Т. 10. №7. 2024
https://doi.org/10.33619/2414-2948/104

UDC 632.7.04/.08
AGRIS H10
https://doi.org/10.33619/2414-2948/104/14

Phyllocnistis citrella Stainton, 1856 CONTROL METHODS IN THE LANKARAN-ASTARA REGION

©Akbarova U., *ORCID 0000-0002-8930-3723, Ph.D., Lankaran State University, Lankaran, Azerbaijan, ulkarcoqrafiya@mail.ru*
©Malikov A., *Lankaran State University, Lankaran, Azerbaijan*
©Azizli N., *Lankaran State University, Lankaran, Azerbaijan*

МЕТОДЫ БОРЬБЫ С *Phyllocnistis citrella* Stainton, 1856 В ЛЕНКОРАНСКО-АСТАРИНСКОМ РАЙОНЕ

©Акперова У. З., *ORCID: 0000-0002-8930-3723, Ph.D., Ленкоранский государственный университет, г. Ленкорань, Азербайджан, ulkarcoqrafiya@mail.ru*
©Меликов А. Ш., *Ленкоранский государственный университет, г. Ленкорань, Азербайджан*
©Азизли Н., *Ленкоранский государственный университет, г. Ленкорань, Азербайджан*

Abstract. Research has been carried out on the biology and ecology of *Phyllocnistis citrella* Stainton. This is one of the main pests of lemon and tangerine gardens in Azerbaijan. To combat this pest, various agricultural methods and chemicals were used. The most effective combinations have been identified. A detailed description is given in the work. Guidelines for pest risk assessment have been developed, emphasizing measures to protect citrus orchards from heavy infestation by Phyllocnistis citrella.

Аннотация. Проведены исследования по биологии и экологии *Phyllocnistis citrella* Stainton. Это один из основных вредителей лимонных и мандариновых садов Азербайджана. Для борьбы с данным вредителем были использованы различные агротехнические методы и химические препараты. Выявлены наиболее эффективные комбинации. Подробное описание приведено в работе. Разработаны рекомендации по оценке фитосанитарного риска, в которых подчеркиваются меры по защите цитрусовых садов от сильного заражения Phyllocnistis citrella.

Ключевые слова: цитрусы, *Phyllocnistis citrella*, пестициды, Азербайджан.

Keywords: citruses, *Phyllocnistis citrella*, pesticides, Azerbaijan.

The citrus fruit plants are humid subtropical and tropical trees and bushes. The most common of them is lemon-citrus limonium, tangerine-citrus nobiles, orange-citrus cinensis. The profit from the lemon, tangerine, orange other plants occupies one of the main places in economy of this region because the Lankaran-Astara region belongs to the subtropical climate condition. The citrus plants are grown in open and covered form for frost-resistance in winter. The lemon plant is non-resistant for frost and it blooms all year round, i.e. it is a remonant plant therefore the farmers grow this plant in a covered form not only in the south region but also in other regions.

"The State Program about the population's reliable provision with food products in the Azerbaijan Republic for 2015-2020", and this area of fruit-growing should be seriously paid attention for the purpose of Food Safety ensuring. The therapeutic effect of the citrus plants is great. A need for lemon and tangerine plants grows because they are rich in C and P vitamins and these

Т. 10. №7. 2024
https://doi.org/10.33619/2414-2948/104

plants are used in the pharmacology industry. Therefore, at present there are lemon gardens more than 250 hectares and about 500 hectares tangerine gardens in the Lankaran region.

The Lankaran-Astara region is in the humid and subtropical climate condition, that's why different pests and diseases damage plants. Sometimes a rate of this damage can grow to 29-33%. Main pests of the lemon and tangerine are *Pseudococcus citriculus* (Coccineae), mining moths, red and silvery ticks, various *Aphidoidea*, snails, etc. Development of the diseases: antaknosis, phytophtora, hommoz, malsecco, fruit- rotten causes plant weakness, decrease of the marketability of products, drying and consequently, great economic damage to farmers. Taking into account the abovementioned facts, the research of pests and diseases of these plants has been continued in the Lankaran-Astara region since 2017. The research aim is an investigation of the pests causing varying degrees of economical damage for the lemon and tangerine gardens in the Lankaran-Astara region. The integrate fight system against the pests and diseases, taking into account their bio-ecological characters. The brown *Pseudococcus citriculus*, mining moths, silvery and red tick pests and antraknosis, phytophtora, malsecco, hommoz, fruit rotten diseases have been mostly observed [1, 3].

The research has been performed to determine the spread of pests and diseases in the citrus (lemon and tangerine) gardens. The bio-ecological characters of the widespread pests and disease forms have been studied in the laboratorial and field conditions for thorough investigation. Research have been performed for 2 times in the citrus gardens in April–November months, but the regular observations have been conducted for 3 times in a month and every 10 days with the diagonal or chess rule [2, 4].

1. Prevalence and incidence of the pests and disease.
2. Infection intensity (degree).
3. Pest infection and disease development.

Infection of the pests and disease was calculated on the following formula.

$$p = \frac{\text{n.}100}{\text{N}}$$

P - spreading of the pests and disease (%), N - a total number of the observed plants; n – the number of the infected plants.

An average value of spreading pests and diseases on the investigated total garden area was calculated as the following rule:

$$\text{P}_{average} = \frac{\sum sxp}{S}$$

P - an average value of the pest and disease spreading; $\sum sxp$ – Multiplication of sum of the investigated garden areas to the spreading percentage of general spreading of the pests and diseases.

Spreading intensity of the pests and diseases has been determined with the infection degree. The citrus plants are defined with the infection degree of *Pseudococcus citriculus*, *Aphidoide*a, a quantity of colonies in the branches and leaves are determined with ticks, mining moths, agganadlilar. The research condition and place. It was carried out in 3 replications consisting of 4 variants in the area planted with a 4×3 scheme in the river branch of 0,40 hectares.

The research object. An object of the research is a mining moth (*Phyllocnistis*) damaging the lemon and tangerine plant.

The research results and discussion. The researches were started in 2018 and they are going on at present.

Т. 10. №7. 2024
https://doi.org/10.33619/2414-2948/104

One of the scariest pests on the citrus plants (lemon, tangerine) is a citrus mining moth (*Phyllocnistis sitrella*). This belongs to the vermin butterflies (*Lepidoptera*) bunch and moth family (*Lepidoptera*), mainly their small caterpillar damage plants. This insect spreads in the Asia countries — Afghanistan, India, Indonesia, Iran, Malaysia, etc., South America, Australia and Georgia.

Recently, the citrus mining moth (Figure 1, 2) widely spreads in the Lankaran-Astara region and damages all the citrus plants except lemon and tangerine plants. Our researches show that the citrus mining moth produces six generations a year. Two generations are in spring, four generations are in summer and autumn.

Figure 1. Mature individual

Figure 2. Larvae of a mature individual

A length of the butterfly body is 2,1 mm, with the wings open it is 4,8 mm. A head is white, the eyes are black and vivid. The front wings are silvery white in color and look like sharp leaves. There are two black lines in the inner corner of the wings, but two black spots in the part near the ends. The back wings are thin and needle-shaped. The stomach is silvery white. Females are larger than males. Six days after mating the butterflies lay eggs on the young sprouts and new leaves. Its egg is bright white, oval-shaped, length is 0,27 mm.

The caterpillars that hatch are green, then it turns yellowish. Forehead part of the caterpillars' head is approximately square-shaped bulge, the first and second joints are full square-shaped, but the tail part is thin and sharp. Most of the head is yellow, and a small part is reddish-yellow. A length of the adult caterpillars is 3,6 mm. The caterpillars are fed with parenchyma on the middle and end part (Figure 3, 4), curved bright paths (sap) open. As a result, Photosynthesis process on the leaves weakens and the leaves fall prematurely. The caterpillar spends 4 years in its development period. Before pupation, the caterpillars form small depressions on the middle and end parts of the leaves, they build a nest and pupate. 3-5 caterpillars feed and pupate on a leaf. Pupation of the last generation occurs in the II-III decade of November. The pest continues its development in greenhouse conditions without going on into diapauses.

The pupa is longish –shaped, thin and sharp on both sides. Before it is light, then dark-yellow and at last it becomes dark brown. There are 4 long hairs on the upper surface of the abdomen.

Intensive reproduction of the pest falls on the period of development of new sprout. The female individuals lay averagely 45-50 eggs. A summer generation of the pest completes its generation development in 15-21 days. The sewerage citrus moth is one of the most dangerous pests. The leaves formed on fresh shoots of plants infested with the pest fall and then fall, the plant

Т. 10. №7. 2024
https://doi.org/10.33619/2414-2948/104

remains underdeveloped, the productivity decreases. Spreading of the pests in plants was averagely 19,5% in 2019-2020.

Figure 3. The damaged leaves

Figure 4. The damaged leaves

The agro-technical fight measures against pests should be allowed after neutralizing the transportation of planting material, prematurely shed leaves and dry branches should be cut and burnt, excess sprouts and leaves should be torn out because the moth feeds with the new sprouts and leaves, frequent irrigation and fertilization of plants shouldn't be allowed in order to prevent the intensive reproduction and damage.

When all these agro-technical and mechanical measures are realized, 22,5-24,0% of efficiency is obtained [4].

The chemical fight measures were also tested against pests in addition to the agro-technical and mechanical measures [1, 2].

Three preparates which are different affective substances have been used in the experiment. The consequences of the experiment are shown on the following Table.

Table

CONSEQUENCES OF CHEMICAL FIGHT
(Lankaran Tea Branch, lemon and tangerine garden)

Name of preparate	*Affective substance*	*Filthiness (%)*	*Biological rationality, %*
Hekplan	20% asetamiprid	0,15	95,9
Volsamost	Asetomipirin	0,15	73,7
Hekvidor	350 g/t imidacloprid	0,07	98,8
Control (chemical fight)	-	-	-

It is shown on the Table that it is applied against citrus mining moths, 15% hekplan, 0,15% volsamost, 0,07% hekvidor gave 95,9…..73,7… and 98,8 biological efficiency. 0,5% hevidor and 0,15% hekplan insecticides gave much more biological efficiency. The chemical fight possesses great importance in addition to agro-technical and mechanical fight against mining moth that damages lemon and tangerine plant.

Conclusions

1. Conduction of the agro-technical and mechanical fight measures against citrus mining moth gave 24,0% efficiency.

2. Hekvidor and hekplan insecticides like the chemical fight measure against this pest gave 98,8% and 95,9% biological efficiency.

References:

1. Akhundzade, I. M. (1950). Tsitrusovye rasteniya v Azerbaidzhane. Baku. (in Russian).

2. Mamedova, S. R. (1974). Vrediteli plodovykh i subtropicheskikh kul'tur v Azerbaidzhane i bor'ba s nimi. Baku. (in Russian).

3. Mamedova, S. R. (2000). Osnovnye vrediteli i bolezni sel'skokhozyaistvennykh kul'tur (dlya fermerov). Baku.(in Azerbaijani).

4. Dahmane, M., & Chakali, G. (2020). Distribution pattern of developmental stages of Phyllocnistis citrella Stainton (Lepidoptera: Gracillariidae) on the surface of citrus leaves. *Polish Journal of Entomology*, *89*(1), 1-6. https://doi.org/10.5604/01.3001.0014.0230

Список литературы:

1. Ахундзаде И. М. Цитрусовые растения в Азербайджане. Баку: Шарг, 1950.

2. Мамедова С. Р. Вредители плодовых и субтропических культур в Азербайджане и борьба с ними. Баку: Азернешр, 1974.

3. Məmmədova S. R. Kənd təsərrüfatı bitkilərinin əsas zərərvericiləri və xəstəlikləri (fermerlər üçün). Bakı, 2000.

4. Dahmane M., Chakali G. Distribution pattern of developmental stages of Phyllocnistis citrella Stainton (Lepidoptera: Gracillariidae) on the surface of citrus leaves // Polish Journal of Entomology. 2020. V. 89. №1. P. 1-6. https://doi.org/10.5604/01.3001.0014.0230

Работа поступила
в редакцию 30.05.2024 г.

Принята к публикации
11.06.2024 г.

Ссылка для цитирования:

Akbarova U., Malikov A., Azizli N. *Phyllocnistis citrella* Stainton, 1856 Control Methods in the Lankaran-Astara Region // Бюллетень науки и практики. 2024. Т. 10. №7. С. 104-108. https://doi.org/10.33619/2414-2948/104/14

Cite as (APA):

Akbarova, U., Malikov, A., & Azizli, N. (2024). *Phyllocnistis citrella* Stainton, 1856 Control Methods in the Lankaran-Astara Region. *Bulletin of Science and Practice, 10*(7), 104-108. https://doi.org/10.33619/2414-2948/104/14