Tropentag, October 5-7, 2011, Bonn

"Development on the margin"

Effect of Drought on the Mobility of Foliar-applied Boron in Plants

Arjun Shrestha, Thomas Eichert, Monika Wimmer

University of Bonn, Institute of Crop Science and Resource Conservation (INRES), Germany

Abstract

Boron is considered to be phloem immobile or to have only limited phloem mobility in many higher plant species, where it is transported along the transpiration stream and accumulates in the margins of leaves. However, one would expect a phloem transport of boron if the back diffusion into the xylem in some way be prevented and it may be possible under reduced transpiration, as it was shown for *Ricinus communis*. In this research, the distribution of foliar-applied B in green gram plants (*Vigna radiata* L.) under varying transpiration rates was evaluated in a greenhouse experiment during 2009. This research also evaluated the possibility to use strontium as an indicator for the cumulative transpiration of a plant. The experiment was laid out in a complete randomised block design comprising three moisture levels (75, 50 and 25 % WHC), two boron levels (100 and 0 mM B) and two harvest dates. The top of the second trifoliate leaf was immersed in 100 ml of 100 mM boric acid solution for one hour. In addition, 20 ml of 10 mM Strontium chloride (SrCl2) was applied directly to the root of all plants. Results showed that most of the B absorbed from the foliar application was accumulated in the treated leaves indicating that reduced transpiration did not support the phloem B transport out of the leaves. Sr uptake and its distribution within the plant parts were related to the transpirations rate and can be used as a reference for transpiration measurement.

Keywords: Boric acid, boron, drought, phloem mobility, strontium chloride, transpiration

Contact Address: Arjun Shrestha, University of Bonn, Agricultural Sciences and Resources Managements in the Tropics and Sub-Tropics, Nussallee 1, 53115 Bonn, Germany, e-mail: arjunshrs@yahoo.com