

FOR IMMEDIATE RELEASE

**Automatic seedling growth monitoring technology with an accuracy of 0.5mm
-- Revealing new facts which may contribute to improvement in variety and production --**

Tokyo, October 14, 2004 ---Hitachi, Ltd. (NYSE:HIT / TSE:6501), has developed technology which automatically monitors the growth process of rice seedlings with image data by the minute with an accuracy of 0.5mm. As a result, new facts about the rice seedling's growth process are being clarified; such as, it was found that the rice leaf during the vegetative phase^(*1) grew by about 80mm a day, about five times the level commonly believed. This technology is expected to become an important means for obtaining new information on the growth of agricultural products, and the relationship between the genetics and the growth environment. This research was conducted as part of a national project, "Development of Rice Genome Simulators" (SY-1108), under the guidance of the Ministry of Agriculture, Forestry and Fisheries (Supervising body: Dr. HIGO Kenichi, Vice President (Plant Science), National Institute of Agrobiological Sciences).

As the concern for food safety continues to increase, there is a strong need for improved variety and production technology of quality agricultural products at low cost. To be able to initiate crop improvements, however, it is necessary to have detailed information on the growth process, such as when and under what environmental conditions, and the amount of growth. In the past, such information, e.g. plant height measurement, was manually collated and thus there was a limit in the type of data and accuracy which could be obtained. As a result, the development of technology for an efficient method of obtaining detailed plant growth information was desired by those involved in agricultural management.

In response to this need, Hitachi developed a growth monitoring system^(*2) which automatically monitored the growth of several seedlings by the minute. However, as several thousands of image data can be accumulated for each seedling, new technology enabling efficient and accurate analyses of the huge amount of data was still required. Thus a new plant growth monitoring system was developed, capable of efficiently analyzing the huge amount of image data with high accuracy.

Features of the new system are as below:

(1) Image capture device for high accuracy fixed point photographs.

An automatic transport mechanism with a positioning accuracy of 0.1mm was developed to enable the fixed point photography of seedlings which are photographed sequentially. The positioning of the camera and sample, and photography, are conducted automatically, and are photographed and filed according to the measurement objective. As a result, a maximum of 2,000 growth image data per plant can be obtained promptly and conveniently over several weeks or months.

(2) Plant growth tip monitoring technology.

Image processing technology was developed for automatic monitoring of a specified growth tip on an image. Thus the large amount of images obtained can be fully utilized without omission to promptly record and analyze growth speed, and other time-related details of the growth process.

With the above technology, it is now possible to automatically monitor plant growth by the minute with an accuracy of 0.5mm from image data recorded of the plant growth.

When this technology was applied to the observation of rice growth, it was found that the newly developed rice leaf grew by about 80mm a day during the vegetative phase. This new finding was about five times faster than the growth speed observed using the plant height measurement method. Further, as it is possible to use this system to quantitatively analyze the effect of the environment on plant growth and the timing with which differentiation occurs, it is expected to contribute to the development of improvements in production technology and plant variety.

The National Institute of Agrobiological Sciences is acknowledged with thanks for their guidance and cooperation in this development.

The results of this research will be on exhibition at the Agribusiness Creation Fair 2004, held at the Tokyo International Forum, from 14th-16th October 2004.

Notes:

*1) Vegetative phase:

Plant growth can be divided into the vegetative phase and the reproductive phase. In the vegetative phase, the roots, stems and leaves develop, and active photosynthesis occurs. In the reproductive stage, the terminal shoots begin to differentiate, and in many plants, this results in the formation of seeds or fruits after flowering. It is known that various external factors such as length of daylight, temperature, and nutrition, during the vegetative phase, affect the process to the reproductive phase. The amount of growth during the vegetative phase has a significant impact on the grain yield after the reproductive phase, and thus growth analysis during this earlier phase is important.

*2) Growth monitoring system:

The system monitors minute-by-minute the growth of seedlings cultivated within an artificially controlled environment, using a fixed camera. The seedlings are transported in turn to the camera, and the growth period from germination to flowering can be recorded over 2-3 months.

About Hitachi, Ltd.

Hitachi, Ltd., (NYSE:HIT/TSE:6501) headquartered in Tokyo, Japan, is a leading global electronics company, with approximately 326,000 employees worldwide. Fiscal 2003 (ended March 31, 2004) consolidated sales totaled 8,632.4 billion yen (\$81.4 billion). The company offers a wide range of systems, products and services in market sectors, including information systems, electronic devices, power and industrial systems, consumer products, materials and financial services. For more information on Hitachi, please visit the company's Web site at <http://www.hitachi.com>.

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