

Abstract

Sugarcane planting areas in the Northeast of Thailand is about 42 % of total planting area. However, the average cane yield in this area is very low with low number of ratooning. The important limiting factors include coarse texture soils with low fertility and water holding capacity and low rain fall with an erratic distribution. These lead to insufficient water consumption for sugarcane during some part of growing periods and low nutrient utilization efficiency. Efficient water management, soil water holding capacity improvement and fertilizer management based on soil fertility might be the critical cultivated practices to increase cane yield, prolong ratooning and consequently raise the income for sugar cane growers in this area.

The field experiments were conducted to study the effects of various methods of water supply, soil amendment and chemical fertilizer application on sugar cane yield, quality and economic return of sugar cane production. There were 4 conditions of water supply for sugar cane planting: 1) no water supply, 2) furrow irrigation, 3) surface drip irrigation and 4) sub surface drip irrigation. The split plot in RCBD with 3 levels of soil amendments as main plot and 4 fertilizer applications as sub plot were arranged in each watering condition. Combined analysis among all conditions was performed to determine the effects of water supply, soil amendment and fertilizer application and their interactions. The results showed that all methods of water application increased seedling germination, plant height, cane number, cane weight, cane yield of the plant cane, the first and the second year ratoon canes. Among water supply conditions, subsurface drip irrigation produced the highest yield in the plant cane but surface drip irrigation tended to produce highest yield in the second year ratoon. CCS of plant cane was not significantly affected by water supply.

Soil amendment with core dust incorporation resulted to more seedling germination than rice husk ash and no soil amendment. However, it did not affect plant height, cane number, cane weight cane yield of plant cane and ratoons. Different chemical fertilizer application had no effects on seedling germination, plant height, cane number, cane yield of plant cane and ratoon canes.

The economic analysis revealed that water supply resulted to high production cost especially in the first year (plant cane) from the water system. However, cane

production under all water supplies led to slightly more income than cane production under non-water supply in the plant cane. The income was more different between cane production under water and non-water supply in the first and second year ratoon canes because water supplies could maintain high yield of ratoon cane with a slightly more investment than no water supply.

Furrow irrigation, even though, could produce high yield as drip irrigation, it used about 1.5 times more water than drip irrigation. It would not be an appropriate water application method in current condition in which water is very limited.