

[P3] Abiotic Stress for Crop Production

Thu. Sep 9, 2021 12:15 PM - 2:00 PM Room 3 (Poster) (Abiotic Stress for Crop Production)

12:15 PM - 1:00 PM

[P3-25] Morphological Characterization of Calcium Oxalate Crystals and Effect of Growth-Medium Calcium Levels on Morphology of the Crystals in Tubers and Roots of Chinese Yam

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Calcium oxalate crystals are widely found in various plant species. The crystals have been proposed to have various functions including regulation of calcium levels in plant bodies. In Chinese yam, the tuber grows from the base of normal stem and many roots grow from the tuber. In this study, morphological characterization of calcium oxalate crystals and involvement of the crystals in calcium homeostasis in the roots and tubers of Chinese yam grown under different calcium levels of growth-medium were investigated. Under scanning electron microscopy and optical microscopy, crystals scattered in the cortex and stele of tubers. In this study, crystals were found in the cortex of root tips. Almost all of crystals were observed as bundle of needle-shaped crystals (raphide type). These crystals were identified as calcium oxalate crystals by energy dispersive X-ray spectroscopy (EDS). The number of crystal bundles, lengths of major and minor axes of crystal bundle, and area of crystal bundle in the tuber sections were higher in 20 mM and 40 mM calcium nitrate treatments than in 0 mM calcium nitrate treatments. In the sections of root tips, area of crystal bundle was higher in 20 mM calcium nitrate treatments than in 0 mM calcium nitrate treatments. Calcium mapping images by EDS showed a positive correlation between the area localized calcium per crystal cell and calcium level of treatments. Thus, it is suggested that the crystals possibly participate in the regulation of calcium levels in not only tubers but also in the tips of roots grown from the tubers.