Across the globe, it is widely observed that current change in climate or weather pattern has marked effect on insect population dynamics and behavior, though with varied aspects and intensity. The study revealed that the population was highest during the fruit development and ripening stageand it was found that the number of flies per trap and meteorological parameters (temperature and humidity) is positively correlated with appreciable statistical significance.The current study aims to determine how changes in weather parameters influence the population dynamics of fruit flies and to develop an optimized weather-based population prediction model for fruit flies infesting citrus in the mid-hills of Arunachal Pradesh.