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**Effects of strong shading on growth and yield in sweet potato
(*Ipomoea batatas* L. LAMK.)**

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Abstract

Sweet potatoes (*Ipomoea batatas* (L.) LAMK.,) have been cultivated in Central and South America for about 2000 years and are now grown mainly in Asia and South America. Sweet potatoes are annual in the temperate region, but are classified as perennial in the tropical region. In 2000, the cultivation area of sweet potatoes decreased to about 16,000 ha in 2000, but the cultivation area increased slightly in recent 20,000 ha in Korea. Sweet potatoes do not show higher maximum dry matter production of 120 ~ 150g per plant, and the leaf area index (LAI), which maximizes dry matter production, is known as 3.0 ~ 4.0. As the leaf area increase, the penetration of light into the canopy becomes poor, and sufficient photosynthesis cannot be achieved in the lower leaves, on the other hand the respiration increase, which results in poor dry matter production. This study was conducted to know the responses of sweet potatoes to intensive shading treatment of 80% shading. This experiment was conducted for about 42 days from September 6, 2016 to October 18, 2016 at Gyeongsang National University Experimental Farm, Jinju, Korea. The plant canopy was shaded with black nylon 80% shade cloth suspended 1.2 m above the ground. The photosynthetic rate, stomatal conductance, chlorophyll fluorescence, SPAD and NDVI were measured in 3 replicates every 7 days after shading initiation. After the fresh weight was measured, the samples were dried at 80 °C in a dry oven and measured. By the 80% shading treatment, chlorophyll fluorescence of the treated plants was slightly higher than that of the control, the SPAD value was higher by 3.4 and NDVI value was higher by 0.01. However, photosynthetic rate and stomatal conductance were lower than those of the control. The stomatal conductance of the control were two times higher than those of the control and the photosynthetic rate of the control was four times higher than that of the control. In control, plant showed a tendency to steadily increase in fresh weight and dry weight. However, in the case of shading treatment, the tendency to increase in the fresh and dry weight of tuberous roots was not clear. The fresh weight of shoot showed a tendency to increase steadily while the difference between treatment and control was not large, but tended to decrease after frost.

Keywords: Sweet potato, Shading, Photosynthesis, Tuberous root

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