

Application of GDD as Weather Health Indices and Simulation of Groundnut Yield in Bapatla Agroecological Region

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ABSTRACT

Projected changes in weather parameters, mainly temperature and its weather health indices GDD have already started to show its effect on groundnut production. To cope with the changing climatic scenarios, adoption of appropriate management strategies for optimum yields of groundnut are of paramount importance. Weather conditions are not always favorable for optimal growth, development and yields of groundnut. It is because the photoperiod influences only the development of groundnut whereas the temperature and its weather health indices GDD influences both growth and development. These two are variables both in space and time. Therefore, field experiments must be repeated over time and space in order to obtain results that can reflect the average conditions of temperature and GDD of a specific area and season for groundnut. However, the Crop growth models (CGMs) and Decision Support Systems (DSS) are useful tools as a complement to expensive field research experiments. The CGMs have the ability to simulate a crop's response to different management scenarios under varying temperature and GDD conditions. Of the three seasons (kharif, rabi and summer) of groundnut grown in Bapatla of Guntur district of Andhra Pradesh the study revealed that the GDD as weather health indices required for optimum yields are 1720 for kharif, 1802 for rabi and summer 1901. Of the three seasons tested for a consecutive period of five years from 2010 to 2014 the model predicted in harmony with a - 4.5 per cent deviation. Pod yield of crop season was estimated with RMSE ranging from 178.9 to 223.4 where the per cent deviation was from -5.3 to -15.5 percent. It was concluded that increase in air temperature shorten the effective growing season and higher temperatures have negative effect on Groundnut pod yields. The pod yields also decrease by 11 % for every 2 °C increase of air temperature in Bapatla agroecological region.

Key words: *Groundnut, GDD, CGMs, Simulation, Weather health indices*