Plant Archives Volume 20 No. 2, 2020 pp. 9019-9025 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

EFFECT OF ALCOHOLIC EXTRACT OF *CATHARANTHUS ROSEUS* L. AND AVANT S INSECTICIDE ON SOME BIOLOGICAL ASPECTS OF *SESAMIA CRETICA* IN *ZEA MAYS*

S.A. Kathiar, Z.J. Shnnan and H.M. Mamdouh

Department, of Biology, College of Science for Women, University of Baghdad, Iraq.

Abstract

This experiment was carried out in the laboratory of the Plant Protection Department of the Ministry of Agriculture- Abu Ghraib during the period from 2019 to 2020, that was to evaluate the effect of different alcoholic extract concentrations (2.5, 5, 10, 15) % of *Catharanthus roseus* L. and Avant S insecticide of 0.5 ml per 1000 ml water concentration on some biological aspects of the stem borer insect *Sesamia cretica* including, eggs, larval stages and pupa. The results of the statistical analysis showed that the concentrations 10, 15% of alcoholic extract *Catharanthus roseus* L. gave - highest mortality rate (100%) of the eggs, compared with the pesticide. While the hatching percentage were 52.30% and 21.50% on 2.5% and 5% concentrations, respectively. The result have also showed that the concentration of the alcoholic extract 15% led to the mortality percentage 88.2 in the first larval stage, 70.4 in the third larval stage and 83.3 in the fifth larval stage . The highest mortality percentage of pupa was76.7 % at the concentration of 15%. Also the extract effect on the adult fecundity of treated first larval stage, third larval stage, fifth larval stage and pupa. In conclusion, the findings of the present study indicate that the extract of *Catharanthus roseus* L. can be widely and effectively used in the control of *S. cretica*.

Key words: Alcoholic extract, *Catharanthus roseus* L., *Sesamia Cretica*

Introduction

Yellow corn (*Zea mays* L.) occupies an important economic rank in the nutritional and therapeutic level, producing dyes, or using it as a promising biofuel as a substitute for traditional auto fuel or other uses until it was called the King of crops (License, S.A. 2008) It is mainly utilized as a food source and presently has developed as the most essential ingredient for animal nourish (Pimentel, D. and T.W. Patzek). Maize production is limited by a number of factors including insect pests. These pests are able to cause huge losses, about 20-40 %, throughout cultivation, about 30-90 % after harvesting and throughout storage losses (Alhussein, M.B., *et al.,* 2015). In the many regions of the world(John, E.S. 2010) and Middle East, maize is endangered essentially because of Lepidoptera stem borers, these borers are mainly *Sesamia cretica* insect (Alhussein, M.B., *et al.,* 2015, Ezzeldin, H., *et al.,* 2009). *S. cretica* insects are active in *zea mays* plants during spring and autumn, Where it causes losses ranging from 16-78% in production depending on the stage of plant growth the loss in the yield will be greater when the seedlings are infected and the loss will decrease as the plant ages and the cultivated variety (Revellin, C., *et al.,* 2001) These pests attack *Zea mays* plants with age of plants 4 - 6 weeks. They firstly hibernate then as turning into larvae stage, in the stalks and crops, they damage the young plants which subsequently resulting in significant reduction in harvest at the end of the season (Ezzeldin, H., *et al.,* 2009). Thus, several approaches have been carried out for the protection of *Zea mays* plants from infestation by *S. cretica*. Chemical pesticides such as, methomyl are generally utilized to limit *S. cretica* effects (Revellin, C., *et al.,* 2001). Despite the several benefits of the conventional pesticides, such as consistency, high availability and, fast action, pesticides are considered to possess detrimental side effects concerning resurgence of the pest population, non-target organisms, and growth of resistance (Stephenson, G.R., 2003). Additionally, it is predicted that 90% of the functional pesticides are vanished during or afterward their application (Stephenson, G.R., 2003, Ghormade, V., M.V. Deshpande *et al.,* 2011). Accordingly, there is an enlarged inspiration to advance –plant extract as the one of methods of control with the

cost of use is generally their low safe ecofriendly and more environment compatible with environmental and their use does not cause any accumulation remains of it in plant parts, soil or groundwater because it degrades quickly and dose not leave any negative effect (Gilden R.C. *et al.,* 2010) Many researchers extracted compounds from leaves, seeds and fruits of many plants, for use as feeders, repellants, or insect growth regulators (Chauhan S.P. Setal, 1987).

This study is aimed to Preparing an insecticide that is safe for the environment and for humans from natural plant extracts (*Catharanthus roseus*) and studying its effectiveness in affecting the pest stages of the corn stalk compared to the effect of the approved chemical pesticide Avant S.

Materials and Methods

S. cretica rearing

In order to meet the laboratory experiments needs, the *s. cretica* larvae were collected from the infected *Zea mays* plants in Abu Ghraib, Baghdad, Iraq. Subsequently, the collected larvae were transferred to the laboratory and placed in plastic petri dish, which contains the main natural food the component of yellow corn steam of the plant the length of the piece 2-3 cm, maintained at laboratory conditions (30°C ± 1, 70±5). The nutrition was swapped with fresh ones every two days. Upon *S. cretica* turning into pupal phase, the pupal were relocated into different plastic petri dish with small pieces of *Zea mays* plant's stem, and stem provided with moisture to prevent them from drying and death. The latter plastic petri dish was placed in rearing glass cage ($120 \times 120 \times 60$ cm^2) with airflow holes (20×20 cm). Continuously, in 24 hours, adults were gathered and placed in different glass cage with the same aforementioned dimensions with pre-planted *Zea mays* plants using plastic pots of 25cm diameter. Later, during the fourth day from release, the eggs were collected from the *Zea mays* plants' leaves and then kept in plastic containers(3*20 cm). Incubation period of eggs was ranging from 3 to 4 days until the first larval phase was reached . These were later placed in different plastic containers to rear the larvae together with small pieces of *Zea mays* plant's (Fatemeh Soltani Orang *et al.,* 2014).

Some of the larvae were kept separately for identification purpose until they reached the adult phase (3 days old) and then the insects were deceased in a sealed bottle containing potassium cyanide. The deceased insect was then collected using forceps and fixed on a white cork, and the insects were sent to Natural History Museum and Research Center/Iraq for identification species.

C. roseus extraction

Plant parts (Stem, leaves and flowers) were collected from public gardens in Baghdad, Iraq. Consequently, the collected *C. roseus* were cleaned and washed thoroughly with distilled water and then dried at atmospheric temperature until the *C. roseus* was dried and then was grinded using electrical machine to obtain fine powder. 100 gm of the pulverized material was extracted using 200 ml of ethanol for 10 hours at 500 r.p.m. then it was subject to filtration. The subsequent filtrate was treated with Diethylether (100 ml) in order to get rid of chlorophyll and fat. Afterward, the obtained aqueous phase of the mixture was boiled with 2 ml of sulphuric acid and then 0.5 g of lead oxide was added. Hereinafter, the mixture was filtered and the residual fluids were evaporated by Rotary evaporator until olive oil was obtained (The British Pharmaceutical codex, 2006).

Insect treatment

The first factor represents *C. roseus* plant extract with concentration of 5, 10 and 15% and Avant S (0.5 mL) with Indoxacarb15% SC as an active ingredient, distilled water were employed as control .Fifteen larvae for each cycle with 4 rounds and concentration were initialized, while Tween-20 was initialized to increase the spraying surface area of *C. roseus* extract and distilled water. Larval first, third and fifth stage were isolated depending on their size and color. Then they were sprayed by small hand sprayer with treatments and the control, individually, with 15 cm distance to insure the coverage area. Hereinafter, the following indicators were taken into consideration to evaluate the presented study. larval stage period, Percentage of mortality of larvae, pupal stage period, percentage of mortality of pupae, adults' emergence of insect (males and females), longevity (males and females) and fecundity.

Statistical Analysis

Statistical analysis of data was performed using SAS (Statistical Analysis System - version 9.1). Least significant differences (LSD) post hoc test were performed to assess the significant differences among means. $P < 0.05$ was considered statistically significant (SAS.2006)

Result and Discussion

It is noticed from the results of table 1 showed significant differences when the *S. cretica* eggs were treated with alcoholic extract *C. roseus* and pesticide, The lowest rate of the egg period was 6.7 days at a control, while it was 8. 82 and 10. 23 at a concentration

Table 1: Effect of alcoholic extract *c. roseus* and pesticide, treatments on *S. cretica* L. egg and their development.

treat-ment	Average egg period (day)S.E. ±	Egg hatching (%)	Average larval period (day)S.E ±	Larval Mortality (%)	Average pupal period (day)S.E ±	Pupalmo rtality (%)	Adult emergence (%)		Adult longevity (day)		Fecundity egg
							female	male	female	male	
Control	6.70± 1.02 c	100.0± 16.04 a	27.75±6.53 a	8.28±0.93 a	8.65±1.07c	6.60±1.52	33.23±5.43a	51.70±7.04a	10.35±1.13a	8.13±0.62a	195.50±17.59a
pesticide	0.00± 0.0 d	0.00± 0.0 d	0.00± 0.0 d	0.00±0.0 c	0.00±0.0	0.00±0.0 d	0.00±0.0 d	0.00±0.0 d	0.00±0.0 d	0.00±0.0 d	0.00±0.0 d
2.5	8.82± 1.11 b	52.30± 7.82 b	33.17±4.36 c	1.50±0.08b	10.87±1.88 b	6.60±1.08	16.62±3.45 b	21.62±4.59 b	7.08± 0.09b	7.32±0.14 b	57.20±7.03 b
5	10.23± 1.44 a	21.50± 4.13 c	35.50±4.17b	9.95±0.66 a	11.63±2.06 a	6.70±0.93	5.00±0.51c	8.40±0.33c	3.50±0.03c	4.38±0.02 c	32.5±4.51c
10	0.00± 0.0 d	0.00± 0.0 d	0.00± 0.0 d	0.00±0.0 c	0.00±0.0 d	0.00±0.0	0.00±0.0 d	0.00±0.0d	0.00±0.0d	0.00±0.0d	0.00±0.0 d
15	0.00± 0.0 d	0.00± 0.0 d	0.00± 0.0 d	0.00±0.0 c	0.00±0.0 d	0.00±0.0	0.00±0.0 d	0.00±0.0d	0.00±0.0d	0.00±0.0d	0.00±0.0 d
LSD	*1.19	*3.78	*1.24	*3.59	*0.47	7.37 n.s	*5.54	*5.82	*2.52	*1.87	*1.87
t cant xe											

*Significance of LSD values at probability level (P <0.05). The upper values are the mean of the coefficients and below the standard error values (S.E ±) and the letters (a, b, c and d) indicate the differences between the averages. Similar letters indicate no significant differences.

of 2.5 and 5%, respectively and did not hatch at the concentration of 10 and 15% and pesticide treatment. The table also showed that the percentage of eggs hatching at 2.5 concentrations was 52.30% and decreased to 21.50 at concentration 5%. The results of the statistical analysis showed the presence of significant differences in the duration of larval stage, larval mortality and the duration of pupa phase. No significantly differences were observed in the rate of pupa mortality. Control treatment had a highest emergence rate for female and male which reached to 51.70 and 33.23for both sexes, respectively. While it decrease to 16.62 and 21.62 for females and males, respectively at concentration 2.5 and with significant differences from control treatment. The lowest average age for adult females at concentration 2.5% was7.08 day for females and7.32 3day for males compared to concentration 5% where it to reached 3.50 day for females adult and 4.38% for male adult that were related to the differences significantly from the control treatment of 10. 35 for females 8.13 for males; as it reflected in females fecundity 57.20 at concentration 2.5% and 32.5 at concentration 5%, it was observed that the values were significantly different from control treatment.

"These results indicate that the eggs are sensitive to the plant extract and that the reason for the failure of hatching eggs may be due to the physical effect of these extracts in the eggs in the gas exchange with the external medium, and the hardening of the egg shell, which leads to the death of the fetus, or due to the leakage of the extracted material into the egg shell and its conflict with the vital systems of fetal growth" (Tawiletal, 2007). The results of the current study are in agreement with the findings of (Al-Rubaieetal, 2011), as the extract caused hexane and methyl alcohol for the fruits of the *Melia azedarach* L. plant at a concentration of 10% to not completely hatch the eggs of *S. cretica*.

The results presented in table 2 showed that all the concentration used of *c. roseus* extract, had a significant differences effect on increasing the duration of the larval period to reached 30.9, 31.5 and 34 day at 5, 10 and 15% respectively. The mortality of the first larval stage were 53.3, 68.3 and 88.2% at the 5, 10 and 15% concentrations, respectively. While the larval mortality was 100% when treated with Avant pesticide compared with control treatment (16.6%). The results also showed that there were significant differences between the average duration of the pupal stage at concentration 10% and 15% compared to the control treatment that reached 10.9 and 12.7 days. The results also showed that the natural emergence of adult females and males decreased in all concentrations and with significant differences from the control treatment. We notice that the lowest fecundity (12.8 egg) at 15% concentration compared to the two concentrations of 5%, 10%, which reached 61.1and

Table 2: Effect of alcoholic extract c. roseus and pesticide, control treatment on first larval stage of S. cretica L. and their development.

treat-ment		Average larval period (day)S.E ±	Larvalm Mortality (%)	Average pupal period (day)S.E ±	Pupal Mortality (%)	Adult emergence (%)		Adult longevity (day)		Fecundity egg
						female	male	female	male	
Control		29.5 ± 3.4 d	16.6 ± 3.7 d	8.48 ± 0.9 c	13.3 ± 2.1 a	31.6 ±5.8 a	40.0 ± 6.9 a	9.4 ± 0.05 a	7.3 ± 0.04 a	242.8 ± 29.8 a
pesticide		0.0 ± 0.0 e	010 ± 0.0 e	0.0 ± 0.0 d	0.0 ± 0.0 c	0.0 ± 0.0 d	0.0 ± 0.0 d	0.0 ± 0.0d	0.0 ± 0.0d	0.0 ± 0.0 c
extract	5	30.9 ± 6.8 c	53.3 ± 8.6 c	9.5 ± 1.0 b c	11.7 ± 1.9 ab	15.0 ±0.9 b	18.3 ± 2.1 b	8.0 ± 0.06 a b	7.4 ± 0.1 a	61.1 ± 8.4 b
	10	31.5 ± 7.6 b	68.3 ± 8.4 b	10.9 ± 1.7 b	8.2 ± 0.8 b	14.8 ± 1.0 b	16.6 ± 2.6 b	6.2 ± 0.03 b	5.0 ± 0.02 b	44.5 ± 6.1 b
	15	34.0 ± 5.9 a	88.2 ± 11.7 a	12.7 ± 2.9 a	0.0 ± 0.0 c	5.0 ±0.02 c	3.3 ± 0.01 c	2.7 ± 0.001 c	2.2 ± 0.004	12.8 ± 1.0 c
LSD		0.9	6.5	0.9	4.6	6.8	7.7	2.3	1.9	18.8

* Significance of LSD values at probability level (P <0.05). The upper values are the mean of the coefficients and below the standard error values (S.E ±) and the letters (a, b, c and d) indicate the differences between the averages. Similar letters indicate no significant differences.

44.5 egg, which were all significant differences with the control treatment of 242.8 egg.

A study by (Abdul Hamid *et al*, 1988), who reported that the cause of perishing to the penetration of toxic compounds into the body of the larva through the body wall during or after its molting. The 15% concentration of both methanol and hexane extracts of *Melia azedarach* L. plant killed all larvae of *Sesamia cretica* in the first day after treatment (Al-Rubaie *et al.,* 2011).

Table 3 results showed an increase in the duration of third larval stage and the mortality rate with increased concentration to reach 23.9 day with concentration 15%, while the treatment of the pesticide Avant S led to kill all larvae. The alcoholic extract of the plant also showed significant effect in increasing the time period for the pupa 9.1 day when the concentration is 5%, while this period reaches 12 days it treated with concentration is 15% compared to the control treatment of 8.8 days. On the other hand, the results of the statistical analysis showed that there were significant differences between the concentrations of the extract in the percentage of pupal mortality, as this percentage reached 20% at concentration 5%, and it decrease to 13.2% at concentration 10% compared to control treatment of 4.9%. No significant differences were observed among the concentrations of the extract and the control treatment in the emergence of partial adult males and females resulting from the larvae treated with the concentrations of the extract. The table 3 showed a decrease in the proportion of the emergence of natural adult males and females, where the larvae treated with the three concentrations showed 5%, 10% and 15%, the lowest percentage of adult emergence 11.6 females and 11.6males at 15% concentrations respectively. The adult longevity was decrease and reached 3.8 day female and 3 day males for s at concentration 15% compared to the control treatment (9.1 day males and 10.6 day females), and this was reflected in the fecundity where was 34.1egg at the concentration of 10% and 21.8 egg at the concentration of 15% compared to the control treatment of 252.8 egg. "In the previous study, the results of the phytochemical composition of the *Catharanthus roseus* leaf extracts showed that all tested extracts (acetone, ethanol and distilled water) contains Terpenoids and essential oils have membrane disruption characteristics. Quinines and polyphenols inactivate the enzymes, bind to adhesions and forms complex with cell wall. Flavonoids inhibit gastro intestinal tract releasing acetylcholine. Saponin possesses membrane permeabilizing properties, leads to vacuolization and disintegration of integuments. Some of the characteristics of saponins include formation of foams in distilled water solutions, cholesterol binding properties and hemolytic activity which affects mosquito larvae". (Tiwari P. *et al.,* 2011, Okwu D.E. *et al.,* 2004) Alkaloids inhibits the metabolic processes in mosquito larvae, interfere with growth hormones, and digest the protein in the larval body and turn it into peptone derivatives that will host larvae as food shortages and eventually leadsto the death of larvae (Utomo *et al.,* 2013).

It was appear from the results of table 4 that the fifth larval stage period is directly increase in plant extracts concentration, as it was reached to13.6 day at a concentration at 15% and with significant differences from the control of 5.9 days. The highest rate of mortality percentage was 83.3 at the concentration 15%, to decrease to 40 at the concentration of 10%, while it reached to 100% with the treatment of pesticides. No significant differences were recorded in the duration of the pupa among the two concentrations of 5% and 10%, and the control treatment, while the differences differed significantly at the concentration of 15%, as for the

Table 3: Effect of alcoholic extract *c. roseus* and pesticide, control treatment in the third larval stage of *S. cretica* L.and their development.

treat-ment		Average larval period (day)S.E±	Larvalm Mortality (%)	Average pupal period (day)S.E±	Pupal Mortality (%)	Adult emergence (%)		Adult emergence partial (%)		Adult longevity (day)		Fecundity
						female	male	female	male	female	male	
Control		16.9±3.1 d	10.0± 1.0 d	8.8± 0.7 c	4.9± 0.1 c	38.3± 4.8 a	46.6± 5.7 a	0.0± 0.0	0.0± 0.0	10.6± 0.21 a	9.1± 0.07 a	252.5± 33.6 a
pesticide		0.0± 0.0 e	0.0± 0.0 e	0.0± 0.0 d	0.0± 0.0 d	0.0± 0.0 d	0.0± 0.0 d	0.0± 0.0	0.0± 0.0	0.0± 0.0 d	0.0± 0.0 d	0.0± 0.0 c
xe + cant	5	18.7±3.9 c	39.9± 5.6 c	9.1± 1.0 b	20± 3.6 a	16.6± 3.2 b	20.0± 4.4 b	1.7± 0.001	1.6± 0.001	6.8± 0.05 b	5.6± 0.03 a	46.3± 7.1 b
	10	21.3±4.2 b	58.6± 7.7 b	10.0± 1.2 b	13.2± 1.1 b	13.9± 1.3 c	9.9± 1.3 c	2.6± 0.002	2.6± 0.002	5.6± 0.03 b	4.5± 0.02 b	34.1± 4.9 b
	15	23.9± 5.7 a	74.9± 9.8 a	12.0± 2.3 a	6.7± 0.3 c	11.6± 1.5 c	11.6± 1.5 c	1.6± 0.001	1.6± 0.001	3.8± 0.001 c	3.0± 0.01 c	1.82± 1.4 c
LSD		0.4	4.4	0.5	3.2	5.1	3.3	3.9 n.s	3.8 n.s	1.6	2.4	21.1

* Significance of LSD values at probability level (P <0.05). The upper values are the mean of the coefficients and below the standard error values (S.E ±) and the letters (a, b, c and d) indicate the differences between the averages. Similar letters indicate no significant differences.

Table 4: Effect of alcoholic extract *c. roseus* and pesticide, control treatment on fifth larval stage of *S. cretica* L. and their development.

treat-ment		Average larval period (day)S.E±	Larvalm Mortality (%)	Average pupal period (day)S.E±	Pupal Mortality (%)	Adult emergence (%)		Adult emergence partial (%)		Adult longevity (day)		Fecundity
						female	male	female	male	female	male	
Control		5.9± 0.3 d	11.6± 2.2 d	8.5± 1.1 b	8.3± 2.2 b	36.6± 3.8 a	43.3± 4.9 a	0.0± 0.0	0.0± 0.0	9.7± 0.42 a	8.2± 0.06 a	239.0± 41.1 a
pesticide		0.0± 0.0 e	0.0± 0.0 e	0.0± 0.0 c	0.0± 0.0 c	0.0± 0.0 d	0.0± 0.0 d	0.0± 0.0	0.0± 0.0	0.0± 0.0 d	0.0± 0.0 d	0.0± 0.0 c
xe + cant	5	7.9± 0.9 c	31.6± 5.1 c	8.9± 1.1 b	5.0± 0.6 b	26.6± 5.1 b	28.3± 5.0 b	3.3± 0.2	5.0± 0.6	7.4± 0.08 b	5.9± 0.04 b	49.3± 8.4 b
	10	9.4± 2.3 b	40.0± 6.9 b	8.7± 0.9 b	15.0± 2.6 a	18.4± 2.9 c	20.0± 2.4 c	1.7± 0.3	3.3± 0.2	5.7± 0.02 b	5.1± 0.02 bc	34.2± 3.7 b
	15	13.6± 3.4 a	83.3± 8.8 a	13.1± 2.5 a	1.7± 0.3 c	5.0± 0.01 d	3.3± 0.1 d	1.7± 0. 4	5.0± 0.2	3.3± 0.001 c	2.8± 0.01 c	13.3± 3.3 c
LSD		0.7	6.6	0.8	4.7	9.8	4.7	4.1 n.s	8.4 n.s	1.9	2.3	16.7

* Significance of LSD values at probability level (P <0.05). The upper values are the mean of the coefficients and below the standard error values (S.E ±) and the letters (a, b, c and d) indicate the differences between the averages. Similar letters indicate no significant differences.

percentage of pupa perishing, the concentrations differed, it was 5.0% at concentration 5% and 1.7% at concentration 15% reaching their highest rate of 15% at concentration 10% and with significant differences from the control treatment of 8.3. It was observed that there was a clear effect of the concentrations of the extract on the emergence of adult reach 26.6 females and 28.3 males at a concentration of 5%, while the concentration showed 15% the lowest eruption rate reaching 5.0% females and 3.3% males compared to the control treatment of 36.3 Females 43.3 males. Statistical analysis confirmed the no significant differences in terms of partial emergence in female and male complete and for all concentrations. The table also showed significant differences between concentrations 5%, 10%, 15% and control treatment in the average longevity of adults to reach at concentration 10% to 5.7 days females and 5.1 days males whereas, while this period decreased by concentration 15% to 3.3 days females and 2.8 days males while it was 9.7 day female and 8.2 day male at control treatment. The average number of eggs placed in the control treatment was 239 while it decreased in the remaining concentrations to 13.3 eggs, at a concentration of 15%.

The result is confirmed by (Al-Tamimi *et al.,* 2002) When using *Ibicella lutea* Stapf plant extract methyl alcohol on *Sesamia cretica* Led to mortality larvae 56.7% at concentration of 100%, is possible that the cause of increased larval death on the effect of these compounds on the gut in particular Epithelial cells in them leading to larval poisoning, or as a result of the combination of these compounds with the fatty substances present in the digestive system without benefiting from it, which causes great damage to the larvae (Pederson *et al.,* 1987, Wiggles worth, V.B., 1972). Also, a previous study showed that in the digestive tract of insects regions they contain a group of

Table 5: Effect of alcoholic extract *C. roseus* and pesticide, control treatment on pupa of *S.cretica* L. and their development.

treat-ment		Average pupal period (day)S.E ±	Pupal Mortality (%)	Adult emergence (%)		Adult emergence partial (%)		Adult longevity (day)		Fecundity
				female	male	female	male	female	male	
Control		8.8± 0.9 c	10.0± 1.6 d	43.3± 4.5 a	48.3± 5.1 a	0.0± 0.0 c	0.0± 0.0	9.3± 0.6 a	8.5± 0.06 a	205.5± 32.5 a
pesticide		0.0± 0.0 d	0.0± 0.0 e	0.0± 0.0 c	0.0± 0.0 d	0.0± 0.0 c	0.0± 0.0	0.0± 0.0 d	0.0± 0.0 d	0.0± 0.0 c
extract	5	9.3± 1.1 c	33.3± 3.6 c	26.8± 5.1 b	35.0± 4.8 b	5.0±0.02 ab	0.0± 0.0	7.5± 0.04 ab	6.3± 0.05 b	50.4± 6.7 b
	10	10.3± 0.9 b	41.6± 5.4 b	25.0± 2.9 b	26.6± 2.4 c	1.7± 0.08 bc	6.7± 0.2	5.1± 0.02 b	5.5± 0.01 b	35.8± 4.2 bc
	15	14.1± 2.5 a	76.7±8.9 a	5.1± 0.01 c	3.3± 0.1 d	8.3± 0. 9 a	4.9± 0.2	3.6± 0.003 c	3.3± 0.01 c	12.8± 2.0 c
LSD		0.9	9.3	7.5	7.5	4.3	6.7 n.s	2.1	1.8	23.4

* Significance of LSD values at probability level (P <0.05). The upper values are the mean of the coefficients and below the standard error values (S.E ±) and the letters (a, b, c and d) indicate the differences between the averages. Similar letters indicate no significant differences.

enzymes and these active secondary compounds may have a role in the cells of the lining of the gut die, leading to an increase in proportions larvae die (Broer, W.S., 1984).

The results of pupa activity of *C .roseus* extract at various concentrations on *S.cretica* were noted and presented in table 5 the pupa duration was 8.8 days at control treatment, Pupa duration has highly extended to 14.1 days at 15% concentration. Mortality was increased as the concentration increased; at 5% concentration, pupa mortality was 33.3%, whereas at 10% and 15% concentration, it was increased to 41.6% and 76.6% respectively. While it was recorded 10.0 at control treatment. Emergence has been reduced in the highest concentrations tested in the study. Emergence was 28.6 female, 35.0 male at 5% concentrations and 25 female and 26.6 male at 10% concentration Adult emergence has been highly affected by the treatment 15% to5.1 female, 3.3 male decreased. When the control male and female insect lives for 9.3 days female, 8.5 days male. The longevity reduces significantly to 7.5 female, 6.3 male, 5.1 days female, 5.5 days male and 3.6 female and 3.3 male in the treatment using *C. roseus* at (5 to 15)% concentration. Fecundity was 205.5 eggs in the control, has reduced to 50.4 eggs and35.8 eggs and 12.8 when treated at5%, 10%, 15% respectively, is found. (Jyotsana Sandey *et al.,* 2016) through their research that pupal mortality Percentage of 6th instar of *Spodoptera litura* was 73.33 when pre-pupae were treated with 2.0% leaf extract of *C. roseus* and mortality in newly emerged adults from treated pupae was highest of 100 percent at same concentration.

Conclusion

It from the results of experiment could be concluded that the extract from *C. roseus* could be exploited to develop potent pesticide, because of the high mortality caused at low concentration to *S. cretica*. These potential botanical insecticides may fit well in IPM programs designed to control *S. cretica* Considering that these plants are already used for medicinal purposes, they will be safer compared to the current conventional pesticides used to control *S. cretica*. Never the-less, more research into their toxicity will be warranted. Most importantly, this study provides the basis for fur-there exploration on the isolation and identification.

References

Abdul Hamid, Zidan Hindi and Abdul Majeed, Muhammad Ibrahim. Recent trends in pesticides and insect control. part One . Economics - Structure – Behavior . Arab Publishing and Distribution House/Cairo. 1988, 572 pages.

Alhussein, M.B., *et al.,* (2015). Relative resistance of some maize *Zea mays* L. genotypes against stem borers (Chilo partellus and Sesamia cretica) in central Sudan. *Journal of Advances in Biology,* **7(1):** p. 1238-1243.

Al-Tamimi, Nihad Kadhim Khalaf, Hussain Fadhil al-Rubaie and Sabri Faraj Muhammad (2002). Evaluation of the effectiveness of some aqueous and alcoholic extracts of deer horn (Ibicella lutea Stapf.) Against different stages of corn stalk borer (Sesamia cretica Led.). *Iraqi Atomic Energy Organization, Department of Agricultural and Biological Research, P.O.* **765:** Baghdad, Iraq.

Al-Rubaie, Thaer Mahmoud, Maytham Abdel-Hadi Al-Sudani, Bushra Abbas and Jabbar Abadi (2011). Effect of hexane and methyl alcohol extract of the fruit of the pollen plant. *Melia azedarach* L. on the eggs and larvae of the corn stalk borer Sesamia cretica Led. (Lepidoptera: Noctuidae). *Babylon University Journal, Pure and Applied Sciences,* **19(1):**.

Broer, W.S. (1984). Insect-Plant interaction. Pitmanbooks. London U.K. 119-137.

Chauhan, S.P.S., A. Kumar, C.L. Singh and U.K. Pandey (1987). Toxicity of some plant extracts againstrice moth, *Corcyra cephalonica* Stainton (Lepidoptera). *Indian Journal of Entomology,* **49:** 532-534.

Ezzeldin, H., *et al.,* (2009). Effect of some materials on Sesamia

cretica infesting some maize and sorghum varieties. *Archives of Phytopathology and Plant Protection,* **42(3):** p. 277-290.

Fatemeh Soltani Orang, Hossein Ranjbar Aghdam, Habib Abbasipour and Alireza Askarianzadeh (2014). Effect of Temperature on Developmental Rate of *Sesamia cretica* (Lepidoptera: Noctuidae) Immature Stages, *J. Insect. Sci.,* **14:** 197.

Ghormade, V., M.V. Deshpande and K.M. Paknikar (2011). Perspectives for nano-biotechnology enabled protection and nutrition of plants. *Biotechnology advances,* **29(6):** p. 792-803.

Gilden R.C., K. Huffling and B. Sattler (2010). "Pesticides and health risks"; *Journal of Obstet Gynecol Neonatal,* **604:** pp.127-132.

John, E.S., Maize cobs and cultures history of *Zea mays* L. Springer Heidelberg Dordrecht London New York, 2010. 266pp.

Jyotsana Sandey and Sudha Summarwar (2016). Pupicidal activity of plant extracts of Catharanthusroseus against 6th instar of Spodoptera litura. *International Journal of Fauna and Biological Studies,* **3(4):** 09-10.

License, S.A. (2008). Maize from New World Encyclopedia. Organizing knowledge for happiness, prosperity and world peace. http://www.Newworldenclopedia.org/entry/Maize.

Okwu, D.E. and M.E. Okwu (2004). Chemical composition of Spondias mombin linn plant parts, *Journal for Sustaining Agricultural Environment,* **6:** 140-147.

Pimentel, D. and T.W. Patzek (2005). Ethanol production using corn, switchgrass, and wood; biodiesel production using soybean and sunflower. *Natural resources research,* **14(1):** p. 65-76.

Pederson, M.W., D.F. Zimmer and J.O. Mcallister (1987). Natural products of plant. *Crop Science,* **7:** 349-352.

Revellin, C., *et al.,* (2001). Effect of some granular insecticides currently used for the treatment of maize crops (Zea mays) on the survival of inoculated Azospirillum lipoferum. *Pest Management Science: formerly Pesticide Science,* **57(11):** p. 1075-1080.

SAS. (2010). SAS/STAT Users Guide for Personal Computer. Release 9.13. SAS Institute, Inc., Cary, N.C., USA. 2006.

Stephenson, G.R. (2003). Pesticide use and world food production: risks and benefits. ACS Publications.

Tawil, Iyad Ahmed, Hamed Kazem Al-Obaidi and Hassan Saeed (2007). Al-Asadi. Sensitivity of some stages of the potato tuber moth, Phthorimaea: opercullela to gamma rays, Plant Protection Journal.

The British Pharmaceutical codex. *Viola odorata*. Published by direction of the council of the pharmaceutical society of Great Britain 2006, 1911.

Tiwari, P., B. Kumar, M. Kaur, K. Gurpreet and K. Harleen (2011). Phytochemical screening and extraction: *A review, Internationale Pharmaceutica sciencia,* **1:** 98-106.

Utomo, Margo (2013). Own power plant-based ingredients papaya seed powder against death Aedes aegypti larvae isolates SALATIGAB2P2VRP Laboratory (Proceedings of the National Seminar Unimus). DOI: http//: jurnal.unimus.ac.id.

Wiggles worth, V.B. (1972). The principle of insectphysiology. Chapman and Hall, London, U.K., 827 pp.