



## Perception on the incidence of pest mites and their forms of control in "La Rosita"

### Percepción sobre la incidencia de ácaros plagas y sus formas de control en "La Rosita"

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**ABSTRACT:** All agricultural workers must know the main pest that affect their crops to prevent their attacks or take appropriate action as soon as they appear. The objective of this work was to know the perception of the agricultural workers of the "La Rosita" farm on the incidence of pest mites and their control. For this, a semi-structured survey was applied. The data were processed using Microsoft Excel<sup>®</sup> 2016 electronics spreadsheets and were analyzed through descriptive statistics, determining the frequencies of appearance of the responses. It was found that 80 % of those surveyed are aware of pest mites, with a higher presence of *Polyphagotarsonemos latus* and *Tetranychus tumidus* in peppers, tomatoes and beans, although between 10 and 20 % found these pests in cabbage, corn and onion that shows little knowledge in relation to its identification. The 80 % of agricultural workers choose chemicals using sulfur, dicofol and Mitigan CE 18.5 more frequently. The 20 % of agricultural workers are aware of some plant extracts that are used and 100 % are unaware of the biological controls that can be used, including predatory mites. This infers that this topic constitutes one of the main training needs for agricultural workers on the farm

**Keywords:** agroecology, training, knowledge, biological control.

**RESUMEN:** Todo trabajador agrícola debe conocer las principales plagas que afectan sus cultivos para prevenir sus ataques o tomar acciones oportunas en cuanto aparezcan. El objetivo de este trabajo fue conocer la percepción de los trabajadores agrícolas de la granja "La Rosita" sobre la incidencia de los ácaros plagas y su control. Para esto, se aplicó una encuesta semiestructurada. Los datos se procesaron mediante hojas de cálculo electrónica Microsoft Excel<sup>®</sup> 2016 y se analizaron por medio de la estadística descriptiva, determinándose las frecuencias de aparición de las respuestas. Se comprobó que el 80 % de los encuestados conocen los ácaros plagas, con mayor presencia de *Polyphagotarsonemos latus* y *Tetranychus tumidus* en pimiento, tomate, frijol y habichuela, aunque entre el 10 y el 20 % ubicaron esas plagas en col, maíz y cebolla, lo que evidenció poco conocimiento en relación con su identificación. El 80 % eligió los productos químicos, utilizando con más frecuencia azufre, Dicofol y Mitigan CE 18,5. El 20 % conoce algunos extractos vegetales que se usan y el 100 % desconoce los controles biológicos que se pueden utilizar, incluyendo los ácaros depredadores. Esto infiere que este tema constituye una de las principales necesidades de capacitación para los trabajadores agrícolas de la granja.

**Palabras clave:** agroecología, capacitación, conocimiento, control biológico.

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## INTRODUCTION

The increase in human population over the last century has needed the intensification of agriculture, which has led to worsening pest problems and increased pest-related losses (1,2). These losses can occur at any stage of crop production in the field (pre-harvest) or even during storage (post-harvest). Arthropods destroy approximately 18-26 % of annual production worldwide, worth more than \$470 billion (1).

The most important crops can be affected by specific pest species that attack every time they are planted, so the farmer must know them well to act in their prevention or make timely interventions (2). Insects and mites cause most of the damage to crops (3). Among mites, the most damaging pests are found in the orders Trombidiformes (families Tydeidae, Phytoseptidae, Ditylomiopidae, Eriophyidae, Tetranychidae, Tenuipalpidae, Tuckerellidae and Tarsonemidae) and Sarcotiformes (3-5).

Currently, large quantities of pesticides are used worldwide to eliminate pests and diseases that attack crops (2,6). In this way, it is possible to guarantee a higher productivity of the field and obtain better economic benefits (6). For mites, products such as Abamectin, Sulfur, Dicofol, Spiridiclofen and Vertimec have been used (7,8). It has been reported the regrowth of pests after the applications of these pesticides, development of resistance of populations, elimination of natural enemies and increase of secondary pests above the threshold causing economic damages, therefore, the use of these chemical products has been a failure (2,9). For these reasons, there is a need to look for new technologies more friendly to the ecosystem to increase production and offer products free of toxic residues to consumers, such as biological products (2,10). Several alternatives have been used, such as vegetable extracts and essential oils (8,9,11,12), bacteria (7), fungi (13) and predatory mites (4,5,8,14,15).

Considering this problem, the objective of this work was to know the perception of the agricultural workers of the farm "La Rosita", on the incidence of mite pests in their crops and their control methods.

## MATERIALS AND METHODS

For this purpose, a semi-structured survey was applied to 100 % of the agricultural workers of the farm "La Rosita", located in Guanabacoa municipality, Havana, Cuba at 23°07'44.1 "LN 82°10'49.5 "LW. The survey was divided into three sections. The first was focused on the mite pests that most frequently occur on the farm and on which crop. The second was dedicated to the ways they use to control these mite pests. The last one was devoted to the use of predatory mites as biological control, with the objective of determining the level of knowledge and training needs present. The data were processed using Microsoft Excel® 2016 and analyzed by means of descriptive statistics, determining the frequencies of occurrence of the responses.

## RESULTS AND DISCUSSION

"La Rosita" farm has a total area of 45.7 ha of land dedicated mainly to pasture and fodder (18 ha), tubers and vegetables (23.7 ha), fruit trees (2 ha) and infrastructure (2 ha). The farm employs 93 workers, 60 % of whom are men and 39 % women between the ages of 20-70. Five percent are university graduates, 25 % with 12<sup>th</sup> grade, 17 % are technicians, 45 % have a ninth grade and 6 % have less than a ninth grade. Eighteen percent of the workers belong to the administration area, 30 % to the service area and 51 % to the production area. Only 13 % are directly involved in crop production, the rest in the production of pigs, rabbits, eggs and milk.

This farm has five types of soils: browns, Fersialitics, Humics, Calcimórficos, Vertisoles and Fluvisoles. The climate of the region is relatively dry sub-humid tropical, with rainfall of about 1.200 mm per year and average annual temperatures of 24-25 °C (16).

Only workers directly involved in agriculture (33 % women and 67 % men) were surveyed. Eighty percent claimed to know the pest mites that affect the crops they commonly plant, with the white mite (*Polyphagotersonemos latus*) and the red spider mite (*Tetranychus tumidus*) having the greatest presence (Figure 1). Forty percent of the workers identified another mite that did not appear in the survey and that attacks the tomato crop, causing chlorosis and browning of the plants until the leaves dry up and fall off. This suggests that it could be the tomato tanning mite (*Aculops lycopersici* (Masse))). All these organisms, if not adequately managed, become severe pests, with considerable effects on crop yields (13,17).

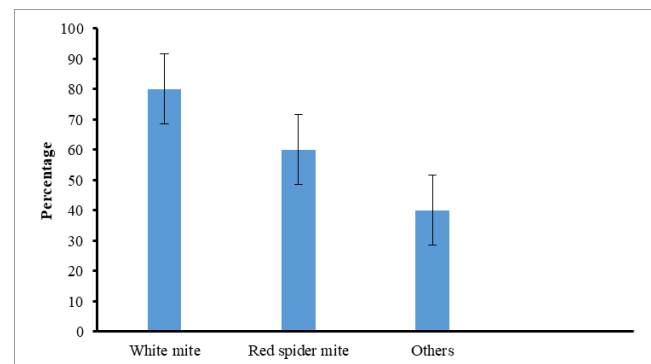


Figure 1. Main pest mites present in the farm's crops

From the crops grown on the farm, a high percentage of the workers surveyed identified bell pepper, tomato, bean and bean as the crops most attacked by the aforementioned mites. Ten percent identified cherry as another affected crop. A group pointed out crops such as corn, onion and cabbage with incidence of these pests (Figure 2), suggesting that they could be confusing them with some insects such as aphids. This result indicates the need to establish a training system that will enable better preparation for pest identification and consequently their management.

In relation to measures used to deal with these pests, the chemical option is the best known and most widely used (Figure 3). In second place is biological control and a combination of both. Among the most frequently used products was sulfur, followed by diicofol pordicofol and Mitigan CE 18.5 (Figure 4).

This way of dealing with the phytosanitary situation of crops favors the presence of a high number of harmful organisms. Although initially chemical control always seems effective, when the pest recovers it usually reaches even higher population levels than before the pesticide was applied, since when the predators that restrained the development of the pest are eliminated, the pest can now reproduce without any factor limiting the growth of its populations (18,19).

There is a series of biological products widely used for bioregulation of pest mite populations as an agroecological practice. Among the most widely used in our country are *Beauveria bassiana* (Balsamo) Vuillemin, *Lecanicillium lecanii* and *Bacillus thuringiensis* Berliner (13) and some plant extracts such as *Melaleuca quinquenervia* (Cav) S.T. Blake (12). Other essential oils from plants known to producers can be used, such as eucalyptus (*Eucalyptus globulus* Labill), rosemary (*Rosmarinus officinalis* L.), peppermint (*Mentha piperita* L.), lemon tree (*Citrus limon* (L.) Osbeck), sweet orange tree (*Citrus sinensis* (L.) Osbeck) and pepper (*Pimenta dioica* L. Merr) that cause more than 50 % mortality to mites of the family Tetranychidae (11). 100 % of the respondents do not know any of these organisms and only 20 % know tabaquine and Neem tree extract as pesticides, which coincides with several authors (9,20,21).

It should be emphasized that 100 % of the agricultural workers of the farm do not know any natural enemy of pest mites such as predatory mites. Therefore, it is to be expected that a set of measures to protect and conserve them in the agroecosystem is not fully exploited. This problem has been reported previously by several authors (19).

These results demonstrate the need to use alternative control practices that are ecologically safer and, at the same time, compatible with integrated pest management. One possible alternative is the use of mites of the Phytoseiidae family (4,5). To efficiently reduce the incidence of spider mites in our country, the predatory mites *Phytoseiulus macropilis* (14) and *Neoseiulus longispinosus* (14,22) with a high capacity to search for and feed on all stages of the pest can be used. The generalist mite *Amblyseius largoensis* can also be used to control spider mites, but it is much more efficient in controlling the white mite, which causes high losses in solanaceae, mainly in peppers in cultivation houses and in open fields (5,14,23,24). In addition, it is compatible with several chemical products used in protected cultivation (24).

From the topics evaluated in the survey, the highest percentages of lack of knowledge among workers were

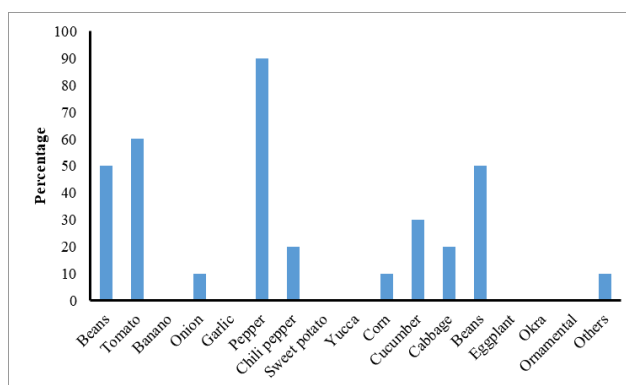


Figure 2. Crops most affected by mite pests

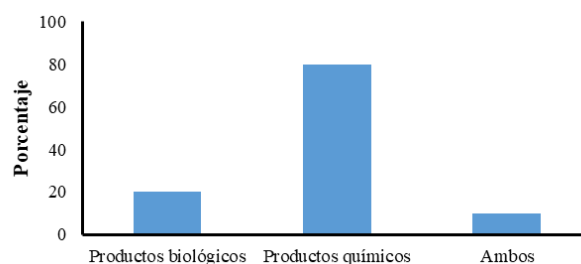


Figure 3. Phytosanitary measures for the control of mite pests

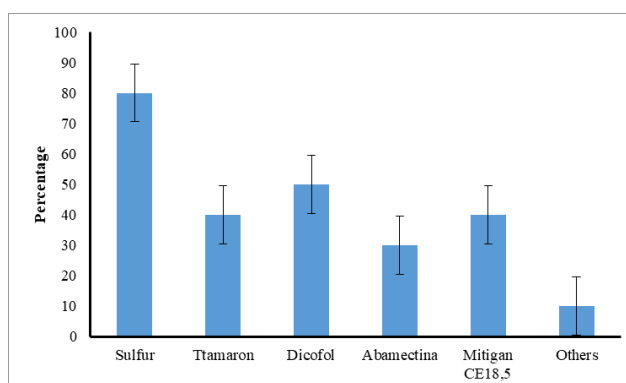


Figure 4. Chemical products most commonly used for the control of mite pests

related to the biological products and natural enemies that can be used in protected cultivation (24).

From the topics evaluated in the survey, the highest percentage of lack of knowledge among workers was related to biological products and natural enemies that can be used to control pest mites; from this it can be inferred that this topic constitutes one of the main training needs for the farm's agricultural workers.

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