



Institute of Crop Science, NARO



The Institute of Crop Science, NARO (NICS) is the core research institute of the National Agriculture and Food Research Organization (NARO) for conducting research on the breeding of crops such as rice, wheat, barley, soybean, etc. using advances in genomics, with the ultimate goal of improving the self-sufficiency ratio of agricultural crop production in Japan. Research activities also cover the understanding of basic mechanism of agronomic and physiological traits regarding crop-quality and productivity, and the development of efficient technologies for innovations in crop breeding.

Development of new cultivars to support Japanese agriculture

The Institute of Crop Science, NARO (NICS) is the core institute of the National Agriculture and Food Research Organization (NARO) addressing various issues facing Japanese agriculture through the development of new crop cultivars and the establishment of basic technologies to achieve this goal. So far, NARO has developed and released many crop cultivars which are now widely cultivated. However, recent developments in crop improvement methods using DNA markers and advances in genome analysis has greatly accelerated many breeding strategies. We will use these promising technologies to elucidates the relationship between the genes involved and their biological functions towards the advancement of breeding methods, development of new breeding materials and novel cultivars, and eventually establish a continuous pathway from genomics to actual breeding of rice, wheat, barley, soybean and other crops.



A new rice cultivar "Oonari", suitable for animal feed and cultivation in paddy field has been developed from a mutant line of cultivar Takanari derived by gamma-irradiation. Although Takanari is a high-yielding cultivar, the seeds are easily dispersed during ripening due to a shattering habit which causes a significant loss in yield. The yield of this new cultivar reaches up to 1 ton/10a in heavy manuring cultivation, which is the highest yield level obtained so far in breeding of animal feed rice. It is also suitable for cultivation in western Kanto areas with much warmer climates during the cultivation season.



Discovery of the pre-harvest sprouting tolerance gene in wheat and barley

The gene involved in pre-harvest sprouting, a condition where germination of grains occurs in the spike before harvest, has been separately identified in wheat and barley. Moreover, it has been found to be same gene in in these two cereal crops. This discovery will contribute to the improvement of pre-harvest sprouting tolerance in both wheat and barley, that will be particularly useful in the breeding of tolerant cultivars.

“Message from Director-General”



Masahiro YANO, PhD
Director-General
Institute of Crop Science, NARO

The Japanese agriculture is undergoing a profound transformation brought about by the declining and aging population in rural areas, the institutionalization of farm management, the emerging impact of climate change in crop production environment, and the diversification of consumer needs. As the world population is expected to reach about 9 billion by the year 2050, Japan in conjunction with the international community must contribute in securing a stable food supply despite the deterioration of farmlands due to climate change or as a consequence of economic activities. The NARO Institute of Crop Science (NICS), which is one of the core research institutes of the National Agriculture and Food Research Organization (NARO), is addressing this issue by developing new crop cultivars that will support Japanese agriculture in the future and the establishment of basic technologies to achieve this goal.

It goes without saying that the development of improved cultivars is the foundation of agricultural productivity. In particular, enhanced production in the rural areas and stabilization of income from agricultural activities can be achieved by breeding crops with highly desirable characteristics, such as cultivars that can be easily grown by farmers, or cultivars with qualities that appeal to consumers. So far, NARO has developed and released many crop cultivars which are now widely cultivated. On the other hand, crop improvement methods using DNA markers has been greatly accelerated with the recent advances in genome analysis. We will use these promising technologies towards the advancement of breeding methods, and the development of new breeding materials and novel cultivars of rice, wheat, barley, soybean and other crops.

Furthermore, in order to accurately respond to structural and other changes in the needs of consumers, it is important not only to strengthen our research capability and resources but also to pursue active collaboration with other research organizations in the public, private and academic sectors. The Advanced Genomic Breeding Section of NICS has been established to promote such research collaborations, and the Director of Applied Genomics Research is taking charge of the coordination of the needs and basic technologies among breeding projects within NARO to facilitate the advancement and promotion of crop breeding in Japan.

Agricultural productivity is increasingly becoming a mainstream challenge in both the domestic and the international front, and such initiative will depend more and more on the development of new crops. As a core institute in breeding crop cultivars, we will strive in strengthening Japanese agriculture through innovative research, and bringing the benefits to producers and consumers. We hope for your continuous support and cooperation in our future endeavors.



Organization

Director-General

•Department of Planning and General Administration

- Deputy Manager
- Planning and Promotion Section
- General Administration Section
- Risk Management Section

•Advanced Genomics Breeding Section

•Director of Applied Genomics Research

•Radiation Breeding Division

•Division of Basic Research

- Plant Genome Research Unit
- Breeding Materials Development Unit
- Breeding Strategies Research Unit
- Field Omics Research Unit
- Breeding Informatics Research Unit

•Division of Rice Research

- Rice Breeding Unit
- Rice Physiology Unit
- Rice Quality Research Unit
- Rice Applied Genomics Research Unit

•Division of Field Crop Research

- Soybean Breeding Unit
- Sweet Potato and Miscellaneous Crops Breeding Unit
- Soybean and Field Crop applied Genomics Research Unit

•Division of Wheat and Barley Research

- Wheat and Barley Breeding Unit
- Wheat and Barley Quality and Applied Genomics Research Unit

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Access

- 20 minutes by taxi from JR Joban Line, **Ushiku** Station
- 15 minutes by taxi from Tsukuba Express, **Midorino** Station
- 16 minutes by taxi from Tsukuba Express, **Tsukuba** Station



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