

# TEMPERATURE BASED MODEL TO FORECASTING ATTACK TIME OF THE SUNN PEST *Eurygaster integriceps put.* IN WHEAT FIELDS OF IRAN

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*Abstract:* - Mathematical simulation model is very suitable to understand insect dynamical systems. This system is nonlinear and it is hard to deal with by pure mathematical models only. It offers a possibility to recognize possible gaps in our knowledge. Cereal Sunn pest (*E. integriceps*) is the most important pest in Iran. Successful management and control of the sunn pest problem call for well-organized monitoring of sunn pest populations. The accurate monitoring of sunn pest migration is the basis for effective chemical control. It governs the timing of applications. This study indicated that changes in population densities of these insect is largely determined by external abiotic and biotic factors. Climatic conditions, especially temperature play an important role in sunn pest population dynamics. Results show the attack time of over wintering adults is not related to special date of year, we can see these happen in an exact temperature in all years.

*Key-Words:* - *Eurygaster integriceps*, population dynamics, Forecasting model

## 1 Introduction

The Sunn pest (*Eurygaster integriceps* Put.) is a very damaging insect pest of wheat and barley in countries of West Asia, including Afghanistan, Iran, Iraq, Lebanon, Syria and Turkey, as well as in the Central Asian republics (Kazakhstan, yrgyzstan, Tajikistan, Turkmenistan and Uzbekistan), and Bulgaria and Romania [3]. Both nymphs and adults cause damage by feeding on leaves, stems and grains [1].

Yield loss is commonly estimated at 20-30% in barley and 50-90% in

wheat. Apart from the direct reduction in yield, the insects also inject chemicals that greatly reduce the baking quality of the dough. Control of Sunn pest by chemical insecticides is expensive, costing over US\$ 40 million annually in the countries concerned, and poses a risk to human health, water quality and the environment as a whole. The present insecticide-based strategies for control of Sunn pest must be replaced with multi-dimensional integrated pest management (IPM) approaches [4].

## 2 Material and Methods

Successful management and control of the sunn pest problem call for well-organized monitoring of sunn pest populations throughout the year and limited, adequate chemical control based on monitoring information that limits the infestation without the risk of favouring other pests. The accurate monitoring of sunn pest migration is the basis for effective chemical control. It governs the timing of applications, thereby reducing the amount of product used by restricting treatment to gregarious populations of sunn pest before they disperse to other fields. This monitoring can be made successful by the use of modern information technology that stores and displays data and allows the prediction of displacements and the orientation of surveys.

population densities of these insect is largely determined by external abiotic and biotic factors. Climatic conditions, especially temperature play an important role in sunn pest population dynamics. Fig 1 and 2 are the times and temperatures of attack time of this insect to wheat fields. This phenomenon is a complex system. While these figures show the attack time of over wintering adults is not related to special date of year, we can see these happen in an exact temperature in all years. This event helps us to be ready to monitoring of sunn pest in wheat field to use selective chemical control where the Economic Threshold Level is exceeded at a particular crop development. Data can be supplied by forecast and warning weather stations in each districts or areas. Chemical treatments against over wintering adults and nymphs should be carried out during recommended period, not lasting more than five to seven days across the entire treatment area. This will stop sunn pest damage while protecting oophagous parasitoids, which is especially critical during chemical control of sunn pest nymphs since some parasitoids are intermixed among sunn pest eggs.

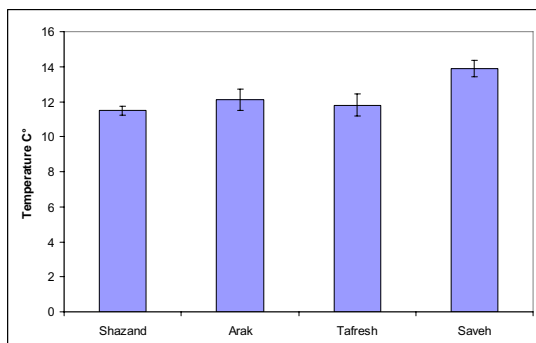


FIG. 1. Temperature of attack time of *E. integriceps* to wheat fields  $\pm$ SD

## 3 Results

A long-term study of the population dynamics of *Eurygaster integriceps* in five areas of Arak district, indicated that changes in

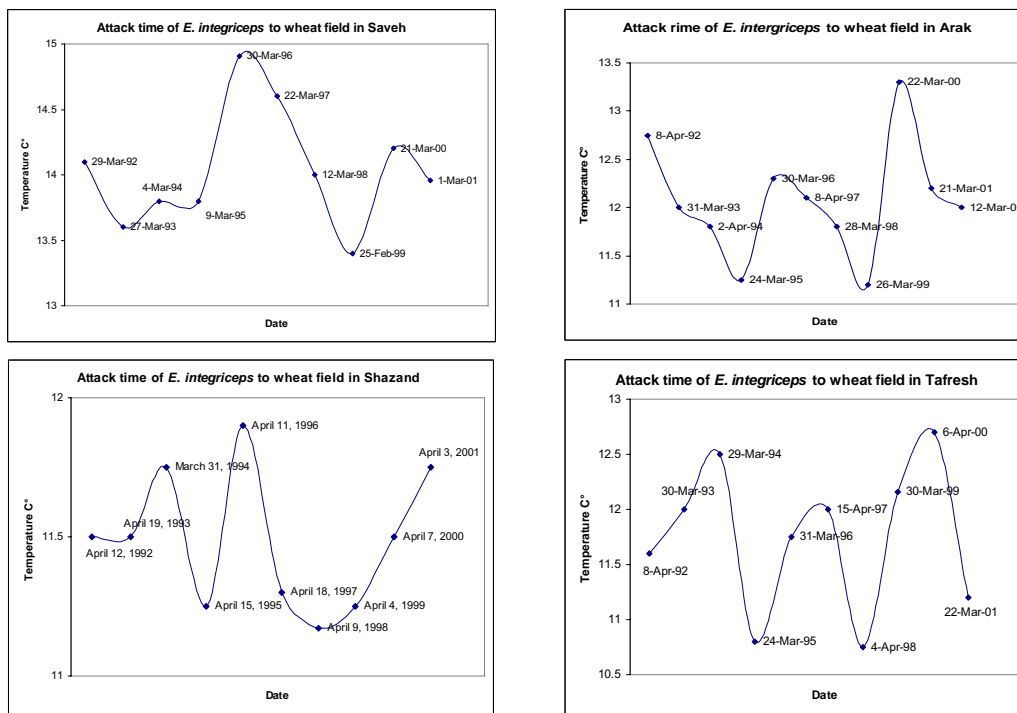


FIG. 2. Attack time of *E. intergriceps* to wheat fields by Temperature in four different areas from 992-2001 in Arak district

### References

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