

Chapter 3

Crop Weather Interaction in Potato in South Bengal Plains

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ABSTRACT

Potato is one of the main staple foods in West Bengal, where it ranks second in production after Uttar Pradesh. There is lots of variation in productivity of the crop. It is due to climatic variability which causes widespread disease infection in potato crop. The shifting of onset and withdrawal of monsoons has also proved to be a barrier in the productivity of the crop. The farmers are habituated to plant the crop within 15th of November; however this is being disrupted because of the shifting of withdrawal of monsoons. Potato is a thermo sensitive crop. The crop growth rate of potato is significantly affected by cumulative maximum and minimum temperatures.

DOI: 10.4018/978-1-5225-1715-3.ch003

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Leaf area index significantly decreased with the increase in cumulative maximum and minimum temperatures. Rainfall and relative humidity are two crucial factors that determine the incidence of late blight in potato, the most devastating disease in Bengal. Rainfall increased productivity by lowering soil temperature and reducing hydrolysis of starch respiratory losses from tubers.

INTRODUCTION

In the Gangetic plains of Bengal, appreciable contributions in research have been made on a few crop plants which include rice, jute, wheat, mustard and few pulses. The assessment of weather on these crops remains incomplete. Potato is a new entrant in this arena of study. The growth of potato plant and its tubers depends largely on weather factors particularly temperature, solar radiation and day length. The potato is surface feeder. The root system is usually confined to the top layers of the soil (up to 30 cm). Therefore, nutrient content within the top layers of the soil principally regulates the growth of haulm as well as tuber. Soil temperature influences the uptake of nutrients and water from the top soil layer. Growth of the buds starts after planting of the tuber, which is largely dependent on temperature. At 15 °C or above, the apical sprout grows faster to restrict the other buds at a small size (Goodwin, 1967). Under non favourable temperatures, many buds continue to grow for a longer period. The dominant sprout is maintained by storing the tuber under favourable and sub-favourable temperatures. Therefore, it is possible to have pre-determined population by manipulating the storage temperature (Moorby & Milthorpe, 1975). The rate of dry weight gain of sprout in single-sprout tubers remains constant over a prolonged period irrespective of temperature.

The crop growth period may be divided into three distinct phases:

1. Planting to establishment of sprouts
2. The first phase of autotrophic growth when biomass accumulation in haulm is prominent
3. Tuber growth period comprising of the translocation of photosynthates with the gradual senescence of haulms

In the Gangetic plains of West Bengal, potato cultivation is generally confined to several districts scattered on both the banks of the Ganges. The winter here is mild and short. The winter creeps in with the withdrawal of the south-west monsoons. This plain welcomes the cool north east continental wind from the end of October. The growing season of potato is thus restricted to November to February. The potato must be planted within 15th of February for better yield. The present scenario is

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