Emergence of Metabolic Resistance to Pesticides in Common Pistachio Psylla, *Agonoscena pistaciae*

Yaser Salim Abadi (PhD)[1*], Hamzeh Izadi (PhD)[2]

[1] *Department of Health Services and Health Promotion, School of Health, Rafsanjan University of Medical Sciences, Rafsanjan, Iran*

[2] *Department of Plant Protection,Faculty of Agriculture,Vali-e-Asr University of Rafsanjan,Rafsanjan,Iran*

Letter to Editor	***Received:*** 30.01.2021	***Accepted:*** 30.02.2021	***Doi:*** 10.22123/phj.2021.288503.1102

Pistachios are a strategic product with a special position among agricultural products. However, production of this crop has been affected by various factors, including pests, being regarded as the most important of them and causing great damage to horticultural products [1]. The common pistachio psyllids, *Agonoscena pistaciae* Burckhardt and Lauterer (Hemiptera: Psyllidae), are known as the most destructive pests of pistachios throughout Iran [2, 3]. In a study aimed to assess the amount of pesticides needed to be applied against pests, it was made clear that about 14,000 tons of pesticides were used during the time period of 2010-2014 [4]. Application of such a big amount of pesticides with direct and residual effects is the main causing factor for environmental contaminations and resistance of pests to different groups of pesticides [5, 6]. Resistance of medically important insects to pesticides showed that the level of resistance to all groups of insecticides increased during the past 20 years in the Iranian public health sector [5]. Chemical control is the main approach to managing *A. pistaciae* in pistachio orchards. To mitigate effects of this agricultural pest, the use of organophosphate (OP) pesticides, such as phosalone, is very common in controlling it. However, other groups of pesticides have been used for this purpose as well [2, 3, 7, 8]. Emergence of resistance to pesticides has been reported in the agricultural sector, such as the public health sector. Thus, different levels of resistance to some pesticides in the Rafsanjan psylla population have been reported in this dangerous pest of pistachios, including hexaflumuron, acetamiprid, and spirotetramat [9, 10]. Similarly, comparison of susceptibility levels of different psylla populations in the Kerman province showed that the Rafsanjan population was the most resistant one to phosalone [3, 11]. Biochemical assays aimed at detecting resistance mechanisms in both resistance psylla populations showed that esterase detoxification was the main reason for metabolic resistance to hexaflumuron, acetamiprid, spirotetramat, and phosalone in the Rafsanjan population of pests [3, 10]. However, management of resistance to pesticides in this destructive pest is the major issue in its chemical control. To achieve this goal, some factors, such as minimizing pesticide use, avoiding tank mixes, avoiding use of persistent chemicals, and use of long-term rotations of pesticides from different pesticide groups could be taken into account.

References

1- Rezaei E, Izadi H, Basirat M. Biology and Damage of the Pistachio Twig Borer on Four Commercial Pistachio Cultivars. Journal of Pistachio Science and Technology.**2020**;*4(8):17-27*.[In Persian]

2- Alizadeh A, Talebi-Jahromi K, Hosseininaveh V, Ghadamyari M. Toxicological and biochemical characterizations of AChE in phosalone-susceptible and resistant populations of the common pistachio psyllid, Agonoscena pistaciae. Journal of Insect Science. **2014**;*14:18.*

3- Alizadeh A, Talebi K, Hosseininaveh V, Ghadamyari M. Metabolic resistance mechanisms to phosalone in the common pistachio psyllid, Agonoscena pistaciae (Hem.: Psyllidae). Pesticide Biochemistry and Physiology.**2011**;*101(2): 59-64.*

4- Morteza Z, Mousavi SB, Baghestani MA, Aitio A. An assessment of agricultural pesticide use in Iran, 2012-2014. Journal of Environmental Health Science and Engineering. **2017**;*15(1):1-8.*

5- Salim Abadi Y, Sanei-Dehkordi A, Paksa A, Gorouhi MA, Vatandoost H. Monitoring and Mapping of Insecticide Resistance in Medically Important Mosquitoes (Diptera: Culicidae) in Iran (2000–2020): A Review. Journal of Arthropod-Borne Diseases.**2021**;*15(1):21-40*.

6- Vatandoost H, Ezeddinloo L, Mahvi AH, Abai MR,Kia EB, Mobedi I . Enhanced tolerance of house mosquito to different insecticides due to agricultural and household pesticides in sewage system of Tehran, Iran. Iranian Journal of Environmental Health Science and Engineering. **2004**;*1(1): 42-45.*

7- Lababidi M. Effects of Neem Azal T/S and other insecticides against the pistachio psyllid Agonoscena targionii (Licht.) (Homoptera, Psyllidae) under field conditions in Syria. Anzeiger für Schadlingskunde= Journal of pest science. **2002**;*75(3):84-88.*

8- Eslami, H, Dolatabadi, M. Effects of Pesticides Used in Controlling Pistachio Psyllid on Human Health, and Control Strategies. Pistachio and Health Journal.**2020**;*3(2):1-4.*

9- Bemani M, Moravvej G, Izadi H,Sadeghi-Namaghi H.Variation in Insecticidal Susceptibility of Agonoscena pistaciae Burckhardt and Lauterer (Hemiptera: Aphalaridae), and its Coccinellid Predator, Oenopia conglobata L.(Coleoptera: Coccinellidae). Journal of the Kansas Entomological Society.**2019**;*91(2):110-118.*

10- Bemani M, Moravvej G, Izadi H, Sadeghi-Namaghi H. Detoxifying enzyme activities in the common pistachio psylla and the coccinellid predator. Journal of Agricultural Science and Technology.**2021**; *23(3): 575-588.*

11- Talebi Kh, Rahmani Moghaddam M, Moharramipour S. Susceptibility of different populations of pistachio psyllid to phosalone insecticide in Kerman province. Iranian Journal of Agriculture Science.**2001**;*32(3):495-500*.[In Persian]