

Evaluation of an Organic Treatment Scheme against *Eurytoma schreineri* Schreiner

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Abstract

The experiment aimed to evaluate some of organic products within a treatment scheme against *Eurytoma schreineri* Schreiner., on two different plum varieties: Stanley and Reine Claude d'Althan. An experimental scheme of organic treatments by using seven organic products with insecticidal effect was developed and used for evaluation in the field. There were three variants taken into account: organic, conventional and untreated, used as control. Each variant consisted of eight trees belonging to Stanley and Reine Claude d'Althan cvs., four trees for each variety. The frequency occurring of *Eurytoma schreineri* was evaluated along two consecutive years (2019-2020). Overall results confirmed the sensitivity of Stanley cv. to *Eurytoma schreineri*. On the other hand, the results showed that the organic scheme developed was unsatisfactory and there is a risk of considerable losses for farmers who opt for this kind of scheme.

Keywords: *Eurytoma schreineri*, organic products, pest, plum

Introduction

In spite of a significantly higher price of organic fruits in comparison with the conventional ones, there is an increasing demand for fruits with no pesticide residues. In this context more and more farmers directed the attention to enlarge the area of organic crops (Neelesh and Attika, 2015; Manoj, 2017). Organic treatments for prevention and control of the diseases and pests are few on the market, and their effectiveness is not fully known yet. This situation exposes the new organic orchards to an imminent risk of disease and pest control, that can affect the quality and quantity of fruits. *Eurytoma schreineri* is one of the most important pests that can cause significant losses on plum (Maxim, 1997, 2008). The pest causes considerable damage up to 90% when no treatment is applied (Tămaș Rodica *et al.*, 2009).

That is why an effective phytosanitary program is needed for its control. *Eurytoma schreineri* develops only one generation per year, and the affected fruits fall prematurely starting with June (Gullan and Cranston, 2014).

Materials and methods

The experiment was organized in the field, where three variants were delimited, depending on the treatments used: conventional, ecological and untreated control, each variant being composed of eight trees. Four trees of each, Stanley and Reine Claude d'Althan cvs. per treatment variant were used. A total of seven treatments in conventional and ecological variants were applied during each year. Ecological insecticides used in this study were: OVIPRON TOP (highly refined, paraffinic mineral oil) 2,5%, KONFLIC (50% Potassium salt

from vegetable oil extract and 50% bitter *Quassia spp.* extract) 0.3%, DEFFORT (plant extract from the *Fabaceae* family and microelements) 0.3%, OLEORGAN (vegetable oils) 0.3%, BACTOSPEINE DF (54% *Bacillus thuringiensis* subsp. *Kurstaki*) 0.1%, ALGASIL (extract *Ascophyllum nodosum* plus silicon and potassium) 0.5%, PREV-AM (Orange oil 60 g/l) 0.8%. Versus were used the following conventional insecticides: MOSPILAN (acetamiprid, 200g/kg) 0.02%, CALYPSO (tiacloprid, 480g/l) 0.02%, KARATE ZEON (lambda-cyhalohrin, 50g/l) 0.015%, ACTARA (thiamethoxam, 250g/kg) 0.01%, MOVENTO (spirotetramat, 100g/l) 0.19%. The concentrations used are those recommended by the manufacturers (Tab. 1).

For a precise determination all fruits from each variant were firstly counted, separately into canopy and fallen on the ground. Then, it was determined the fallen fruits affected by *Eurytoma schreineri* in relation to the physiological fall on both Stanley (Fig. 1) and Reine Claude d'Althan cvs. (Fig. 2) by opening all the fallen fruits using a vise. The number of fruits affected by *Eurytoma schreineri* were reported to the total number of fruits (on the tree plus those affected), thus the frequency of the attack of *Eurytoma schreineri* was determined.

Results and discussions

The results in the variant treated with conventional products showed that the frequency of *E. schreineri* attack on the Stanley variety was 5% in 2019 and 3.5% in 2020. The Reine Claude d'Althan variety recorded 1% frequency of *Eurytoma schreineri* in both years, 2019 and 2020.

The variant treated with ecological products revealed an attack of *E. schreineri* between 12% (2019) and 28% (2020) on Stanley variety, while on Reine Claude d'Althan variety the frequency attack was between 3% (2019) and 4% (2020).

The untreated variant recorded a frequency of *Eurytoma schreineri* attack of 17% in 2019 and 32% in 2020 on the Stanley variety, and of 4% in both years, on Reine Claude d'Althan variety (Fig. 3).

The average attack of *Eurytoma schreineri* in the two consecutive years of study was 4%, on conventional variant on Stanley and 1% on Reine Claude d'Althan variety, respectively. The frequency of attack on the variant with ecologically products, was 20% on Stanley, while on Reine Claude d'Althan, it was only 4%. The average frequency attack on untreated variants in the period of 2019-2020 was 25% on Stanley variety, and only 4% on Reine Claude d'Althan variety (Fig. 4).

Table 1. Treatment schemes with conventional and ecological products applied in the plum orchard (2019-2020)

No.	Phenophase	Conventional treatment	Organic treatment
I	Sprouting	Mospilan (0,02%) + Toil (0,5%) + Champ (0,3%)	Ovipron Top (2,5%) + Bordeaux Mixture (0,75%)
II	Inflorescence emergence	Signum (0,05%)	Mimox (0,3%)
III	Flower fading	Calypso (0,02%) + Folicur Solo (0,075%)	Laser 240 SC (0,06%) + Funres (0,3%)
IV	7-10 days after treatment III	Mospilan (0,02%) + Karate Zeon (0,015%)	Konflik (0,3%) + Deffort (0,3%)
V	7-10 days after treatment IV	+ Movento (0,19%) + Dithane (0,2%)	Oleorgan (0,3%) + Zytron (0,15%)
VI	7-10 days after treatment V	Actara (0,01%) + Score (0,02%)	Bactospeine Df (0,1%) + Laser 240 SC (0,06%) + Funres (0,3%)
VII	7-10 days after treatment VI	Calypso (0,02%) + Bravo 500 SC (0,25%)	Algasil (0,5%) + Zytron (0,15%)
VIII	7-10 days after treatment VII	Mospilan (0,03%) + Topsin (0,07%)	Prev-Am (0,8%) + Mimox (0,3%)
IX	7-10 days after treatment VIII	Signum (0,05%)	Garex (0,2%)



Figure 1. (a) Physiological fall, (b) fruits affected by *E. schreineri* on Stanley variety

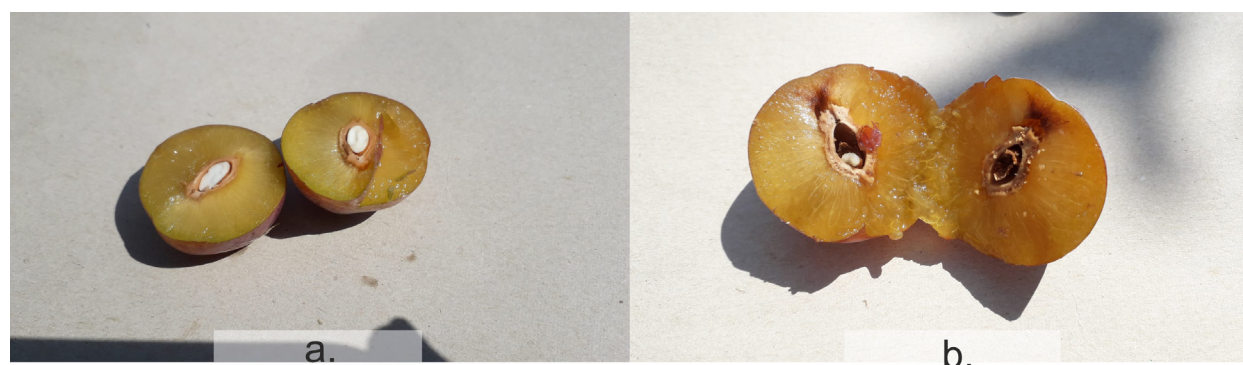


Figure 2. (a) Physiological fall, (b) fruits affected by *E. schreineri* on Reine Claude d'Althan variety

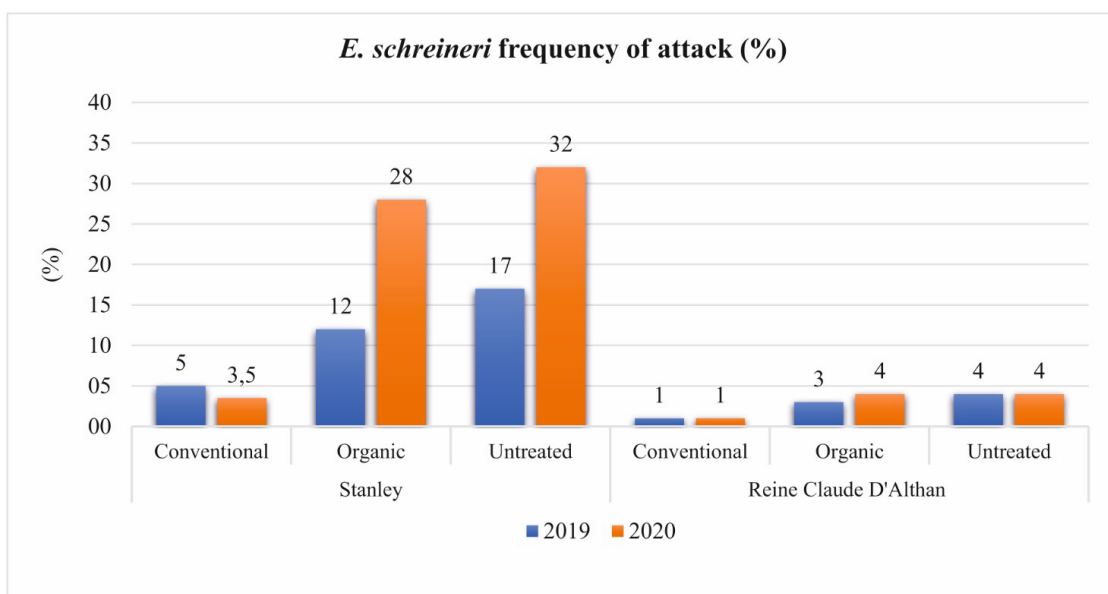


Figure 3. Frequency of *E. schreineri* attack over two years

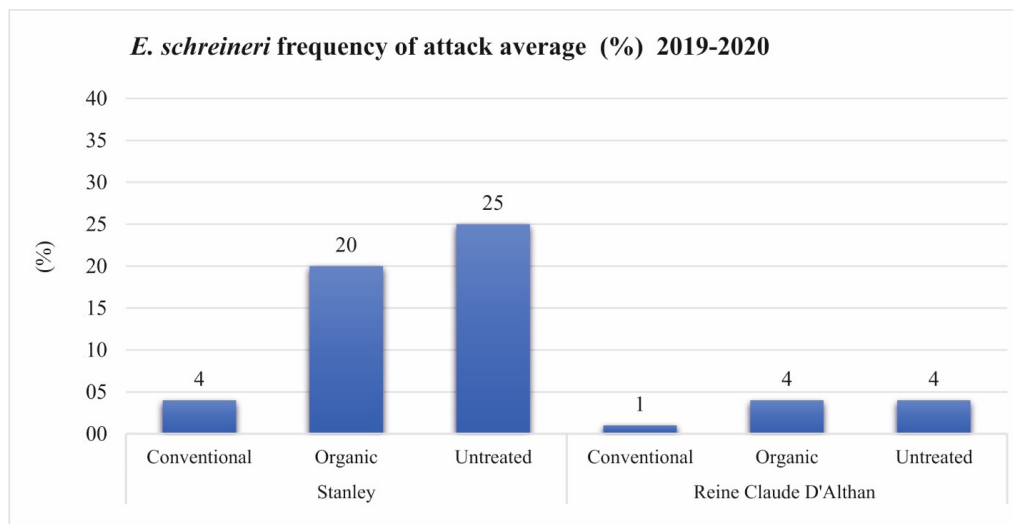


Figure 4. Average frequency of attack of *Eurytoma schreineri* (2019-2020)

Overall results revealed that the ecological scheme developed against *Eurytoma schreineri* was unsatisfactory. On the other hand, our results confirmed that Stanley is a sensitive plum variety to the attack of *Eurytoma schreineri*, and can not be controlled by using such a scheme of ecological treatments. Instead, the use of resistant or tolerant varieties, such as Reine Claude d'Althan can be a better choice for an organic crop.

Although the results obtained along the two consecutive years (2019-2020) are not very encouraging, studies must be continued by looking for an improvement scheme. *Eurytoma Schreineri* is a pest which live inside the plum fruit, this fact create difficulties in ecological protection, because they have only a contact effect. Therefore, increasing the number of treatments with organic products in comparison with conventionals during the flight period could improve the results. Also, on small isolated plum orchards, gathering fallen fruit and destroying them could be an effective method of control, given that the larva does not migrate into the soil but remains in the kernel until the following spring.

Conclusions

The overall results showed that *Eurytoma schreineri* pest is still problematic in organic crops when sensitive varieties are used. Its control only through the use of organic products does not have the desired effect under the treatment scheme presented and there is a risk of considerable

losses from an economic point of view for farmers who opt for such crops. In order to get a significant diminishing of the losses caused by *Eurytoma schreineri* is necessary an improved scheme of ecologic phytosanitary treatment, application of agrotechnical control measures and the choice of resistant varieties.

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