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Bioecology And Phenological Development Of The Californian Shield (Quadraspidotus Perniciosus Comst.) In Uzbekistan

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ABSTRACT

Dangerous coccids are widespread in Uzbekistan. Of these, the Californian shield insect is a quarantine pest. It damages many plants. It damages apple, pear, plum, quince, peach, almond, hawthorn, elm, poplar and others. Diapausing larvae of the first instar overwinter, covered with a dark gray or black shield. In spring it feeds heavily, molts and forms a scutellum similar to that of an adult female. After the second molt, adult females form. After mating, the female gives birth to vagrant larvae, which creep along branches and leaves, and can also settle on fruits. He gives rise to the next generation.

KEYWORDS

Female, male, larva, phase, cycle, larvae.

INTRODUCTION

Californian shield insect (Quadraspidotus perniciosus Comst.) - one of the most serious pests of fruit, greenhouse, ornamental crops, forests and parks in Uzbekistan. In the republic, it is subject to internal quarantine. Until now, the

biology, ecology, harmfulness, distribution of the Californian shield insect and measures to combat it in the republic have been insufficiently studied. The harmfulness of the Californian shield insect is very high [3].



Figure: 1. Strollers 1st age



Figure: 2. Harm of the Californian shield insect on a pear

The California shield insect has been registered with the EPPO through the European and Mediterranean Plant Protection Organization, European and International Plant Protection Organization (EPPO / EOKZR): under the

code QUADPE. Scientists have carried out and studied the Californian shield insect under the synonym *Aonidiella pernicioso*, *Aspidiotus perniciosus*, *Diaspidiotus perniciosus*, *Quadraspidotus perniciosus* and *Comstockaspis pernicioso* [3].



Figure: 3. Imago of the 2nd instar of the Californian shield insect.

In Uzbekistan, the pest most intensively multiplies on apple, quince, pear, plum, cherry plum, cherry, peach, apricot, walnut, willow, lilac and rose hips. During

mass reproduction, the Californian shield insect inhabits all aboveground parts of trees: stems, branches, leaves and fruits. On the leaves there are mainly male

nymphs and larvae of the 1st and 2nd instars; all stages develop on the fruits. Small red spots are formed on the inhabited fruits as a result of the nutrition

of the shield insects. Fruits inhabited in the early stages acquire an ugly shape [4,5].



Figure: 4. Harm of the Californian shield insect on the apple tree.

Due to the nutrition of the Californian shield insect, the growth and development of trees slows down, the annual growth and the number of growing shoots decrease; individual branches dry up, and young trees at the age of 2–5

years, heavily populated with scabbard, completely die. Observations have shown that the shield insect has a selective ability in relation to various varieties of apple and pear [1,2].



Supervision with plant quarantine inspectors



Damaged apple fruit



Injured Apple Horn

PURPOSE OF THE RESEARCH

To study the phenological calendar of the development of the Californian shield insect. The pest in Uzbekistan develops in three generations. Hibernates at the stage of 1st instar larvae under a dense large black shield on the bark of tree trunks and branches. The overwintered larvae wake up in spring at a temperature of $\pm 10-15^{\circ}\text{C}$ with the beginning of sap flow in plants. The number of pests is significantly influenced by climatic features. The air temperature of the winter and spring periods is the determining factor in the life cycle of the pest, shifting the timing of the onset of stages in one direction or another within $\pm 8-12$ days. In the conditions of the Tashkent region, the beginning of molting of the 1st instar larvae in the wintering generation begins in the middle of the 2nd decade of March at an average daily air temperature of $\pm 12-15^{\circ}\text{C}$. The bulk of the 2nd instar larvae turn into females at the beginning of the 1st decade of April. They feed heavily, their body increases in size and mate at the beginning of the 2nd decade of April. In the middle of the 3rd decade of April, a massive flight of males takes place. A month after mating, at the beginning of the 2nd decade of May - until the middle of the 1st decade of June, the females give birth to vagrant larvae. By the beginning of the second decade of

June, larvae of the 1st instar and single larvae of the 2nd instar are found in nature in nature. The development of the second generation of the shield insect begins in the first decade of July. At the end of the second decade of July, numerous colonies of 1st instar larvae of the 2nd generation are observed on branches, leaves and fruits (apple, pear and plum). In the third decade of July, the larvae move to the 2nd instar, and at the beginning of August they turn into females. Hatching of larvae of third generation vagrants occurs at the end of the 2nd decade of August and lasts until the end of the 1st decade of September. The beginning of molting of the 1st instar larvae is observed in the 1st decade of September and continues until the middle of the 3rd decade of the month. 2nd instar larvae turn into females at the end of the 2nd decade of September. The flight of males takes place at the beginning of the 3rd decade of September. At the beginning of the 1st decade of October, the females begin hatching of larvae, and it lasts until the end of the 2nd decade of October. At the end of the 1st decade of November, in nature (on the leaves of apple and plum trees), larvae of the 1st and 2nd instars are found in mass, which later go to winter.

Table 1.

Phenological calendar of the development of the Californian shield insect (Tashkent region, 2018-2019).

Generations	March			April			May			June			
	I	II	III	I	II	III	I	II	III	I	II	III	
1st Generation													
													
													
													
													
													
2nd generation													
													
3rd generation													
 Egg  Larva  Imago  Reproduction Stage													

July			August			September			October		
I	II	III	I	II	III	I	II	III	I	II	III
●											
🐛											
●	●	●	●								
●	●	●	●	●							
	●	●	●	●	●						
			🐛	🐛	🐛						
				●	●	●	●	●			
					●	●	●	●	●		
						●	●	●	●	●	
									●	●	●
● Egg	🐛 Larva	● Imago	●	●	●	●	●	●	●	●	●

(This table is based on the Tashkent region.) In the southern part of the country, the retreat of the California shield was on the 1st day of February, and the wintering was observed in November.)

RESULTS AND CONCLUSIONS

Thus, the development of the 1st generation of the pest lasts from the 3rd decade of March to the middle of the 1st decade of July, the 2nd generation - from the 2nd decade of June to the 3rd decade of August, the 3rd generation - from the 1st decade of August to the end of the 2nd decade of October. The full developmental cycle of the 1st generation lasts $\pm 43-53$ days, the 2nd generation $\pm 42-45$ days, and the 3rd generation $\pm 66-82$ days. The fecundity of females of the 1st generation is $\pm 75-95$, of the 2nd generation $\pm 125-155$, of the 3rd generation $\pm 110-130$ of vagrant larvae. It should be noted that the 1st and 2nd generations as well as the 2nd and 3rd generations develop in parallel for a long time. Non-simultaneous hatching of larvae leads to the overlap of development dates for different generations. In this regard, in summer, the simultaneous development of all stages of the scale insect is observed. Therefore, during this period, insecticides can be effective, destroying all stages of the pest. The Californian scale insect is distributed mainly with planting and grafting materials. In addition, vagrant larvae can be carried by wind, water, birds, or actively spread through the trees growing nearby.

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