# Differences in chilling tolerance among genotypes of sweetpotato *(Ipomoea batatas* (L.) Lam.)

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## ABSTRACT

*We aimed to develop a simple method to identify the most chilling tolerant sweetpotato genotypes. Plants at the stage of five to eight most fully expended leaves were used in this experiment. Temperature was reduced in five sequent 144 hrs lasting steps (16/14), (14/12), (12/10), (10/8) and (8/6) °C. Structural changes, chlorophyll fluorescence parameter and content were utilized as selection criteria. The two more tolerant genotypes with orange flesh Abees and Beauregard indicated the overall picture of only minor morphological changes (<11%) in leaves and stem. They showed beside significant lower development of leaf necrosis, generally higher chlorophyll concentrations, a lower reduction of the electron transport rate (ETR) and much less photoinhibition. The protocol employed in this work, with a relative short hardening time, makes it possible to achieve rapid results with good reliability and to handle a large number of genotypes as required in breeding programs. Although the sweetpotato genotypes Beauregard and Abees, selected in this study, might be suitable for growth at low temperatures, even more practical cultivars could be developed by using the method described in this paper.*

**Key words**: *Chilling tolerance - Chlorophyll fluorescence – Photosynthesis – Sweetpotato.*

## INTRODUCTION

The effects of climate change are shifts in species' geographical range, prompted by shifts in the normal patterns of temperatures and humidity that generally delimit species boundaries. Each 1 °C of temperature change moves ecological zones on Earth by about 160 km. This means for example, if the climate warms up by 4 °C over the next century, species in the Northern Hemisphere may have to move northward by some 500 km (or 500 m higher in altitude) to find a suitable climatic regime (Thuiller, 2007). In this frame of global climate changing reality, it is expected that agriculture will be one of the most affected areas by lower crop production (Lopell *et al.*, 2011). Several publications support the need to come up with new improved varieties to close the ever-increasing gap of food shortage and to use or develop crops adapted to more severe climate (AFED, 2006; Ahmad et al., 2008; Marshall *et al.*, 2009 and Habash *et al.*, 2009). One of these already existing gap-filling crops could be sweetpotato (*Ipomoea batatas*). Sweetpotato is tolerant to severe weather and can be used as a relay crop in various cropping systems (Gregory, 1992). The high adaptability of sweetpotato led to its rapid