

Towards the Agriculture and Food of the Future

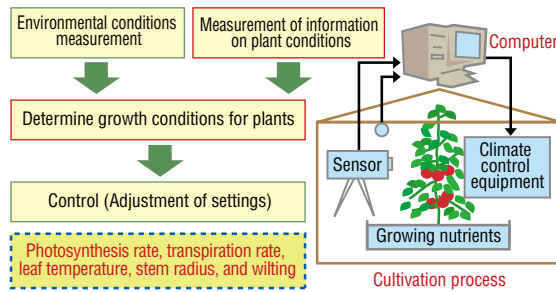
—New generation food factories and low cost agriculture



One of the great concerns for our future is the possibility of worldwide food shortages. The Iseki Group is seeking to contribute to a solution through the development of safe, reliable, and efficient food supply systems. Our sunlight-nourished “intellectual” plant factory represents leading-edge research in this area. With an eye to its application in rice cultivation technology in Japan, we are developing low-cost agriculture—especially sparse cultivation—systems and promoting their use.



Sunlight-nourished “intellectual” plant factories that listen to what plants need



SPA concept flowchart



Integrated climate control system

In collaboration with Ehime University, a national university, Iseki has been conducting research on a large-scale “intellectual” plant factory system that uses sunlight. In June 2008, practical testing facilities were completed at Ehime University. The research is also a part of the Ministry of Economy, Trade and Industry (METI)’s Regional Regeneration Consortium Research Project. Plant factories use artificial light or sunlight systems. The former allows easy control of the amount and duration of light, but has high energy costs. The latter offers energy conservation advantages because of the use of natural sunlight, however, the difficulty of managing the daily amount of sunlight is an issue.

To address these problems, our research team introduced the concept of the speaking plant approach (SPA). In other words, using a variety of sensors, the researchers automatically measure the photosynthesis rate, transpiration rate, leaf temperature, stem radius, and wilting in plants to determine growth conditions. At the same time, they measure the environmental conditions, such as atmospheric temperature, humidity, the nutrient solution temperature, amount and duration of light. By controlling these

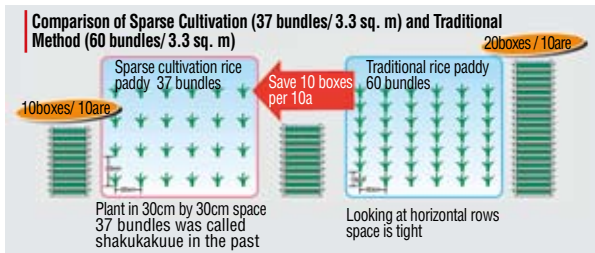
conditions, they can provide the optimum cultivation environment for the plants.

Iseki has plenty of records with nutriculture systems for tomatoes, strawberries, and other fruits and vegetables. Utilizing that abundant experience, the researchers are aiming to elucidate the relationships between the cultivation environment, nurturing analysis, and the amount and quality of fruit or vegetable produced. Based on this information, they are targeting the development of an optimum plant growing model and its self-tuning system. Current topics of research include the scaling up of SPA technology for practical application; the autonomous robot used to manage the factory; self-running plant nourishing analysis equipment that gathers the different types of data; the integrated climate control system that provides the self-tuning; and the fruit or vegetable quality assessment system that projects sweetness and other properties.

Iseki intends to use the research results of the sunlight nourished intellectual plant factory to contribute to the creation of next-generation food supply systems.



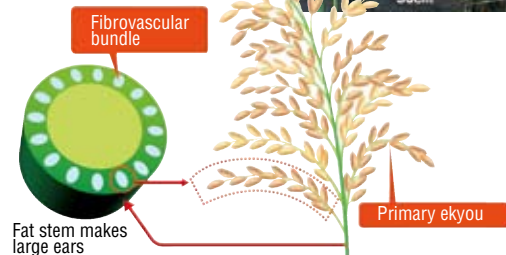
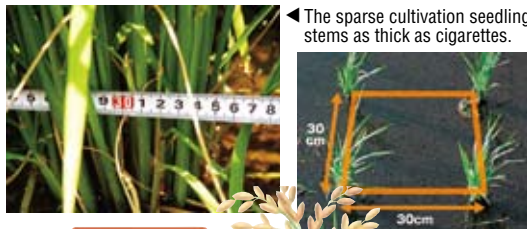
Sparse cultivation system contributes to low-cost agriculture



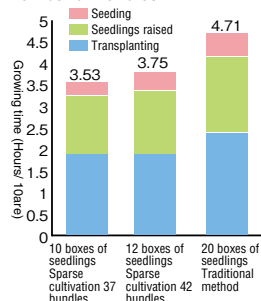
Sparse cultivation of rice, a system being proposed by Iseki, is drawing a lot of attention in Japan.

In sparse cultivation, the space between seedlings is increased during planting, providing greater sunlight and ventilation for each plant. This rice cultivation method raises strong and healthy rice plants and enables stable yields of rice.

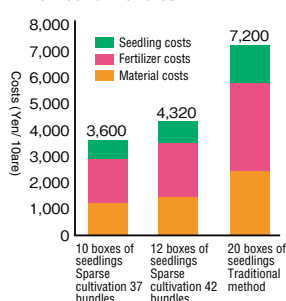
With traditional methods, 60-70 bundles of seedlings are planted in each 3.3 square meters of rice paddy. Using Iseki's method, however, we recommend planting 37 bundles of seedlings in each 3.3 square meters. According to data from experimental rice paddies, the method provides better separation of roots, enabling thicker and stronger stalks that produce bigger ears of rice. Because the rice grows healthy and robust, farmers



Comparison of Growing Time by Number of Bundles



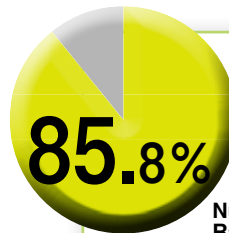
Comparison of Growing Costs by Number of Bundles



can use less agricultural chemicals and the grains of rice tend to be larger. In addition, Iseki has proven that the use of its original cultivation technology produces the same yields as traditional methods. However, since the sparse cultivation method reduces the amount of seedlings by half, there are significant savings in seed and seedling costs and labor spent in planting the crop.

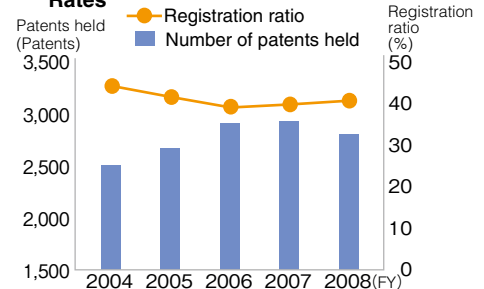
Iseki pioneered the development of rice transplanters compatible with planting 37 bundles of seedlings in 1999. In addition, the Company has experimented and accumulated cultivation know-how on using this system with various weather and soil conditions in an effort to propose and spread the use of this system among rice farmers throughout Japan. During the process, the total area of the Company's experimental rice paddies has grown to approximately 4,500 hectares.

By promoting the greater use of the low cost and laborsaving sparse cultivation system, Iseki seeks to contribute to the preservation and improvement of Japan's food self-sufficiency ratio. For the future, we will work to increase its popularity and make it the standard method for cultivating rice.



Patent Approval Rate No. 1

Number of Patents Held and Registration Rates



Patent Approval Rates and Published Patents
Highest patent approval rate in all industries for five consecutive years

Fiscal Year	2004	2005	2006	2007	2008
Iseki	84.6%	83.7%	90.4%	89.3%	85.8%
Ranking	1st	1st	1st	1st	1st

Patent approval rate = Number of patents approved / (Number of patents approved + Number of patents refused + Number of patents withdrawn or abandoned)

Number of patents withdrawn or abandoned = Number of patents withdrawn or abandoned after receiving notice of reason for patent refusal
Iseki was No. 1 in number of published patents in the agriculture and fisheries sector for seven consecutive years from 2000 to 2006