IRSTI 68.37.13 https://doi.org/10.26577/eb.2023.v94.i1.01

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PHYTOSANITARY MONITORING OF COTTON PESTS

The article describes the route calculation of pests found in cotton fields sown in different periods of practice by farms of the Turkestan region. In connection with the current market economic competition for cotton crops, the most important direction in today's field of science is to increase productivity with minimal costs. Phytosanitary monitoring work is the main part of protecting cotton from pests. A determining factor for making the right decision in the approach to pest control in the field of plant protection and determining the number of treatments and timing of spraying. Therefore, a route survey was carried out in the conditions of the Turkestan region.

In a directional study, it was found that cotton moths settle on cotton fields on average on 1m2-0.5-2 pieces. In the conditions of the Turkestan region, 18-20 pieces per 100 plants were found in the cotton crop, exceeding the threshold of economic harm with pest drugs Dimilin 48% H. K., (0.1 L/ha), Tagrel E. K., (1.5 l/ha); Lyatrin E. K., (0.5 l/ha); Petra 5% H. K., (0.5 l/ha); Karate, 050 H. K., (0.5 l/ha) spraying was carried out. The spread of cotton root rot was 1.5% -11%, the development was 1.0 – 12%, and the spread and development of cotton gommosis was 1-3%.

Key words: cotton, pests, cotton trowel, caradrina, winter trowel, common spider mite, cotton root rot, gommosis, monitoring.

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Мақта зиянкестерінің фитосанитарлық мониторингі

Мақалада Түркістан облысы шаруа қожалықтарының тәжірибе мөлтегінде әр мерзімде егілген мақта егісінде кездесетін зиянкестерге маршруттық есептеу жұмыстары жайлы баяндалған. Мақта дақылын қазіргі заман талабына сай нарықтық экономикалық бәсекеге байланысты, шығынды аз жұмсап, өнімді жоғарылату бүгінгі ғылым саласының ең басты бағыты. Фитосанитарлық мониторинг жұмысы мақтаны зиянкестерден қорғаудың негізгі бөлігі. Өсімдік қорғау саласындағы зиянкестермен күресу тәсілінде дұрыс шешім қабылдауға және өңдеу саны мен бүрку мерзімдерін анықтаушы фактор. Сондықтанда Түркістан облысы жағдайында маршруттық зерттеу жұмыстары жүргізілді.

Бағыттағы зерттеуде мақта алқаптарына мақта көбелегі орта есеппен 1м^2 жерде -0,5-2 дана қоныстанғаны анықталды. Түркістан облысы жағдайында мақта дақылында 100 өсімдікке 18-20 данадан кездесті, экономикалық зияндылық шегінен асқанда зиянкестерге қарсы препараттармен Димилин 48% с.к., (0,1л/га), Тагрел э.к., (1,5л/га); Лятрин э.к., (0,5 л/га); Петра 5% э.к., (0,5 л/га); Каратэ, 050 э.к.,(0,5л/га) бүрку жұмыстары жүргізілді. Мақта тамыр шірігінің таралуы – 1,5%-11%, дамуы 1,0-12%, ал, Мақта гоммозының таралуы мен дамуы 1-3%-ды құрады. Жапырақтың зақымданған жерлері бірнеше күннен кейін астынан қоңырланып, үстінен қызарып шыға келеді.

Түйін сөздер: мақта, зиянкес, мақта көбелегі, карадрин жер үсті көбелегі, күздік көбелек, кәдімгі өрмекші кене, тамыр шірігі, гоммоз, мониторинг.

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Фитосанитарный мониторинг вредителей хлопчатника

В статье рассказывается о маршрутном мониторинге вредителей встречающихся посеянном в опытах крестьянских хозяйств в разные сроки на хлопковом поле Туркестанской области. В связи с современной рыночной экономической конкуренцией хлопчатника повышение урожайности при минимальных затратах является важнейшим направлением современной науки. Фитосанитарный мониторинг является один из основных мероприятий по защите хлопчатника от вредителей. Определяющим фактором в борьбе с вредителями в защиты растений является своевременное применение обработки и сроки опрыскивания. Поэтому в условиях Туркестанской области были проведены маршрутные обследования. Изучены вредители хлопчатника при маршрутном обследовании в хозяйствах Туркестанской областей. Установлено, что хлопковая совка встречаются в среднем на 1м^2 по – 0,5- 2 экз/шт. В условиях Туркестанской области на хлопковой культуре встречается 18-20 штук на 100 растений. При превышении экономического порога вредоносности использованы препараты Димилин 48% с.к., (0,1 л/га), Тагрел э.к., (1,5 л/га); Лятрин э.к., (0,5 л/га); Петра 5% э.к., (0,5 л/га); Каратэ, 050 э.к., (0,5 л/га). Пораженные растения с корневыми гнилями и гоммоза составляли – 1,0-12%, и 1-3%.

Ключевые слова: хлопчатник, вредители, хлопковая совка, карадрина, озимая совка, обыкновенный паутинный клещ, гниль корней хлопчатника, гоммоз, мониторинг.

Introduction

The cotton industry is one of the most valuable raw materials for the production of food products. In its importance, it is on the same line as wheat in the country's economy. The value of cotton for the national economy is determined by a huge range of its use. For example, from 1 T of cotton raw materials, you can get 320 – 340 kg of fiber, 560 – 580 kg of cotton. In turn, from 34 kg of fiber, you can get 3500 m2 of fabric, and from 580 kg of cotton – 112 kg of vegetable oil, 10 kg of soap, 270 kg of sesame seeds, 170 kg of husks and 8 kg of lint. It is the basis for the production of various types of refined oils, soaps, washing powders, linoleum, sealing tapes, artificial leather [1].

"I don't know," he said, " but I don't know, and I don't know, but I don't know, and I don't know, and I don't know, and I don't know, and I don't know, and I don't know." Currently, there is a reduction in acreage and a decrease in crop yields. Cotton is grown in the country in the southern regions of Kazakhstan, including Zhetysai, Maktaaral, Shardara, Keles, Saryagash and Turkestan, Ordabasinsky districts [2].

Phytosanitary monitoring is considered the main part of protecting cotton from pests. The determining factor for making the right decision in the approach to pest control in the field of plant protection and the number of treatments and timing of spraying.

Currently, the introduction and development of crop rotation in cotton production, the use of a correct and effective tillage system, improving the reclamation status of irrigated land, moisture and precipitation in the soil composition on the ground – in addition to the effective use of water, irrigation in winter, improving the culture of the agricultural system, the organization of seed production, the use of organic, inorganic and mineral fertilizers in accordance with the peculiarities of biological development of crops, the formation of mechanization of all advanced agrotechnical measures, the timely application of rational directions of Agriculture in general.

The high yield of cotton per hectare directly depends on the introduction of agrotechnical measures into production. It is necessary to carry out a set of other measures: tillage, sowing methods, the amount of sowing, the use of local and mineral fertilizers in the required amount, weeding and the use of agrotechnical and chemical methods, protection from pests and diseases, mechanization of weeding and harvesting operations and irrigation.

In recent years, the issue of rational use of irrigated cotton crops by peasant farms, protection

against diseases, pests and weeds, timely use of insecticides in accordance with the requirements of the time, improving the quality of cotton products, and the ability to carry out phytosanitary monitoring in a timely manner is also relevant.

Within the framework of timely phytosanitary monitoring, it is possible to get a high-quality, rich harvest only by applying various agrotechnical methods to cotton, spraying pests without bringing them to the limit of economic harmfulness. In the data of phytosanitary monitoring, depending on the density of harmful organisms in cotton crops, the threshold of economic harmfulness, there is a need to correctly apply effective methods of plant protection systems.

In the conditions of the Turkestan region, cotton crops are affected by numerous pests and specialized ones: common spider mites, moths: autumn, caradrin and cotton moths; aphids (cotton or garden, alfalfa or Acacia, large cotton) [3,4,5]. Larvae of multi-feeding pest rodent butterflies (autumn and wild butterflies), starworms and caterpillars of crested and planed beetles, etc [6,7].

In order to protect cotton crops from pests, phytosanitary monitoring was carried out in Turkestan region.

Objects and methods of research

The distribution of phytophages in cotton fields was determined on the basis of periodic route studies in the Turkestan region. Before sowing cotton in the unprocessed area in early spring 2020, as in autumn, an inspection was carried out. To calculate the wintering pupa, a sample was taken in 20 microdistricts with a size of 0.25 m^2 (50x50cm) in an uncultivated area with a depth of up to 10cm; in an uncultivated area with a depth of up to 20cm was taken.

100 plants (5 plants in each sample) were examined in each field to take into account the eggs of cotton butterflies and starworms. The samples were numbered and placed at the same distance on two diagonals, and the eggs of the cotton brown butterfly and caradrin land moth and its entomophages, the number of starworms according to their age, the type of entomophages and the stage of development (Imago, larva, egg) were examined and calculated. During each examination, the upper buds of the Cotton, the lower and upper sides of the leaves, the fruit organs – flowers, nodes, tops-were examined.

In spring and summer, the flight of cotton butterflies in cotton and corn fields continued from May until the end of the growing season, placing pheromone traps on the microdistricts and hanging them in 2-3 pieces on a field with an area of 3 hectares.

Work on the calculation of the butterfly was carried out every 5 days and the data was entered in the log [8,9,10]. Indicators of the number of butterflies caught in the trap with the period of mass flight of the cotton butterfly, the peak of flight was established and the period of egg laying during the mass flight of butterflies was determined. In autumn, after harvesting cotton crops, in the same microdistrict and in the fields of corn and alfalfa, along the road, the number of pupae for wintering on 1 m^2 was calculated, which was taken to predict the growth and spread of pests next year. The method of verification works is the same as the calculation works in the spring.

The effectiveness of protective measures to combat the cotton moth depended on setting deadlines for their implementation. Starworms stay on the surface of damaged plants for a short time, then enter cotton husks or corn cobs, and therefore bioagents (trichogram, gabrobrakon, chrysopidae) were sent to a stationary microdistrict [11,12,13, 14]. For the reproduction of trichograms, gabrobracon, goldenrod, it was not allowed to infect them with ticks, and grain and nutrient mixtures with warehouse pests. Products imported from the warehouse and granary were sterilized in autoclaves before use [15,16,17].

Testing or spraying of insecticides against cotton pests was carried out according to the methodological instructions of preparations registered in agriculture. When carrying out plant protection measures, an assessment of their biological, economic and economic efficiency was made. The biological effectiveness of the use of insecticides against pests was determined by the Abbot equation below:

$$Be = \frac{a-b}{a} \times 100$$

here:

B_e-biological efficiency, % number of pests or reduced damage to various plant organs;

a – the number of live individuals of the pest under control (per plant or per square meter) as of the reporting day;

b – the number of live individuals of the pest (per plant or per square meter) or affected plants in the experiment as of the reporting day [18]. According to the product indicators of each variant, the economic efficiency of the tested chemical preparations

was determined. Mathematical processing of the obtained data on product indicators was carried out by the method of dispersion analysis [19].

In experimental microdistricts, where experimental work is carried out, control works are carried out in full in the spring and throughout the growing season, when pests appear, in the resulting microdistricts. After processing the degree of damage to the plant, the total number of plants and their damage were calculated at the same calculated distances in the microdistrict for 3,7,14 days. The economic effectiveness of using biological agents against harmful moths in cotton was determined by collecting all raw cotton products in the microdistrict by hand (1st, 2nd collection) or by combine harvesters. If necessary, the volume of stored products was determined by collecting products in Model microdistricts [20].

The limit of economic harmfulness of the cotton moth (ESR) is 6-8 eggs per 100 plants in cotton, or 8-10 starworms or pheromone traps – 8-10 butterflies per day in 1 holder, where spraying was carried out and entomophages (trichograms, golden eyes and poisons) were released [3,21, 22]. The effectiveness of protective measures to combat the cotton moth also depended on the timing of their implementation. The starworm was only a short time in the affected cotton leaf, then penetrated into the cotton husk and corn cob, and was not destroyed after sowing insecticides, so trichograms were sent to the cotton field against the cotton moth 3 times in each generation, and gabrobracon to the starworm [23,24,25,26].

Research results and their discussion

Research in experimental microdistricts of peasant farms located in the Turkestan region, the number of pests encountered in the work on calculating the route route for pests found in cotton fields sown in different periods (Table 1).

A type of pest found in the cotton field: the Cotton brown butterfly – Heliothis armigera Hub., caradrin, or small terrestrial butterfly-Spodoptera exigua Hbn., the common spider mite – Tetranychus urtica Koch., the great cotton Beetle – Acyrthosiphon gossypii Mordv., garden aphids or cotton aphids – Aphis gossypii Glov., alfalfa aphids-A. craccivora Koch., autumn butterfly (Agrotis segetum Schiff), wild butterfly (Euxoa conspicua Hb). There were many polyphages in cotton, and only about 10 species of multi-feed pests and specialized pest species caused significant crop losses.

The economic and biological effectiveness of phytosanitary monitoring and protection measures against pests that planted cotton crops in different seasons and cultivated them in different technological ways was demonstrated. The species composition of pests found in cotton crops is determined.

Cotton moth-Helicoverpa armigera Hubn. The pest is distributed in the south and south-east of Kazakhstan. Foci of spread and damage of the cotton moth are distributed in the cotton fields of Turkestan region, in the corn fields of Almaty region, in the fields of corn and melons of Zhambyl region.

Wintering pupae of the cotton moth spring research work was carried out on a total area of 9,610 thousand hectares. The population was 1,3,5,7 thousand hectares. The population density of cotton butterfly dolls ranged from 0.3 to 3 pieces per square meter. In the conditions of the Turkestan region, 75% of pupae (13% sick and 12% dead) overwintered comfortably. Summer studies of the cotton moth starworm were carried out on an area of 206,190 thousand hectares. The settled area was 47,947 thousand hectares. The area of land to be cultivated was 34,870 thousand hectares.

The flight of the first generation of the cotton butterfly was recorded in the first decade of May. The first generation of starworms appeared in the third decade of May, its number per square meter was 0.5-2 pieces. The flight of the second generation of the cotton butterfly was recorded in the first decade of July, the appearance of starlings occurred in July, in the conditions of the Turkestan region, the cotton crop reached 15-18 pieces per 100 plants. The flight of the third generation of cotton butterflies was recorded in the first decade of August, and pupation was recorded in the third decade of August.

The density of pupae for wintering in Turkestan region is up to 3 pieces per square meter, and in Ordabasy district-0.2-1.0 pieces per square meter.

Forecast: in 2021, the planned volume of chemical treatment against cotton moth starworms amounted to 36,666 thousand hectares, including 26,366 thousand hectares in cotton fields and 10.3 thousand hectares in corn fields.

Table 1 – Phytosanitary monitoring of pests and diseases in cotton fields, data, 2020-2021.

Peasant farms	District, ga	Cotton butterfly, per 100 plants/ piece	Caradrin or ground butterfly, per 100 plants / piece	Common spider mite per 100 plants / piece	Autumn butterfly, PCs/м^2	Cotton root with rot damage, %	Cotton gommosis infection, %
Maktaaralsky district, Karakaysky district»`	10	10,8	7,1	87,8	0,3	6,5	3,0
Maktaaralsky district, «Tansholpan»	10	11,6	8,3	99,5	0,2	5,2	2,7
Maktaaralsky district, Atameken «Arai»	8	11,2	8,3	99,6	0,3	1,0	1,9
Maktaaralsky district, Nurlybayev «Berek»	5	12,6	8,6	90,5	0,2	12,0	2,8
Saryagash district, «Unity»	5	10,9	7,8	103,3	0,4	1,5	2,6
Shardarinsky district, Zhaushykum «Korasan Ata»	5	11,3	7,1	101,9	0,2	8,9	1,0

Spring research on the common spider mite – land used for agriculture-was carried out on an area of 12,230 thousand hectares, and the settlement amounted to 1,738 thousand hectares. Spider mites were detected in cotton fields of Turkestan region.

During the spring period, overwintering of spider mites, the appearance of weeds was recorded in the first decade of May, up to 4% in the case of Zhambyl region (0.5 pieces per square meter), and more than 18-20% in the case of Turkestan region.

Summer research work on the settlement of the common spider mite was carried out on an area of 256,210 thousand hectares, and its settlement – 46,720 thousand hectares. The land to be cultivated is 31,100 thousand hectares.

In the conditions of the Turkestan region, the density of pest settlement on cotton was 18-20% (in cotton fields, the pest reproduces by giving 13-15 generations). Autumn surveys of agricultural land were carried out on an area of 13.78 thousand hectares, and 2.182 thousand hectares were settled. During the autumn monitoring, in the conditions of the Turkestan region, the population in the studied area did not exceed 8-10%.

Forecast: in 2021, the volume of planned protective measures to control the dynamic number of common spider mites amounted to 32.25 thousand hectares, including 15.15 thousand hectares in cotton fields.

Caradrin, or ground butterfly-Spodoptera exigua Hb. In the conditions of the Turkestan region, the pest is covered with a plan of 41.0 thousand hectares, of which summer research on starworms is carried out on an area of 37.2 thousand hectares, and its settlement is recorded on 9,178 thousand hectares. The area with a high number of starworms with a high threshold of economic harm (EIS) was 5.46 thousand hectares, which is 4.99 thousand hectares less than last year (10.45 thousand hectares).

Pupation of caradrin, or ground butterfly starworms, was recorded in the second decade of April. The first flight of butterflies of the first generation was observed on May 8, and the mass flight was observed on May 15. Egg laying is scheduled for June 15. The first birth of starworms of the first generation was recorded on June 18, and the mass birth was recorded on June 24. The pupation was determined on June 26. The flight of the second-generation butterfly began on July 5, and the laying of butterflies began on July 12. The birth of the second generation of starworms began on July 18, pupation-on July 28.The flight of butterflies of the third generation was recorded on August 17, laying eggs on August 21. The release of the third generation of starworms began on August 22, pupation began on September 20, and mass pupation began on September 27.

Forecast: in 2021, the number of cotton pests will not increase, but the development of the pest may be affected by the weather. It is expected that in 2021, chemical treatment will be carried out on an area of 5.46 thousand hectares.

Autumn butterfly-Agrotis segetum Schiff. In the southern region, the first pupation of autumn starworm butterflies was recorded on April 22. The first flight of butterflies was recorded on May 2-14, the second – on May 14-19. The birth of starworms was

observed in the third decade of May, with an average density of 0.1-0.4 pieces per 1 square meter. The mass release of starworms was recorded in the first decade of June. Their average density per 1 square meter was 0.2 pieces in cotton field and 0.2 pieces in corn field. The flight of butterflies of the new generation is marked from July 5-10, laying eggs – on July 13. From July 15-18, the birth of starworms was determined. The number of starworms per 1 square meter was 0.2-0.3 pieces.

Forecast: in 2021, the number and harmfulness of rodent butterflies will depend on the wintering of the pest, weather conditions in the spring and summer period, as well as on the results of timely agrotechnical measures.

Cotton root rot-Thielaviopsis basicola Ferraris. Monitoring works to detect the disease in the conditions of the Turkestan region were carried out from May 7 to August 29. The first signs of the disease in cotton fields were recorded on May 14 in Zhambyl rural district of Maktaaralsky district on an area of 0.002 thousand hectares to a lesser extent. Then the disease was registered in Zhetysai district. Compared to last year, the infected area has increased due to the climatic conditions of the weather and last year's preservation of the infectious fund. In general, in the conditions of the Turkestan region, 3.18 thousand hectares of land were examined, the infected area amounted to 0.356 thousand hectares, distribution – 1.5% -11%, Development-1.0-12%.

Cotton gommose-Xanthomonas campestris pv. In the conditions of the Turkestan region, a total of 2,860 thousand hectares of land were examined for the study of the disease. Symptoms of the disease were observed on May 29 in the farm "Karakai" of Maktaaralsky district in the initial degree of development. The total damage amounted to 0.002 thousand hectares. Distribution and development was 1.0-3.0%. Compared to last year, the infected area decreased by 0.003 thousand hectares. This was facilitated by the timely implementation of agrotechnical measures and seed treatment.

Forecast: in 2021, in the absence of compliance with crop rotation, agrotechnical and chemical measures, the spread of cotton gommosis is quite possible.

Conclusion

In the experimental microdistrict of peasant farms, work was carried out to calculate the route route for pests found in cotton fields sown in different periods. In the study of the route on the route, it was found that the cotton moth settled in cotton fields on an average of $1m^2$ – 0.5-2 pieces. Starworms of the first generation of the cotton moth appeared in the third decade of May, its number per square meter was 0.5-2 pieces. Starworms of the second generation of cotton butterflies in the conditions of the Turkestan region were found in the cotton crop in the amount of 18-20 pieces per 100 plants, in microdistricts that exceeded the threshold of economic harmfulness, in the pest control experiment Dimilin 48% s.k., (0.1 L/ha), and in other farms Tagrel e.k., (1.5 l/ha); Lyatrin e.k., (0.5 l/ha); Petra 5% e.k., (0.5 l/ha); karate, 050 e.k.,, (0.5 l/ha) was sprayed with preparations. The prevalence of cotton root rot was 1.5% -11%, the development was 1.0 – 12%, and the prevalence and development of cotton gommosis was 1-3%.

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