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Development of Tree Vigor Prediction Method at an Early Stage Based on Stem Hydraulic Conductance of Seedlings in Citrus Rootstocks

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Assessment of the tree vigor of grafted rootstocks in citrus requires intense labor, a long period, and large fields because tree vigor is judged through cultivation tests with adult trees. We have developed a method to predict tree vigor at an early stage based on the stem hydraulic conductance of 5-month-old seedlings. We used 15 cultivars (strains), including 11 crossed strains, 3 cultivars of commonly used trifoliate orange (common type, 'Pomeroy', and 'USDA'), and 'Swingle citrumelo'. The growth characteristics of 7-year-old satsuma mandarin trees grafted onto those rootstocks were compared with those of 5-month-old rootstock seedlings. The results revealed a relatively high correlation (r_2 = 0.633) between the trunk circumference of 7-year-old trees and the stem hydraulic conductance of seedlings, and furthermore, control cultivars existed approximately on that regression line. Therefore, it seems possible to predict tree vigor from the stem hydraulic conductance of seedlings in a very short period without using a large field and intense labor.

Key Words: breeding rootstock, hydraulic conductance, pressure chamber, tree vigor, trifoliate orange.