

ABSTRACT

Present study was carried out at the Botanic Garden of GC University, Lahore during 2009-wheat growth season with lead nitrate applied to potted wheat plants (*Triticum aestivum* L. cv Shafaq-2006) by assessing its impact on germination, growth, biomass, biochemical and physiological attributes. Lead accumulation was also ascertained in roots, shoots and seeds. Lead ($\text{Pb}(\text{NO}_3)_2$) was applied at different rates to the soil in pots, e.g., 100, 200, 400, 600, 800, 1000 mg/Kg of soil in different treatments. Control plants were grown in pots with normal field soil.

Presence of lead drastically reduce the germination (2-30%), other parameter of germination were also reduced significantly like, seedling fresh weight (10-74%), seedling dry weight (25-77%), vigor index (23-89%) and tolerance index (22-84%). Lead has shown drastic impact on wheat plants because it reduced plant height (17-33%), number of tillers (25-88%) and number of leaves (20-41%). Senescence was found to be much higher in lead-treated plants than that of control ones. Lead significantly reduced root fresh weight (11-50%), shoot fresh weight (18-62%), root dry weight (17-62%), shoot dry weight (21-71%) and root length (10-45%). Lead severely affected physiological parameters viz., photosynthetic rate (11-74%), transpiration rate (27-72%) and stomatal conductance (23-82%). Some of the biochemical attributes like chlorophyll *a*, chlorophyll *b*, total chlorophyll and carotenoids were also reduced in the range of 3-42%, 5-53%, 6-43% and 2-41%, respectively. In addition, protein contents, phosphorous and potassium was also significantly reduced by 19-81%, 10-60% and 18-55%, respectively. Lead accumulation was extremely higher in roots (700-4600%), shoots (1800-9800%) and in seeds (10-119%) of lead treated plants as compared to control plants. Yield

parameters like number of seed/plant, seed weight/ear, 1000 seeds weight and harvest index were reduced by 45-90%, 40-88%, 14-44% and 28-61%, respectively.

In summary, present extensive investigation has reported that lead is injurious to every aspect of wheat germination, growth and yield. Lead accumulation above threshold (0.5mg/kg soil) concentrations in various plant parts and seeds is a matter of serious concern from human health viewpoint.