ID: 726

Application of Different Phytosolutions on Germination and Growth Indices of Wheat

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Abstract

Wheat (*Triticum aestivum* L.) is an important cereal grown in temperate and subtropical regions, mainly for food and animal feed. In Dera Ismail Khan, wheat planting is often delayed because sugarcane and cotton are prioritized. Late planting leads to poor wheat germination due to low temperatures or the presence of weeds, which can harm the crop. This issue is common across the country, affecting farming and causing wheat yields to stagnate. Increasing wheat production is a challenge. Recently, methods like seed treatment and synthetic plant growth regulators have gained popularity for boosting crop growth and ensuring wheat sprouts quickly. Allelopathy is another innovative approach that has gained attraction to mitigate biotic and abiotic stresses. The shift towards sustainable crop production is also supported by innovation in organic farming. The fallen leaves and stubble of some trees and weeds may influence emergence of wheat in the field. A study was performed at the Postgraduate laboratory, Department of Agronomy, Faculty of Agriculture, Gomal University, Dera Ismail Khan during the year 2024. Nine treatments were arranged in a completely randomized design including T1 (Control), T2 (Bitter apple), T3 (Lasoda), T4 (Parthenium), T5 (Garlic), T6 (Peelu), T7 (Conocarpus), T8 (Moringa), T9 (Algal water solution) and were compared for emergence and growth indices of wheat. Germination parameters i.e. day wise germination, germination count, germination (%), germination energy and growth indices i.e. coleoptile, root, shoot, plant length, root, shoot, whole plant fresh and dry biomass at 15 days interval were observed and found significant at 5% probability level. Leaf area, chlorophyll content, crop growth rate, net assimilation rate and photosynthetic efficiency were also noted and significantly different from control. Our results classified Moringa, Bitter apple and Algal solution as growth stimulator, while Parthenium, Conocarpus and Garlic proved as inhibitor because they hampered the wheat germination and growth indices. Moringa water solution at 10% is most effective and should be used to enhance the wheat germination and development of seedling especially in late sown wheat. Plantation of Conocarpus around the crop area should be avoided. Parthenium reduced germination and its indices, so it should be managed before wheat crop plantation.

Keywords: *Wheat germination, Seed priming, Synthetic plant growth regulators, Allelopathy, Growth inhibitors, Sustainable crop production*