

A physiological age model as a forecasting tool for plant protection against the tomato leaf miner *Tuta absoluta*

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The mathematical description of poikilothermic organisms aroused the interest of scientists since long time. To date, the wish of safeguard of the environmental and human health together with the increasing price of the chemical treatments, led to point the attention on the possibility to forecast harmful insects' life cycle. A prediction, in fact, allows a quick action against phytophagous agents, including, according to the Integrated Pest Management philosophy, biological control with predators, parasitoids [5] and entomopathogenic fungi and bacteria. The common difficult encountered by the insiders, is the possibility to relate the development of an age structured population over time with the environmental parameters. Usually, temperature is considered the main driving variable for the development through the stages of insects' life cycle, and several authors provided empirical forms to describe the experimental point's trend [6]. The model proposed, is based on a first order partial differential equation able to describe the density of population in function of time and physiological age, this last considered as a quantity which accumulates over time [1], [3]. Then, the model has been applied in the case of a harmful alien species for the Italian territory, the tomato leaf miner *Tuta absoluta* (Meyrick). The choice of the application, is due to its aggressiveness and to the capability to close a generation in a short time [2] (30 days in optimal conditions), together with the large spectrum of host plants: *Lycopersicon spp.*, *Capsicum spp.* and *Solanum spp.* The validation, has been conducted in an experimental greenhouse, in which an artificial infestation has been reproduced with the aim to record day by day the density of adults' population.

References

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