Poster Session | Farming System | P2: Poster Session

[P2] Farming System

Thu. Sep 9, 2021 12:15 PM - 2:00 PM Room 2 (Poster) (Farming System)

12:15 PM - 1:00 PM

[P2-27]Three-Dimensional Analysis of Soybean Grain Shapes Using a Flatbed Scanner

*Nominated for Presentation Awards

○Dan Eiju[1,2], Masataka Wakayama[1], Fumiko Namiwa[3], Masaru Tomita[1,2] (1.Institute for Advance Biosciences Keio University, Japan, 2.Faculty of Environment and Information Studies, Keio University, Japan, 3.Horticulture Science, Yamagata Integrated Agricultural Research Center, Japan)

Soybeans are classified by grain shape, color, and the hilum color. Although rice shape can analyze using grain analyzer, methods of analyzing soybean properties were insufficient. Here, we aimed to develop new methods for analyzing the soybean shape and color. Using the methods, we have characterized soybean morphologies among various species.

 One hundred of soybean seeds were set into grid-like partitioned board (soybean grid board). XY bean shape information was obtained using flatbed scanner. As Z-axis information (thickness) was difficult to obtain, we set the soybean grid board and scanner vertically on the desk and scanned. The images were processed by ImageJ software. For extracting soybean outline from images, the appropriate color spaces were selected.

 For soybean outline extraction, the Lab color space was suitable than other color space.
L-values which indicate brightness discriminate between i) brown, red and black, ii) green iii) yellow varieties. a-values (green and redness component) were suitable for brown, red and black. Using L and a-values, soybean color characteristics could be discriminated.

 Positive and strong correlations were found between grain weight and volume (R = 0.84), major axis (R = 0.76), and minor axis (R = 0.74), respectively. While, the correlation between grain weight and grain thickness (R = 0.49), aspect ratio (major axis / minor axis) (R = 0.30) and the flatness (long axis/grain thickness) (R = -0.12) were very low. Using those characteristics, the soybean species characteristics were discriminable among variety of