

Environmental Factors Affecting Development of Crop Diseases

Binod Pokhrel*

*Agriculture and Forestry University, Rampur, Chitwan, Nepal.

Published October 13, 2021

ABSTRACT

Crop disease is the result of three way interaction between susceptible host, virulent pathogen and favourable environment. Disease incidence and severity are affected by various environmental factors including temperature, soil moisture, humidity, light, soil properties (pH and nutrients) and atmospheric carbondioxide. The effect of environmental factors on host and pathogen has positive, negative or neutral effects on crop disease incidence. Elevated carbondioxide concentration and increased temperature influence the plant disease interaction. Fungal diseases are found most prevalent at lower temperature (12°C - 22°C) and high relative humidity (~90%) than bacterial diseases (25-35°C temperature and 75-85% RH). Most of the diseases are found to occur in dry soils and some in wet soils due to poor germination of chlamyospores in dry soil and poor germling growth in wet soil. The number of conidia is lower and acclimation of photosynthesis at elevated CO₂ concentration (700 ppm) than in low concentration of CO₂ (350 ppm). Diseases prevalent in acidic soil (pH<7) can occur in alkaline soil (pH>7) only if there is high temperature (23°C), high moisture (70%) and high crop load (105 -107 spores/gram of soil). Fusarium graminearum in wheat produces large numbers of mycotoxins, Deoxynivalenol at high humidity (~85% RH) which reduces the probability of grains being sold. For late blight of potato by Phytophthora infestans, the minimum, optimum and maximum temperature, leaf wetness duration and concentration of inoculum each depends on other two factors, sometimes on one and often on balance of both. Deficiency of macronutrients primarily, nitrogen, phosphorus and potassium were found to be most inimical to plants resulting into physiological disorders.

Keywords: Crop disease, Environmental factors, Host pathogen interaction, Temperature

Corresponding author: Binod Pokhrel, Agriculture and Forestry University, Rampur, Chitwan, Nepal, Tel: +9779843861816; E-mail: binodpokhrel240@gmail.com

Citation: Pokhrel B. (2021) Environmental Factors Affecting Development of Crop Diseases. J Infect Dis Res, 4(S2): 03.

Copyright: ©2021 Pokhrel B. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.