Poster Session | Others (including the category of JSAM and SASJ)

[6-1130-P]Other Categories (6th)

Fri. Sep 6, 2019 11:30 AM - 12:30 PM Poster Place (Entrance Hall)

11:30 AM - 12:30 PM

[6-1130-P-11]Temporal Source Strength Estimation of Sweet Pepper for Crop Management and LED Supplementation Efficiency Improvement

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Keywords:sweet pepper, supplemental light , fruit number, yield, source strength, sink strength

The fruit load of sweet pepper (*Capsicum annum* L.) is heavy, and if a sufficient amount of photosynthesis cannot be produced, abscission occurs, and the yield is lowered. When considering photosynthesis, it is important to balance the strength of energy sources and sinks. The source strength is the extent of the supply of assimilates, which depends upon the amount of solar radiation received, leaf area, plant architecture, and photosynthetic characteristics. Since the leaves of sweet peppers are not generally cut, the amount of light in a production facility is important for the generation of high yields. In this study, the amount of light was increased using irradiation by LEDs from above, and the influence of the light intensity on the number of fruits and the yield was measured. We also investigated whether the source strength could be properly evaluated, based on the prediction of the number of fruits. The experiments in sweet peppers were conducted in two plastic houses in Miyagi Prefecture, Japan. Three independent surveys were conducted, with planting times in the middle of July 2017, the end of February 2018, and the end of August 2018. As a result, it was shown that the yield and the number of fruit set were increased in the areas where light was supplemented in the three experiments. By investigating the amount of light received, light utilization efficiency, and fruit distribution rate, it was possible to estimate the number of fruit set. When the source strength was increased by supplementing the LEDs, the predicted number of fruits changed, and the change in the actual number of fruit set showed the same tendency. These results showed that light source strength was properly evaluated. The correct source strength can be quantified more accurately in real time by utilizing such a depth sensor to acquire plant growth information. The most effective way to use LED supplementation involves being able to use additional source strength without waste. Advanced cultivation management methods are made possible by using an estimation of light reception amount by the sensor, and by the adjustment of the light amount by the LED as required. This research was supported by grants from the Project of the NARO Bio-oriented Technology Research Advancement Institution (research program on development of innovative technology).