

学 位 論 文 要 旨	
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題 目	Studies on the elucidation of optimal environmental conditions for stable high-quality fruits production of passion fruit (<i>Passiflora edulis</i>) (パッションフルーツ (<i>Passiflora edulis</i>) における高品質果実安定生産のための最適環境条件解明に関する研究)
<p>This study was conducted to elucidate the optimal environmental conditions for stable high-quality fruits production of passion fruit (<i>Passiflora edulis</i>). Effects of temperature, light intensity, and soil moisture on vine growth and the quality of passion fruit were investigated. The results are summarized as follows:</p> <ol style="list-style-type: none">1. The relationships among temperature and photosynthesis characteristics in passion fruit were elucidated. I investigated the characteristics of gas exchange and chlorophyll fluorescence under several light and temperature conditions. Light saturation points in passion fruit were recorded at around $1,200 \mu\text{mol} \cdot \text{m}^{-2} \cdot \text{s}^{-1}$ as the photosynthetic photon flux density. The optimal temperature based on the photosynthetic characteristics of passion fruit was observed at 30°C. In addition, ‘Summer Queen’ is susceptible to heat stress and the range of its optimal temperature for photosynthesis is lower than that of ‘Ruby Star’.2. I elucidated the optimal temperature for the fruit maturation period. Relationships between temperature and fruit quality in the two passion fruits ‘Summer Queen’ and ‘Ruby Star’ were investigated. Both cultivars showed a greenish fruit peel and low sugar/acid ratio at 15°C. In ‘Summer Queen’, a high Brix, low titratable acidity, and high sugar/acid ratio were observed at 25°C. In ‘Ruby Star’, the peel coloration was highly favorable at 25°C. In Both cultivars, the peel tended to be yellowish in color and Brix of the juice was low at 35°C. These results indicate that the optimal temperature for passion fruit maturation was 25°C.3. Effects of several shading levels vine growth and fruit quality were investigated. Flowering was inhibited when the shading level was high. Under heavy shading (shading level about 60%), the leaves show shade leaf and fruit quality becomes low. Under low shading (shading level about 30%), the highest sugar/acid ratio of juice was observed in all the treatments. These results indicate that a shading level of about 30% is optimal for shading, improving the fruit quality of passion fruit.4. The effects of excessive moisture and dryness of the soil on vine growth and fruit quality were studied. Excessive moisture (pF1.3 - 1.9) and dryness (pF2.1 - 2.8) of the soil had adverse effects on vine growth and fruit quality. Early drought stress (until about 20 days after fruit-bearing) and late drought stress (from about 30 days after fruit-bearing onward) was effective for the improvement of fruit set and fruit peel color, respectively.5. The results of this study clarify the optimal environmental conditions for passion fruit. This study is considered to be useful for producing high-quality passion fruit.	