

Effect of weather parameters on rice yellow stem borer *Scirpophagain certulas* (walker) population dynamics under shallow low land ecology

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Rice is Asia's most important and cheapest staple food crop which is likely to eradicate acute under nutrition. Food security is essentially a reflection of rice security in this region. One-third of the economy in this region is dependent on rice production, consumption and marketing. Rice is the staple food for more than 50 per cent of the population in Asia, and 70 per cent in South Asia. Additionally, more than half of the daily caloric intake in some countries comes from rice. Asia is the largest producer of rice contributing around 91 per cent of total world rice production (Varma, 2017). India holds the status of largest rice cultivated area (43.9 million ha) with the production of 112.9 million tonnes and productivity of 3.01 t ha⁻¹ during 2018 (Indiastat, 2019). During the last three decades, after the green revolution, a paradigm shift has occurred in the insect pest complex in rice ecosystems (Pandi *et al.*, 2016; Jena *et al.*, 2018). In recent years, rice production in the eastern part of India during Rabi season has been hampered by yellow stem borer, *Scirpophagain certulas* (walker) (Lepidoptera: Pyraustidae) infestation which lead to yield loss of about 10-60 per cent (Panda *et al.*, 1976; Jena *et al.*, 2018). Different weather parameters play a significant role for determining the population abundance and geographical distribution of major insect pests in rice (Singh *et al.*, 2012). All these weather parameters *viz.*, temperature, relative humidity, rainfall, wind speed, evaporation and sun shine hours *etc.* play a vital role in insect survival, reproduction and further spread. Therefore, a thorough understanding of interaction between weather parameters and YSB population dynamics is essential for standardizing management practices. Hence, the present investigation was undertaken to study the effect of different weather parameters on population dynamics of YSB, *S. incertulas* in shallow low land rice ecosystem.

The present study was carried out at experimental

farm of ICAR-National Rice Research Institute, Cuttack, Odisha, India (20°45' N latitude, 85°932' E longitude and 36 m altitude) during the year 2015 and 2016 in randomized block design (RBD) with rice variety TN1, which was raised in accordance with recommended agronomic practices without insecticide application. Number of yellow stem borer (YSB) from each light trap was collected daily from 10 days after transplanting to harvesting stage and data were recorded at standard meteorological week (SMW). The data on weather parameters during the observation period was collected from meteorological observatory located in the institute. The weather parameters included are daily maximum temperature, minimum temperature, average temperature (°C), relative humidity at 7.00 am (RH-I) and 2.00 pm (RH-II), bright sun shine hour and wind velocity (km ph). Correlation was analyzed statistically using SPSS 16 statistical software in order to find out the effect of different weather parameters on the incidence of YSB on rice.

Correlation coefficient between YSB, *S. incertulas* population and weather parameters (Table 1) revealed that YSB population had significant positive correlation with relative humidity (0.515 and 0.489) and negative correlation with wind speed (-0.427 and -0.453) during the corresponding week for both the years 2015 and 2016; whereas lag week 1 data showed that maximum temperature (-0.476), minimum temperature (-0.455) and wind speed (-0.493) had significant negative correlation; while, morning relative humidity has significant positive correlation (0.488) during 2015. Similar result were observed during 2016 indicated that increased maximum temperature, minimum temperature and wind speed had depressing effect on YSB population; whereas morning relative humidity favoured YSB population. Figure 1 shows that infestation of YSB, *S. incertulas* started from 3rd standard meteorological week (SMW) during 2015 and the population gradually increased