

Analysis of Differences in Rice Panicle Structure Between Organic and Conventional Farmings Using Image Analysis Technique

著者	SUGA Kyoko, UNO Toru, TAJIMA Ryosuke, ITO Toyoaki, SAITO Masanori
journal or publication title	Journal of Integrated Field Science
volume	15
page range	87-87
year	2018-10
URL	http://hdl.handle.net/10097/00124028

p12. Analysis of Differences in Rice Panicle Structure Between Organic and Conventional Farmings Using Image Analysis Technique

Kyoko SUGA, Toru UNO, Ryosuke TAJIMA, Toyoaki ITO and Masanori SAITO

Faculty of Agriculture, Tohoku University

In organic farming, the panicle number is usually smaller than in conventional farming. Therefore, in order to heighten yield in organic farming, it is important to increase the spikelet number per panicle and the ripening rate. For analyzing these two yield components in detail, we focused on analyzing the panicle structure that is how each spikelet on the panicle is formed and ripe. In this study, we developed the panicle structure analysis using the image analysis technique and applied the technique to analyze differences between organic and conventional rice production.

We cultivated rice plants in organic and conventional paddy fields, Kawatabi Field Science Center, Tohoku University. We investigated the tiller number and plant height as crop growth and, at harvest, yield and four yield components: the panicle number, the spikelet number per panicle, the ripening rate and grain weight. At harvest, we also investigated the panicle structure using the image analysis technique. In this technique, after collecting the main panicle of each rice plant, we set the grains on a scanner as the position of each grain on the panicle can be known and got the images with the scanner. We evaluated the thickness of grains, which is the important index of the grain quality in Japan, using image analysis. We pre-analyzed the relationship between the grain images and their thickness.

The panicle number and the plant height were smaller and lower in the organic farming than in the conventional farming throughout crop growth. As a result, The panicle number in conventional farming was almost twice that in organic farming and the yield in conventional farming was 1.6 times higher than in conventional farming. On the other hand, the spikelet number was significantly higher in organic farming than in conventional farming and the ripening rate also tended to be higher in organic farming than in conventional farming. In the panicle structure analysis, the primary and secondary branches of the panicle in organic farming are greater than in conventional farming but the grains in organic farming tended to have small grain thickness. From these results, for increasing yield in organic farming, it could be possible to control the number of branches of the panicle and to increase the fertility of the grain.