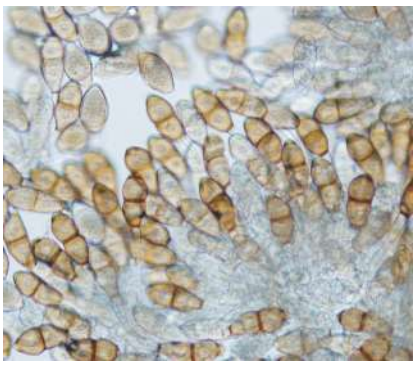
Tokyo Metropolitan Agriculture and Forestry Research Center





challenge
&
Innovation





Tokyo Development Foundation for Agriculture, Forestry and Fisheries

Tokyo Metropolitan Agriculture and Forestry Research Center

As a public research institute that works in a wide range of fields from the agriculture, forestry and fishery industries to the food industry, the Agriculture and Forestry Research Center (AFRC) works closely with administrative office and improvement (extension) center to conduct research and development that satisfies diverse needs with the aim of further developing the agriculture, forestry and fisheries industries and food industry in the rapidly changing metropolis of Tokyo.

Research Planning and Coordination Office

This office engages in planning and coordination to fulfill the three missions of the AFRC:

i) Contribute to the further development of the agriculture, forestry and fisheries industries and food industry in Tokyo through research and development based on the fields of production, distribution and consumption
ii) Contribute to the development of healthy and prosperous lives for residents of Tokyo through research and development that addresses their needs as well as those of the many people who visit Tokyo
iii) Forge ahead with pioneering research and development to explore new possibilities in the agriculture, forestry and fisheries industries and food industry in Tokyo

Effective promotion of research

In addition to internal experiments, we promote research that is useful for business entities and residents of Tokyo through such efforts as formulating research plans based on external evaluations by experts in various fields and disseminating findings from our research.

A meeting of an external evaluation committee made up of experts

Promotion of Multidisciplinary Research through Industry-Academia-Government Collaboration

We aim to conduct multi-disciplinary, effective and efficient research and development through cooperation between industry, academia and the government as well as between the agricultural, commercial and industrial sectors by taking advantage of the many industries and amalgamation of universities and other research and educational institutions based in Tokyo.

Developing a Tokyo-style integrated environment control production system through the fusion of agriculture and industry

Cost-reduced greenhouse with improved natural lighting and heat retention

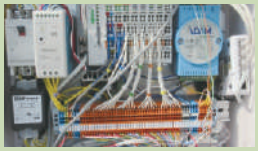
A Tokyo-style hydroponic system

Project promotion system

- **Tokyo Metropolitan Agriculture and Forestry Research Center**
- **Tokyo Metropolitan Industrial Technology Research Institute**
- **Private companies**

Environment control technology to optimize photosynthesis

Use of general information technology



Pubilishment of Research Results

We proactively publish the findings of our research for producers, business entities and residents of Tokyo.

Our exhibit at the Agribusiness Creation Fair

A presentation of research results

Training and dietary education using AFRC technology

We conduct training for succeeding generations of farmers, and education and public awareness of dietary education through hands-on experiences and other events.

Agricultural technology trainees observing agriculture in the field

Preschoolers participating in a hands-on experience with sweet potato cultivation

Horticultural Crops Research Division

Tokyo's main crops are vegetables, fruits and flowers. We work to establish management models that produce high profits from limited farmland through such efforts as breeding original Tokyo varieties and developing new technology to improve productivity and quality.

Development of Original Tokyo Varieties

"Tokyo Gold" (Kiwifruit)

"Haruka Midi" (Fragrant cyclamen)

We breed Original Tokyo varieties by crossing between plants with superior characteristics and using biotechnology and other techniques, and also develop technology for using them.
The original Tokyo varieties bring high profits to producers and are good resources for promoting the presence of Tokyo agriculture.

"Tokyo Komachi" (Wakenegi, tillering type of welsh onion)

Breeding of blueberry cultivars with tolerance to heat and drought of big cities as Tokyo

"Tokyo Ohisama Berry" strawberries are extremely sweet and suitable for pick-your-own strawberry events

Development of Technology to Improve Productivity and Quality

For vegetables, we develop hydroponic systems capable of producing several fruit vegetables, and an integrated environment control production system that controls temperature, humidity, CO_2 and more. We also select and establish cultivation techniques for varieties for direct sales. For fruit trees, we develop highly profitable cultivation technology for saving labor, shortening the time from planting to first harvest, low-cost technology and more. For flowers, we develop technologies in protected horticulture that delivers higher quality and consumes less energy, and in urban greening through expanding the use of flowers in summer aiming for Tokyo 2020 Olympics and Paralympic Games.

Japanese pear trees planted on rhizosphere control system

A hydroponic system that can handle high yields and produce several fruit vegetables

Screening of bedding flower plants to last hot conditions in summer

Evaluation of cut flower varieties suitable for direct sales

Agro-Environmental Research Division

To ensure the safety and stable production of crops, we work to identify the causes of pests and growth disorders; develop technology for pest control, reduction of pesticide residues, and appropriate soil management; and also develop fertilization control technology for hydroponics and ICT-driven environment control technology.

Development of Pest Management Technology

We investigate the causes of both newly and abnormally occurring agricultural pests in Tokyo to create appropriate pest control measures while concurrently studying phenomena such as the resistance of pests to pesticides in an effort to develop Integrated Pest Management (IPM) technology that does not rely solely on chemical pesticides.

Observating pest and disease occurrence in wasabi fields (Okutama Town)

Left: Symptoms of Phytophthora rot on wasabi
Right: Pathogen

Testing tomato rootstock resistant to bacterial canker

Development ofAppropriate Soil Management Technology

We are developing the management technology for soil fertilization based on soil characteristics and environmental consideration. In addition, we are proceeding with investigations of the causes of growth disorders and the development of reduction and prevention for them.

Studying soil characteristics with a test pit

Studies on Pesticide Residues and Developing Analytical Techniques

We analyze and evaluate pesticide residues on crops and the surrounding environments of farmland in order to ensure the safety and security of crops and promote the proper use of pesticides.

Analyzing pesticide residues

Development of Environment Control Technology

By using ICT to control the greenhouse environment integratedly, we are developing cost-reduced, high-performance technology that can create optimal growing environments for several fruit vegetables.

Left: Tomato Production in a greenhouse with integrated environment control
Right: Control device

Livestock Research Division (Ome Branch Station)

We promote the development, maintenance and improvement of safe and high-quality Tokyo brand animal products. In addition, we conduct research to develop technologies to improve productivity in animal husbandry, by establishing highly profitable livestock management and addressing environmental issues to solve problems unique to Tokyo.

Development of Tokyo Brand Animal Products

We maintain and improve the high quality of "Tokyo X" (original pigs variety in Tokyo) meat and conduct research to investigate the performance of "Tokyo Ukokkei" (original fowls variety in Tokyo) meat and the like in efforts to further strengthen the brand power of animal products in Tokyo.

Tokyo X

Tokyo Ukokkei

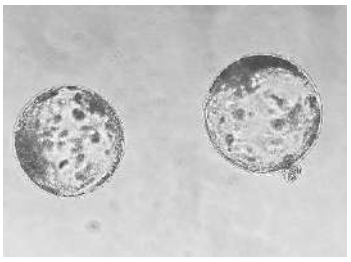
Tokyo Ukokkei meat

Tokyo Milk

Development of Advanced Technology for Improving Productivity

We conduct researches on the technology development for the usage of frozen boar semen and transfer technology for in vitro fertilized embryos in order to ensure superior genetic resources and efficient breeding, and proceed with the development of technology to control summer heat and the other technology for improving productivity. We develop livestock disease control techniques that do not depend on only pharmaceuticals in efforts to ensure safer animal products.

Developing production and transfer technology for in vitro fertilized porcine embryos



In vitro fertilized porcine embryos

Non-surgical transfer of in vitro embryos

Stabilizing milk quantity and quality by controlling summer heat

Spraying water on cows

Assessing effects of countermeasure for summer heat by measuring cow milk components

Raising healthy piglets

An emaciated piglet with a diarrheal disease

Healthy piglets

Countermeasure for animal husbandry harmonized with urban environment

We conduct researches on the technology development for animal husbandry harmonized with urban environment, on animal faces composing for organic resources. We develop the technology to reduce odors from composting facility effectively and efficiently, and suggest the appropriate management method of waste-gas treatment facility.

Developing the technology to improve reducing capacity of odor from waste-gas treatment facility

Front: Waste-gas treatment facility
Behind: Composting facility

Urban-Green and Forestry Research Division

To make Tokyo metropolis safe and filled with greenery, we work to develop technology to green various urban spaces and select tree species that add color to greenery areas. We also develop technology that activate the forest industry and regenerate and preserve our valuable forests in Tokyo for future .

Development of Urban Greening Technology

We promote the development of greening technology and the selection of new tree species to green various areas such as streets, rooftops and walls of buildings, seaside, riverbeds and event venues.We also work to clarify the characteristics of roadside trees which prevent spread of fires, and develop greening technology that contributes to disaster prevention in an effort to create a highly disaster-resistant metropolis.

Trees planted in transportable containers to create cool spots around central Tokyo

Greening by planting trees suitable for tight spaces around town

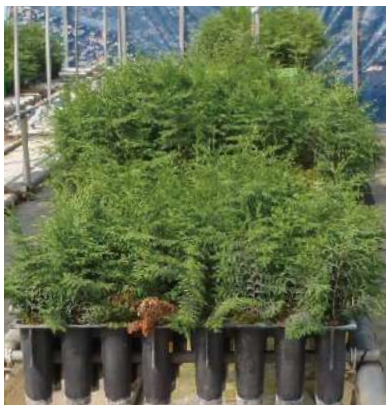
Urban greening trees
(picture: *Arbutus unedo* 'Compacta')

Development of Forest Regeneration and Preservation Technology

We develop forest maintenance technology for both broad-leaved forests and coniferous forests with low pollen suited to the forest environment in Tama area, western Tokyo. We also work to comprehend the state of damage to forests by sika deer (*Cervus nippon*) and other wild animals, to develop technology for low-cost forest management.

Research forest of Pollen-free Japanese cedar (*Cryptomeria japonica*)
(Hinode Research Site)

Comprehending of the state of damaged forests caused by wild animals



Low-cost forestation technology with container tree nursery

A broad-leaved forest in Okutama Town

Edogawa Regional Branch Center

At this AFRC base in eastern Tokyo, we work on developing technology for stable production, new products and more with a focus on komatsuna (Japanese mustard spinach), potted flowers, nursery flowers and other regional specialty vegetables and flowers with history and tradition.

Enhancement of Product Appeal of Traditional Tokyo Vegetables

We aim to improve the productivity of komatsuna (Japanese mustard spinach), a main vegetable product in eastern Tokyo, and identify characteristics of varieties in terms of suitability for fresh and processed products, and a wide array of other uses. We also promote the preservation of superior genes and establish cultivation techniques for traditional Edo-Tokyo vegetables such as Goseki bansei komatsuna and Kameido daikon.

Contest for comparing komatsuna varieties
Evaluations by extension officers, researchers, etc.

Quality evaluation of komatsuna
Identification of relationship between taste (umami, sweetness, bitterness) and chemical components, especially amino acid

Improving management methods for komatsuna year-round production
Evaluation of farmwork efficiency

Kameido daikon (a traditional Edo-Tokyo vegetable)
Developing technology for stable production

Development of New Flower Products

We are proceeding with the development of cultivation management technology for new varieties of flowers—namely for the cut flower production of new varieties of tulips which bloom in March—and other new high-value-added products. We also work on product development that produces new value, such as “Asagaoichi” Japanese morning glories and “Nanakusakago” which are connected to traditional new-year events. We will also deploy the technology to the producer of flowers for informal.

Developing stable production technology for March-blooming tulips

Developing technology for producing and using pansies for cut flowers

Food Technology Research Center

To promote the food product industry in Tokyo and improve food safety and diets for people in Tokyo, we develop attractive products with a focus on traits such as safety and functionality, and conduct research to develop processed food products that use local resources. We also implement a wide range of technical support projects in order to resolve the technical issues faced by food product companies in Tokyo.

Development of Products with Tradition and Fresh Appeal

We aim to develop food products that provide health functionality, ensure and improve safety, utilize local resources, adapt to changes in the diets of residents of Tokyo, and exhibit appeal and competitiveness befitting the cosmopolitan metropolis of Tokyo, and also to develop technology to produce those food products based on the history- and tradition-rich food product production technology of Tokyo.

Research and development of natto and *Bacillus subtilis* strains

Diamond squid (*Thysanoteuthis rhombus*; product from the sea around the Ogasawara Islands, body length 1 m)

Diamond squid sausage
Brown: Squid meat only
Black: With squid ink

Pickled daikon (*Raphanus sativus* var. *longipinnatus*) with lactic acid bacteria

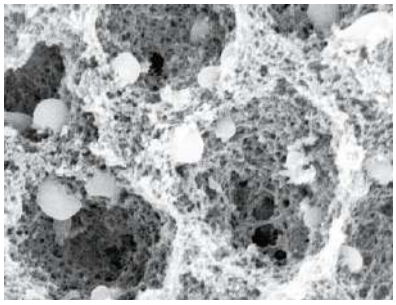
Natto jointly developed with private companies

Technical Support for Food Product Companies and Promoting the Sixth Industrializations

To resolve the technical issues faced by food product manufacturers, we provide technical consultations, accept requests from private companies to conduct testing and perform other work, and implement a wide range of support programs, which include providing open laboratories where companies can develop products and evaluate product quality on their own, hosting workshops for engineers to acquire various inspection technologies, and dispatching food product technology advisors. We also support the sixth industrialization (integration of primary, secondary and tertiary industries), through the development of processed products by farmers, foresters, fishermen, or their groups in Tokyo.

New open laboratory filled up with equipment (remodeled in 2017)

A workshop for engineers of food product companies



Structural observation of food using an electron microscope (contracted work)

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