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Evaluation of Kenaf and Forage Crops Production Under Reclaimed Land in Jeollabukdo-Province, Korea

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[Introduction]

There is a reclaimed land of 135,100ha in Korea. Of these, most of land (about 95,000 ha) have been using for production of rice over the past few years. It is known that only sufficient water supply can make rice grow well in reclaimed land. It is essential that the reclaimed land to yield rice should be grown into other crops to prevent the rice price. A reclaimed land has poor soil environment for crop growth due to a high salt concentration. The corn is used for bioenergy production. As a result, the international grain price has been increasing steadily. Therefore, forage crop production can be important for the utilization of the many acres of reclaimed land. The kenaf, barely, Italian ryegrass, rye, and triticale can tolerant moderately saline soil conditions. Accordingly, the main objective of this study is to select optimum cropping system using kenaf and winter crops for reclaimed land.

[Materials and Methods]

Seeds of kenaf var. Hongma 300, barley var. Youngyang, Italian ryegrass var. Passerelplus, rye var. Elbon, and triticale var. Shinyoung were used as a material. The experiment was conducted at reclaimed land, Saemangeum, located in Gimje City from 2017 to 2018. The agro-morphological properties, K/Na ratio, and silages qualities such as pH, protein and organic acid were evaluated.

[Results and Discussions]

The present study has been performed to select the optimum cropping system combination by using kenaf and four forage crops at reclaimed land in Korea. First, the kenaf was cultivated for 170 days at a planting spacing of 20 × 20 cm, from May to mid-October, then four forage crop such as barley, Italian ryegrass (IRG), rye and triticale from late-October to the end of May next year. The agronomic performances and physiochemical analyses were investigated for kenaf and four forage crops in reclaimed land. The kenaf yield at reclaimed land accounted for 75% (2.4 t/10a) of the upland field's yield (3.25 t/10a). The germination percentage of IRG was highest on the solution of 0.3% NaCl compared to other forage crops. The agronomic performances of forage crops were estimated during vegetative period twice. Significant difference of dry weight was observed in the barley on 30 days of sowing. At second investigation on 160 days of sowing, the highest plant height was shown in rye and the dry weight of IRG was lowest. At harvest time, the rye showed significant difference for the plant height as 159.8 cm and fresh weight was greatest in IRG. At this time, there was big difference for the dry weight of rye and IRG compared to barley and triticale. About the K/Na ratio, the rye showed the highest increase in K/Na ratio over other crops when cultivated at reclaimed land. Among the extracts of four winter crops, extracts from kenaf abridged germination of IRG by 81.7%. With regard to the silage quality estimation, nothing increased IRG in terms of the lactic acid content. Taken together, IRG could be useful for the silage and rye for the green manure at reclaimed land after cultivating kenaf.

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