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ONLINE ISSN: 1349-0990

PRINT ISSN: 0011-1848

Japanese journal of crop science

Vol.66 , No.3(1997)pp.472-478

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Gravitropic Reaction in the Growth of Tea Roots

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[Received: 1996/06/20]

[Published: 1997/09/05]

[Released: 2008/02/14]

Abstract:

In Japan, tea (*Camellia sinensis* (L.) Kuntze) seedlings are propagated by cutting. A root system of clonal plants by cutting consists of adventitious roots and lateral roots. Most of the roots grow horizontally, which results in a shallow distribution of the root system. Such a shallow root system could be one of the factors contributing to the deterioration of nutrient uptake and resistance to water stress. Gravitropism of the roots is considered to be a decisive factor that controls the depth of a root system. The authors have investigated changes in the growth direction of roots to gravitative stimulus, using several kinds of roots (seminal roots, lateral roots and adventitious roots).

Furthermore, amyloplasts in the root-cap cells, which are considered to be an equipment sensing gravistimulus, were observed. Seminal roots prominently showed orthogravitropism and contained many amyloplast particles in their root cap cells. Most lateral and adventitious roots showed plagiogravitropism, growing in an angle to gravistimulus, and lacked observable amyloplast particles in their root cap cells. The results suggest that the shallowing of root systems of clonal tea plants could be attributed to a gravitropic reaction of the adventitious and lateral roots composing the root system. There could also be a close relationship between the growth direction of roots and the presence of amyloplasts in root-cap cells.

Keywords:

Adventitious root, Amyloplast, Camellia sinensis L., Gravitropism, Lateral root, Plagiogravitropism, Seminal root, Tea plants

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