

# Incidence of *Bemisia tabaci* and *Trialeurodes vaporariorum* in Hydroponic Tomato Crop as Affected by Rootstock



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## Introduction

- Vegetable growing in greenhouses is among the most advanced agricultural technologies. Constant improvement of production technology in order to achieve profitability and contribute to environment protection is the main goal and implies new approaches.
- Tobacco whitefly *Bemisia tabaci* (Gennadius) and greenhouse whitefly *Trialeurodes vaporariorum* (Westwood) are the most widespread and damaging whitefly species worldwide, and both of them habit on tomato.
- Due to the benefits of grafting in the alleviation of the effects of abiotic or biotic stresses in fruiting vegetables, this technique has been increasingly used in recent years (Lee et al., 2010). According to Žanić et al. (2016), grafting could be the useful tool in integrated greenhouse pest management of tomato.

Fig. 1



a) *B. tabaci* (adult)    b) *T. vaporariorum* (adult)    c) Tomato grafted seedling

## Objectives

To determine the grafting/rootstock effect on incidence of adult instar and oviposition of *B. tabaci* and *T. vaporariorum*, during tomato transplant growing in summer/autumn season (2015).

## Methods

Two separated greenhouse experiments were conducted in 2015, using tomato cv. Clarabella as a scion, in a hydroponic system. In both experiments, grafted plants (cv. Clarabella grafted onto the commercial rootstocks Arnold, Buffon, Emperador, and Maxifort) were compared to non-grafted plants (cv. Clarabella and rootstocks) and self-grafted (cv. Clarabella grafted on its roots) plants.

At 20 October, tomato plants were artificially infested with *B. tabaci* reared on cotton (Fig. 2a), while infestation with *T. vaporariorum* was done at 22 October using the pest population reared on cucumber.



Fig 2. a) Infestation with *B. tabaci*    b) *T. vaporariorum* on cucumber

The populations density were done according to Žanić et al. (2011),

Assessments of adult number were conducted 2, 5 and 7 days after infestation (DAI). Adults were recorded early in the morning (7 a.m.) on the 7 fully developed leaves per each observed plant, using the leaf-turn method, starting with the youngest leaf.

To record the densities of egg at 10 DAI (in both experiments), all leaves were collected from 8 plants per treatment and examined in the laboratory. The total number of eggs per leaf was recorded using a stereo microscope. The data were expressed as the number of eggs per plant.

## Results

Number of *B. tabaci* adult individuals per leaf was lower on rootstock leaves and on leaves of cv. Clarabella grafted on tested rootstocks compared to non-grafted or self-grafted cv. Clarabella (Fig. 3). These results indicate that the effect of rootstock on *B. tabaci* incidence was transferred into scion at 2, 5 and 7 DAI.

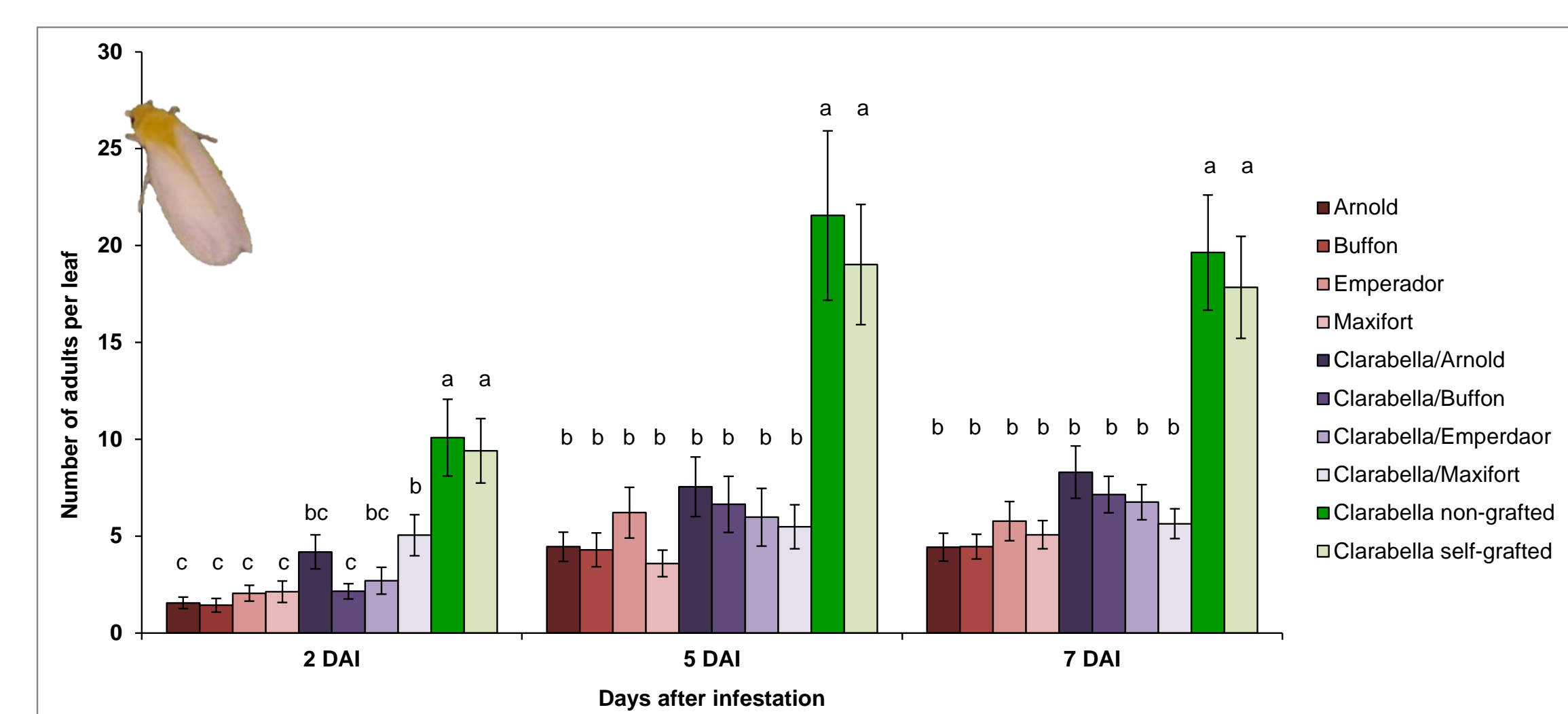


Fig. 3 The effect of rootstock on adult density of *B. tabaci*

Similar effect was found for number of *T. vaporariorum* adult individuals per leaf only in cv. Clarabella grafted onto the rootstock Buffon or on Buffon leaves compared to self-grafted tomatoes at three sampling dates (Fig. 4).

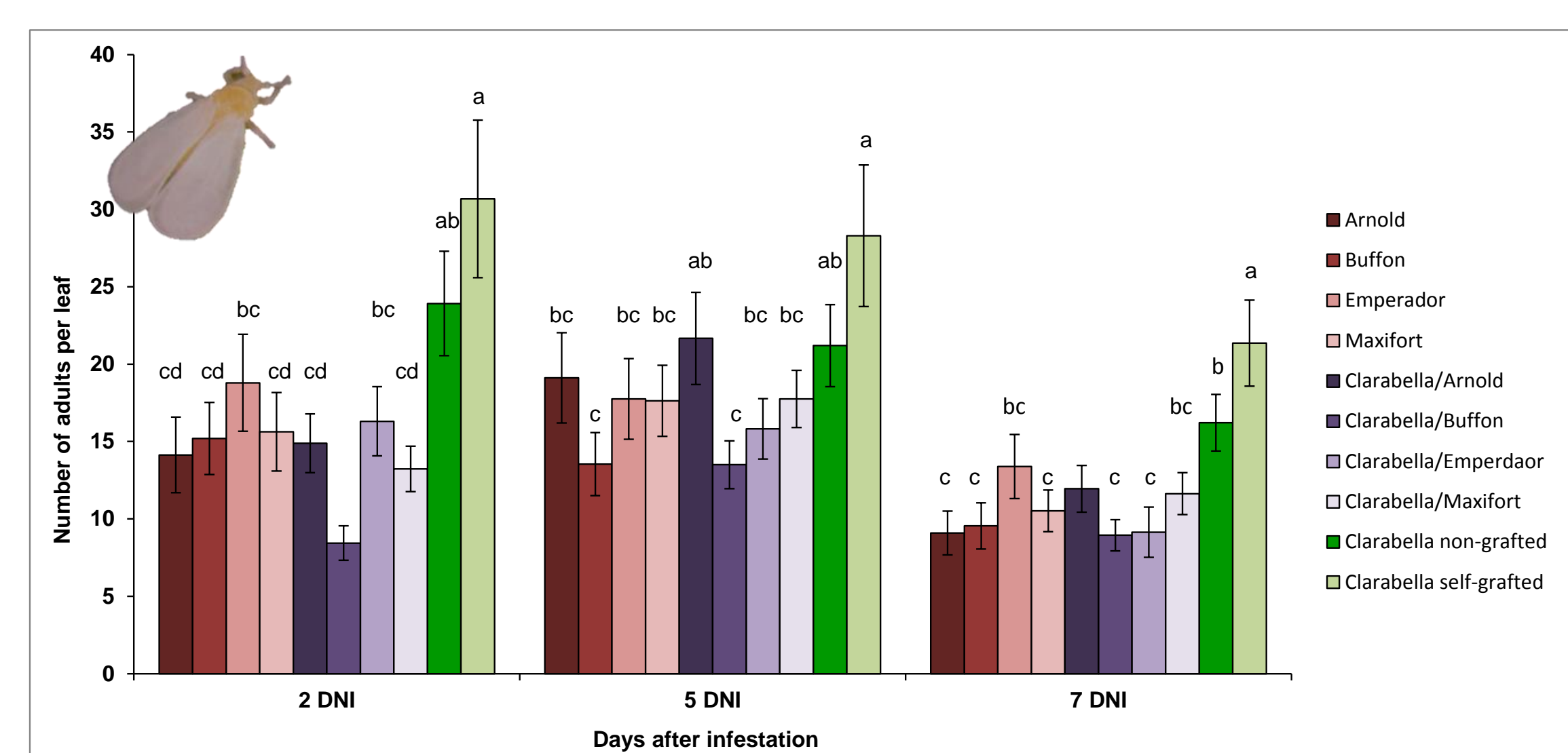


Fig. 4 The effect of rootstock on adult density of *T. vaporariorum*

The leaves of non-grafted cv. Clarabella plants were the most attractive for oviposition of *B. tabaci*, while differences among treatments were not significant for *T. vaporariorum* oviposition activity (Table 1).

Table 1. Oviposition of *B. tabaci* and *T. vaporariorum*

Treatment	No. of <i>B. tabaci</i> eggs per plant	No. of <i>T. vaporariorum</i> eggs per plant
Arnold	781.50 ± 318.21 bc	2168.25 ± 299.96
Buffon	732.75 ± 449.48 bc	2586.50 ± 380.99
Emperador	1081.75 ± 274.09 bc	2232.50 ± 616.68
Maxifort	307.50 ± 56.81 c	2419.75 ± 778.05
Clarabella/ Arnold	637.50 ± 98.59 bc	2825.75 ± 974.51
Clarabella/ Buffon	569.50 ± 309.21 bc	1051.50 ± 374.74
Clarabella/ Emperador	711.00 ± 138.57 bc	2057.25 ± 834.25
Clarabella/ Maxifort	717.25 ± 209.99 bc	1989.50 ± 538.56
Clarabella non-grafted	2522.75 ± 318.21 a	2619.25 ± 244.37
Clarabella self-grafted	1699.25 ± 694.69 ab	3380.75 ± 1541.62
F (df=9)	2.681	0.651
P	0.0204	0.745

## Conclusion

This study suggests that rootstock effect on pest incidence could be transferred in scion but effect depends on rootstock and pest. Also, it confirms the importance of tomato rootstock choice and that grafting could be applied in a sustainable management against *B. tabaci* and *T. vaporariorum* in tomato crops.

## References

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