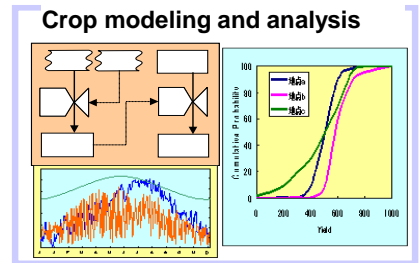


CROP YIELD NEVER CHANGES WITHOUT CAUSE

Lab. Crop Science Prof.: Shiraiwa, T., Assoc. Prof: Katsube-Tanaka, T.,
Lecturer: Homma, K., Assist. Prof: Tanaka, Y.

Crop production in the world is conducted under diverse conditions, including shifting cultivation, rainfed paddy culture and intensive production with well organized irrigation systems, and they have different production constraints. We are identifying genetic and environmental factors that govern crop yield and quality in various production systems, focusing on efficient utilization of solar energy, water and soil nutrition, for improvement of crop management and plant genetic traits.

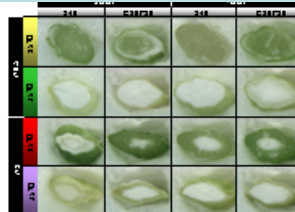
Genotype × Environment Interaction in Crop Production System



We are analyzing yield-limiting processes such as photosynthesis, N fixation and water uptake in rice and soybean crops, quantifying the interactive effects of genotype and environment on the respective processes.

Quality Improvement of Food Crop & Protection against Global Environmental Change

Research on genotypically and/or environmentally dominant factors affecting on the quality of food crop has been carried out at molecular to plant population levels for the quality improvement. Effect on the quality caused by global warming, etc. is also analyzed.



Model experiment with detached ear culture (right) and rice seeds suffered by higher temperature (top)



Toward the sustainable development of agricultural production



Improvement trial in NE Thai.



Experimental site in N. Laos.



Investigation in Madagascar.



Farmer's fields in Kyoto

Field investigations have been conducted to evaluate and improve agricultural productivity and sustainability in various ecosystems: In Northeast Thailand, which is a representative rainfed rice area; in Northern Laos, an upland rice production area with slash-and-burn system; in Madagascar, which has a quite interesting agronomic management named SRI; and in Tamba, Kyoto, special black soybean “Tambaguro” is produced.

Keywords

Rice, soybean, yield, genotype by environment interaction, photosynthesis and dry matter production, nitrogen and water utilization efficiency, crop production in Asia, crop physiology, crop ecology, quality of food crop.

Recent Publications

Effects of elevated CO₂ concentration and temperature on seed production and nitrogen concentration in soybean (*Glycine max* (L.) Merr.)

Kumagai, E., Tacarindua, C.P., Homma, K., Shiraiwa, T., Sameshima, R.
J. Agric. Meteorol. 68, 1-13. (2012)

The response of soybean seed growth characteristics to increased temperature under near-field conditions in a temperature gradient chamber.

Tacarindua, C.P., Shiraiwa, T., Homma, K., Kumagai, E., Sameshima, R.
Field Crops Res. 131, 26-31. (2012)

Variability of leaf morphology and stomatal conductance in soybean [*Glycine max* (L.) Merr.] cultivars.

Tanaka, Y., Fujii, K., Shiraiwa, T.
Crop Sci. 50, 2525-2532. (2010)

Tandem repeat inserts in 13S globulin subunits, the major allergenic storage protein of common buckwheat (*Fagopyrum esculentum* Moench) seeds.

Khan, N., Takahashi, Y., Katsube-Tanaka, T.
Food Chemistry 133, 29-37. (2012)

Changes in the subunit composition of seed storage proteins by controlling nitrogen and sulfur metabolism.

I. Rice plants in sandy soil and hydroponic cultures.

Katsube-Tanaka, T., Nakashima, H., Khan, N., Yamaguchi, T., Nakano, J.
J. Crop Res. 56, 17-22. (2011)

Evaluation of soil moisture status in the field to improve the production of Tanbaguro soybeans.

Homma, K.
Soybean - Applications and Technology. Tzi-Bun Ng (Ed.), 127-150. (2011)

Evaluating crop productivity on the basis of the remote sensing of plant canopy temperature.

Homma, K., Hara, R., Hongo, C., Kanbayashi, M.
IEICE Technical Report 111, no. 239, 179-184. (2011)

The effects of soil drying and rewetting on rice growth in lowland aquatic Ferralsols in the southeastern forest region of Madagascar.

Tsujimoto, Y., Homma, K., Shiraiwa, T.
Plant Soil 333, 219-232. (2010)

Other publications are presented on the web-site [http://www.cropscience.kais.kyoto-u.ac.jp/list.html](http://www.cropsscience.kais.kyoto-u.ac.jp/list.html) .