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Efficiency of Foliar Micronutrient Fertilisation in Lychee

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Abstract

Photooxidative stress during winter in northern Thailand upland was identified as a possible reason for chlorosis on lychee leaves mainly appearing at the 2nd youngest flush at south/south-west exposed branches. This is probably due to a missing compensation of photooxidative stress caused by the widespread extremely low boron and/or zinc nutritional status of Lychee fruit trees. Affected plant parts show reduced or missing flower induction and fruit set, leading to considerable economical losses. To decrease the development of free radicals and to increase their detoxification for remediation of transient chlorosis, optimal boron and zinc supply are necessary.

Foliar application is an adequate measure to reduce acute deficiency rapidly and side-specific. Compared to soil fertilisation, foliar application can reduce the application rate and therefore the costs considerably. However, the efficiency of common foliar spraying of zinc mainly on the upper side of the leaves is yet very limited in Lychee and other subtropical fruit trees.

The main objective of this study is to improve the effectiveness of foliar fertilisation in Lychee and to get a better understanding of the underlying mechanisms of foliar micronutrient penetration using Lychee and Soybean as examples.

Boron was applied via boric acid labelled with 10B to individual leaves of 11B-pretreated plants. For experiments on zinc penetration and translocation, 65Zn was applied in the isotope laboratory at Hohenheim.

Different surfactants were tested on their physical-chemical properties and on their performance promoting boron and zinc penetration and translocation to sink regions in the plants.

The relevance of upper and lower leaf surface as well as plant nutritional status for penetration success will be presented and discussed.

Keywords: Boron, foliar fertilisation, Lychee, micronutrient penetration, micronutrient translocation, photooxidative stress, zinc

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