



Impact of Climate Variability on Groundnut Rust (*Puccinia arachidis* Speg.) at Hot Semi-Arid Region of Gujarat

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Abstract

Severity of groundnut rust disease caused by pathogen *Puccinia arachidis* Speg was studied over eight *kharif* seasons between 2010 and 2020 at Junagadh located in hot semi-arid eco region under agro climatic zone of Gujarat plains and hills. Rust severity was measured on five cultivars (GG 20, GJG 22, TG 37A, TLG 45 and Western 66) grown during three sowing periods (May II fortnight, first and second fortnights of June). Climatic variability for the *kharif* period of groundnut cultivation was quantified for three climatic variables viz, temperature (maximum and minimum) and rainfall so as to relate to rust severity. The rust progressions in respect of seasons aggregated over cultivars and sowing time on calendar and crop age basis indicated varying duration and severity of the disease. Mean rust severity differed significantly across seasons, cultivars and sowing periods. The rust severity was significantly higher in 2011, GJG 22 and June (both first and second fortnight) sowings, respectively. Although the progression of rust severity varied on calendar as well as crop age basis amongst cultivars, the disease commencement in respect of sowing times was during 34th standard meteorological week (third week of August) coinciding with crop age of eight weeks. Magnitude of climatic variability worked out for *kharif* of 2011-2020 over long term normals (40 years' average) indicated a significant change in respect of maximum temperature (+ 0.7 °C) and rainfall (+16.9 mm/week). The significant impact of climatic variability on rust severity over seasons indicated positive and negative association of the unchanging minimum temperature and increasing rainfall, respectively. Climate variability impacts on rust severity brought out CJG 22 and TLG 45 as climate resilient cultivars, and sowing groundnut during second fortnight of May as an adaptive practice for recommendation to farmers under the current climate change scenario.

Keywords: Climate variability; Cultivar; Groundnut; Gujarat; Sowing period; Rust

Introduction

Climate in terms of increased temperature, rising atmospheric CO₂ level and changing precipitation patterns have significant impacts on all components of agriculture including diseases. The compounding effects of climate change are manifested not only on crop production and food price, but also on nutrition and hunger across the world [1-2] and India is not an exception. Negative im-

pacts of changing climate outweighing positive ones on global crop production were reported [3]. Relationship between environment and crop diseases suggests that climate change would cause modifications in host pathogen relationships. It is also well known that other system variables such as varietal selection and agronomic practices influence the manifestation of diseases. Under the changing climate, much of Brazil, India and Southeast Asia were predict-