diseases resulting from separation stress of cow and calf immediately after birth and abnormal behavior resulting from very short duration of artificial suckling were two issues regarding animal welfare. We use two (feeding equipment for calves) in Japan for feeding practices compatible types of original technology ie with animal welfare standards.



“Strategy for Sustainable Food Systems, MIDORI”

- Shift toward sustainable production systems compatible with high quality production - **The development and spread of technological measures to improve animal welfare based on scientific knowledge**

“Basic plan for food, agriculture, and rural communities”

The export target for agriculture, forestry, fishery and food products is 5 trillion yen (of which 360 billion yen is beef)

The promotion of livestock farm management based on international Animal welfare standards

◆ For conformity with animal welfare standards ◆

- Disease prevention in calves separated from their mother → 10% improvement in calf separation rate with mock grooming equipment (NARO Yayo Patent number JP6449028)
- Prevention of abnormal behavior in suckling calves → 60% decrease in abnormal behavior by using a feeding container that can extend the feeding time (Toyama Research Institute Nanbu et al. 2021, ORION MACHINERY Hara et al. Design number 1751181)

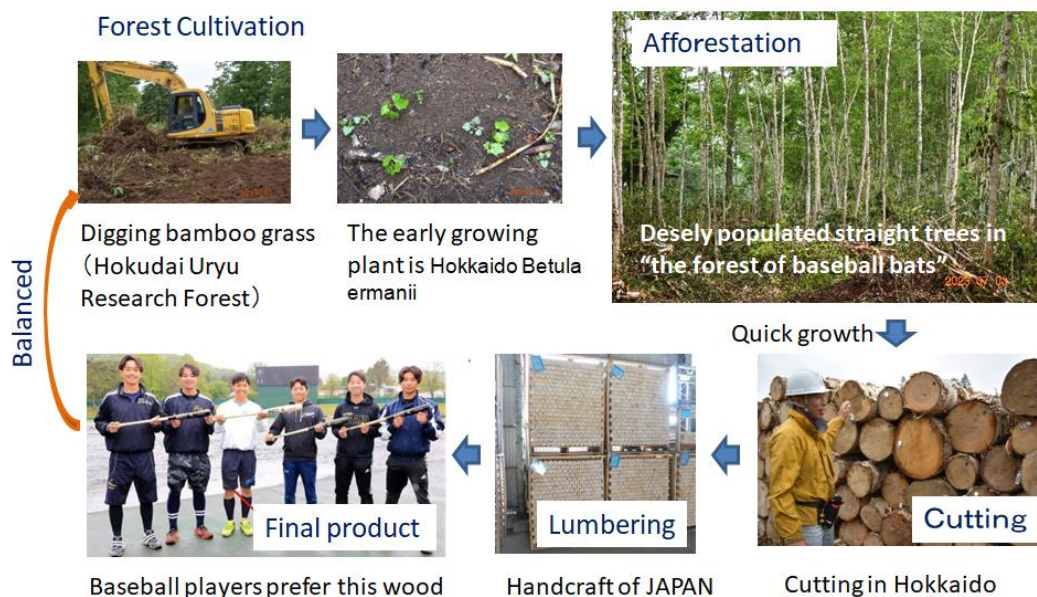
Corresponding Platform

Sustainability-29: R&D Platform for Next-generation Livestock Production Technology

Contact

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Hokkaido *Betula ermanii* forest for wood baseball bat



Currently, almost all the wood used for bats are imported from overseas. However, with expanded use of Hokkaido *Betula ermanii*, we can revitalize Hokkaido's forestry industry and offer a stable domestic supply of bat materials. The nature of the plant, first seeded and rapid growth, is the great advantage for keeping the sustainability of forest resource.

Betula ermanii is popular in Hokkaido. The wood is known for its strength and robustness; it can also be used in agricultural tools and furniture. However, there have been few profitable way of making use of the wood. It had mostly been limited to use as chips in paper manufacturing and as fuel. The tree has been dealt with a miscellaneous one in Hokkaido.

Fraxinus lanuginosa was the wood in Hokkaido that was quite popular as the wood for bats. However, the supply was extinguished, and now North American maple is dominating the market. For bats, *Fraxinus lanuginosa* is quite soft, as compared with the extreme hardness of maple. When *Betula ermanii* prototype bats were made, those who used realized that its hardness was just intermediate between *Fraxinus lanuginosa* and maple. Moreover, its toughness to fracture is comparable to maple.

There are not a few baseball players who prefer the softness of *Fraxinus lanuginosa* bats. We want to enlarge the fun of baseball by providing an extra hardness option to players through *Betula ermanii*. The bat has been approved to use in any official amateur baseball games since 2021 and is expected be open to the market. *Betula ermanii* forest of bats may work as the buffer of bat materials in future.

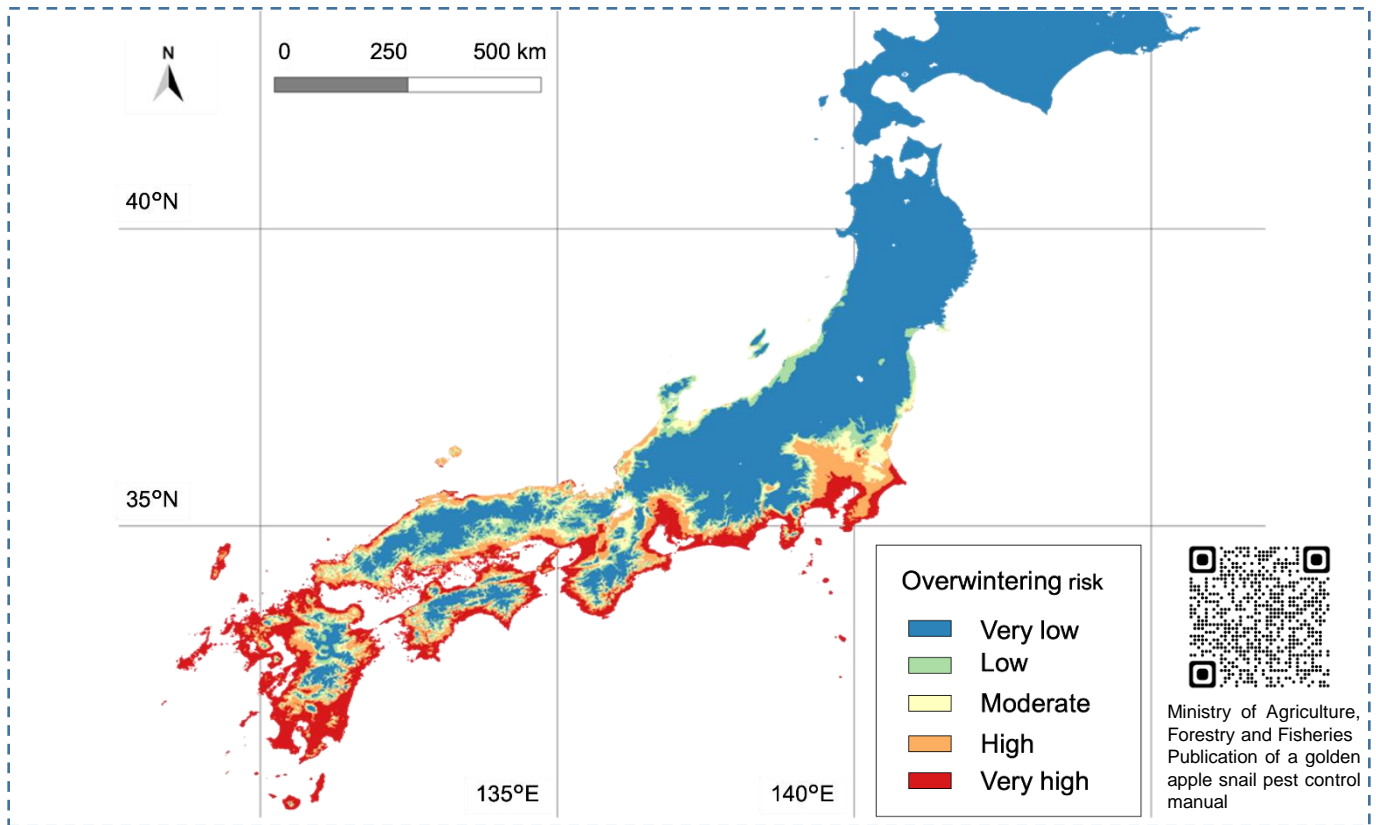
Corresponding Platform

Sustainability-31: Research and Development Platform for Robust Agriculture, Forestry and Fisheries Industries

Contact

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The risk map of the golden apple snail



We created the map of overwintering success of the golden apple snail in Japan. The map is available for preventive and initial controls of this snail.

Overwintering success and failure of the golden apple snail depends on winter temperature: large numbers of the snails can overwinter in the warm areas of Japan while no snails can overwinter in the northern areas. We developed a logistic model that classified the overwintering risk of the snail into five categories (very low – very high) on the basis of winter temperature. Over 99 % (1342 of 1346) present records of the snail in Japan were from areas with Moderate or higher risk, and there has been no records of the colonization of the snail from areas with Very low risk.

* This research was performed with the support of the BRAIN Research Program on Development of Innovative Technology (JPJ007097).

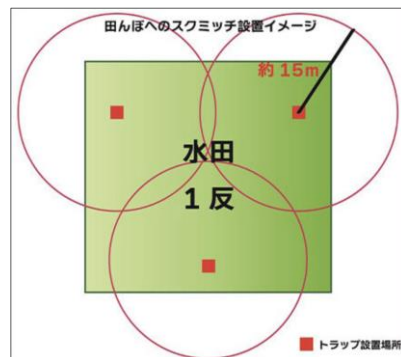
Corresponding Platform

Sustainability-38: Platform for Development of New Plant Protection Technology that contribute to SDGs.

Contact

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Institute for Plant Protection, NARO

Mass collection trap and high-efficiency attraction agent for the golden apple snail



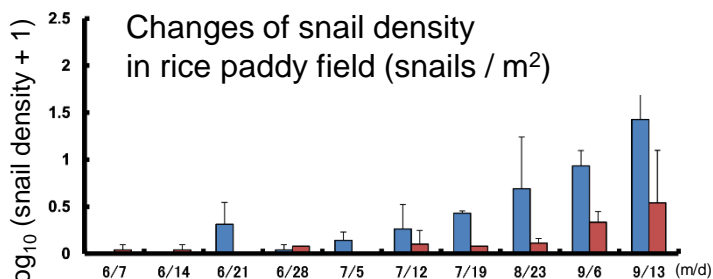
Sukumicchi is (1) light and easy to handle, (2) easy to drain water from slits after use, and (3) eco-friendly because of using harmless attractants.

How to use: (1) place Sukumicchi in irrigated rice paddy fields after transplanting (3 Sukumicchis per 1,000 m²) and (2) replace the attractants 'Sukumicchi food' in the box every week.



An eco-friendly attractant
'Sukumicchi food'

Changes of snail density
in rice paddy field (snails / m²)



A paddy field with Sukumicchi (red bar) could suppress the increase of snail density compared to control (blue bar)



Product details

We developed and commercialized a high-efficiency and eco-friendly attractant and a specialized trap for mass trapping of the golden apple snail, which is an invasive rice pest spreading in Japan.

We developed a harmless attractant that can attract the snails effectively for long time even in water and a specialized trap that has large-capacity and is easy to handle in field. Use of the attractant and the trap can suppress the snail density in rice paddy fields. In our verification, ~18,000 snails were captured for 1 month by placing 9 traps in a 3,000 m² rice paddy field although the number of trapped snails varies depending on initial snail density.

* This research was performed with the support of the BRAIN Research Program on Development of Innovative Technology (JPJ007097).

Corresponding Platform

Sustainability-38: Platform for Development of New Plant Protection Technology that contribute to SDGs.

Contact

Keiichiro Matsukura (mtrk@affrc.go.jp)
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Expansion of pesticide registration to allow blower-spraying microbial pesticides

Microbial pesticide Batista hydrating agent (For diseases)

Blower sprays (air distribution) can now be used!

Microbial pesticide Botanigard hydrating agent (For pests)

Website introducing the related research with videos
<https://www.setsunan.ac.jp/~pp/inobe>

Pest/Disease control for crops that previously required the transport of a diluent for concentrated pesticides can now be performed more easily and with less labor by using a portable blower.

Pest/Disease control for crops is primarily performed with pesticides, but this generally must be performed while carrying water to dilute the pesticide. In mountainous areas, there are fields where a water supply is difficult to obtain. Therefore, it is ideal to have a pesticide spray method that does not use water and that is easier to perform for the worker. However, pesticide registrations are regulated in detail for aspects such as the type of pesticide, the target pest or disease, the usable concentration and quantity, the processing method, etc., and these must be followed for legal compliance.

If pesticide powders could be distributed in air with a portable blower, it would eliminate the need to dilute and adjust the concentration as well as transport the heavy diluent, allowing the pesticide to be distributed more easily and with less labor. This research was performed after sufficiently demonstrating the pest and disease control benefits of an air spray of two pesticides with microbial ingredients. It was approved in FY2022 following an application for an expansion to pesticide registrations to allow air spraying for these microbial pesticides.

Currently, there are no portable blower products that support pesticide sprays. We are waiting for the development of one. Microbial pesticides are not hard on the environment and are safe. We hope that they can be introduced soon in farms.

This research was performed with the support of the BRAIN research program on development of innovative technology (JPJ007079).

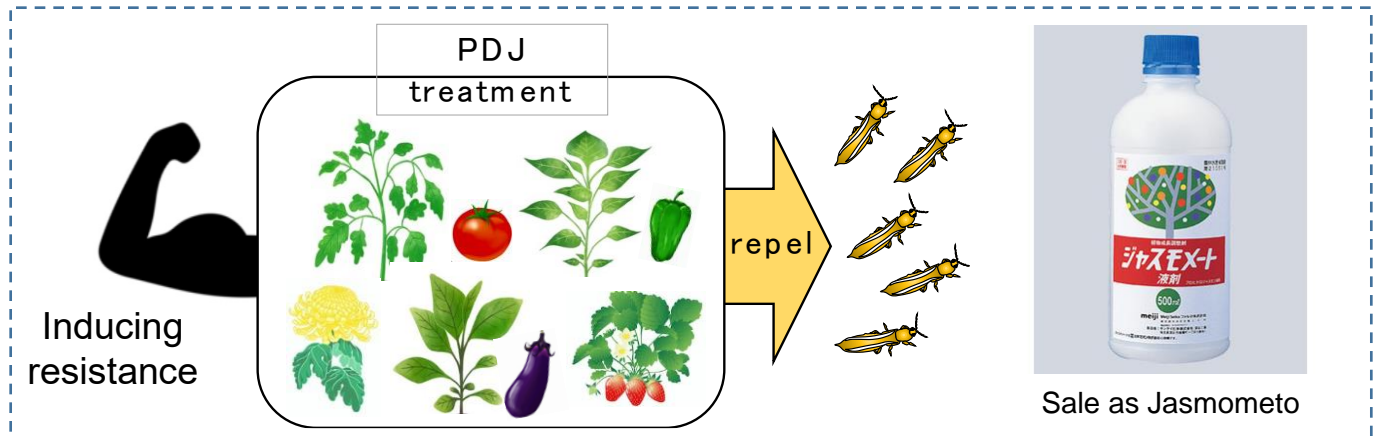
Corresponding Platform

Sustainability-38: Platform for Development of New Plant Protection Technology that contribute to SDGs.

Contact

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Development of pest repellent technology using prohydrojasmane, a plant activator



By inducing the stress resistance present in plants to repel pests, the risk of insecticide resistance and the burden on the environment and people can be greatly reduced.

- There is a limit to how much conventional chemical pesticides can reduce the harm of pests and diseases on crops, and the development of new pest control technology is greatly needed.

- Prohydrojasmane (PDJ), a jasmonic acid analogue, is a promising new material that induces plant resistance to achieve a pest repelling effect. The strength of the pest repellent is measured according to biomarkers (genes related to plant resistance and secondary metabolites), which means PDJ can be suitably used for each crop.

- PDJ is a substance similar to plant hormones and has little risk on the environment and people. Therefore, it can help reduce the amount of chemical pesticides in use for the Strategy for Sustainable Food Systems, MIDORI. In addition, there is a very low possibility of pests developing resistance to pesticides. Therefore, it strongly supports sustainable agricultural production.

[Pesticide registration] March 2021 Target crops: Tomatoes, cherry tomatoes Target pests: Thrips

[Patent information] Registered August 2021 (patent number JP6928353), European registration May 2023 (EP3437472)

[Reference materials] Sakurai et al. (2022) Regulation of Plant Growth & Development 57(1): 67-73 (Review article)

* This research was performed with the support of the BRAIN Research Program on Development of Innovative Technology (JPJ007097).

Corresponding Platform

Sustainability-38: Platform for Development of New Plant Protection Technology that contribute to SDGs.

Contact

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Development of comprehensive control method for sweet potato foot rot disease and publication of corresponding manual

BRAIN
The Research Program on Development of Innovative technology Grants (01020C)
"Development of control methods for sweet potato rot and avert the collapse of production sites"

Ecology of sweet potato foot rot disease and countermeasures

For technical instructor
(2021 edition)

March 2022

Kyushu Okinawa Agricultural Research Center, NARO
Institute for Plant Protection, NARO
Kagoshima Prefectural Institute for Agricultural Development
JA Kagoshima
Miyazaki Prefectural Agricultural Experiment Station
Okinawa Prefectural Agricultural Research Center

**Chapter 1
Disease ecology**

Occurs in the field

Occurs in the nursery

Storage root rot

Spores are spread by rain

Stem blight

The pathogen survives in residues

**Chapter 2
Diagnosis methods**

Characteristic symptoms

Pathogen form

Genetic methods

**Chapter 3
Prevention methods**

Preventing the invasion

- (1) Harvest seed potatoes from non-infected, healthy fields
- (2) Introduce shoot apex cultures regularly
- (3) Disinfect the nursery
- (4) Sort and disinfect the seed potatoes and slips

Suppressing the spread

- (1) Crop rotation or fallowing
- (2) Use resistant cultivars
- (3) Drain the fields
- (4) Remove infected plants and spray fungicides
- (5) Harvest early

Preventing the survival

- (1) Remove infected residues and facilitate decomposition
- (2) Disinfect the soil

This manual is being used to comprehensively control foot rot diseases in southern Kyushu and Okinawa, which are most severely affected, and in areas nationwide where there is a risk of spreading.

Since fall 2018, sweet potato foot rot disease, that had no previous reports in Japan, has been frequently occurring in Kagoshima, Miyazaki, and Okinawa. It has reduced yields and had a significant economic effect on the area. Since 2020, the disease has been newly confirmed in 28 other prefecture, and prevention of the spread nationwide is an urgent problem.

Therefore, by identifying the ecology of the disease in Japan and developing diagnosis and control methods, we created and released a manual for technical instructor in order to encourage prompt action at production sites. By accurately diagnosing the disease and taking comprehensive measures to prevent the invasion, spread, and remnants of the pathogen, we can reduce its occurrence and effectively prevent its spread in production areas, including ones without a history of the disease.

The measures shown in this manual are used in manuals for farmers in prefectures where the disease often occurs, public relations materials and seminar materials for regional bodies, and special report on disease outbreak forecasts. They are also used with measures receiving support from Ministry of Agriculture, Forestry and Fisheries foot rot assistance programs; in political policies; at production sites; and across a wide range of other uses as required.

Corresponding Platform

Sustainability-38: Platform for Development of New Plant Protection Technology that contribute to SDGs.

Contact

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Standard Operating Procedure for Spring-sown Onion Cultivation Systems in the Tohoku Region

東北地域における 春まきタマネギ栽培体系 標準作業手順書

公開版



(盛開) 月旬	2月		3月		4月		5月		6月		7月		8月					
	中	下	上	中	下	上	中	下	上	中	下	上	中旬以降					
管理場所	パイプハウス						圃場											
生育概要	播種	(育苗)			定植	(圃場生育)										倒伏	根切	収穫
出葉数	出芽 1 2 3			3.5	4	5	6	7	8	9	10	11	12	13	14			
積算温度(℃)	育苗中 ~1200				定植後													
育苗管理	かん水・温度管理・剪葉																	
圃場管理	施肥 耕耘・畝立 (中耕)														● : 作業日			
雑草防除	● 定植直後処理 ● 雑草発生前																	
虫害防除	かん注 ネギアザミマに効果の高い殺虫剤の定期散布																	
病害防除	剪葉後の予防散布 ● かん注 糸状菌病害を対象に予防散布 ● 細菌性病害を対象に予防散布																	

History of spring-sown onion cultivation in the Tohoku region

We developed a spring-sown onion cultivation system in the Tohoku region that allows domestic shipments of onions in July and August when the supply decreases, and we created a standard operating procedure for this system.

Onions are a vegetable that are in demand year-round, but production is centralized in specific regions such as Hokkaido, Saga, and Hyogo. Therefore, shipments decrease in July and August when production shifts from Honshu to Hokkaido. Weather disasters in these regions also have a large effect.

For spring cultivation in the Tohoku region, the seeds are sown in February, and the seedlings are planted in April for harvesting in July to August. This allowed onions to be shipped if there was an insufficient supply, but it was not possible to secure a stable supply due to a lack of information and because production levels were still too low. Therefore, the NARO Tohoku Agricultural Research Center worked with prefectural agricultural testing centers to develop a cultivation system that allows stable production and to create the Standard Operating Procedure for Spring-sown Onion Cultivation Systems in the Tohoku Region, which explains the conditions for introducing the cultivation system based on cultivation tests in actual fields.



https://www.naro.go.jp/publicity_report/publication/laboratory/naro/sop/142600.html

(URL for the Standard Operating Procedure for Spring-sown Onion Cultivation Systems in the Tohoku Region)

(Published on July 14, 2021)

Corresponding Platform

Sustainability-39: R&D Platform for Creating Innovative Technology in Tohoku Agriculture

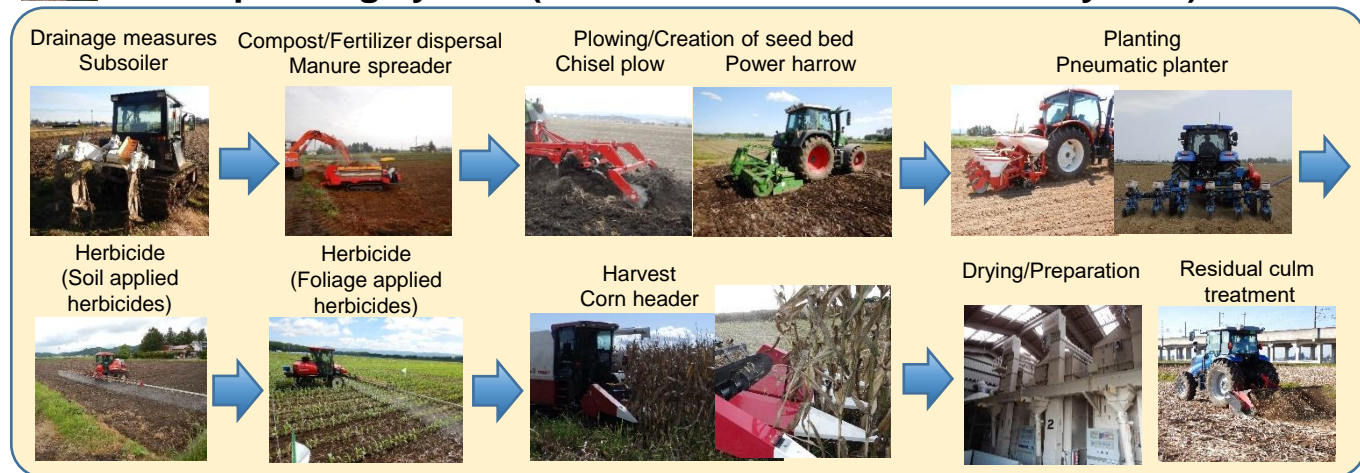
Contact

Business Promotion Office, Department of Research Promotion
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Standard operating procedure for high-speed operating system for cultivating corn in upland fields converted from paddy fields (Tohokou edition)



Corn operating system (establishment of mechanical system)



We developed a high-speed operating system that can be introduced in upland fields converted from paddy fields that combines harvesting with a corn header and corn with plowing.

Recently, the cost of compound feed has increased. In order to strengthen our ability to respond to fluctuating international conditions, there is a focus on the domestic production of corn, which is almost entirely imported. Recently, labor-saving cultivation with plowing and direct planting on dry fields has been becoming more popular on paddy fields in the Tohoku region. Accordingly, assuming that corn will be a part of paddy crop rotation that focuses on direct planting on dry fields, we developed a system for creating seed beds and sowing that uses a vacuum planter that can plow and sow at a high speed and precision. Additionally, we developed a harvest system that uses a domestically-manufactured general-purpose combine fitted with a specialized header (corn header) for corn that can separate the grain-bearing ear and send it to the thresher.

In order to expand this technology throughout the Tohoku region, the NARO Tohoku Agricultural Research Center worked with prefectural agricultural testing centers and corporate producers, manufactures (farm machine companies, seed companies etc.) to create a standard operating procedure that explains the conditions for introducing the system based on cultivation tests in actual fields converted from rice paddies.

(Published on April 27, 2022) ○ URL for the standard operating procedure



Corresponding Platform

Sustainability-39: R&D Platform for Creating Innovative Technology in Tohoku Agriculture

Contact

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An everbearing strawberry “Natsu-no-shizuku” for summer and autumn production



Natsu-no-shizuku



We developed an everbearing strawberry variety “Natsu-no-shizuku” to provide more opportunities for consumers to enjoy fresh, high-quality desserts with domestic strawberries even in the mid-summer. ♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥♥

Japanese consumers demand strawberries all year round, both for eating fresh and for processing into cakes and other sweets. However, the production decreases during the summer and autumn (from June to November), due to the high temperature.

Therefore, around 3,000 tons of strawberries are imported from the United States and other countries during this off-season period, but pastry chefs and related business companies want fresh, high-quality domestic strawberries.

To meet this need, the NARO Tohoku Agricultural Research Center, through collaborative research with Aomori, Iwate, Miyagi, Akita, and Yamagata prefectures, bred a new everbearing strawberry variety “Natsu-no-shizuku” which can be harvested in June through November.

Natsu-no-shizuku

- **Can be harvested from summer to autumn in cool and cold regions when domestic production is low.**
- **Yields 3 tons per 10a even in summer in cool areas.**
- **Suitable for cakes due to high sugar content and acidity.**

(Press-released on July 28, 2021)

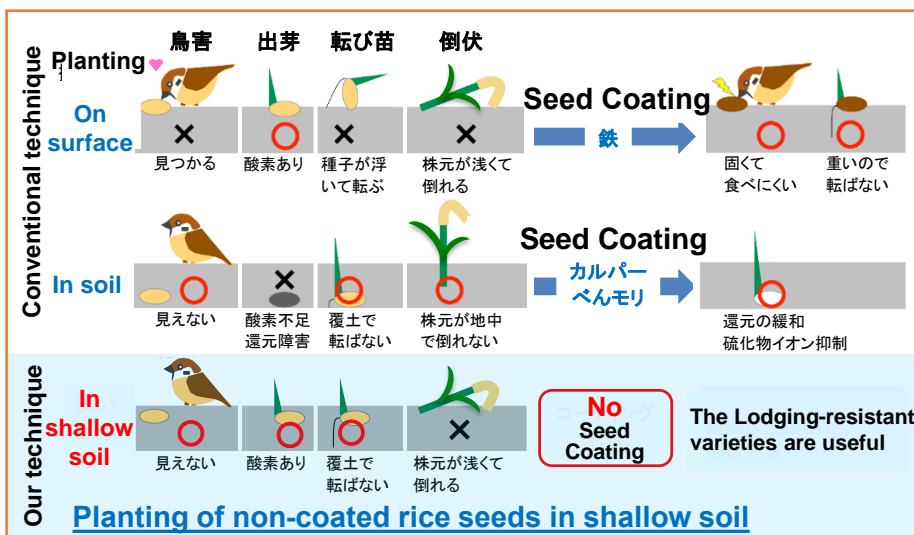
Corresponding Platform

Sustainability-39: R&D Platform for Creating Innovative Technology in Tohoku Agriculture

Contact

Business Promotion Office, Department of Research Promotion
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National Agriculture and Food Research Organization (NARO)
jigyoka@ml.affrc.go.jp

Standard operating procedure for planting and cultivation in shallow soil with simultaneous puddling of non-coated rice seeds



We developed a planting technique for planting non-coated rice seeds in shallow soil while puddling with a specialized planting machine. It allows cultivation of numerous rice cultivars more cheaply and with less labor.

The direct planting and cultivation of rice in a puddled field is an established technique that coats the seeds in various materials to stabilize seed establishment. However, the coating requires money, labor, and experience. There are various problems such as a reduction of planting efficiency as the area and number of seeds increases, and planting machines being subjected to dirt and wear.

In order to solve this problem, the NARO Tohoku Agricultural Research Center (TARC) developed a technique that stabilizes seed establishment even without a seed coating by (1) using root-elongated seeds that bud earlier and (2) planting the seeds in shallow soil (depth of 5 mm or less) while performing the final puddling. Many cultivars, including brand names, can now be grown at a lower cost and with less labor.

In order to expand this technique throughout the Tohoku region, the TARC worked with the Yamagata Integrated Agricultural Research Center and corporate farmers in Akita and Yamagata to issue a standard operating procedure that explains the conditions for introducing the cultivation system based on cultivation tests in local rice paddies.

(Published on November 21, 2022)

URL for the standard operating procedure



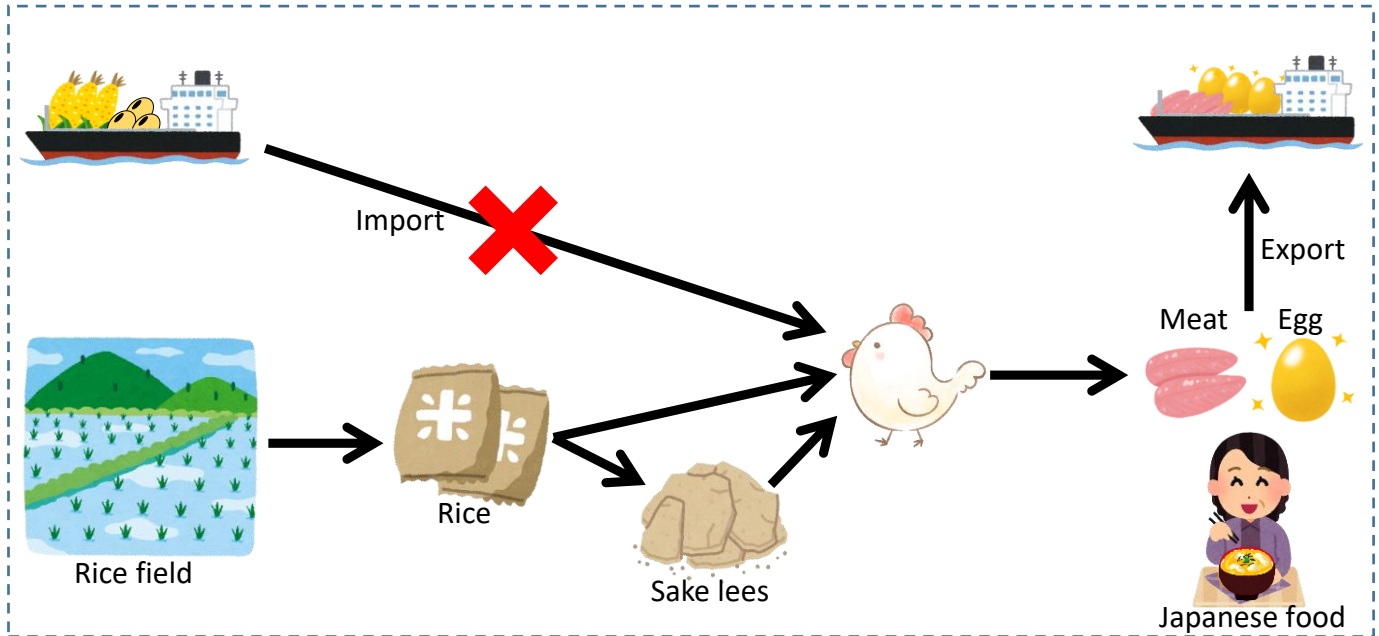
Corresponding Platform

Sustainability-39: R&D Platform for Creating Innovative Technology in Tohoku Agriculture

Contact

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Development of high-value-added domestic chicken meat and eggs based on rice farming



Domestic chicken meat and egg production is dependent on imported feed in Japan, but we can make it more sustainable system by using domestic brown rice and sake lees.

Around 70% of the feed given to broiler and laying hens is composed of corn and soybean meal from overseas. This dependency is a serious problem to be solved, as we are subject to the effects of a bad crop overseas, currency fluctuations, and other adverse events.

Recently, we found that we can produce high-value-added chicken meat and eggs by using domestic brown rice and sake lees instead of imported corn and soybean meal as feed ingredients.

We will try to establish a production and distribution system for chicken meat and eggs that matches the supply capabilities of brown rice and sake lees from rice field and sake breweries in Japan. While advancing a circulating system for feed and food production in Japan, we also aim to achieve a supply of domestic chicken meat and eggs that are worth exporting.

Corresponding Platform

Sustainability-57: R&D Platform for High-value-added Domestic Chicken Meat

Contact

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Start of project to revitalize former minefields using prickly pear cactuses



[Planted cactuses]



[Former minefield]



[Demining robot developed by IOS]

A project was started to improve the standard of living in rural Cambodia by spreading and commercializing prickly pear cactus cultivation techniques for use in former minefields.

From four to six million mines were laid in Cambodia during the civil war that began in the 70s and lasted over 20 years. The removal of the mines is ongoing, but one challenge is how to effectively use the land after mines have been removed. In rural areas, where there are many minefields, there are few profitable industries, and compared to urban areas, the standard of living is lower.

With IOS. Inc., a member of this platform (PF) and primary contributor, we started cultivation tests in July 2022 for the commercial use of prickly pear cactuses in a former minefield (total area 1,795 ha) managed by the Cambodian Mine Action Centre (CMAC). The cultivation is mostly performed by CMAC members. Other PF members (Casa Natural Corp, Goto Saboten, Chubu University) are cooperating with us to obtain the cactuses and lead the on-site cultivation. The cactuses are planned to be used as vegetables, for fruit juice, as animal feed, and as raw materials for processing. The cactuses used as raw materials for processing will be imported into Japan and are planned to be used in the development and sale of cosmetics and processed foods by PF members.

Related website: IOS. Inc. (<https://ios-robot.com/en/business>)

Corresponding Platform

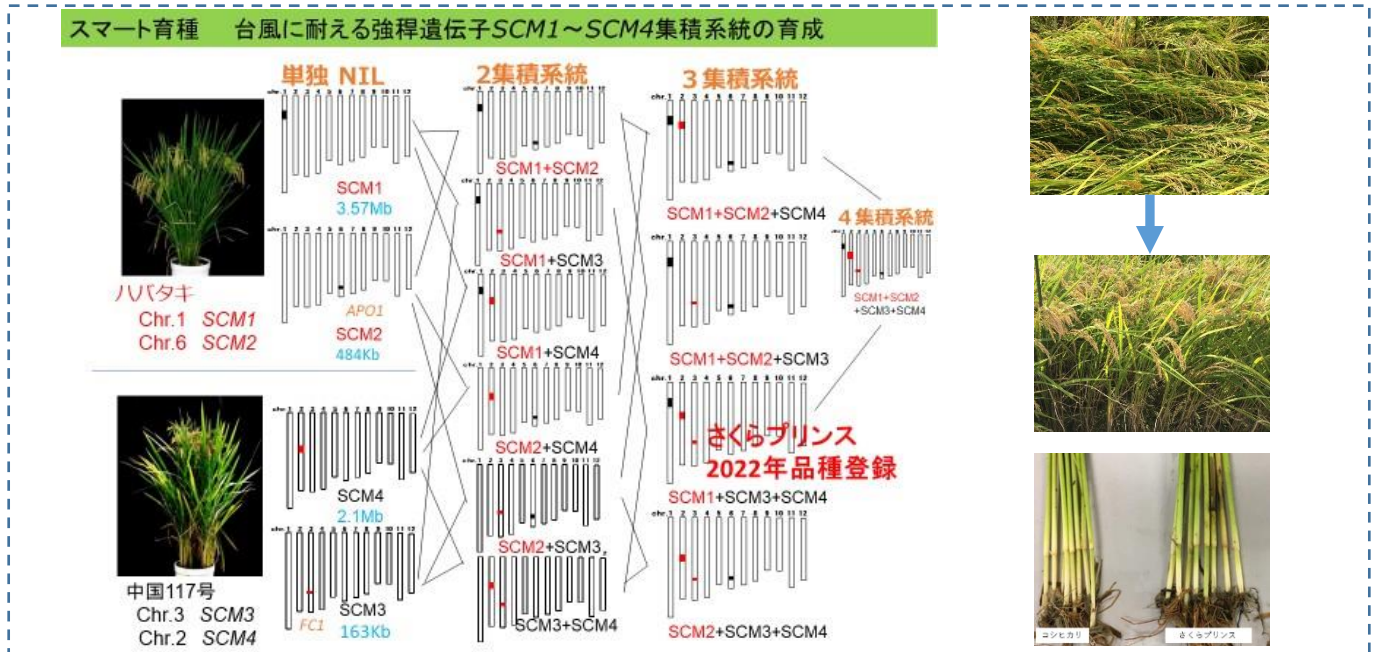
Sustainability-60: Platform for Promoting the Use of Cacti and Succulents

Contact

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Associate Professor, HORIBE Takanori (Dr.)
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Development of Sakura Prince, a Koshihikari cultivar with strong culms through smart breeding



Koshihikari is a rice cultivar which has the problem of lodging during typhoons. We used next-generation breeding technology to develop Sakura Prince, an improved cultivar that is more resistant to lodging.

Koshihikari, the most widely cultivated rice cultivar in Japan, has a thin culm and is susceptible to lodging, making it difficult to harvest. Improvements to lodging resistance posed a challenge. We used smart breeding with DNA markers to combine several alleles beneficial for strong culms from genetically different cultivars, such as Habataki, an *Indica* cultivar; and Chugoku No. 117, a *tropical Japonica* cultivar with Koshihikari, a *temperate Japonica* cultivar. These pyramiding lines had thick and strong culms, there was little reduction in the number of panicles, the grains were large, and the flavor was delicious and equivalent to Koshihikari. A cultivar application was submitted for the triple combination of SCM1+3+4, and the cultivar was registered by the Ministry of Agriculture, Forestry and Fisheries as Sakura Prince in August 2022 (registration number 29364).

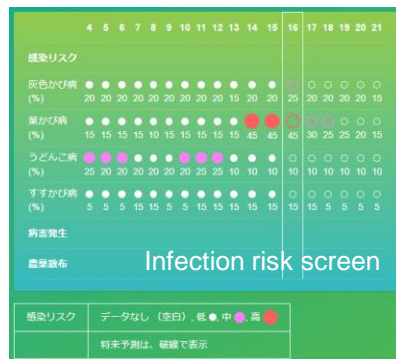
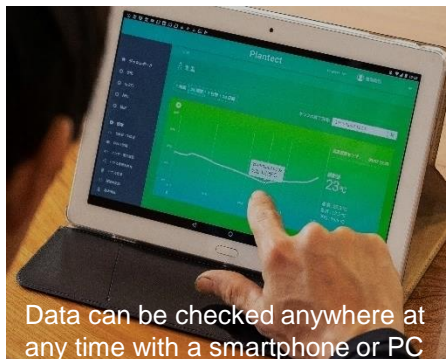
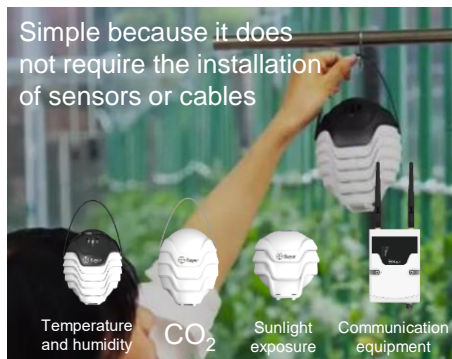
Corresponding Platform

Smart-10: Promotion Platform for Cultivars Developed by Next-generation Breeding Technology

Contact

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Development of comprehensive support software for disease prediction and control with AI that predicts the occurrence of major diseases in greenhouses



Improve productivity through greenhouse environment monitoring (disease infection predictions, suitable timing of spraying pesticides, reduces labor for spraying).

Features

Artificial intelligence predicts and provides notifications on disease infection risks, making it possible to spray pesticides at the suitable time and reduce the number of times pesticides are sprayed and the labor involved.

- ◎ Labor savings in management: The environment in the greenhouse can be monitored at any time from a remote location. Therefore, there is no need to go to the greenhouse, requiring less labor for management.
- ◎ Yield improvements: Greenhouse management is performed based on monitoring data and disease infection predictions, allowing yields to be improved.
- ◎ Reducing the frequency of pesticide sprays: Artificial intelligence analyses and provides notifications on the risk of infection of major diseases for tomatoes, cherry tomatoes, cucumbers, and strawberries. This makes it possible to estimate when pesticides should be sprayed, thus reducing the frequency.

Related information

- [Predicting and Managing the Occurrence of Airborne Diseases in Greenhouses \(Consortium on AI-based Disease Predictions Manual and Research Report\)](#) Published in FY2022
- [Bayer Crop Science Plantect® website](#) Updated FY2023

Corresponding Platform

Smart-11: R&D Platform for Disease and Pest Control

Contact

Bayer CropScience K.K.

Contact: <https://cropscience.bayer.jp/ja/home/plantect/lp-contact/>

Monday-Friday 9:00-12:00, 13:00-17:00 (Excluding Saturday, Sunday, national holidays and corporate holidays)

Development of technology for improving productivity at plant factories by using potassium reduction technology and nutrient solution recycling/sterilization equipment



Achieves lower potassium concentrations with the same sugar level (including strawberries and sweet potatoes)



Nutrient solution recycling/sterilization equipment (Patented, sale in 2024)



Benefits of electrolysis
 (1) Decomposition of substances that inhibit growth
 (2) Kills pathogens in nutrient solution
 → 1.5x increase in yield amount



Kills fungi and bacteria

For plant factories with low productivity, it achieves both low costs and productivity improvements while providing crops with high added value through the introduction of nutrient recycling/sterilization devices.

■ Background of development

- Kidney disease patients cannot eat a large variety of vegetables and fruits of high potassium.
- Many plant factories operate in the red. In addition, the environmental effect of water usage and disposal of the nutrient solution are large.
- We became conscious that these problem could be solved by improving the performance of the plant factories and adding value to the crops.

■ Features

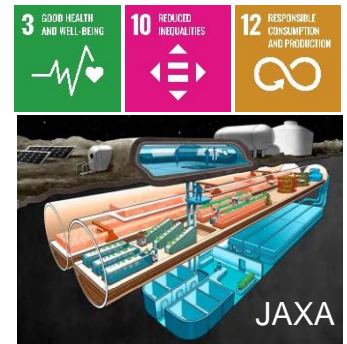
- Kidney disease patients can enjoy meals **in the same way as healthy people.**
- The quantity of **water and nutrient solution used in the plant factory can be greatly reduced.**
- It was confirmed that the **yield of the plant factory can be increased by around 1.5 times for strawberry and lettuce.**
- Achieves high efficiency because the yield is higher with less water and nutrient solution.
 → **We are continuing research on the technology necessary for lunar farms in the near future.**

■ Year put on the market

- Shimane Yume Melon (2018)
- Nutrient solution recycling/sterilization equipment (2024)

■ Patent information

- Patents JP6551731, JP6124251, JP5622260



Corresponding Platform

Smart-15: R&D Platform for High-performance Plant Factories

Contact

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JAS standard testing method for fish freshness (K-value)



Establishment of JAS testing method ahead of international standards for visualizing the K-value, a scientific indicator of fish freshness intended to facilitate exports of domestic fishery products

The quantity of fresh fishery exports is increasing and is expected to increase even further. There is a Japanese food boom, but Japanese raw food culture is still largely unknown overseas. There are many cases where freshness is not correctly evaluated. In order to suitably evaluate the freshness of Japan's fishery products, we established a scientific freshness evaluation standard as the first step toward an international standard, and on March 31, 2022, we established Japanese Agricultural Standard JAS 0023 "Testing method of K-value as a freshness index for fish—High performance liquid chromatographic method".

http://www.famic.go.jp/english/jas/_doc/jas0023.pdf

<For reference> <https://www.maff.go.jp/j/press/shokuhin/ninsyo/attach/pdf/220331-2.pdf>

Eight of the twelve institutes in the Cold Chain Consortium connected to this Platform applied for support for the "Development of Technology to Control the Quality of Fresh Fishery Products and to Visualize Freshness in Order to Facilitate Exportation" as a Research Program on Development of Innovative Technology (BRAIN) and was adopted 2021-2023. Within the project, the Fresh Distribution Technology Demonstration Consortium is performing research and development on implementing the K-value in society, distributing the freshest fish, and freshness sensor device technology.

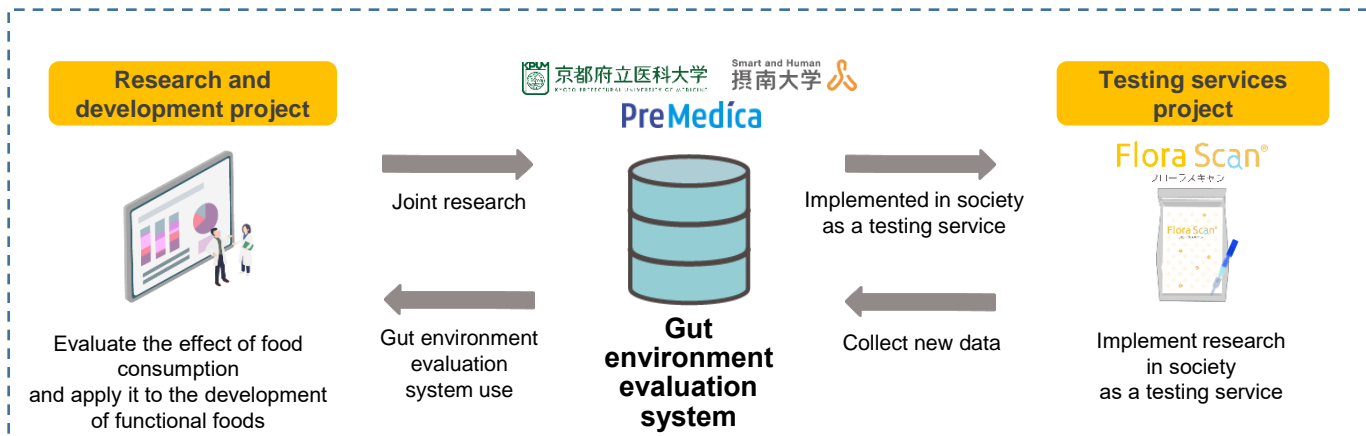
Corresponding Platform

Smart-22: R&D Platform for Innovative Agriculture, Forestry, and Fishery Industries Using Industrial Technology

Contact

Hakodate Regional Industry Promotion Organization
 (Hokkaido Industrial Technology Center)
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Development of gut environment evaluation system and commercialization of testing services using a database of Japanese gut microbiota



In a large-scale analysis of the gut microbiota of Japanese, we found a unique balance of gut microbiota.

[Background of development]

The gut environment of Japanese people is usually evaluated based on research performed overseas where people have different dietary habits or domestically but with inconsistent measuring procedures, making the results difficult to interpret.

[Features]

By unifying the measurement and analysis procedures in this project, we performed a large-scale analysis of the gut microbiota of Japanese people. We discovered a unique balance of gut microbiota, and we established a system for evaluating the gut environment.

[Related information]

- Release of Flora Scan®, a gut microbiota testing service, in December 2021
- Acquisition of patent in February 2023: Method for classifying gut microbiota by type in order to evaluate patient risk (patent number JP7193810)

Corresponding Platform

Healthy Food-03: Development Platform for High-performance Agriculture, Forestry, and Fishery Industries targeting the Gut Environment and Gut Microbiomes

Contact

PreMedica Inc. Business Planning Division General Manager
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Be the person you want to be with the "Personal Nutrition Optimized Diet (AI Diet®)"

Wellnas AI Diet®

Everyday data **Bodyweight Nutrient consumption**

Wellnas's original personalized analyses (patented technology)

(1) **Creation of a bodyweight prediction model and identification of relevant nutrients**
 Body weight = $-0.0043 \text{ iron} - 0.0057 \text{ zinc} - 0.031 \text{ vitamin E} + 0.025 \text{ vitamin B}_2 + 0.082 \text{ sodium} + 68.2$

(2) **Design of the AI diet**

Nutrients that increase body weight



Reduce the quantity of Vitamin B₂ and sodium

Nutrients that lower body weight

Increase the quantity Iron, zinc, vitamin E

Personalized analysis of how nutrients affect your body

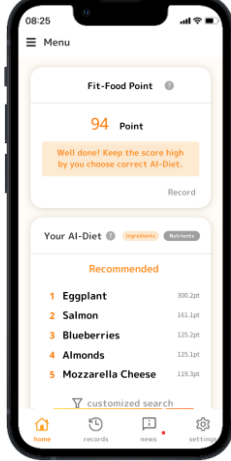
Proposals AI Diet® for improving your bodyweight

Use reduced-salt soy sauce to reduce **sodium** and clams rich in **iron** and **zinc**
 * Calorie and sugar intake are not reduced

Achieve your health goals without stress and while eating delicious food!

Minimum viable product, NEWTRISH, launched in January 2023



AI Diet® supports the personal achievement of everyone Creating a future where you can achieve your well-being

Achieve your health goals without holding back and while eating delicious food! Wellnas developed the "Personal Nutrition Optimized Diet" (AI Diet®) in order to achieve this ideal. AI Diet® knows the nutrients that you need. It creates a diet with patented technology (patent number JP7090232) that optimally adjusts quantities of the nutrients to achieve your goals. In demonstration tests, it lowered higher blood pressure and improved body weights. The value of AI Diet® for health is clear. We started services with the NEWTRISH smartphone application in January 2023 as a minimum viable product of AI Diet®. NEWTRISH has been downloaded more than 20,000 times and has about 10,000 users. Currently, we are working on improving the convenience of NEWTRISH based on user opinions. We challenge advertising business that proposes products of food companies as the optimal food for the individual user through open innovation. In order to contribute to the environment that individuals live in (society, culture, economy, nature) with a futuristic diet that achieves health as defined by the Health and Food Technology Working Team (representative Wellnas) of the Ministry of Agriculture, Forestry and Fisheries Council for Public-Private Partnership in Food Technology and to more quickly achieve well-being for everyone with a personally-optimized diet for a healthy body and mind across one's life that matches one's interests, feelings, and lifestyle, we want to accelerate the improvement and spread of the AI Diet® service.

Corresponding Platform

Healthy Food-44: Selfcare Food Development Platform

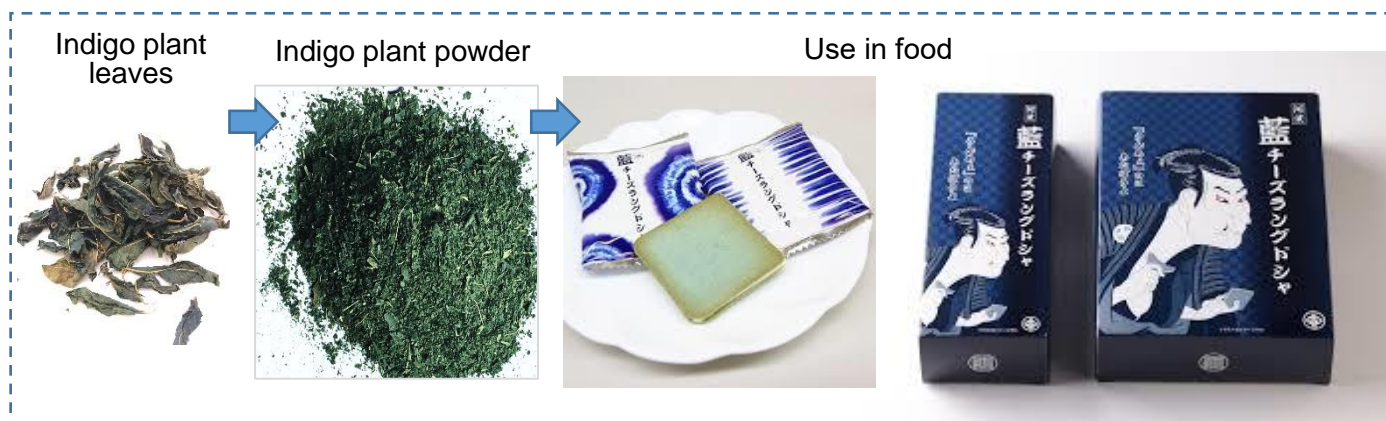
Contact

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 HP : <https://www.wellnas.biz>



HP

Sale of indigo cheese langue de chat using dried indigo plant (TADEAI) powder



The use of indigo plant leaves, stems, and roots in food has been approved by the Ministry of Health, Labor and Welfare and is now available in a safe and edible form

The Tade line of indigo that grows in Japan was not a plant approved for consumption when the Platform (PF) was established. In order to obtain approval from the government to use it in food, we had to confirm the safety of indigo plant (TADEAI) and submit materials on food culture and dietary habits.

The PF is composed of diverse members such as producers, sweets manufacturers, research institutes (universities and prefectural facilities), and retailers. While scientifically establishing the safety of Tade indigo, industry, academia, and the government worked together to hold edible indigo trials in multiple places and other activities in order to obtain approval. We were able to obtain approval for the use of indigo plant leaves, stems, and roots in food on July 9, 2020 (CND/PSEHB Notification No. 0709-33). Following approval, we requested sweets manufacturers in the Platform to create sweets with indigo, and they began to sell souvenirs in April 2023 in Tokushima Prefecture, which has the highest indigo plant production in Japan.

Corresponding Platform

Healthy Food-11: R&D Platform for Indigo

Contact

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Development of skincare soap using sea cucumber antifungal components



Skin problems caused by fungi are on the rise. Our skincare soap containing sea cucumber antifungal ingredients can help to solve these skin problems.

In order to develop antifungal skincare products for practical use, the “High-Performance Sea Cucumber Product R&D Platform”, led by the Iwate Biotechnology Research Center, was established in the “Knowledge Integration and Innovation Field”, and a research and development consortium was formed to work on the practical application of the products.

Fungi (*Malassezia*, *Candida*, etc.) are one of the causes of skin problems.

The sea cucumber (*Apostichopus armata*) has the antifungal ingredient holotoxins, and a skin care soap using holotoxins was launched by HoloSrin Pharmaceutical Co., Ltd. on 1 July 2023.

HoloSrin Pharmaceutical Co., Ltd. has obtained a patent (Patent No. JP6902803) for the antifungal composition (technology to enhance antifungal suppression by combining silk and sea cucumber extract). With this patented technology, the soap promotes healthy skin by suppressing the fungi that cause skin problems.

Official website: <https://silkrio.com/>

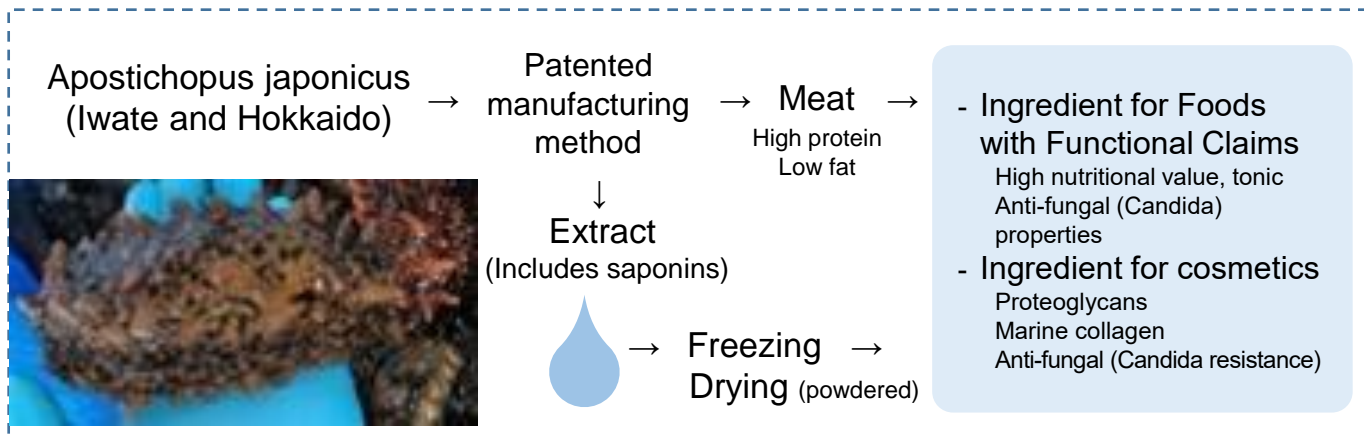
Corresponding Platform

Healthy Food-20: R&D Platform for High-performance Sea Cucumber Products

Contact

HoloSrin Pharmaceutical Co., Ltd. CEO Umio Arai
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“The saponin-containing sea cucumber extracts”, a unique antifungal (anti-*Candida*) material produced using patented technology



**Includes *Apostichopus japonicus* saponins that only kill fungi
without interfering with bacteria.**

Suppresses *Candida* in the oral mucosa and vagina to support indigenous bacteria.

In order to develop antifungal products for practical use, the “High-Performance Sea Cucumber Product R&D Platform”, led by the Iwate Biotechnology Research Center, was established in the “Knowledge Integration and Innovation Field”, and a research and development consortium was formed to work on the practical application of the products.

Patent “Method for extracting sea cucumber saponin-containing extract and method for maintaining constant content thereof (Patent No. US 11,272,727,B2).” (The materials produced by the patented technology are now on sale.)

Application examples: Takakura New Industries, Inc.

“Pubicare Organic feminine medicated soap” for delicate areas

https://takakura.co.jp/life_style/life/life_category/sensitive_zone/

An antifungal oral jelly for the elderly is also in development.

Corresponding Platform

Healthy Food-20: R&D Platform for High-performance Sea Cucumber Products

Contact

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“Job’s Tears Advanced Usage Manual” ~ Cultivars, Cultivation, and Applications ~



This manual provide a summary of Job’s tears; cultivars, the basic cultivation methods, new techniques to increase yields, and information on cultivation for medical use.

The innovation project in the Job's tears Consortium (Research Program on Development of Innovative Technology (JPJ007097)) created the Job's tears Advanced Usage Manual.

Job's tears is used for various purposes such as medicinal use, cosmetics, foods and drinks, and is also attracting attention as a paddy field shifting crop. This manual provides the character of plants, Japanese main cultivars, and basic cultivation methods of the crop which is still relatively unknown in Japan. In addition, this manual has information of newly developed cultivation techniques to increase yields, for medicinal use and for processing on “Tsuyakaze” which is the cultivar recently bred. This manual would be useful for those who cultivate and use Job's tears as well as who are considering introducing it and who are interested in Job's tears.

URL of manual https://www.naro.go.jp/publicity_report/publication/pamphlet/tech-pamph/158291.html

Where to obtain seeds for the new cultivar, Tsuyakaze* https://www.naro.go.jp/collab/breed/seeds_list/index.html

Research results https://www.naro.go.jp/project/results/5th_laboratory/kiban/2021/ngrc21_s02.html

*Cultivar registration application number 35387

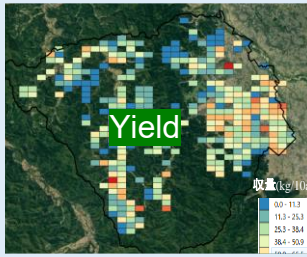
Corresponding Platform

Healthy Food-21: Platform for Advanced Utilization of Specialty Crops by Technology Development

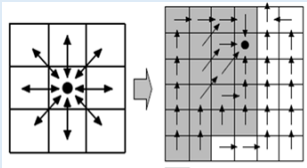
Contact

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POC: Research Promotion Office, Core Technology Research
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Risk diagnostic method for excess water stress and countermeasures in buckwheat



Development of risk diagnostic method for buckwheat excess water stress

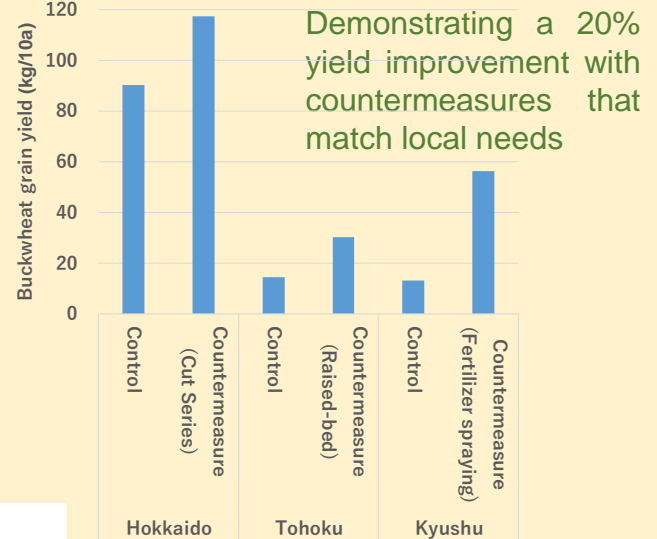


Identification of water-accumulating topography



Collection, analysis, and integration of data on excess water conditions and geography

Demonstration of countermeasures



Poor drainage leading to lower yields (excess water stress) posed a challenge, but we developed a excess water risk diagnostic method and countermeasures for improving yields.

Buckwheat is a field crop vital for community revitalization and crop rotation. The largest problem is lower yields due to poor drainage (excess water stress). Various countermeasures have been developed, but the difficulty is in choosing which one to actually use.

Therefore, we developed a diagnostic method to estimate the risk of excess water stress. By introducing a countermeasure according to excess water factors in fields with a risk of poor drainage, we demonstrated at three buckwheat cultivation sites in Hokkaido, Tohoku, and Kyushu, respectively, that the yield can be improved.

[Related websites]

- https://www.jstage.jst.go.jp/article/jsidre/91/1/91_1_99/article-char/ja
- https://www.jstage.jst.go.jp/article/jcs/92/3/92_245/article-char/ja
- <https://www.sciencedirect.com/science/article/pii/S0378429023001284>
- https://www.jstage.jst.go.jp/article/dohikouen/67/0/67_104_2/article-char/ja/

Corresponding Platform

Healthy Food-21: Platform for advanced utilization of specialty crops by technology development

Contact

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Development of sake for overseas use based on an integrated analysis of metabolome analysis and evaluation of preferences of foreign exchange students at Tohoku University



Quick development of Japanese food based on preferences of expected export destinations through precision device analysis and sensory evaluation

◆ Development target

To take the flavor of Japanese food (mirin: about 400 years, sake: about 1,300 years, kamaboko: about 900 years, fermented fish seasonings: about 3,000 years) developed and passed on for a span of hundreds of years, adjust it for compatibility with foreign food culture, and quickly spread it worldwide.

◆ Specific activities

This project involved (1) the development of high-value-added fermented rice products (seasonings and drinks), (2) the development of high-value-added sake, (3) the establishment of technology to control the properties of food gels and to extend expiry dates, and (4) the development of high-value-added fermented horned krill food products.

During these activities, a precision device analysis and sensory evaluation with the cooperation of exchange students were conducted, and an integrated analysis was performed on both sets of data to develop products that are compatible with overseas food culture and preferences. Sake+ (Sake Plus) was put on the market in 2022. See the following for detailed information.

<https://ichinokura.co.jp/pickup-product/sakeplus-en>

Corresponding Platform

Export Promotion-04: R&D Platform for High-value-added Japanese Food and Food Industry Based on Scientific Reasoning

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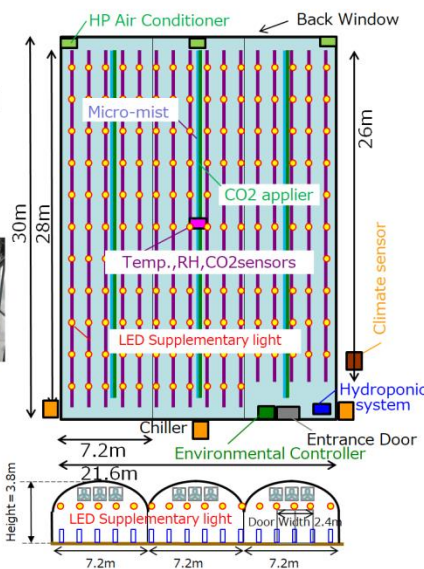
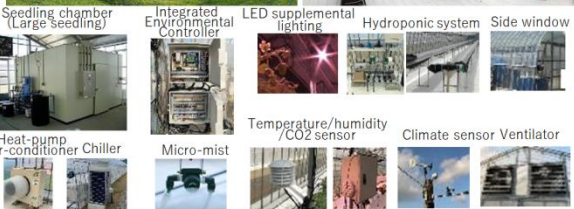
Contact

Development of solar-powered plant factory system for areas of high temperature and humidity

Key spec

Combined with a windbreak net, the greenhouse can withstand wind speeds of 100 m/s

Structure : Triple-span architecture
 Dimensions: 7.2m(W) x 3(spans) x 30m(L) [648m²] x 3.8m(H)
 Cooling : Heat-pumps, Ventilators
 Options for Strawberry: Supplemental LED lighting
 Chillers: for cooling medium/crown



It is difficult to cultivate tomatoes and strawberries in the summer, but we solved this problem of year-round cultivation by introducing a plant factory system for areas of high temperature and humidity.

It is difficult to cultivate tomatoes, strawberries, and other vegetables in the summer when there are high temperatures and humidity. The Asian Monsoon PFS Consortium developed seedling cultivation technology, environmental control technology, and ICT control technology to achieve technology for year-around cultivation at JIRCAS in Ishigaki, Okinawa.

Based on the interest of the research consortium, a startup was established in January 2022 (Japan Premium Vegetable), and it began to provide services such as consulting and cultivation guidance.

Japan Premium Vegetable website: <http://www.jpveg.co.jp/>

Corresponding Platform

Export Promotion-06: R&D Platform for Farm Complexes in Society 5.0

Contact

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Currently open to new members

MAFF
Ministry of Agriculture,
Forestry and Fisheries

