Using The aquatic And Alcoholic Extracts Of The Sesbanian Sesban Leaves As Insecticides Against The Fig Moth (Ephestia cautetla)

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ABSTRACT

Conducted a series of laboratory experiments to demonstrate the influence of alcohol and aquatic extract for Sesbania plant leaves in concentrations 20,40,60 mg/ml according to standards life performance of an insect Ephestia . The rest of the concentrations showed different effect in all phases of the insect life.

The results showed that the phase II and V larval more sensitive to plant extract concentrations . And also the Ephestia eggs and larvae phases were collected and treated with the aquatic extract of Sesbanian sesban with concentration (20 - 40 – 60 mg/ml)and compared with control factor.

The results showed that the concentration 40 mg/ml was more effective influence in the eggs and all the insect larval . The result showed that 60 mg/ml concentration was more activity and effect from others concentrations

Keywords: labo , active , sesban.

I.INTRODUCTION

The stored food in general, including dates, is of economic importance. All countries are keen to maintain a strategic stock of enough for several months to cope with natural disasters and the acute shortage of annual production. These stored items are damaged by many organisms such as insects and rodents, and thereby spoiled, losing their nutritional value (Ismail, 2006). Losses caused by insects in stored materials are estimated at about 5-10% of global production (Naeem, 1993). Some countries suffer losses from 3-0.05% in developed countries, to 50-45% in developing countries (Matlah, 2002).

Stored dates are infected by many species of the *Ephestia* belong to the family *Pyralidae, Lepidoptera class*, where (Abdul Hussein, 1985) that the date moth (Walker) (*Ephestia Cautella*) is one of the most important pests that attack and damage the stored dates in in Iraq, causing serious damage to the dates from harvesting till marketing. It causes problems in marketing and consumption and creates multiple problems in the marketing process of Iraqi dates in foreign markets. Economically, it is considered the most important pest because it affects falling dates and stockpile, which makes it worthy of great attention and combined efforts in combating and controlling its spread (1998).

The extracts of the *Sesbania sesban* leaves were used as an insecticide against this insect because it contains chemical compounds (alkaloids, flavonoid, tanins and terpenoids) and other minerals because of the lack of studies on the effect of the extracts as an insecticide against this insect. Many insecticides have been used to control insects, which have led to the emergence of many pesticides and caused damage to the environment (Gelski, 2001). Therefore, research began using many plant extracts by humans as insecticides for the chemicals that their flowers, leaves and roots contain, which are of a toxic effect (Sydney and Eleen, 2004). The reason for using pesticides of plant origin in combating insect is because it possess desirable qualities that are not available in chemical pesticides, such as being non-pollutant for their rapid degradation (Promsiri et al. 2006). Secondary plant substances in plant are the biological compounds produced by the plant under natural conditions to perform defensive functions against the animals feeding on that plant (Bennett and Walls grove, 1994). They have vital activities related to environmental relationships among other organisms, such as attracting beneficial insects or repelling many other insects (Balandrin, 1985).

Because the Iraqi environment contains diverse plants rich with effective compounds of medical importance that can be used in combating insect (Afifi, 2002). Therefore, this study aimed to use the extract of *Sesbania sesban* as an insecticide, and this treatment came as an environmentally friendly method.

Sesbania Sesban Plant

Classification

Kingdom: Plantae

Division: Magnoliophyta

Class:Magnoliopsida

Order :Fabales
Family:Fabaceae
Genus:*Sesbania*
Species:*Sesbania sesban*

(Gutteridge.2007)

There are 11 species of *Sesbania sesban* in the legume family. The common name of this plant is Ohai (1991, Haragan)

Nature Of The Plant

The *Sesbania sesban* is a tree that reaches a height of approximately 2-4 meters and bears feathery leaves of thin rectangular shape with yellow flowers. The fruit is a long, narrow pod that carries a number of seeds inside of it and grows well in low-nutrient and low-salty soil. It grows and blooms at the end of spring or during summer, and does not tolerate low temperatures or frosts.

Geographical Distribution Of The Plant

The original habitat of the *Sesbania sesban* is North and East of Africa and the United States (Chapin, 1991)

Plant Importance

(Gillett, 1963) suggested that the main economic value of the *Sesbania sesban* is probably to be used as green fertilizer and as food for cattle as cattle feed on it. Townsend, in 1937, stated that this species is grown in Iraq to be used as mentioned, as Dalziel 1937 has mentioned the same use for it in tropical Africa.

The Importance of Secondary Chemical Compounds for the Plant as Defensive Mechanisms against Insects

Plants produce secondary metabolites that play an important role in the protection, growth, and development of these plants. These compounds are formed in plants as a final result of the metabolic activity of carbohydrates, amino acids, and fats, and produce toxic substances against animals (Harborne, 1982 - Hedin, 1983). Many studies pointed to the possibility of using compounds derived from plants in pest control (Moreiera 2007).

The analysis of the plant's (*Sesbania* Grandflora) chemical components of the leaves and flowers showed the presence of steroids, sponins and tannins (Fojas, 1982). However, (Ahn, 1989) noted that *S. Sesban* did not contain concentrated tannins in soft matter or that dried in the oven, and that the concentration of phenolics reached 2.5% and 2.8% in the dry and soft matter, respectively. Phenolic compounds are considered secondary chemicals that affect the life of insects (Harborne, 1982). The role of these compounds, however, includes their toxic effects on insects as either repellent or inhibitory (Sharifi and Rubayee, 2011).

II.MATERIALS AND METHODS

1. Plant sampling

The leaves were collected in November from the College of Education for Girls Then, they were cleaned , dried and grinded to obtain a powder and prepare the extract, and keep the powder in a plastic container until use.

2. Preparation of water extract

The water extract of *Sesbania sesban* leaves was prepared according to that method of (Harper 1983). 50g of the powder was put in a 1000ml glass flask, and 500 ml of water was added. The mixture was well mixed, then left for 48 hours. Layers of gauze cloth were applied to separate the large plankton, and then again filtered with two layers of gauze cloth. Then, the leachate was dried in the oven after pouring in (pteridish) for 48 hours. After that, (120 mg) was weighed from the dried mix, and solved in (200 ml) of distilled water to prepare (stock solution), and then concentrations (20 - 40 – 60mg/ml) were prepared. The extracts were then stored in sealed glass containers in the fridge.

3. Preparing the Alcoholic Extract of *Sesbania Sesban* Plant

The Hernandez, 1994, method was followed to obtain the plant extract. The methyl alcohol was selected as a solvent, weighing 50g of dried powder and placed in a 1000ml clean glass flask, and added 500ml of methyl alcohol with absolute concentration. The mixture was then mixed and left for 48 hours. The solution was then used with a soft cloth and then filtered with filter paper. The leachate is then poured in pteridish after weighing the dish empty, then put the dishes in an electric oven of 41m, until the sample is dry. After that, we then weigh the sample with the dish to find out the weight of the raw material. In order to test the effectiveness of the alcohol extract of the *Sesbania Sesban* leaves and its impact on the date moth insect, we took 120 mg of dry raw material, added in 200 ml of distilled water as it was used as a stock solution, and the concentrations (20 , 40 , and 60) mg/ml were prepared. The control coefficient was only using distilled water.

4. Collect And Raise The Insect

The fig tree moth was raised after transferring dates infected with those insects into plastic bottles, filling these bottles to the half with dates, covered with a soft cloth, and sealed firmly.

In order to determine the effect of the concentrations of the water and alcohol extracts of the *Sesbania sesban* leaves plant separately in annihilating the immature generations of the insect, the larvae and the larval larvae of the insect were treated with the above concentrations, with 50 insects per concentration, (10) insects for each dish, and five times for each concentration for each (20) minutes, using the control coefficient, the distilled water, for comparison.

III.RESULTS AND DISCCUSSION

As shown in Table 1, the number of eggs was significantly higher in the 20 and 40 concentrations compared with the control treatment in which no case of death occurred to the eggs. The concentration of 60 had little effect compared with previous concentrations. The reason why there was a rapid death rate of the eggs is because the solution entered the egg which caused a rapid killing of the fetus inside the egg through its effectiveness of direct cytotoxicity because of its infiltration through the outer shell of the egg and led to the failure of embryonic development, which makes the fetus loses its ability to hatch (Roxtin, 1999).

Table (1): Effects of the concentrations of *Sesbanian Sesban* Leaves alcoholic extract in the death of Date Moth eggs.

Alcohol Concentrations Mg/ml	No. of Egg	Time 20 minutes First Egg Dies	Death Count	Survival Count Last Egg Dies	Control Coefficient
20	10	17 : 00	8	2 00:19	0
40	10	08 : 02	8	2 10:15	0
60	10	09 : 00	2	8 15:02	0

LSD=4.3 sign first 20 ,40 mg /ml

The results of Table 2 showed a positive relationship between the concentration factor of the plant extract and the larval loss, where 40 and 60 were more active.

Table (2): Effects of the concentrations of *Sesbanian Sesban* Leaves alcoholic extract in the death 1st stage Larvae.

Alcohol Concentrations Mg/ml	No. of Larvae	Time 20 minutes First Larvae Dies	Death Count	Survival Count Last Larvae Dies	Control Coefficient
20	10	03:02	6	4 00:17	0
40	10	11:00	10	0 Time does not count	0
60	10	20:00	10	0 Time does not count	0

LSD=3.6 sign first 40 ,60 mg/ml

The results in tables (3 , 6) show that the number of larvae killed was significantly increased in all concentrations where it had a fatal effect and for all larvae within 20 minutes compared with control treatment in which no death occurred and at the same time observed during the first minutes of overall time, the speed of killing increased with increased concentration. The fastest killing occurred in the first minute using 60 mg /ml .

Table (3): Effects of the concentrations of *Sesbanian Sesban* Leaves alcoholic extract in the death 2st stage Larvae.

Alcohol Concentrations Mg/ml	No. of Larvae	Time 20 minutes First Larvae Dies	Death Count	Survival Count Last Larvae Dies	Control Coefficient
20	10	03:00	10	0 19:00	0
40	10	02:00	10	0 12:00	0
60	10	01:00	10	0 Time does not count	0

LSD=8.2 sign 20, 40 ,60 mg/ml

The results of table 4 showed a difference in the number of larvae killed by different concentration. The number of larvae killed was greater when 40 mg/ml and 60mg/ml were used. However, the number of larvae killed was high compared with the control coefficient in which no case of third stage larvae occurred.

Table (4): Effects of the concentrations of *Sesbanian Sesban* Leaves alcoholic extract in the death 3st stage Larvae.

Alcohol Concentrations Mg/ml	No. of Larvae	Time 20 minutes First Larvae Dies	Death Count	Survival Count Last Larvae Dies	Control Coefficient
20	10	07:00	3	7 12:00	0
40	10	04:00	7	3 13:00	0
60	10	03:00	6	4 19:25	0

LSD=4.8 last 20 ,first 40 mg/ ml

The results in Table 5 showed an increase in the number of larvae in almost all concentrations, respectively (20 , 40 , 60) mg/ml compared with control treatment in which no death in larvae occurred.

Table (5) Shows the effects of the concentrations of *Sesbanian Sesban* Leaves alcoholic extract in the death 4st stage Larvae.

Alcohol Concentrations Mg/ml	No. of Larvae	Time 20 minutes First Larvae Dies	Death Count	Survival Count Last Larvae Dies	Control Coefficient
20	10	03:00	10	0 00:12	0
40	10	04:00	9	1 12:05	0
60	10	01:00	10	0 Time does not count	0

LSD=7.3 sign first 20 ,60 mg/ml

Concentrations 20 mg/ml and 60 mg/ml are very effective in eliminating the larvae of the first, second, fourth and fifth stages. Concentration of 40 mg/ml is more effective on all stages of the insects' development.

Table (6): Effects of the concentrations of *Sesbanian Sesban* Leaves alcoholic extract in the death 5st stage Larvae.

Alcohol Concentrations Mg/ml	No. of Larvae	Time 20 minutes First Larvae Dies	Death Count	Survival Count Last Larvae Dies	Control Coefficient
20	10	06:00	10	0 15:00	0
40	10	04:00	10	0 12:00	0
60	10	01:00	10	0 Time does not count	0

LSD 8.2 sign first 20, 40 ,60 mg/ml

There was no death in the case of distilled water (control factor) only one case occurred in the egg phase, only one egg exploded. The concentration is 60 mg/ml higher than all of the other concentrations in the loss of eggs. Whereas all eggs have been lost, it is the most effective concentration that caused death of larval larvae which exceeded other concentrations. The 20mg/ml concentration is the least effective. The effect is almost none-xistent in some larval stages, such as the II and V. Results showed that the effect of concentration 60 mg/ml and 40 mg/ml gave good results compared with 20 mg/ml . Table (7) shows the eggs of the insect under the effect of the water extract of Sesbania sesban plant. The result showed the death of all eggs in the 60% concentration.

Table (7): Effect of the Water Extract on the Eggs.

Cold Water Concentrations Mg/ml	No. of Eggs	Time20 minutes First Egg Dies	Death Count	Survival Count Last Egg Dies
20	10	17:46	5	5 19:54
40	10	16:44	8	2 19:08
60	10	16:14	10	0 19:02

LSD 7.7 sign first 40 mg/ml

The 60 mg/ml Concentration is the most effective in the death of the 1st stage Larvae

Table (8): Effect of the Water Extract on the 1st stage Larvae.

Cold Water Concentrations Mg/ml	No. of Larvae	Time 20 minutes First Larvae Dies	Death Count	Survival Count Last Larvae Dies
20	10	18:46	3	7 19:58
40	10	18:20	5	5 19:24
60	10	18:04	8	2 19:02

LSD =5.5 sign last 20 ,first 60 mg/ml

The 60% mg/ml Concentration is the most effective in the death of the 2nd stage Larvae

Table (9): Effect of the Water Extract on the 2nd stage Larvae.

Cold Water Concentrations Mg/ml	No. of Larvae	Time 20 minutes First Larvae Dies	Death Count	Survival Count Last Larvae Dies
20	10	18:55	1	9 19:58
40	10	18:26	4	6 19:37
60	10	18:22	6	4 19:13

LSD = 8.1 sign last 20 ,first 60 mg/ml

The 60mg/ml Concentration is the most effective in the death of the 3rd stage Larvae

Table (10): Effect of the Water Extract on the 3rd stage Larvae.

Cold Water Concentrations Mg/ml	No. of Larvae	Time 20 minutes First Larvae Dies	Death Count	Survival Count Last Larvae Dies
20	10	18:59	2	8 19:58

40	10	18:32	4	6 19:37
60	10	18:30	6	4 19:13

LSD =6.2 sign last 20 ,first 60 mg/ml

The 40mg /ml Concentration is the most effective in the death of the 4th stage Larvae

Table (11): Effect of the Water Extract on the 4th stage Larvae.

Cold Water Concentrations Mg/ml	No. of Larvae	Time 20 minutes First Larvae Dies	Death Count	Survival Count Last Larvae Dies
20	10	19:03	2	8 19:58
40	10	18:47	4	6 19:47
60	10	18:41	3	7 19:35

LSD=6.4 sign last 20 ,60 mg/ml

The 40 mg/ml Concentration is the most effective in the death of the 5th stage Larvae

Table (12): Effect of the Water Extract on the 5th stage Larvae.

Cold Water Concentrations Mg/ml	No. of Larvae	Time 20 minutes First Larvae Dies	Death Count	Survival Count Last Larvae Dies
20	10	19:21	1	9 19:57
40	10	19:53	3	7 19:55
60	10	18:47	2	8 19:52

LSD 6.4 sign last 20 ,60 mg/ml

Conclusions

1- The results showed that the concentration effect of 60 mg/ml gave a significant increase in the percentage of death of eggs and most larval stages.

2- The study showed that the concentration of 40 mg/ml has affected the rate of destruction of larvae at stages IV and V.

The results showed that the concentration of 20 mg/ml has little or no effect on the decay of the larval stages of the insect

3- The results indicated that the alcoholic extract of *Sesbania sesban* leaves was very effective in affecting the creature's performance standards compared to the control treatment.

4- The 40 mg/ml concentration of the alcohol solution was more effective in affecting the larval stages.

5- The second and fifth larvae were more sensitive than the other larval stages when treated with the cytosol extract.

6- It was Proven that the alcoholic extract of *Sesbania sesban* leaves plant has a significant affected reducing the number of eggs perforated compared with the control treatment.

Recommendations

1- Introducing the *Sesbania sesban* extract in integrated insect management programs for the economically effective chemicals it contains.

2- Applying of the results of this experiment in large warehouses to evaluate the insect repellent effect using the water extract of *Sesbania sesban*.

3- Conducting a field study to determine the ability of the water extract and alcohol extract of the plant *Sesbania sesban* in controlling the date moth while in the field before the date infection for the economic

importance it represents.

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