



OPPORTUNITIES FOR IMPROVING METHODS FOR PREDICTING THE DISTRIBUTION OF THE APPLE WORM (CARPOCAPSA POMONELLA L)

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Article history:	Abstract:
Received: 11 th September 2022	It is determined that the apple worm (<i>Carpocapsa pomonella</i> L) started damaging the trees after they were infected. In this case, the apple worm causes a certain amount of economic damage to fruits, by predicting their spread in advance, it is possible to take countermeasures before causing economic damage. This article presents experiments on the development of methods for predicting the spread of apple worm in advance.
Accepted: 11 th October 2022	
Published: 20 th November 2022	

Keywords: Thermal, prediction, insect, apple, butterfly, egg, larva

Apple worm (*Carpocapsa pomonella* L) is a pest of the family of leaf-eaters. It is widespread in Europe, Crimea, Caucasus, Afghanistan, Iran, Turkey and Central Asian countries. This pest seriously damages apple fruit, sometimes pear, quince, apricot, peach and pomegranate.

Apple worm, if not prevented, damages 60-70 percent of the fruit. Fruits infested with the pest will drop, the quality will be low. This pest belongs to the group of oligophagous insects. During the development period, the insect goes through complete developmental phases. That is, the egg, worm, pupa, and adult imago go through the stages of a butterfly. The mouth of the apple worm is gnawing and is of the hypognathic type. This pest causes serious damage to fruit trees with more seeds. The forewings of the appleworm butterfly are dark gray and 14–22 mm when recorded. is equal to, the back side of the wings is lighter. The body of the worm is liquid, and the back is pink. Adult worms overwinter in cobwebs under the bark, cavities in apple tree cracks and branches, in apple storage, in the surface layer of soil, and under leaves.

In early spring, when the air temperature does not fall below 10 degrees on average, when the apple buds are getting color, the worms turn into pupae. 2-3 weeks after the apple blossoms, butterflies begin to emerge from the bud. That is, they pass to the period of adult imago. Butterflies fly above the tree mainly after dark. When the female is 15 degrees, she lays eggs on the leaves and nodes on the top of apple, pear, quince, apricot, peach and pomegranate branches. Apple worm infestation is more severe in the upper part of the trees.

Research objective: Development of a device for remote prediction of apple worm

A device for predicting apple worm based on thermal resources was developed. The device works at a voltage of 5 volts. It can be connected to a solar battery and a 220 volt network. Placed in a box made of plastic material. The device consists of sensors that show the relative humidity, temperature, amount of gases, soil temperature, the amount of water covering the plant body and how long it has been left in the plant body. The information received from the sensors can be mathematically processed and sent to the phone and the central computer about the probability of the appearance of a harmful organism. The device is placed 1.5 meters above the ground in field conditions. The soil temperature sensor is buried in a 5 cm soil layer.

Table 1

Development of apple worm (*Carpocapsa pomonella* L) based on thermal resources

№	Phases of pest development	Butterflies	Larvae	Sum of effective temperature		Phases of pest development
				1st generation	2nd generation	
1.	To appear	5	0	75-120	600-620	To appear
2.	An increase in the number	25	1-2	170-190	680-700	An increase in the number
3.	suddenly increase in number	50	25-30	260-270	960-980	suddenly increase in number
4.	Decrease in number	75	45-50	370-380	1140-1160	Decrease in number
5.	Completion of development	95	70-75	480-520	1300-1350	Completion of development

The data received from the sensors are sent to the website in EXEL, PDF, CSV and other options. Based on the received information, decisions are made regarding the use of chemical or biological control. The apple bollworm prevalence and density predictor is based on the data in Table 1. By analyzing the thermal resources in the place installed in the field, it is possible to get information about the development of the apple worm.

In conclusion, it is possible to predict the spread of the apple worm *Carpocapsa pomonella* L and the development phases in the field with the help of the device developed at Khorezm Ma'mun Academy.

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