

# Valuation of Drought Stress Impact on Physiological Characteristics of Mung Bean (*Vigna Radiata* L.) under Arid Climate

Ali Abdullah Alderfasi\*, Awais Ahmad, Mostafa Muhammad Selim, and Muhammad Afzal

**Abstract**—Water limitation is undoubtedly a critical environmental constraint hampering the crop productivity under arid and semiarid areas. Acclimatization of new and drought resistant crops to such water deficit areas is one of the economically suitable option for agricultural sustainability. Mung bean (*Vigna radiata* L.) has been found a drought resistant summer crop. Therefore, present study was conducted to assess physiological response of various mung bean genotypes exposed to drought stress under arid conditions of Saudi Arabia. A two-year (2013 & 2014) field experiment was conducted at Educational Farm (24.72° North, 46.63° East), King Saud University. Trial comprised of four irrigation levels (3, 5, 7 and 9 days interval) and three mung bean genotypes: Kawmay-1, VC-2010, and King. Experiment was arranged under split plot design, and replicated thrice. Stomatal conductance ( $g_s$ ), SPAD, relative water content (RWC), leaf temperature ( $T_L$ ), canopy temperature ( $T_C$ ) and leaf-air temperature gradient ( $T_L-T_A$ ) were recorded four times (25, 40, 55 and 70 days) during crop growth season fortnightly. Results revealed that increase in irrigation interval had significantly ( $p < 0.01$ ) influenced all the studied parameters in descending order. Moreover, mung bean genotypes also depicted significant differences. Increase in SPAD,  $g_s$  and RWC were later reversed as crop entered in reproductive phase under control irrigation while  $T_C$  and  $T_L$  were increased. However, water deficit stress treatments resulted in continuous decline in SPAD,  $g_s$  and RWC but leaf and canopy temperatures were increased. On the other hand irrigation-genotype interaction has produced no specific trend excluding RWC and  $g_s$ . Overall, minimum irrigation interval (3 days) resulted in maximum values while VC-2010 performed comparatively better under lower irrigation. It is concluded that mung bean may be successfully adopted under Saudi Arabian climate and genotypic differences are a hope to develop improved varieties.

**Keywords**— Mung bean, RWC, SPAD,  $T_c$  and Water deficit.

\*Ali Abdullah Alderfasi\*, Awais Ahmad, Mostafa Muhammad Selim, and Muhammad Afzal are with Plant Production Department P.O.Box 2460, College of Food and Agriculture Sciences, King Saud University, Riyadh 11451, Saudi Arabia, email id:aderfasi@ksu.edu.sa\*.