

NIFTS

Institute of Fruit Tree and Tea Science,
National Agriculture and Food Research Organization



Research to be carried out and the mission and vision of NIFTS

Improving productivity and strengthening international competitiveness by smartening fruit tree and tea breeding and production processes

In the fruit tree industry of Japan, the domestic market is expected to shrink as the production base is weakening due to labor shortages at production sites. However, the production volume is declining more than the decrease in demand. Even in the tea industry of Japan, maintaining production has become difficult due to sluggish prices and labor shortages at production sites. In response to this situation, we are aiming toward labor-saving and productivity improvement through data-driven cultivation management for affordable fruit supply, and we also intend to promote the following research to add value to and expand exports of fruits and tea by developing new fruit-tree and tea varieties and cultivation technology.

- Cultivation of new fruit tree varieties that contribute to strengthening international competitiveness
- Improvement of fruit tree productivity by data-driven cultivation management system
- Enhancement improvement of brand power by fostering varieties with high content of citrus health functional ingredients and adding value to domestic fruits and tea
- Cultivation of tea varieties containing health functional ingredients and large-scale smart production

In R & D, we intend to collaborate with prefectures, private companies, and universities for the practical utilization of newly developed varieties and implementation of production technologies, and in collaboration with government agencies, we shall utilize measures to promote production and expand demand. We shall also promote the popularization of fruit and tea.

The development of new fruit tree varieties will promote the conversion of excellent items and varieties in production areas and strengthen the competitiveness of domestic fruits. Increased productivity of fresh fruits allows for scale expansion and supply of fruits at affordable prices. Consequently, the fruit tree production base will be strengthened, which will contribute to securing the supply of domestic fruits and expanding exports. In the tea industry, we shall contribute to the expansion of exports by expanding demand through the development of new products focusing on healthy functional ingredients, and by strengthening the productivity farmers with an aim to expand the scale by developing labor-saving smart technology.



Organization Chart

2021.4.1

President Auditor

Senior Vice President・Vice President

NARO Headquarters

One Technology Research Headquarters
 ・RCAIT/NARO
 ・RCAR/NARO
 ・NGRC
 ・NAAC

Segment I
 ・NFRI
 ・NILGS
 ・NIAH

Segment II
 ・HARC/NARO
 ・TARC/NARO
 ・CARC/NARO
 ・WARC/NARO
 ・KARC/NARO
 ・IAM/NARO

Segment III
 ・NICS
 ・NIFTS
 ・NIVFS
 ・NIAS

Segment IV
 ・NIAES
 ・NIRE
 ・NIPP

NCSS

BRAIN

Director

Department of Research Promotion

- ・Research Promotion Office
- ・External Training Section
- Coordinator, Akitsu Research Station
- Coordinator, Makurazaki Research Station

Division of Fruit Tree Breeding Research

- ・Deciduous Fruit Tree Breeding Group
- ・Fruit Tree and Tea genome Group

Division of Fruit Tree Production Research

- ・Fruit Tree Smart Production Group

Division of Citrus Research

- ・Citrus Breeding and Production Group

Division of Tea Research

- ・Tea Breeding and Production Group



History

-History of Fruit Tree Research-

- 1902** The Horticultural Division of the Agricultural Research Station was established as an agency of the Ministry of Agriculture and Commerce (MAC) in Okitsu Town (a sector of present-day Shizuoka City), Ihara District, Shizuoka Prefecture.
- 1906** The Apprentice System was started (succeeded by the Agricultural Technical Training System in 1959)
- 1921** Reestablished as the Horticultural Research Station under MAC.
- 1947** Relocated to Ono Town (a sector of present-day Hiratsuka City), Naka District, Kanagawa Prefecture.
- 1950** Reorganized as the Horticultural Division of the National Institute of Agricultural Sciences under the Ministry of Agriculture and Forestry (MAF)
- 1961** Reorganized as the Horticultural Experiment Station under MAF
- 1973** The Fruit Tree Research Station (under MAF) was established after separation from the vegetable and floriculture divisions.
- 1977** Relocated to Yatabe Town (a sector of present-day Tsukuba City), Tsukuba District, Ibaraki Prefecture.
- 2001** Establishment of the National Institute of Fruit Tree Science (NIFTS) as one of the institute of National Agricultural Research Organization (NARO) independent administrative institution.
- 2006** NARO was renamed as the National Agriculture and Food Research Organization.
- 2016** Reorganized as the Institute of Fruit Tree and Tea Science of NARO (NIFTS).

-History of Tea Research -

- 1896** The Tea Research Station was established as an agency of the Ministry of Agriculture and Commerce (MAC) in Nishigahara (a sector of present-day Kita Ward), Tokyo Prefecture.
- 1905** Reorganized as the Tea Division of the Agricultural Research Station under MAC.
- 1919** Reorganized as the Tea Research Station under MAC and relocated to Kanaya Town, Haibara District, Shizuoka Prefecture.
- 1920** The Tea Industry Trainee System was started (succeeded by the Agricultural Technical Training System in 1959)
- 1950** Reorganized as the Tea Division of the Tokai-Kinki Agricultural Experiment Station under the Ministry of Agriculture and Forestry (MAF).
- 1961** Reorganized as the Tea Research Station under MAF.
- 1986** Integrated with the Vegetable and Ornamental Crops Research Station into the National Research Institute of Vegetables, Ornamental Plants and Tea under MAF.
- 2001** Transition to the National Institute of Vegetable and Tea Science (NIVTS) of the National Agricultural Research Organization (NARO) independent administrative institution.
- 2006** NARO was renamed as the National Agriculture and Food Research Organization.

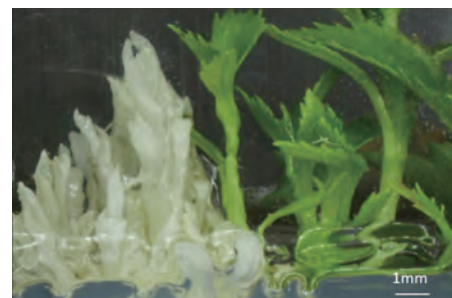
Division of research

Division of Fruit Tree Breeding Research

The Division of Fruit Tree Breeding Research is pursuing research on the development of high-quality and easy-to-cultivate cultivars of deciduous fruit trees and the development of new breeding materials. Recently, we are developing new deciduous fruit cultivars that are delicious, easy-to-eat, and easy-to-cultivate such as the superior-colored apple cultivar 'Kinshu,' the Japanese pear cultivar 'Kanta' with high sugar content, the Japanese chestnut cultivar 'Porotan' which pellicle is easy-to-peel after heating, the peach cultivar 'Sakuhime' that is highly expected to flower and ripen stably even when the winter temperature continues to increase due to global warming, the superior-colored grape cultivar 'Grosz Krone,' and the pollination constant non-astringent type persimmon cultivars 'Reigyoku' and 'Taiga' that enable stable production of seedless fruits. To improve the accuracy and efficiency of fruit tree and tea breeding, we are working on developing genome information databases, data-driven breeding system, and genome editing techniques. To date, we have resequenced the apple cultivar 'Fuji' and performed whole-genome sequencing of the grape cultivar 'Shine Muscat'. We have developed high-precision markers related to apple leaf spot disease resistance and chestnut easy-peeling pellicle. We have also successfully produced genome-edited plants for apples and grapes.



Development of linkage maps and DNA markers linked with important agronomic traits



Development of genome editing techniques of fruit trees

Division of Fruit Tree Production Research

In the fruit industry of Japan, it is expected that the domestic market will shrink due to the loss of interest in fruit among young people and the increase in fruit prices. Furthermore, in the future, domestic fruit production bases may become weaker and production volume may decline due to an increasing shortage of labor at production sites and the impact of global warming. In response to this situation, we should aim at achieving a stable supply of high-quality fruit at reasonable prices by saving labor and improving productivity through data-driven cultivation management while responding to the ongoing global warming. To expand domestic and overseas demand and strengthen production bases in domestic production areas, we are working in cooperation with external organizations to conduct research from cultivation to distribution.



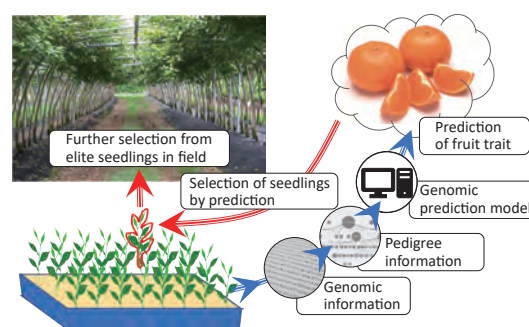
Integration of labor-saving suitable varieties and cultivation technologies and development of labor-saving production technologies

Division of Citrus Research

In the Division of Citrus Research, we are developing new citrus varieties with excellent cultivability and market competitiveness as well as breeding materials using genomic information. As a current issue, we are producing distinctive cultivar series with a high content of healthy functional β -cryptoxanthin. In terms of cultivation technology, we are aiming to develop labor-saving technology at a low cost for the stable production of premium fruits to increase the global competitiveness of domestic citrus fruits and cope with labor shortages due to the declining birthrate and aging population in Japan. In the modern production of high-sugar-content premium Satsuma mandarin fruit, sheet mulch cultivation is widespread, in which the ground under the canopy is covered with a water-proof sheet to block raindrops. However, this technique does not work well whenever rainwater seeps under the mulch through the gaps and the roots extend to the outside of the mulch coating. Therefore, we are developing shielding mulch cultivation to address these problems and are conducting research to further increase its utility.



Citrus trees with matured fruit in the shielding mulch cultivation



Efficient development of breeding materials using citrus genomic information

Division of Tea Research

The Division of Tea Research has two research stations. The Kanaya tea research station is located in Shizuoka Prefecture, and the Makurazaki tea research station is located in Kagoshima Prefecture. We are conducting studies on breeding, agronomy, farm management, tea processing/manufacturing, quality evaluation, and utilization of health benefit components. The Kanaya tea research station is developing new tea production technologies by researchers with diverse expertise. The Makurazaki tea research station is developing tea cultivars in warm climates and holds a large number of accessions to tea genetic resources from both domestic and overseas. During this 5-year research period, we are working on two major research projects. The first is to breed cultivars containing health benefit ingredients and develop technologies for utilization of health benefit ingredients to expand the demand for tea, and the second is to develop labor-saving and smart production technology contributing to improving the productivity of tea producers who are expanding their management scale.



Kanaya Tea Industry Research Center



Makurazaki Tea Industry Research Center

Development of new cultivars

Introduction of fruit tree varieties

We are pursuing research on the development of high-quality and easy-to-cultivate cultivars of citrus, Japanese pear, chestnut, stone fruits (peach, Japanese apricot and Japanese plum), grape, persimmon and apple.



Citrus 'Mihaya'
Early-ripening, good eating quality and attractive appearance



Citrus 'Asuki'
Late-ripening, high sugar content and less drip



Lemon 'Rinoka'
Resistant to citrus canker disease, large fruit with mild acidity



Apple 'Morinokagayaki'
Large yellow cultivar with sweet taste



Apple 'Kinshu'
Superior-colored cultivar with good texture and sweet taste



Apple 'Beniminori'
Superior-colored cultivar with good keeping quality



Grape 'Shine Muscat'
Large-berry cultivar with crisp flesh texture and muscat flavor



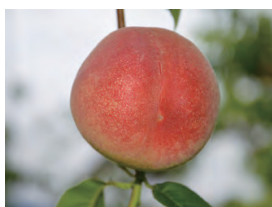
Grape 'Grosz Krone'
Superior-colored cultivar with large berries



Japanese pear 'Kanta'
High-yielding cultivar with high sugar content and soft flesh



Japanese pear 'Narumi'
Self-compatible cultivar with soft flesh



Peach 'Sakuhime'
Good-taste cultivar with lower chilling requirements



Persimmon 'Taiho'
Pollination-constant nonastringent-type, suitable for seedless fruit production



Japanese apricot 'Tsuyuakane'
Cultivar for processing, fruit liquor and juice



Japanese plum 'Honey Beat'
Sweet-taste cultivar with low acidity



Chestnut 'Porotan'
Japanese chestnut with an easy-to-peel pellicle after heating

Introduction of tea varieties

The Division of Tea Research has bred diverse green tea cultivars with high quality, pest resistance, aroma, and color characteristics. These cultivars are contributing to the revitalization of the Japanese tea industry and the export of Japanese tea overseas.



'Seimei'

Cultivar registration at 2020.
Suitable for Matcha and Sencha.



'Saeakari'

Cultivar registration at 2012.
Suitable for Sencha.



'Kanaemaru'

Cultivar registration at 2022.
Suitable for Sencha.



'Nanmei'

Cultivar registration at 2014.
Suitable for Sencha.



'Kiyoka'

Cultivar registration at 2020.
Floral Fragrance Tea cultivar.



'Sunrouge'

Cultivar registration at 2011.
Anthocyanin rich Tea cultivar.

Strategic Japanese tea export cultivar 'Seimei'

The export of Japanese teas, mainly Matcha and powdered tea, has increased since 2001. Recently, the demand for these products has been growing rapidly. NARO has developed a new green tea cultivar, 'Seimei' suitable for Matcha and powdered tea, as a strategic export cultivar for Japanese teas. We are expanding its cultivation areas primarily in Kagoshima Prefecture.

Characteristics of 'Seimei'

- *High yield by covering culture
- *High quality and bright green color
- *High amino acid content (especially Theanine)
- *Disease resistance
- *Suitable for export tea cultivation system

Future Prospective

Export a high quality Matcha and powdered tea that is made from 'Seimei' for U.S.A and EU



Covering Culture



Tencha Processing Line (Steamed & Dried)



Tencha



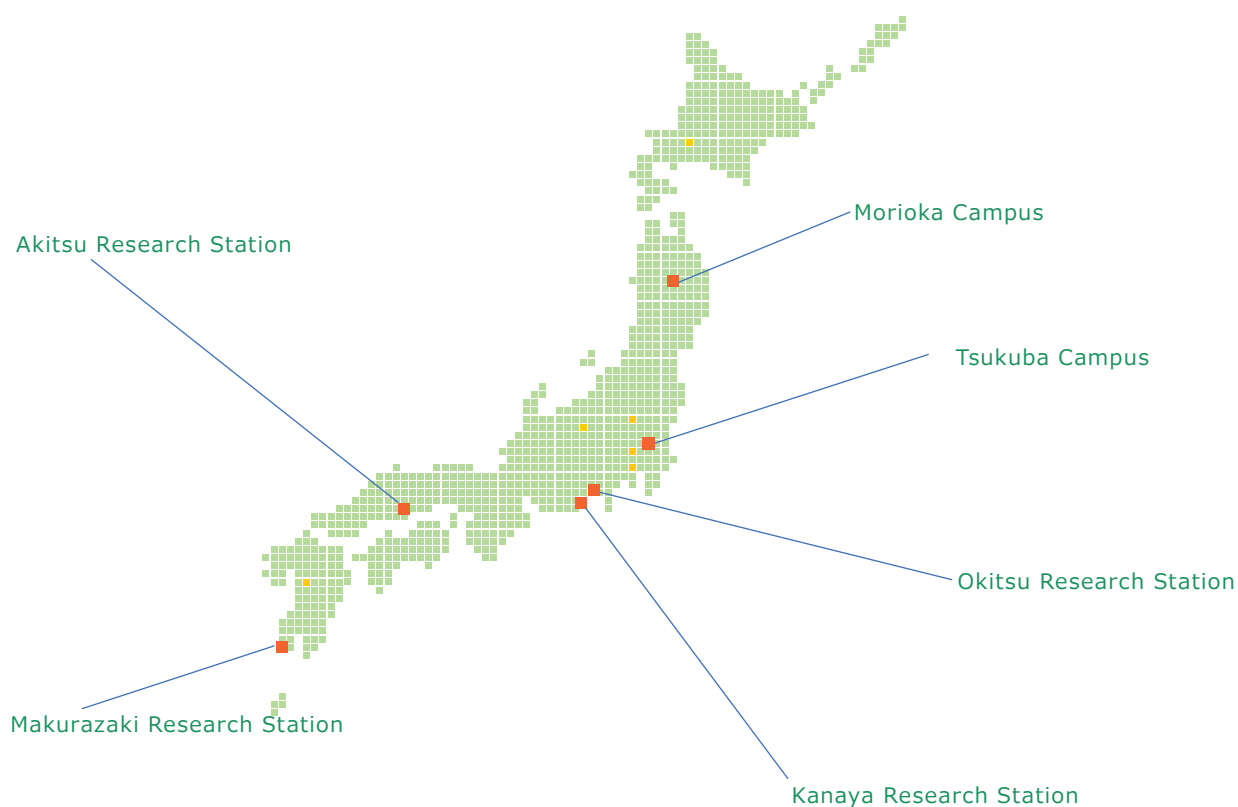
Grinding Using a millstone



Matcha

Summary of 'Seimei' Matcha processing

Locations and Contact Information



[Tsukuba Campus]

2-1 Fujimoto, Tsukuba, Ibaraki 305-8605, Japan
FAX +81-29-838-6437

[Morioka Campus]

92-24 Nabe-yashiki, Shimo-kuriyagawa, Morioka,
Iwate 020-0123, Japan
FAX +81-19-641-3819

[Okitsu Research Station]

485-6 Okitsunaka-cho, Shimizu, Shizuoka City,
Shizuoka 424-0284, Japan
FAX +81-54-369-2115

[Akitsu Research Station]

301-2 Akitsu, Hiroshima 739-2494, Japan
FAX +81-846-45-5370

[Kanaya Research Station]

2769 Shishidoi, Kanaya, Shimada, Shizuoka
428-8501, Japan
FAX +81-547-45-2169

[Makurazaki Research Station]

87 Seto, Makurazaki, Kagoshima 898-0087, Japan
FAX +81-993-76-2264

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<https://www.naro.go.jp/english/laboratory/nifts/>



Inquiries
<https://www.naro.go.jp/english/inquiry/>

