

Seed potato production using aeroponics system with zone cooling in wet tropical lowlands

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Acta Horticulturae 1011: 141-145. 2013.

Abstract

Conventional production of seed potatoes has some disadvantages such as low productivity, invested with high pest and diseases, longer production time, and limitation in the availability of the area with high altitude and low temperature suitable for planting potato seeds in Indonesia. Planting potatoes in wet tropical lowland is one alternative to help farmers and protect the environment. Constraints of potato cultivation in the lowland are high temperatures. High temperatures can cause stress and inhibit the initiation of the potato tubers. This problem can be solved by introducing aeroponics cultivation techniques with limited cooling (zone cooling). The purpose of this study was to develop and obtain the appropriate cooling zone temperature on seed potato production in wet tropical lowlands. Cultivation techniques used in this study were the aeroponics system with 3 cooling zones (10, 15 and 20°C) and control (room temperature). The 'Granola' potato seeds were used in the experiment, and were derived from tissue culture. The results showed that the cooling zone could reduce the stress on the potato roots cultivated by aeroponics in wet tropical lowlands, although burning wilt also happened due to high temperatures in the plant canopy. The highest tuber growth 60 days after planting was performed by plants subjected to the cooling zone temperature of 10°C producing as much as 108 knol/1.5 m². Optimization of nutritional requirements was necessary to increase the number of tubers in wet tropical lowlands. Further studies needed to control the temperature at the top of the plant to prevent the plants from burning wilt due to high temperature stress.