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Evaluation of the effect of Salpi botanical pesticide based on eucalyptus oil on Euphyllura olivine in Tehran green space

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Abstract
Euphyllura olivine (Costa) (Hom., Aphalaridae) is the most important pest of olive trees - which has recently caused a lot of damage to these trees in urban green space. One of the components of integrated control of this pest is the use of pesticides. Due to the dangers of the use of chemical pesticides in urban green space, it seems necessary to study the effect of low-risk compounds. In this study, the effect of Salpi plant pesticide based on the eucalyptus essential oil and biodegradable polymers prepared from the pesticide research department of the Phytosanitary Research Institute of Iran with a dose of 3 per thousand in comparison with 60% diazinon toxin with a dose of 2 per thousand in 10 repetitions in the green space of Tehran 17 was sprayed. Sampling was performed one day before foliar application, and 3, 7, 14 and 21 days after. The results showed the percentage of the effect of these two compounds on nymphs and adult insects after 3 days in Salpi on nymphs was 98.29% and on adult insect was 94.19% and diazinon on nymphs was 94.35% and on adult insect was 97.61. Although Salpi pesticide was used with a relatively higher dose than diazine, due to its lower price and environmental friendliness, it can be a good alternative to chemical pesticides in urban green space.

Keywords: Olive psyllid, Plant pesticide, Salpi, Eucalyptus essential oil

Introduction

The secretion of honey and wax filaments by this pest on the one hand due to the absorption of dust and also the growth conditions of fumagine fungus prevents light from reaching the leaves and impairs photosynthesis and on the other hand may cause more absorption of Sunlight and vegetation. The olive psyllid spends the winter as a full-grown insect on olive trees. From late March to early April, male and

female psyllids mate. The female lays her eggs first in the lateral buds on the olive branches, then inside the terminal buds, and then in the flower buds between the sepals and the petals. Female psyllids lay 51.4 ± 2.7 eggs on average and their spawning period is from early April to early June. The nymphal period is from mid-April to late July, and the full-fledged psyllids of the spring generation appear from late May to early June. This insect has one generation per year and the complete psyllids of the spring generation mate throughout the summer, autumn and winter on olive trees and go to the diapause.

Consecutive use of multiple insecticides over a period of several years due to the multi-generation and high regenerative power of this pest, as well as indiscriminate spraying of farmers has caused the phenomenon of resistance, the destruction of natural enemies of pests and more severe outbreaks of pests. The use of chemical pesticides such as fosalene to control pistachio psyllids has shown well that such chemical pesticides were not only unable to control the pest population for a long time but also led to its re-emergence (Mohseni, 2001).

A study was conducted to investigate and compare several conventional insecticides in the control of olive psyllids on olive trees in the green space of Tehran's 14th district. In this study, Confidor 2 per thousand, 1.5 per thousand, oil and stain 10%, citral 3%, tendaxir 2 per thousand sodium hypochlorite solution 2 per thousand Palysin 2 per thousand and combined treatments of Confidor + Palizin oil and stain + Citral were used for treatment and conventional spraying was considered as a control. To perform the experiments, 3 trees for each treatment and four leaves from different geographical directions of each tree were selected as repeat. Death counts of adult insects and olive psyllid nymphs were performed 7 days after treatment. Based on the results, the highest rate of insect mortality was obtained in the combined treatment of confidor and oil and stain 66.94% and the lowest amount was obtained in the treatment with sodium hypochlorite 16.4%. Therefore, the use of a combination of confidor toxin and emulsifying oil is recommended to control olive psyllids in the green space of Tehran.

Research method

To conduct this research, in one of the municipal parks of District 17, Sarang Park, under Haghshenas Bridge, yarrow with the dominant cultivar of green olive in Tehran province was conducted in 2019. In the mentioned parks, 30 olive trees of the same age were considered as experimental units. The experiment was performed in a completely randomized block design with 3 treatments, Salpi (Eucalyptus 3000 ppm) and Diazinon (2000 ppm) in 10 replications.

For each experimental unit, 10 olive trees were considered. On all experimental units, common horticultural operations were carried out uniformly according to the local custom. Foliar spraying was performed by a 100 liter diffuser sprayer equipped with an agitation system. The time of foliar application was in the region according to the population of olive psyllid nymphs (economic loss threshold, 10 nymphs per leaflet) (Hassani et al., 2009; Mehrnezhad, 2010). Accordingly, the first foliar spraying took place in mid-May and the next two stages were carried out in mid-June and July. To collect the population of olive psyllid nymphs, 10 complete leaves (containing 30 leaflets) were randomly selected from four directions of the tree and the number of

psyllid nymphs on them was counted and recorded. Surveys were performed one day before foliar application and 3, 7, 14, 21 days after each foliar application. To compare the treatments, the percentage of effect of each treatment was determined based on the percentage of population decrease. For this purpose, Henderson-Tilton formula was used to calculate the percentage of effect of treatments (Henderson, 1955). Analysis of variance was performed using SAS software and treatments were grouped using Duncan's multiple range test at 5% probability level.

Findings

In Table (1) the effect of Salpi pesticide has acted as a chemical toxin and the statistical results are almost similar. However, the dose of this substance formulated to be 3 per thousand was completely biocompatible with environmental factors and beneficial insects. Due to the effect of the chemical toxin diazinon on the third day and the persistence of the chemical effects of the toxin on the seventh day and even on the 14th day, it can lead to environmental hazards for urban green space, but the effects of Salpi pesticide on the third day compared to chemical toxin showed significant deaths. The results of observations in olive trees showed that the population of insects such as ladybugs was preserved for a week and tasted in the green space.

Table (1) - Survival percentage of biological stages (puree and adult insect) of olive psyllids in three treatments in 2018

Mature	April	June	July
Control	96.12	76.34	57.44
Diazinone	14.18	5.14	3.01
Salpi	19.34	11.05	6.35

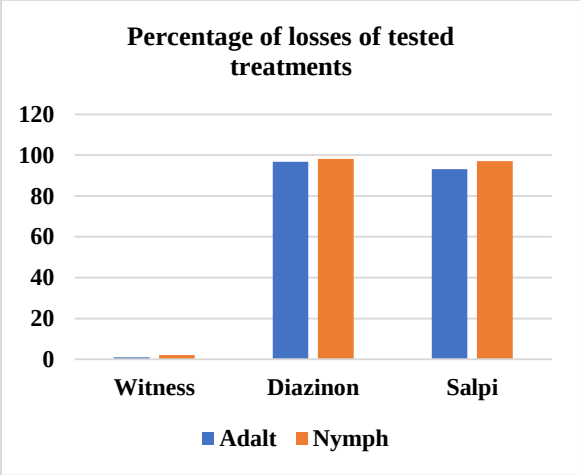
Nymph	April	June	July
Control	38.09	65.45	86.42
Diazinon	16.07	3.21	1.09
Salpi	14.23	4.09	2.08

Olive psyllids Insects work on the cotton cover, but the puree is inside the cotton cover and it is much harder to kill the adult insect, so the performance of the spray nozzle is very important in the spraying operation.

Discussion

The following diagram shows (1) the efficiency of the two chemical toxins and the plant pesticide Salpi on the stage of puree and adult insect.

Figure 1- Percentage of efficacy of diazinon toxin and Salpi plant pesticide on biological stages



In Figure (1) the effect of diazinon toxin was slightly higher than Salpi, but the yield of both pesticides shows nearly 100% of adult insect deaths.

The results of this article was consistent with Kaykhosravi et al. Palm oil and biodegradable polymers with a dose of 6 per thousand compared to the chemical pesticide (APPLAUD 40%) with a dose of 2 per thousand in the market of Rooz Qala-e-Marghi located in the municipality of District 17 on the biological stages of whitefish (2). According to the results on the third and seventh day, the effect of diazinon toxin after 7 days accurately shows the biological stage of olive psyllids, especially the adult insect stage. Although the combination of diazinon as a chemical has an effect on pest control, the compound formulated as Salpi pesticide at a dose of 3 per thousand has shown definitive results in controlling olive psyllids while maintaining environmental sustainability.

And the goals of national production of environmentally friendly pesticides can be effective in producing optimal formulations with appropriate odor performance efficiency in urban green space and a scientific and practical phenomenon in maintaining per capita green space and insects is useful.

Discussion

The sex ratio of full male to female psyllids in Rudbar and Jamalabad in both regions was approximately 1.1: 1. The nymphs of this pest are parasitized by bees of Pteromalidae and Encyrtidae families. Various predators such as ladybugs, bald eagles, caterpillars and spiders also work on the eggs, nymphs and adult insects of this insect. In addition, winter cold causes the death of complete overwintering psyllids and reduces their population (Zarei et al., 2017).

The study of Ismaili et al. 2018 on the effect of Salpi post pesticide on these two aphid species in bioassay experiments by leaf immersion method showed that LC50 Salpi pest on oleander and willow aphids was, respectively, 32.777 and 1224/50 PPM. According to the results of Salpi Pest

pesticide research, it is a good alternative to chemical pesticides. Considering the results of experiments on the pesticide effect of this plant compound with Tandaksir plant pesticide (garlic and red pepper extract) which is consistent in the research of Kaykhosravi et al. 2018 on olive psyllids, it can be concluded that plant pesticides If used purposefully in the field on the biological stages of the olive psyllid pest, it can be useful in pest control in urban green space and environmental protection.

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