[Episode56] Emimaru, a Newly-Developed Rice Variety Suitable for Direct Seeding in Hokkaido, Offers Superior Taste and Commercial Viability

Outcome Example of Bio-oriented Technology **May 29, 2024**
Research Advancement Institution

A research group led by the Hokkaido Research Organization has developed a new rice variety named “Emimaru” (see photos 1 and 2), which was registered in 2023. The name “Emimaru” includes “emi” (means “smile” in Japanese) as a part of it, embodying the hope that it will bring smiles to both producers and consumers, as it allows for labor-saving production and offers a good taste. Emimaru was developed to meet the needs of steamed rice manufacturers for lasting softness and deliciousness after cooking, making it suitable for commercial uses including lunch boxes. It is also suitable for direct seeding cultivation in Hokkaido, and its popularity is expanding.

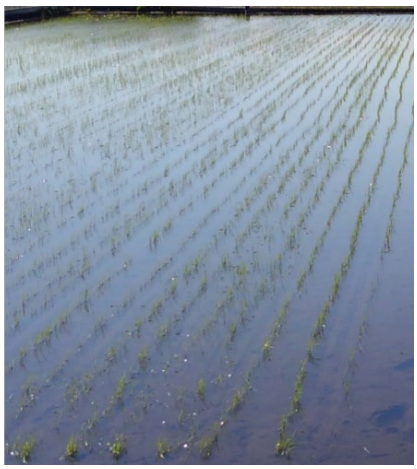

Photo 1: Cultivation of Emimaru (Immediately after water is introduced to the fields: seedlings are well-aligned.)
Provided by Hokkaido Research Organization

In Hokkaido, rice farming is transitioning to large-scale operations, with a shift from traditional transplanting cultivation to a more labor-efficient direct seeding method. However, the production of traditional rice varieties by direct seeding cultivation tends to be unstable due to poor germination in low temperatures. The newly developed Emimaru variety, however, exhibits a high germination rate even under low temperatures and is resistant to rice blast fungus, thereby ensuring stable yields even in direct seeding cultivation.

The cultivation area of Emimaru in Hokkaido was approximately 400 hectares in 2019. By 2022, it expanded nearly fivefold to about 1,900 hectares, with the majority being directly seeded. Emimarum has a taste comparable to “Nanatsuboshi,” the primary variety used in transplanting rice cultivation in Hokkaido, and is expected to continue spreading. The expansion of direct seeding rice cultivation areas with the proliferation of Emimaru will contribute to improve the labor efficiency in Hokkaido’s rice farming.

Photo 2: Package of Emimaru
Provided by Hokuren

What is Emimaru?

Emimaru is a variety developed using “Ryokukei 07216” as the maternal parent, which is known for its robust early growth after germination even in low temperatures, and “Joukei 06181” as the paternal parent, renowned for its

resilience against low temperatures and diseases. Emimaru has inherited these strong traits, making it resistant to both the cold and diseases. In terms of taste, it is comparable to “Nanatsuboshi,” the most popular variety in Hokkaido, and is suitable for commercial use in products such as convenience store bento, or lunch boxes, and restaurant meals due to its ability to retain its softness and flavor for an extended period after cooking. Steamed rice manufacturers who handle commercial sushi rice have reported that blending Emimaru improves the vinegar’s adherence to the rice, and as such, an increase in demand for Emimaru is anticipated in these commercial markets.

What is Direct Seeding Rice Cultivation?

When it comes to rice cultivation, the transplanting method, which involves growing seedlings in a greenhouse and then planting them in the field, is the norm, as is often imagined as the spring rice planting scenary. The advantages of this cultivation method include: 1) the ability to nuture vulnerable seedlings in a controlled environment within a greenhouse during the early spring when weather changes are significant; and 2) planting more developed seedlings that can outcompete weeds. However, despite the mechanization of seedling planting, the tasks of growing seedlings, carrying heavy seedling boxes, and loading them into planting machines remain labor-intensive and difficult to streamline, posing a barrier to scaling up operations.

Therefore direct seeding cultivation, which involves sowing rice seeds directly into the fields, eliminating the need for both seedling cultivation and planting, is garnering attention. The area of rice fields under direct seeding cultivation in Japan has increased from 7,505 hectares in 1995 to 36,681 hectares in 2022. In Hokkaido, the direct seeding method generally extends the growing period in the fields by one to two weeks compared to transplanting cultivation. Combining both methods can help distribute the peak workload, which is beneficial for expanding the management area.

Savior of Direct Seeding Rice Cultivation in Hokkaido

In Hokkaido, there has been a surge in large-scale rice cultivation. However, the traditional method of transplanting has its limitations in scaling up operations due to its labor intensive process. Consequently, there is a growing interest in the direct seeding method, which eliminates the need for seedling cultivation and transplanting. Unfortunately, the conventional varieties used for direct seeding cultivation in Hokkaido have had unstable production volumes from year to year due to poor germination under low temperatures, and their yield was also insufficient.

Against this backdground, the research group decided to experiment with direct seeding cultivation using the new variety, Emimaru, known for its good taste, high germination rate even at low temperatures, and robust disease resistance. The results revealed that Emimaru not only germinates well under low temperatures but also yields more than the conventional varieties used for direct seeding. It has been registered as a recommended variety for Hokkaido to be widely spread in place of conventional ones. The cultivation area of Emimaru in Hokkaido reached 1,927 hectares in 2022, exceeding the initial target of 1,000 hectares set for 2023, indicating its rapid adoption.

Initially, there were reports from farmers who used the variety about its excessive lodging, where the weight of the plant causes its stem bending and the plant falling flat, due to the variety's robust germination even at low temperatures and vigorous growth. However, recent improvements in the seeding method, such as reducing the amount of seed sown, have allowed the characteristics of Emimaru to be fully realized. One rice farmer who introduced Emimaru in 2020 switched all 22 hectares of the paddy field cultivation to direct seeding method, making it possible to manage the operations single-handedly.

Comments from the Researcher

Mr. Shinya Munekata of the Hokkaido Research Organization, the leading institution of the research group, spoke about Emimaru: "We have been working for a very long time to develop a variety that can ensure stable seedling establishment under the cool climatic conditions of Hokkaido, but we had not been able to develop a practical variety until the development of Emimaru. It is the fruition of the efforts of our predecessors involved in the breeding of direct-seeded rice in Hokkaido. In the future, we aim to improve agricultural characteristics such as yield while maintaining the low-temperature seedling establishment, which is a strength of Emimaru, and connect it to the development of varieties that can be cultivated with lower labor and cost."

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https://www.naro.go.jp/laboratory/brain/english/press/stories/index.html

Project name	Research program on development of innovative technology (development stage)
Project period	FY2015-2019
Title	Development of High-Yield Rice Varieties for Commercial Use to Meet Actual Demand Using a New Simplified Rice Evaluation Method
Leading research institutes	The Hokkaido Research Organization Hokkaido Agricultural Research Center, National Agriculture and Food Research Organization Agricultural Administration Division, Department of Agriculture, Hokkaido Government