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**STUDY ON THE EFFECT OF IMIDACLOPRID ON DATE PALM HOPPER BY
SOIL APPLICATION AND INJECTION**

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ABSTRACT

Date palm hopper (*Ommatissus binotatus* Fieb.) is one of the most important pests of date palm, which causes serious damage by feeding on palm syrup directly or reducing photosynthesis indirectly by fuming the leaves surface due the growth of fungus *Meliola camellia*. Foliar application of insecticides, especially spraying by Aircraft, induces many side effects by drift of insecticides. This study was done to select an alternative method for foliar application of insecticide in date groves. This study was done in Tezerj district in HadjiAbad in north of Bandar Abbas. In this region, 20 palms of same age of Piyarum cultivar, with same irrigation and fertilization condition were selected. Treatments were Imidacloprid 10% in three dosages, 12.5, 15 and 20 cc per 10 liter water and check 10-liter pure water without any insecticide. This study was done in randomized blocks, 3 days before treatment palm irrigated and first sampling was done just before treatment. Insecticide solutions were poured in the shade of palms. Sampling was done three, seven and 14th days after treatment, 5 leaflet from each palm collected and adults and nymphs of hopper were counted. Analytical studies showed that there is no difference between treatments and check but in another additional treatment by injecting 12.5 cc Imidacloprid per palm in palm trunk showed significant differences with check, which shows that there was a problem in insecticide absorption by palm and if it was a possibility to provide a situation for better absorption so that it would be effective.

Key words: Date palm hopper, *Ommatissus binotatus*, imidacloprid, application method.

INTRODUCTION

The Date Palm hopper (*Ommatissus binotatus* Fieb.) (Hom: Tropicuchidae), is one of the most important pests of Date palm in Iran. Afshar reported it from south of Iran in 1937. It is distributed now in all of date growing areas in Iran and also in some of Arabian countries such as Iraq, Egypt, Liberia and Algeria. This pest not only attacks the date palm but also some other palms such as *Chamerops humilis* L. (Lepesme, 1947). The adult insect and all stages of nymphs can damage the date palms by thrusting their beak to the phloem of the leaves and decreasing the productivity of the trees directly with the losses of syrup from the phloem or indirectly due to growth of fungus *Meliola camellia* on excreted honeydew that decreases the photosynthetic rate

of the trees. In case of severe infections the quality and quantity of the fruits are decreased and leaf surface become sticky, by the phloem exudations from induced holes on the leaves by the adult insects and nymphs and also on the feces of insects (Gharib, 1967).

The insects lay their eggs on the leaves, mainly on the central vein of the leaflets in one or two rows and some time they may lay their eggs in the rows parallel with the central vein or at the end of leaflet and connection point of leaflet with central axle of the leaves. The average number of eggs on the leaves, the main criteria for the detection of severity of infestation, is as follows:

More than 10 eggs per leaflet (on average) is considered as heavy infestation; while 5-10 eggs and less than 5 eggs per leaflet are considered as medium and low infestations, respectively.

Adult females are 5-6 mm and pale yellow to pale green with several black points on the front, thorax or some abdominal segment of the insects. Male insects are usually smaller than female (3-3.5mm) and the main differences of male and female insects are lack of black points on seventh and eighth abdominal segments in the male insects (Behdad, 1991).

This insect has five nymphal stages, all of which are active with 16 wax fiber at the end of body. The wax fibers are the main character that separates these nymphs from other hoppers (Esmaili, 1983).

Date hopper has two generations in the date growing conditions of Iran: spring generation and fall generation. It hibernates and aestivates by eggs on the leaves of the trees. Eggs are laid on leaves and about 1/3 of these eggs are in the tissue and the tissue around the egg deforms to the necrotic and brownish that can be distinguished easily (Esmaili, 1983).

Period of hibernation and aestivation is more than five and three months, respectively, most of the eggs during this period are attacked by predators and parasitoids and in some cases more than 95% of these eggs are not able to pass this period. Date groves with dense plantation that induce low ventilation and high relative humidity, help in increasing the population of the pest which must be controlled chemically (Davatchii, 1949). In chemical pest control method, the main factor that increases the success of pest control is spraying on time i.e. before 40% of eggs have been hatched. Due to this reason, we are forced to do most of chemical spraying in Iran against this pest by aircraft with high drift in vast date groves. In this study we tried to find out another alternative method for chemical application with minimum pesticide drift and side effects on the nature and valuable natural enemies.

MATERIALS AND METHODS

This study was carried out in Hadjiabad district in north of Bandarabbas in Hormozgan province on date cultivar Piyarom, which is of economic importance. Trees of same age, under similar growing conditions were selected. This study was done with five treatments in five replications, in a randomize block design. Imidacloprid 10%, 12.5cc (A), 15cc (B), 20cc (C), dissolved in 10 litre of water, was applied in the shade of the tree or the same chemical @ 12.5cc (D) was injected in the trunk of the tree. Untreated trees were sprayed with water.

Before pesticide application 5 leaflets from each tree were randomly collected and the number of nymph or adult insects on the leaflet was counted. All the trees were irrigated after the application of treatments. The sample of 5 leaves from each of the treated and untreated trees were also collected after seven and fourteen days of treatments application. The percentage of efficacy was calculated by Henderson-Tilton's formula and these percentages were statically compared.

RESULTS AND DISCUSSION

Results were not statistically significant until seven days after treatments and only the result of injection (D treatment) was significant statistically in the last sampling, i.e. 14 days after treatment. It is clear that the Imidacloprid 10% is capable to be effective against Date hopper (*Ommatissus binotatus*) if the problem of absorption by the root is solved. It is assumed that most

of this pesticide before absorbing to the root would be absorbed by the soil and finally it will be inactive in the soil or it may be washed and transferred to the lower level of the soil and out of root absorption areas, due to this fact no significant effect of soil application of this pesticide can be seen while trunk injection is effective.

Results of sampling after 14 days of treatment showed complete efficacy indicating that trunk injection or soil application of pesticide should be done at least 10 days before the time of foliar application and it is the time that pesticide need to be absorbed and transfer to the target points (Table 3). The data in table 1 & 2 show that the percentage of efficacy in D treatment grows gradually and in the last sampling (14 days after treatment) it reached to the maximum level with statistically significant difference with other treatments.

Duncan's Multiple Range test for the last date of sampling (14 days after treatment) the result was as follows:

LSD value = 44.22

Sx = 10.42 at alpha = 0.010

Original order				Ranked order		
Mean	A =	14.60	B	Mean	D =	76.02 A
Mean	B =	14.72	B	Mean	B =	14.72 B
Mean	C =	14.14	B	Mean	A =	14.60 B
Mean	D =	76.02	A	Mean	C =	14.14 B

As the Date Palm hopper is a sucking insect with high active egg predators that are capable to reduce the population of the insect this method of pesticide application is safer for natural enemies and with very low drift as compared to foliar application especially by aircraft, but as the pest is active on the young leaves especially the central leaves of the tree (Fig. 1) the pesticide after application have to travel long distance to reach the target point and also high volume of the syrup in the phloem is the another reason for decreased concentration of pesticide. From the holes, induced by the insects, exudation of syrup can be seen easily (Fig. 2). In spite of most advantages of this method of pesticide application as above mentioned it has some disadvantages that can be counted as follows:

1. Difficulty in application, as there is no formulation of this pesticide to be used in soil that gradually releases the pesticide such as granola, thus this type of formulation (FL) must be used in several times to be absorbed by root in an appropriate amount and to be effective against this pest, or it must be used by trunk injection.
2. Another disadvantage for this method of application is the washing of pesticide by irrigation water and pollution of the underground water which is very important and must be controlled by gradual irrigation after pesticide application and also by use of proper formulation it can be solved.

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TABLES

Table1: The percentage efficacy of the treatment three days after application

Rep	A	B	C	D
R1	0	0	0	22.1
R2	31.2	25.8	25	15.2
R3	0	0	0	0
R4	0	0	0	0
R5	12.7	63.8	5.2	62

Table 2: The percentage efficacy of the treatment seven days after application

Rep	A	B	C	D
R1	0	0	0	65.2
R2	25	56.3	71.7	70.1
R3	0	0	10.9	37.2
R4	31	61.9	61	45
R5	46.2	0	32.1	27.5

Table 3: The percentage efficacy of the treatment fourteen days after application

Rep	A	B	C	D
R1	0	0	0	77.2
R2	0	20.6	0	95.2
R3	0	0	0	68.1
R4	49	0	70.7	64.2
R5	24	53.2	0	77.2

FIGURES



Figure 1: A view of crowded nymphs on the central leaves of the Date Palm.



Figure 2: A view of honeydew excretion on an infested leaf of Date Palm.