



## **Tritrophic Interactions in the mass-rearing system: Common Bean – *Trialeurodes vaporariorum* – *Encarsia formosa*. Parameterization of a Simulation Model.**

**Marco A. Diaz<sup>1</sup>; Daniel Rodriguez<sup>1</sup>; Fernando Cantor<sup>1</sup>**

<sup>1</sup>Basic and Applied Sciences Faculty. Nueva Granada Military University, Km 3 Cajicá Zipaquirá – Colombia. Email: [ecologia@unimilitar.edu.co](mailto:ecologia@unimilitar.edu.co)

The Greenhouse Whitefly *Trialeurodes vaporariorum* is a major pest in Bogotá Plateau - Colombia. An alternative for its control is the use of natural enemies, such as the parasitic wasp *Encarsia formosa*. Nowadays the commercial local supply of this biocontrol agent is low due to poor optimization of production methods derived of the trophic interactions unawareness. In order to understand the ecologic interactions in a mass-rearing tritrophic system under greenhouse (*Phaseolus vulgaris* – *T. vaporariorum* - *E. formosa*), a supply-demand regulated, age-structured population dynamics simulation model was developed. To build the model three cohorts of common bean plants of the same age were followed, corresponding to three treatments: clean plants, plants interacting with a whitefly population and plants with whitefly and *E. formosa*. Destructive samples were taken from plants during a production cycle, measuring variables such as dry weight of each plant structure, leaf number, leaf area, number of individuals of each whitefly state and number of parasitoid pupae. With this data a growth functional analysis was made for each treatment, and growth parameters, such as Absolute Growth Rate (AGR), Relative Growth Rate (RGR), Leaf Area Ratio (LAR) and Specific Leaf Area (SLR), were estimated. Also, population growth curves for *T. vaporariorum* and *E. formosa* were adjusted using the plant physiological time, measured in day degrees. When the AGR and RGR curves were compared between treatments, it was found that plants with the presence of the whitefly develop slower than plants with the presence of the parasitoid and clean plants. Similarly, the LAR and SLR curves were higher in clean plants than plants with the parasitoid-pest interaction and plants with only the pest. Finally, the population growth rate for *T. vaporariorum* and *E. formosa* were estimated. All the data estimated was used to complete the parameterization of the model.

**Keywords:** mass-rearing, simulation model, tritrophic interactions, growth functional analysis.

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