

# **Forewarning models for Early Shoot Borer populations (*Chilo infuscatellus*) in Sugarcane - A Count Time Series Approach**

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## **ABSTRACT**

The present study was conducted to model the early shoot borer pest population in sugarcane at Regional Agricultural Research Station, Anakapalle. The secondary data between 2013-2020 (308 observations) was considered based on data availability. Correlation and stepwise regression were used to check the relationship between pest and weather parameters. The maximum temperature, minimum temperature and relative humidity morning showed significant positive correlation and maximum temperature and rainfall were significantly contributing, and had positive impact on ESB population. Count time series and machine learning models were used for fitting the ESB dataset. ANN model was outperformed well than INGARCH, ZIPAR, ZINBAR models based on error comparison criteria (MSE and RMSE) and the statistical significance between the models was verified in the study by using Diebold- Marino test statistic (DM test). The order of prediction accuracy of the models under consideration was identified as ANN>ZINBAR>ZIPAR>INGARCH.

**Keywords:** ANN, INGARCH, Modelling, MSE, RMSE, ZIPAR and ZINBAR.