

Photooxidation Response as a Method to Screen for Drought Tolerance in Azuki Bean (*Vigna angularis* (Willd.) Ohwi & Ohachi) Germplasm

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ABSTRACT

*One-hundred-and-twenty-one azuki bean (*Vigna angularis* (Willd.) Owi & Ohashi) accessions were chosen from different regions of China to study the relationship between drought tolerance and photooxidation tolerance. The germplasm was sown in irrigated and non-irrigated cement blocks filled with soil of Kamphaeng Saen Series (a silty-clay loam soil). At flowering, their leaves were excised and submerged in water with low contents of CO₂ (~5 µmol/L) and O₂ (~350 µmol/L). The leaves were then placed under strong sunshine at the temperature of 30–35°C. The degree of photooxidation in each leaf was determined according to the rate of change in leaf color. The correlation between drought tolerance and photooxidation tolerance of the azuki bean germplasm was r=0.792**. In general, most of the azuki bean accessions were moderately tolerance to photooxidation, while tolerance and non-tolerance varieties were found in less number. Azuki bean germplasm originated from dry area such as Shan Xi and Tian Jin provinces seemed to be more tolerance to drought and photooxidation conditions compared with those from the other provinces. Thus, we recommended that the technique for identifying photooxidation tolerance can be used as a preliminary screening method to identify drought tolerance germplasm in azuki bean.*

Key words: Azuki bean, *Vigna angularis* (Willd.) Ohwi & Ohashi, Photooxidation tolerance, Drought tolerance, Preliminary screening

INTRODUCTION

The effect of global warming is alarming agricultural scientists to work more actively towards plant tolerance to drought and heat stresses. For plants grown under strong sunshine, the leaves normally absorb more light energy that is required for electron transport process, resulting in decreasing the activity of Photo System II and photosynthesis as a whole (Yi and Yang, 2005). Under