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NATURAL ENTOMOPHAGOUS INSECTS IN POMEGRANATE AND DATE PALM AGROCENOSES OF THE SOUTHERN REGIONS OF UZBEKISTAN AND THEIR ROLE IN PEST CONTROL

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Abstract

This article analyzes natural entomophagous insects widely distributed in pomegranate and date palm agrocenoses and their significance in pest control. The study provides information on parasitoids belonging to the species *Pseudaphycus malinus* and other entomophagous insects effective against pests. The results justify the prioritization of biological control measures for the production of environmentally safe agricultural products without the use of chemical pesticides.

Keywords: Comstock mealybug, pomegranate, date palm, agrocenosis, entomophagous insects, *Pseudaphycus malinus*, biological control, parasitoids, predatory insects

Introduction

In Uzbekistan, significant sectoral measures have been implemented to modernize agriculture, particularly to establish export-oriented production systems. As a result, the cultivation and export volumes of agricultural products have steadily increased. Uzbek agricultural products are known to be in high demand on international markets. Agrologistics services, including the packaging of fruits and vegetables according to international standards and their shipment to foreign buyers, are gradually developing. The production and supply of agricultural products that meet high quality and safety standards enable export to countries worldwide.

The country's favorable natural and climatic conditions provide substantial opportunities for agricultural production. When exporting locally produced agricultural commodities, their phytosanitary status must be satisfactory, as high-quality and safe products consistently find buyers abroad. Therefore, agricultural products must be free from harmful organisms.

Results

Monitoring studies were conducted from 2022 to 2024 to determine the species composition of natural entomophagous insects in pomegranate and date palm agrocenoses in the Qashqadaryo and Surxondaryo regions. The results are presented in Tables 1–2. In total, 14 species of entomophagous insects belonging to 5 orders and 8 families were recorded (Table 3).

Within the order Hymenoptera, the family Encyrtidae included the parasitoid of the Comstock mealybug, *Pseudaphycus malinus* Gahan; the family Platygastridae included *Allotropa burrelli*; the family Aphelinidae included *Aphelinus mali* and *Encarsia perniciosi* (syn. *Prospaltella perniciosi* Tow); and the family Formicidae included predatory ants (*Tetramorium caespitum* L.).

1- Tables

(Coordinates of occurrence of Pseudophycus entomaga in the districts of Surkhandarya region 2022-2024yy)

In Sherabad district	(37°38'37.3"N,66°55'27.9"E), (37°38'52.6"N,66°57'56.5"E), (37°40'02.7"N,67°02'43.8"E)

In Sariosiya district	(38°26'39.0"N,67°56'57.0"E), (38°24'42.5"N,67°55'17.0"E), (38°23'16.5"N,67°56'06.6"E);
In Kyzyryk district	(37°34'17.0"N,67°08'53.4"E), (37°32'52.5"N,67°06'36.4"E)
In Angor district	(37°29'42.4"N,67°06'05.8"E)
In Muzabad district	(37°24'25.6"N,66°42'14.0"E)

2- Tables

(Coordinates of Pseudophycus entomagae occurrence in the districts of Kashkadarya region in 2022-2024)

In Kitab district	(39°12'13.5"N,67°00'20.6"E), (39°12'19.2"N,67°00'33.6"E), (39°12'22.5"N,67°00'44.3"E);
In Shakhrisabz district	(39°03'26.0"N,66°52'34.0"E), (39°02'45.5"N,66°54'00.1"E);
In Dehqanabad district	(38°21'06.6"N 66°33'32.8"E);
In Yakkabog distric	(38°59'08.2"N 66°43'51.3"E)

Within the order Coleoptera, the family Coccinellidae included *Cryptolaemus montrouzieri* Mulsant, *Scymnus binaevatus* Kugelann, *Chilocorus bipustulatus* L., and *Coccinella septempunctata* L.

Within the order Diptera, the family Syrphidae included the hoverfly *Syrphus torvus* Osten Sacken.Within the order Neuroptera, the family Chrysopidae included the common green lacewing (*Chrysopa carnea* Stephens) and the seven-spotted lacewing (*Chrysopa septempunctata* Wesmael).Within the order Hemiptera, the family Nabidae included predatory bugs (*Gonocerus juniperi* Herrich-Schaeffer) and *Orius niger* Wolff.These entomophagous species were observed to contribute significantly to the reduction of pest populations in pomegranate and date palm orchards.It should be noted that large-scale laboratory mass-rearing of entomophagous insects and the development of methods for propagating new beneficial species remain urgent tasks in modern pest management.

3- Tables

Species composition of natural entomophagous insects distributed in the pomegranate and date agrocenosis

(Kashkadarya and Surkhandarya regions 2022-2024)

№	Uzbek name	Latin name	Category	Occurrence in biocenosis
	Ensirtidlar *(Encyrtidae)*			
1	Psevdofikus	*Pseudaphycus malinus* Gah	Pardaqanotlilar *(Hymenoptera).*	+++
	Platygastridae.			
2	Allotropa burrelli.	*Pseudococcus burelli*	Pardaqanotlilar *(Hymenoptera).*	+++
	Afelinidlar *(Aphelinidae)*			
3	Afelinus	*Aphelinus mali*	Pardaqanotlilar	+++

			(Hymenoptera).	
4	Encarsia pernisiosi	*Prospaltella pernisiosi* Tow	Pardaqanotlilar *(Hymenoptera*	+++
	Chumolilar *(Formicidae)*			
5	Yirtqich chumolilar	*Tetramorium caespitum* L.	*Hymenoptera*	++
	Xonqizilar (*Coccinellidae)*			
6	Kriptolemus	*Cryptolaemus montrouzieri* Muls.	Qattiqqanotlilar (*Coleoptera*)	+++
7	Scymnus	*Scymnus binaevatus* Kug.	Qattiqqanotlilar (*Coleoptera*)	+++
8	Ikki nuqtali xilokorus	*Chilocorus bipustulatus* L.	Qattiqqanotlilar (*Coleoptera*)	+++
9	7 nuqtali xonqizi	Coccinella septempunctata	Qattiqqanotlilar (*Coleoptera*)	+++
	Guldor pashshalar (*Syrphidae*)			
10	Sirfid pashshasi	*Syrhus torvus* Osten Sacken.	Ikki qanotlilar (*Diptera*)	++
	Oltinko‘zlar (*Chrysopidae*)			
11	Oddiy oltinko‘zlar	*Chrysopa carnea Stephens.*	To‘rqanotlilar *(Neuroptera)*	+++
12	Etti nuqtali oltinko‘z	*Chrysopa septempunctata* Wes.	To‘rqanotlilar *(Neuroptera)*	+++
	Nabidae			
13	Yirtqich qandala	*Gonoserus juniperi* Herrich-Schaeffer.	Qandalalar (*Hemiptera*)	+
14	Qora orius	Orius niger Wolff.	Qandalalar (*Hemiptera*)	+

Shartli belgilar: + kam; ++ o‘rtacha; +++ ko‘p sonda uchraydi.

Laboratory Bioassay Results (2023)

During laboratory trials in 2023, *Pseudaphycus malinus* was applied against the Comstock mealybug (*Pseudococcus comstocki* Kuwana) at ratios of 1:10, 1:15,

and 1:20 (parasitoid : host larvae). The corresponding reductions in pest populations were 87.1%, 82.2%, and 73.39%, respectively. These results indicate that applications at 1:10 and 1:15 ratios achieve the highest efficacy in pest control.

Therefore, the specialized parasitoid *Pseudaphycus malinus* Gahan is considered an environmentally safe biological control agent suitable for mass rearing under laboratory conditions and field release in pomegranate and date palm orchards for the suppression of the Comstock mealybug.

The effectiveness of using Pseudoficus in different proportions against Comstock worm larvae (OKHITI laboratory M. Shaymanov 2022-2024)

№	Experiment	Repeat	Number of Comstock larvae and pseudoficus (pcs)					Pseudoficus efficiency %
			larvae	mummy	pseudoficus	larvae	Mushrooms in a mummy	
1.	When applying Pseudoficus at a ratio of 1:10 against Comstock worm larvae	1	110	-	11	26	84	76,36
		2	68	-	7	8	60	88,23
		3	101	-	10	2	99	98,02
		average	**279**	-	**28**	**36**	**243**	**87,1**
2.	When applying Pseudoficus at a ratio of 1:15 against Comstock worm larvae	1	84	-	6	12	72	85,71
		2	52	-	3	11	41	78,85
		3	61	-	4	12	49	80,33
		average	**197**	-	**13**	**35**	**162**	**82,23**
3.	When applying Pseudoficus at a ratio of 1:20 against Comstock worm larvae	1	89	-	4	23	66	74,16
		2	54	-	3	11	43	79,63
		3	75	-	4	24	51	68,0
		average	**218**	-	**11**	**58**	**160**	**73,39**
4.	General control	1	96	-	-	96	-	-
		2	57	-	-	57	-	-
		3	83	-	-	81	-	-
		average	**236**	-	-	**234**	-	-

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