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Research Regarding the Use of Natural Predators for the Control of Pests for Pepper in Protected Culture

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Abstract

The experiment was conducted in solarium, in a pepper culture, using 2 hybrids: Red Night F1 for bell pepper and Kaptur F1 for long pepper. During the experiment, the influence of biological combat with natural predators and of chemical combat over the pepper production was observed, as well as plant reaction to management systems with 2 and 3 offshoots. Biological combat was made by introducing 3 times natural predators: first introduction 10 days after planting, to combat trips with Thripor-l with 500 insects of *Orius laevigatus*, the second one 14 days since the first, with Thripor-l with 500 insects of *Orius laevigatus* and half bottle of Swirski-mite with 25000 insects of *Amblyseius swirskii* and the last one 50 days since planting with Spidex with 2000 insects of *Phytoseiulus persimilis* to combat the spider (*Tetranychus urticae*). The results obtained showed that the best results were obtained from biological combat with natural predators for both pepper varieties. Regarding the number of offshoots, long pepper is more suitable for 2 off shoots management, while bell pepper for 3 offshoots management. Production per square meter (sqm) varied between 9.52 kg and 11.98 kg.

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Keywords: pepper, biological combat, chemical combat, solarium.

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1. Introduction

Protected areas for vegetable culture ensure favorable conditions for installing pest such as: mites, trips, aphids, white fly, tomato fruit mining moth, etc. As a result of the attacks of these pests, the plants suffer various morpho-physiological and biochemical modifications, influencing considerably the production capacity and harvest quality, but the using the bio fertilizers ensure a good tolerance at pests (Vlahova V., Popov V. 2014). In this context, possibilities to combat the Californian trips (*Frankliniella occidentalis* Perg.) and common red mite (*Tetranychus urticae* Koch) through biological methods were studied. Biological combat with the use of zoophages can be made by using predators, biopesticides and parasites that are domestic or imported from other countries (Fatu A.C., 2015, Hoza Gh., 2001, Dobrin I., 2008).

The red mite (*Tetranychus urticae* Koch – Acari - *Tetranichidae*) installs on pepper cultures from the moment of planting and can stay until harvest. The adults colonize the lower part of leaves and the floral buttons, the presence of the pest being manifested through discoloring of the leaves and floral buttons, resulting in their abortion (Pasol P. et al., 2007). Young pepper plants has a low resistance to the attacks of mites, a high density of pests leading to compromising the culture (Coss - Romero and Pena, 1998; Jovicich et al., 2009). Using the species *Phytoseiulus persimilis* Athias-Henriot (Acari- *Phytoseidae*) in combating the red mite reduces the attack on the culture, ensures healthy products and reduces the expenses with plant protection.

The Californian trips (*Frankliniella occidentalis* Perg. Thysanoptera –*Thripidae*) is a polyphagous specie that attack numerous vegetable and floral plants, their number being different enough by authors: 500 species of plants out of 50 botanical families (Georgescu M., 2006), Roman (1999, 2005b) and about 240 plants, Perju (2004).

Adults and larvae colonize the leaves, the vegetative tops, flowers, and fruit and suck the sap out of tissues. As a result of an attack, discoloring spots appear, which in time become silver or brown. Floral buttons that are attacked do not open anymore. Large attacks lead to reduced productions, with low quality, the damages going up to 80% of production (Zepa-Coradini, 2010).

The Californian trips are known as active vector in transmitting the TSWV virus to tomatoes and other species (Broadbent et al., 1986). The use of some predators in combating this pest in protected areas reduces the degree of attack on plant and increases product quality. *Orius laevigatus* (*Hemiptera – Anthocoridae*) is a predator that feeds with Californian trips adults and larvae, reducing its populations in vegetable and flower culture from protected areas.

The species *Amblyseius swirskii* (Athias - Henriot) (Acari: *Phytoseiidae*) is frequently used to combat Californian trips and other species of pests specific to vegetable culture in protected areas (Messelink et al 2006, 2008), currently being widely used in sweet pepper cultures from south-east Spain. Research made in Turkey on a pepper culture in heated and not heated tunnels showed that using *Amblyseius swirskii* 50 adults/sqm controlled the trips attack, even on the long term (Halil Kutusi et al., 2011).

Recently, also in Romania it was created an opportunity on the food market, especially vegetable market, by the demand for healthy products, which is why more and more vegetable growers use these methods to combat pests. It can be noticed the interest for biological products of the owners of small areas, family gardens meant for consumption, the production on these areas being made by protecting the environment and reducing the expenses with plant protection products (Stoian L., 2005).

2. Materials and Methods

2.1. Experimental design

The experiment was conducted within the vegetable area of Matca, Galati County, in a solar, with a culture of bell pepper and long pepper. The preparation of the soil was made by mobilization of soil, fertilization with organic fertilizer 58 t/ha, Complex 580 kg/ha and disinfecting it with Vertimec 0.2 % and Dithane M 45 0.4 %.

The biological material used was a hybrid of each type of pepper: Red Night F1 for bell pepper and Kaptur F1 for long pepper. The culture was made with seedlings produced in warm solarium, produced according to the classical technology, which at planting had optimum quality features for this culture system, respectively: height of 20-25 cm for bell pepper and 25-28 cm for long pepper, 14–15 leaves and floral button at the top, 70 days old, thick strain, disease and pest free.