

INTERNATIONAL CONFERENCE ON
“ENVIRONMENT, AGRICULTURE & HUMAN WELFARE: AN OVERVIEW OF
SUSTAINABLE GOALS OF FUTURE”
26TH November, 2023

Assessing The Influence of Air Pollutants on Root Knot Nematode Infestations in Chosen Pulse Crops

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Abstract

Air pollution is an emerging environmental stressor that can influence plant growth, soil health, and interactions between crops and soil-borne pathogens. Root-knot nematodes (*Meloidogyne* spp.) are among the most important plant-parasitic nematodes affecting pulse crops, causing root galling, impaired nutrient uptake, reduced plant growth, and significant yield losses. The present study aims to assess the influence of selected air pollutants on root-knot nematode infestation in commonly cultivated pulse crops. The study focuses on selected pulses such as chickpea, pigeon pea, green gram, and black gram and examines the relationship between pollutant exposure and nematode infection. Parameters including plant growth, root-galling intensity, nematode population density, root and shoot biomass, and yield-related characteristics may be evaluated under different levels of air-pollution exposure. Particular attention is given to pollutants such as particulate matter, sulphur dioxide, nitrogen oxides, and ozone, which may alter plant physiological responses and potentially affect host–nematode interactions. The study seeks to determine whether air pollution increases plant susceptibility or induces physiological changes that influence nematode establishment and reproduction. Understanding these interactions is important for developing integrated strategies for crop protection under changing environmental conditions. The findings may contribute to improved management practices for pulse production and provide insights into the combined effects of atmospheric pollution and soil-borne biological stresses on agricultural ecosystems.

Keywords: Air Pollution, Root-Knot Nematodes, *Meloidogyne* spp., Pulse Crops, Chickpea, Pigeon Pea, Plant Stress, Soil Health, Nematode Infestation, Crop Protection.