Blossom end rot: Transport protein identified

November 23 2011

This is a spotty apple due to poor calcium distribution. Credit: Picture: Agroscope

Poor calcium distribution in agricultural crops causes substantial loss of income every year. Now a Korean-Swiss research team under the co-leadership of plant physiologists at the University of Zurich identified a protein that regulates calcium transport in the plant root and up to the shoot. For plant breeding, the specific transport protein provides a first step toward correcting deficiency symptoms in food plants.

Blossom end rot on tomatoes and cucumbers, bitter-pit in apples – these unpleasant blemishes on fruits and vegetables not only compromises the flavor but also causes significant harvest losses every year. The characteristic blotches and spotting can be traced back to insufficient calcium uptake or faulty calcium transport within the plant.

Consequently, the damage can occur even if the soil provides sufficient calcium.

A team under the leadership of scientists from the University of Zurich and Pohang University of Science and Technology, Korea, has for the first time identified a protein which is responsible for the calcium transport from the root to the shoot. "Without this transport protein, plants exhibit stunted growth," explains Enrico Martinoia, Professor for Molecular Plant Physiology at the University of Zurich.

This shows blossom end rot on tomatoes. Credit: Picture: Agroscope

Calcium provides stable cell walls for plants and transmits signals within the cells. Calcium concentration varies within the plant depending on area, which requires complex regulation and transport mechanisms. How and from which tissue calcium ions are taken up by the roots and transported to the shoot of the plant was largely unknown before. In

order to settle these questions, the scientists examined the cultivated plant Brassica Juncea, commonly known as brown or Indian mustard, and the model plant Arabidopsis thaliana, or thale cress. The researchers identified a specific transport protein which advances calcium ions from the root into the shoot.

In their article recently published in the *Proceedings of the National Academy of Sciences*, they also show that the calcium uptake occurs via the root epidermis and not through the endoderm as earlier presumed. The identification of the transport protein for calcium is a first step in eliminating the formidable deficiency symptoms in food plants.

More information: Wong-Yong Song, Kwan-Sam Choi, De Angeli Alexis, Enrico Martinoia and Youngsook Lee. Brassica juncea plant cadmium resistance 1 protein (PCR1) facilitates the radial transport of calcium in the root. *PNAS*. October 14, 2011. doi: 10.1073/pnas.1104905108

Provided by University of Zurich

Citation: Blossom end rot: Transport protein identified (2011, November 23) retrieved 26 April 2024 from https://phys.org/news/2011-11-blossom-protein.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.