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Effects of Fertigation Cultivation using Subsurface Drip System on Growth and Yield of Soybean

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[Introduction]

This study was conducted to investigate the effect of fertigation treatment according to fertilizer types and concentrations on soybean growth and yield using a subsurface drip system.

[Materials and Methods]

Soybean was cultivated with irrigation and fertigation treatment with several fertilizer types and concentrations (N 2, N 4, N 6 kg/10a, NPK 1/2 [half of standard fertilization], and irrigation) during the flowering and R3 stage using subsurface drip systems buried 40 cm underground.

[Results and Discussion]

For the irrigation treatment using a subsurface drip system, the water requirement was 17.6 tons/10a to maintain 25% of the soil moisture content in the 10cm soil layer. For the fertigation treatments, aboveground growth tended to be high in the N 6, N 4, and N 2 kg/10a treatments as a result of fertigation at a 1% fertilizer concentration with water. Among the above-ground growth indicators, stem length (SL) correlated closely with fertilizer concentration, while stem diameter (SN) and the number of branches (NB) correlated inversely with SL; in addition, the number of nodes (NN) correlated weakly with fertilizer concentration. Of the treatments, the N 2 treatment produced the highest yield, while the N 4, N 6, and NPK 1/2 treatments produced slightly lower yields. More specifically, the yield (220 kg/10a) of the N 2 treatment increased by 83% compared with that of the control (120.5 kg/10a). Of the treatments, the N 2 treatment had the greatest number of nodulations that decreased as the fertilizer concentrations increased. Therefore, the fertigation application of N 2 kg/10a as the top dressing using a subsurface drip system can result in irrigation and fertilization labor savings and increase the yield of soybeans.

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