EFFECTS OF MYCORRHIZAL FUNGI ON *CAPSICUM CHINENSE* SEEDLINGS, THEIR ENEMY *BEMISIA TABACI* AND ITS PARASITOID *ENCARSIA FORMOSA* – A MULTI-TROPHIC APPROACH

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INTRODUCTION

Mycorrhiza are fungi that live in symbiosis with the roots of most vascular plants. Arbuscular mycorrhizal fungi (AMF) are the most ubiquitous and wide distributed mycorrhiza amongst these associations. Colonization of plant roots by arbuscular mycorrhizal fungi has shown both positive and negative, as well as variable and null effects on aboveground herbivorous insects. Changes induced in the plants by AM fungal association (plant nutrition improvement, growth and defenses modifications, etc.) can also affect herbivores natural enemies, at higher trophic levels.

Our model of study is composed of an AMF (*Rhizophagus irregularis*), its host plant (Habanero chili pepper, *Capsicum chinense*), an herbivorous insect (the invasive Tobacco whitefly, *Bemisia tabaci*) and one of its parasitoids (*Encarsia formosa*). In this multi-trophic study, we chose to focus on the following bottom-up interactions:

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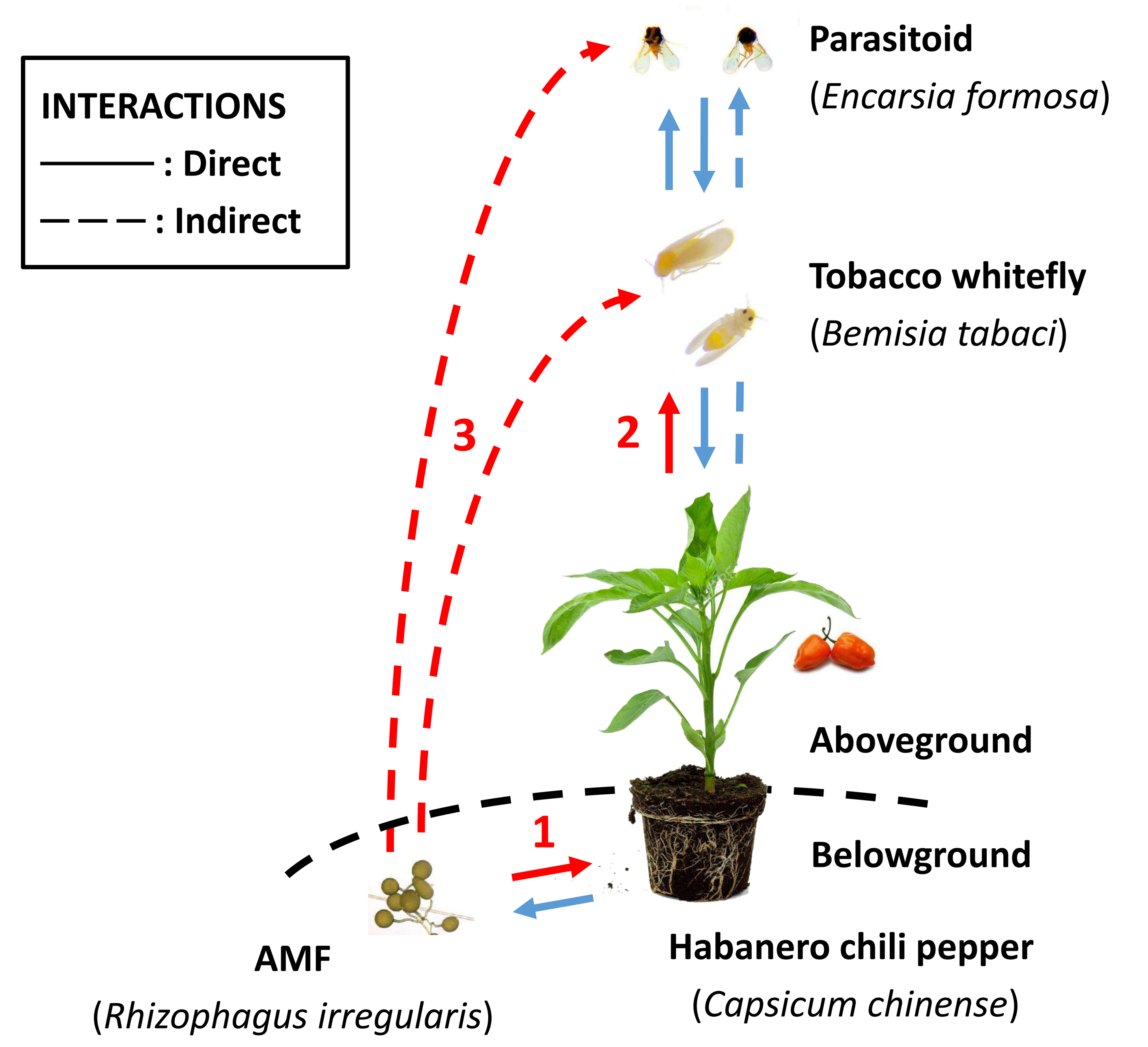
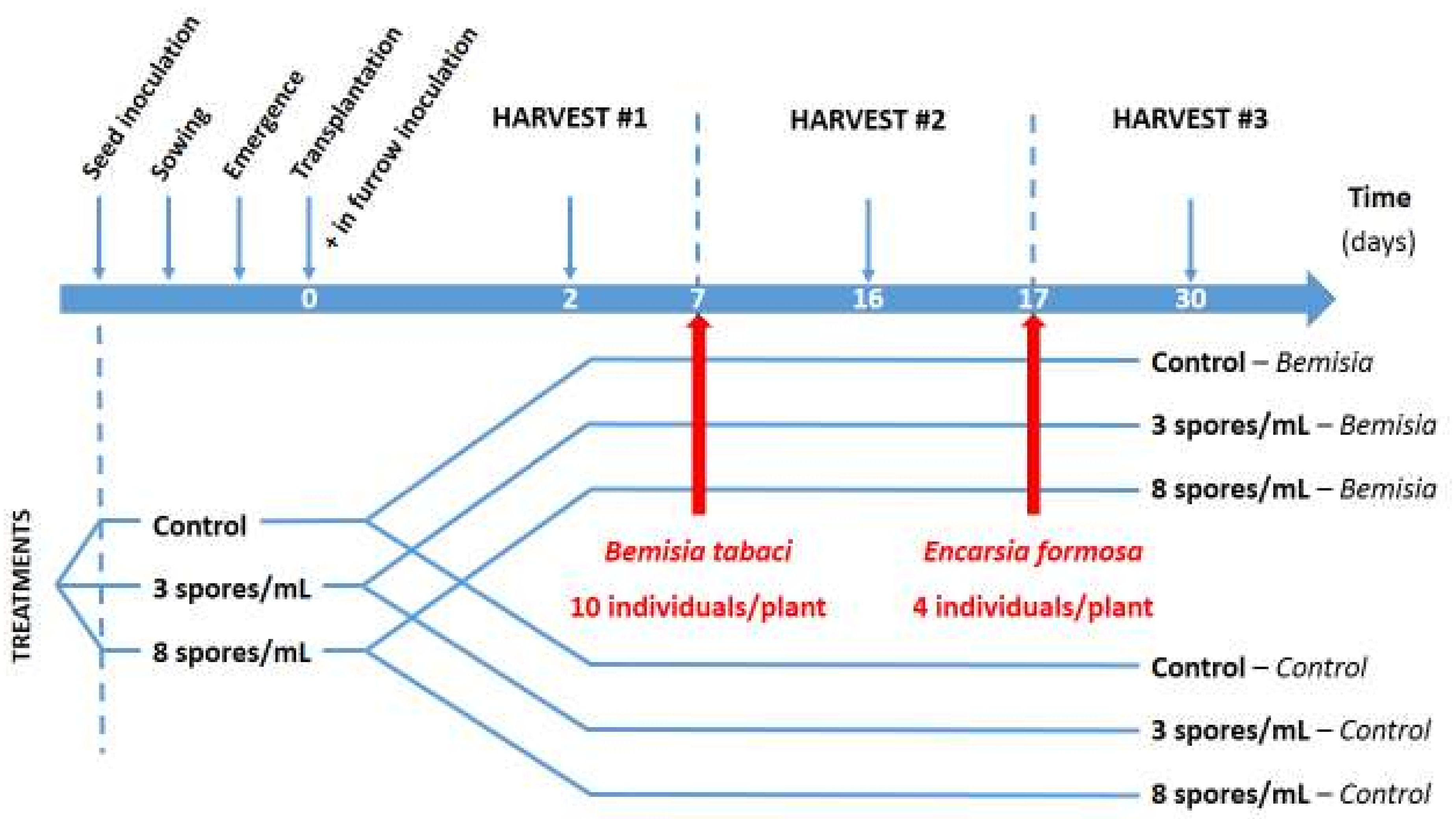
1. Direct effects of AMF on *C. chinense* traits and growth ?
2. Direct effects of *C. chinense* on *B. tabaci* density ?
3. Indirect effects of AMF on populations densities of *B. tabaci* and *E. formosa* ?



MATERIALS & METHODS

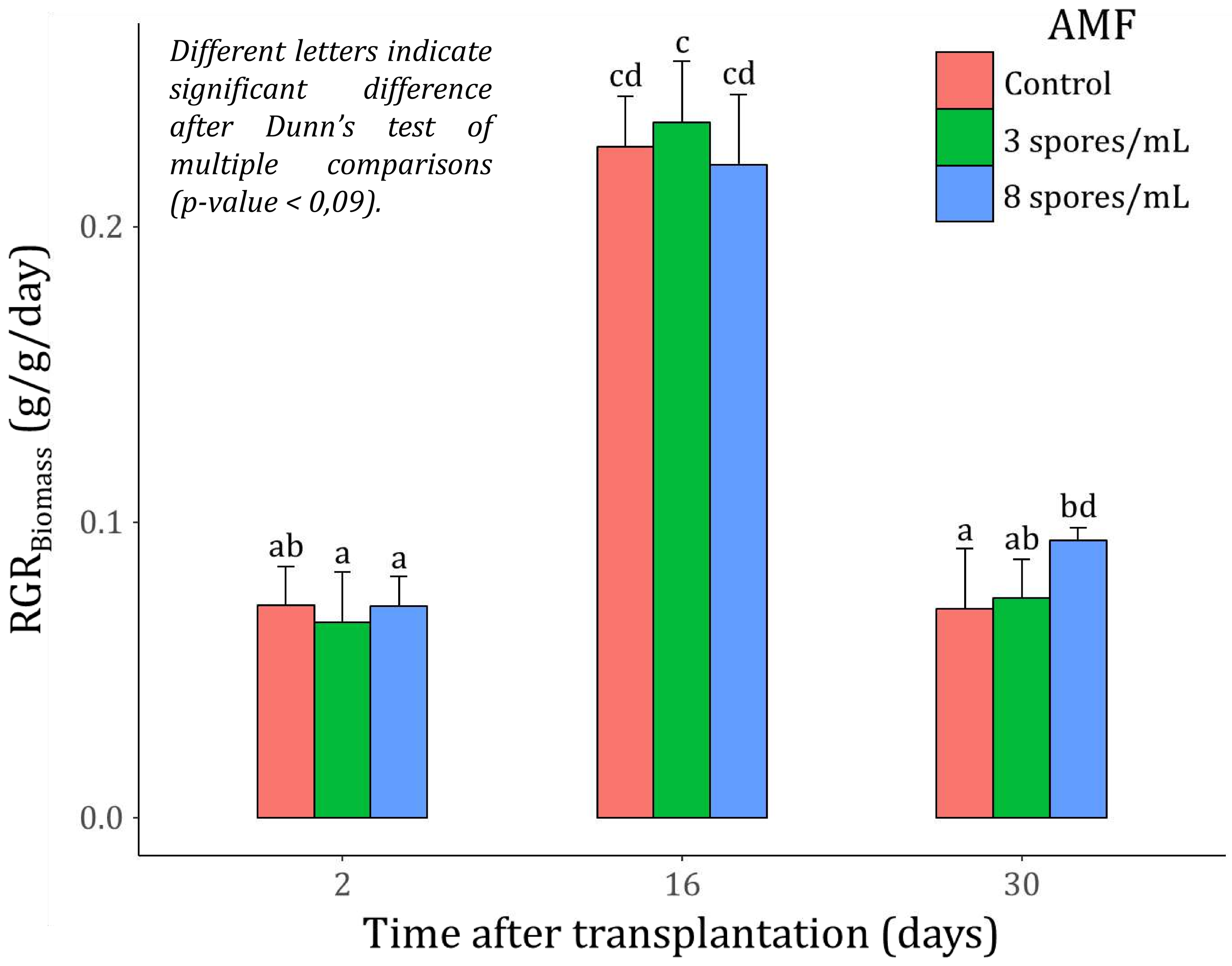


Seeds of habanero chili pepper were inoculated with solutions of AMF diluted at 0 (Control), 3 and 8 spores per mL. Collected in a breeding greenhouse in the Instituto Tecnológico de Conkal (Yucatan, Mexico) (**a**), 10 adults of *B. tabaci* were introduced per plant (n = 25–30 plants per AMF treatment, n = 4 plants per cage; **b**, **c**), as well as 4 pupas parasitized by *E. formosa*. Measures of plant morphological and physiological traits were conducted at 3 successive harvests. Population densities of *B. tabaci* and *E. formosa* were measured at Harvest #3 (**d**). Amongst other indices, Biomass relative growth rate (**1**) and Leaf production rate (**2**) were calculated.

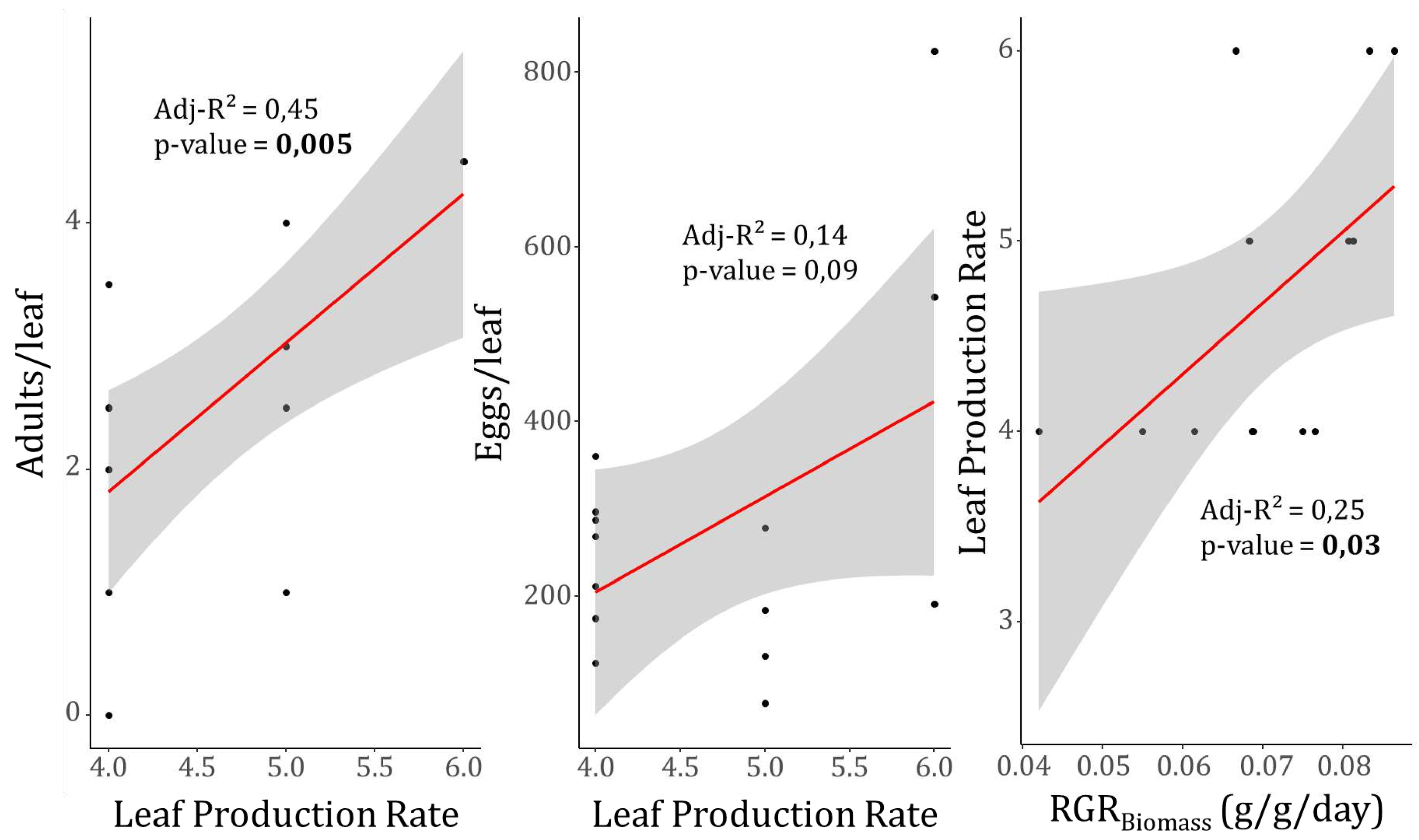
(1) $RGR_{Biomass} = \frac{(\ln_e W_2 - \ln_e W_1)}{(t_2 - t_1)}$ $(g/g/day)$ – W: Plant total biomass (g); t: Time (days)

(2) $LPR = \frac{(nL_2 - nL_1)}{(t_2 - t_1)}$ ( ) – nL: Number of leaves ( )

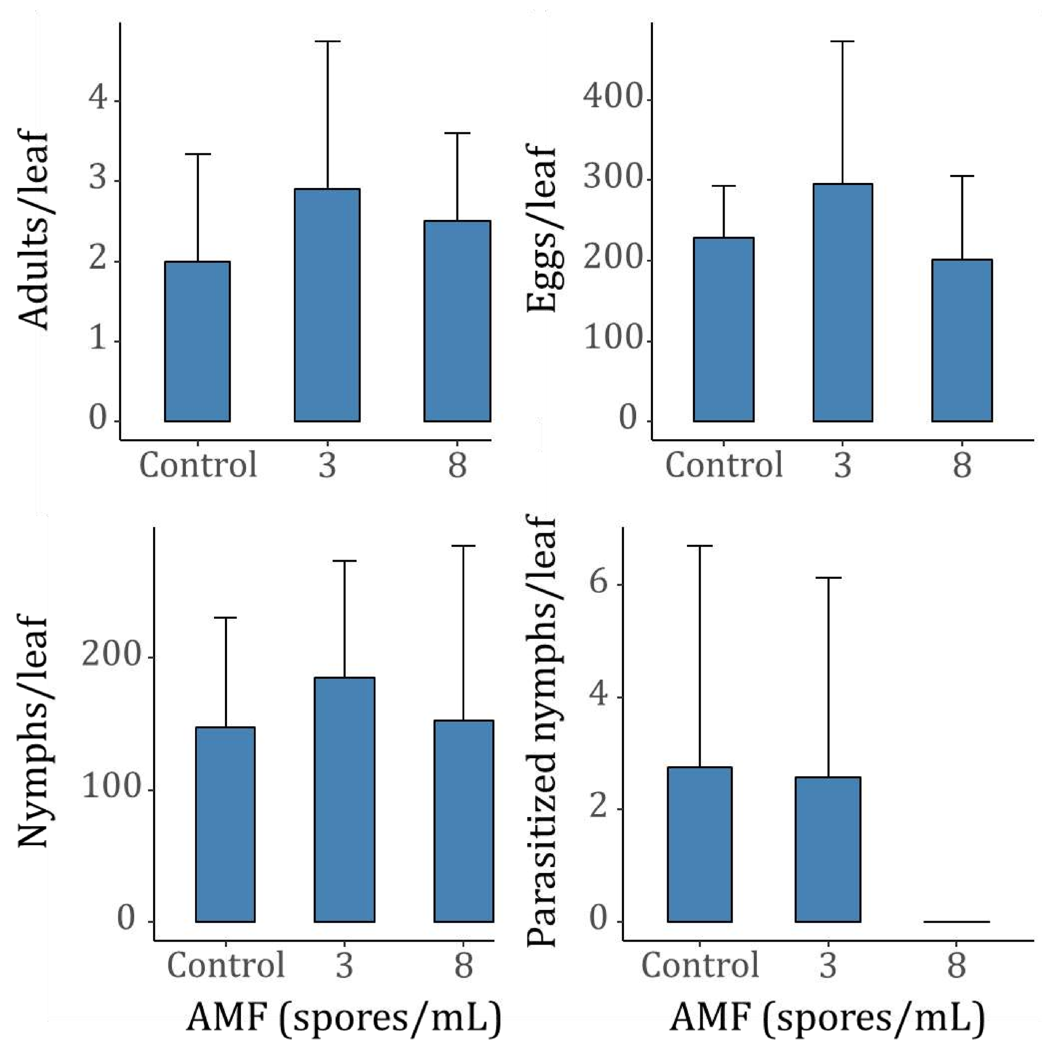
RESULTS & CONCLUSIONS



1 AMF improve plant growth (Harvest #3).



2 A higher Leaf production rate stimulates density of *B. tabaci*.



3 No significant effect of AMF on *B. tabaci* and *E. formosa* were detected.

Nutritional quantity hypothesis: A positive effect of AMF on plant growth may stimulate *B. tabaci* herbivory, leading to an advantage for the enemy (Pineda *et al.*, 2013).

LITERATURE CITED

Pineda, A., Dicke, M., Pieterse, C. M., & Pozo, M. J. (2013). Beneficial microbes in a changing environment: are they always helping plants to deal with insects?. Functional Ecology, 27(3), 574-586.