



ASSESSMENT OF GENOTYPIC VARIATION IN GROUNDNUT (*Arachis hypogaea* L.) GENOTYPES FOR CHROMIUM TOLERANCE USING PHYSIOLOGICAL AND BIOCHEMICAL TRAITS

JAYANNA NAIK BANAVATH^{1,3}, SRAVANI KONDURU¹, VARAKUMAR PANDIT¹, KRISHNA KUMAR GUDURU¹, SURESH RAJU K¹, SUDHAKAR PODHA³, CHANDRA SEKHAR AKILA² AND CHANDRA OBUL REDDY PULI^{1*}

¹Plant Molecular Biology Laboratory, Department of Botany, School of Life Sciences, Yogi Vemana University, Vemanapuram, Kadapa 516003 A.P. India

²Molecular Genetics and Functional Genomics Laboratory, Department of Biotechnology, School of Life Sciences, Yogi Vemana University, Vemanapuram, Kadapa 516003 A.P. India

³Department of Biotechnology, Acharya Nagarjuna University, Nagarjuna Nagar, Guntur- 522510 A.P. India

ABSTRACT

Chromium (Cr) is a well known toxic metal that affect the growth and development of plants. Assessment of genotypic variation for Cr tolerance is crucial to understand the insights of tolerance mechanism. A pot experiment was conducted in a green house to evaluate the genotypic variability in groundnut for Cr tolerance, with different concentrations of Cr. Thirteen groundnut genotypes were exposed to different levels of Cr and studied their relative responses in terms of growth and biochemical traits underlying across the genotypes. After one month of stress imposition, clearly differentiates the genotypes - in their growth parameters, viz., chlorophyll content, free proline, electrolyte leakage and antioxidative enzymes. The effect of Cr was severe with increasing concentration of Cr (100, 200, and 300 mg kg⁻¹ soil) on all genotypes studied. The shoot and root growth, biomass and chlorophyll content was severely affected at - higher concentration of Cr (300 kg⁻¹ soil). Free proline content and antioxidative enzymes like catalase (CAT) and Ascorbate peroxidase (APX) activity was significantly increased at (100 mg kg⁻¹ soil) Cr contamination, however the enzyme activities were gradually decreased at higher concentration of Cr (200, and 300 mg kg⁻¹ soil). The electrolyte leakage was also found to be increased with the increase in concentration of Cr. Based on -the data - genotypes studied can be categorized as - genotypes - highly tolerant (Abhaya, Anantha and Dharani) - as moderately tolerant (ICGV-91114, K-6, K-1375, TG-47 and Rohini) and sensitive (TPT-4, JL-24 and Narayahi) to Cr stress.

KEY WORDS: Heavy metal stress, Chromium (Cr), Groundnut, Proline, Antioxidative Enzymes



*Corresponding author



CHANDRA OBUL REDDY PULI

Plant Molecular Biology Laboratory, Department of Botany, School of Life Sciences,
Yogi Vemana University, Vemanapuram, Kadapa 516003 A.P. India
pcoreddy@gmail.com