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Effects of Soil Properties on Tuber Characteristics in Water Yam and Apios

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New income crops that have recently increased in cultivated area of Korea including Water Yam(*Dioscorea alata*) and Apios(*Apios americana*). However, the cultivation technology of Water Yam and Apios has not been developed much, and it is needed to improve the tuber quality. The influence of soil properties on tubers is expected to be important. Therefore, in this study, we obtained several results by examining the difference in the characteristics of tubers of Water Yam and Apios by soil texture and pH.

[Materials and Methods]

In each pot, 200kg soil was prepared. Soil texture was treated with five types sandy soil, sandy loam soil, loam soil, clay loam soil, and clayey soil. Soil pH was adjusted with four types 5, 6, 7, and 8. Water Yam tubers were measured number of tubers, average weight of tubers, average number of lateral roots of tubers, average weight of lateral roots of tubers by soil texture and pH. Apios were measured total number of tubers, number of tubers over 10 g, average weight of tubers over 10 g by soil pH.

[Results and Discussion]

The properties of Water yam tubers were investigated with various of soil textures. For each sandy soil, sandy loam soil, loam soil, and clay loam soil, the number of tubers was 2.7, 2.0, 2.7, 1.3 and the average weight of tubers was 107.4 g, 49.3 g, 59.9 g, and 93.5 g respectively. Because the same amount of water was given to each soil type, clay soil did not drain well, So Clayey soil did not form tubers. The average number of lateral roots of tubers was 33.5, 17.3, 37.4, 36.8 and the average weight of lateral roots of tubers was 0.13 g, 0.04 g, 0.06 g, and 0.06 g respectively. In sandy loam soil, the number and weight of lateral roots of tubers was less because of the tuber small size than others. The number of lateral roots of tubers was less in the sandy soil than loam soil. However, In sandy soil, the lateral roots were thick than in loam soil. According to pH 5, 6, 7, and 8, the number of tubers was 2.3, 2.0, 2.7, 1.7 and the average weight of tubers was 36.3, 38.5, 20.3, and 25.5 respectively. The average number of lateral roots of tubers was 22.9, 15.5, 13.4, 18.8 and the average weight of lateral roots of tubers was 0.04 g, 0.04 g, 0.02 g, and 0.03 g respectively. The average weight of tubers at pH6 was the heaviest, the number and weight of lateral roots were lower than others. As a result, Water Yam growth in loam soil and soil of pH6 was the best quality of tubers.

As a result of Apios tubers by soil pH, the total number of tubers at pH 5, 6, 7, 8 was 4.3, 10.3, 11.0, and 8.0 respectively. The number of tubers over 10 g, which can be used as a product, was 1.0, 1.0, 1.3, and 1.0. The average weight of tubers over 10 g was 61.9 g, 50.3 g, 70.2 g, and 52.3 g respectively. Therefore the total number of tubers, the number and weight of tubers over 10 g were the highest at pH7.

The tuber crops, Water yam and Apios, were found to be affected by soil. Soil management is considered to be important in order to high yield and tuber quality.

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