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Deficit Soil Water Effects on the Growth, Yield and Water Use Efficiency of Soybean (*Glycine max* (L.) Merr.) and Adzuki Bean (*Vigna angularis* L.)

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[Introduction]
In recent decades, Korea is experiencing severe drought during spring and summer as Korea is under climate change effects. Crops cope with water stress by anatomical, morphological or physiological response. Previous studies reported that Soybean and adzuki bean which are representative legume crops in Korea are susceptible to deficit water stress. Therefore it is important to understand water use efficiency of soybean and adzuki beans in order to avoid drought damage during cultivation and develop conservative water management.

[Materials and Methods]
The experiments of water use efficiency from soybean and adzuki bean were performed in a greenhouse located at Miryang, Gyeongnam from June to September, 2019. Soybeans and adzuki beans were grown in a pot with soil mixture of bed soils and upland soils. Total of 44 pots were made to test water use of crops under three soil moisture contents (30 & 50 for soybean, 40 and 60% for adzuki bean, and 75% of available soil water) and two pots without a crop to measure evaporation. After planting, weights of pot and crops were measured every 30 minutes to calculate water requirements and water use efficiency.

[Results and Discussion]
Water consumption by soybeans and adzuki beans showed a similar trend throughout cultivation. Water consumption steadily increased after planting except ones from 30% and 40% soil moisture content. Water consumption of soybean reached a peak on 70th day after planting and ones of adzuki bean did on 75th day. The greatest amount of consumption from soybean and adzuki bean was 18.9 mm/day and 9.1 mm/day, respectively. After 30th day, soybean water consumption exceeded adzuki bean until harvest. Water use efficiencies from 30% and 40% soil moisture content were the smallest compare to other soil moisture contents from both crops. Water use efficiencies of soybean from 50% and 75% did not show statistical difference and ones from 60% and 75% of adzuki bean did not show difference. These results concluded that threshold of soil water limit to avoid drought effect for soybean is 50% of available soil water and ones for adzuki bean is 60%.

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