Effect of temperature and different extracts of Datura metel leaves on some biological aspects of Hyalomma schulzei (Acari: Ixodidae)

Mohammed R Annon Al-Hasnawi and Esraa F Wathah
Dept. of Biology, college of science, university of Al-Qadisiyah, Diwaniyah, Iraq
Email: Mohammed.al-hasnawi@qu.edu.iq

Abstract. The current study investigated the effect of temperatures (28, 35 and 40) °C Under 90 % R.H and alkaloids, phenolic and terpenoid extracts of Datura metel leaves at different concentration on biological performance of Hyalomma schulzei. The result indicated that egg hatchability was 97% at 28 and 35°C, incubation period was 30.66 days at 28°C the premoulting period for larvae and nymphs were (10.7-14.7) and (18.2-23) days respectively. Preoviposition period was 11.33 days at 28°C while oviposition period was 21 days at the same temp. Total egg production was (8848-8850) eggs and female converted 56.1% of engorged weight into eggs irrespective of temp. Bioassay results revealed that crude alkaloids, terpenoids and phenolics compounds of Datura metel leaves have an acaricidal effects on different developmental stages of Hyalomma schulzei. The mortality of eggs and starved larvae was 90% in all used conc. Of alkaloid, terpenoid and phenolics, the same mortality percentage was exhibited by fed larvae in all conc. Of alkaloid and terpenoids, however, mortality rate of starved and fed nymphs were 74.21% and 64.41% respectively in alkaloid extracts only. Moreover, terpenoid and phenolic extracts have no impact on adult females and males mortality. The outcome of the present study proved that alkaloid extracts of Datura metel. Leaves could effectively control different life stages of Hyalomma schulzei

Keywords: Datura metel, Hyalomma schulzei, alkaloids, terpenoids, phenolics

1. Introduction

Hyalomma schulzei Olinev has a restricted distribution in the world (hoogstraal and Tattchel, 1985). This tick is found in borderline between Iraq and Saudi-Arabia especially in desert region in samawa and Najaf (Mohammed, 1996). H. schulzei adults are parasitic exclusively on camels, while larvae and nymphs fed on rabbits, hedgehogs and rodents and it is a vector of crimrean hemorrhagic fever (Robinson & spradlibg 2006). Acaricides were used extensively to control ticks and because of their toxicity, cumulative effect, damage and the emergence of resistant in many species of ticks over the world. There, a necessity to reduce dependence on chemical pesticides to find alternatives including botanical pesticides due to their safety to the environment diverse bioactive compounds, Datura metel L. belong to the family Solaneacea it has many medically important compounds such as Hyoseyamine, Atropin and Scopolamine (Dujoi, 1996)
In Iraq, so far as the author are aware, prior to the present work, the literatures on \textit{H. schulzei} are mainly taxonomic (Mohammed, 1996) and this is the primary reports on its biology, besides the investigation of the role of \textit{D. metel} leaves extracts as a promising acaricide to control \textit{H. Schulzei}

2. Materials and methods

1- \textit{plant samples collection: D metel collected from the house garden} In Diwaniyah town before flowering time at lab Temperature, then grained for obtaining fine powdery in a mill. The powder was put in tightly closed vials, and kept in refrigerator.

2- \textit{Tick culture :} :Engorged females were collected from infested camels in Samawa desert region (Near Saudi-Arabia borders) all developmental stages were fixed on shaved ears of \textit{Oryctolagus cuniculus} and the colony established according to (watt et al 1972).

3- \textit{Effect of temperature on some biological aspects of H. Schuzei :} - All experiments were held in incubators at 28, 35 and 40 °C under 90% R.H and 12:12 (L: D) photoperiod. The effect of mentioned temperatures were investigated as follows:

3-1: egg incubation period and hatching percentage: 300 eggs within 24 hours age were collected and divided into three replicates in glass vials covered with muslin cloth then kept in desiccator with 90% R.H, these were deposited in incubation time and hatchability.

3-2: Effect of temperature. on molting period of larval and nymphal stages:
Sixty newly emerged larvae or nymphs were fed and put individually in glass tube for testing each temp. All stages were monitored daily to determine the molting time.

3-3: Effect of temp. on pre oviposition and oviposition period: twenty engorged females within 24hrs age were used to determine pre oviposition period

3-4: Effect of temp in female productivity and conversion efficiency index: Twenty engorged females were weighted individually in a sensitive balance, then transferred to glass tubes and the number of eggs was recorded daily. The total weight of egg mass produced by each female was determined and the conversion efficiency index was calculated according to the method of (Drumand, 1977; Ahmed and kheir, 2003)

4- \textit{Preperation of secondary compounds from D. metel leaves}

4-1: phenolic compounds extracts: (Gayon , 1972) method was followed to prepare phenolic extracts

4-2: Terpenoid compounds extracts: Terpenoid extracts was prepared according to (Harborne, 1984)

4-3: Alkaloid compounds extracts : Al sammarai (1983) Method which is modified from (Harbone, 1973) was used to prepare alkaloids

4-4: Test concentration used in bioassay: Four concentration were prepared for each test concentration (i.e: 10, 30, 50 and 70) mg/md in addition to control treatment

5- \textit{Bioassay}

5-1-Eggs: 300 eggs were used for each conc. Which were distributed to five replicates, 60 eggs for each replicate. The eggs were dipped in each extract conc. separately for one minute, then were removed and placed on a clean glass dish and put in desiccator with 90% R.H and kept in incubator at 28°C. The eggs were monitored daily to record hatching rate

5-2- Nymph: (Gupta and Kumar, 1998; Nuth et al 2005) method were followed. 90 fed and 90 starved nymphs were used for each extract, 30 individuals for each concentration. These both groups of larvae were put on filter papers and immersed in petri dish containing the test conc. Of the extract for one minute and then transferred to clean petri dish and kept in same conditions previously mentioned (1-5)

5-3- larvae :The same procedure was followed in larvae bioassays including numbers, replicates and experiment conditions.
5-4- Adults: The same procedure was followed in adult bioassay, both sexes (males and females) were tested.

3. Statistical Analysis

Experiment was designed according to factorial experiment with completely randomized design (CRD); L.S.D was calculated with confidence limit (0.5). Mortality percentages corrected according to Abbott (1925).

4. Results and discussion

4.1. Effect of different temperatures and relative humidity 90% on life cycle of H. Schulzei

4.1.1. Effect on incubation period and hatching rate:

Table (1) shows that eggs were hatched at 35 and 28°C and eggs were not hatched at 40°C, incubation time was 18.33 and 30.66 days respectively, and hatching rate was 97% for each of the above mentioned temperature. Mountford (1966) mentioned that the reason for the failure of hatching eggs is due to the disruption of life events, or the reason for this is due to the existence of a heat threshold after which life events increase with increasing heat until reaching the critical temperature limit at which life events stop (Mohamed 1996; Mourad et al. 1982). The hatching rate for the eggs is Boophilus annulatus (80%). The duration of egg incubation was 24 days at 27°C. While Didipolo (1983) found that incubation eggs of species H.imperessum, H. impeliatum and H. truncatum is 29 days at 24°C temperature. Khalil and Hagrás (1988) found that the best incubation temperature of H.dromedarii eggs was 22.2 days. While Linthicum et al. 1991) explained that hatching rate of T. truncatum is 48% at 26°C and humidity 93%. Al-Asga (1992) reported that the incubation period for H. schulzei was 32.3 days at 28°C and 75% humidity, which is close to current results. Mohammed (1996) confirmed that the incubation period was 12.5 and 26.7 days and hatching rate (84.9 - 87.9%) for R. turanicus and R. sanguineus eggs at 27°C and humidity 93% respectively (Shoukry et al. 2000). The incubation period for eggs of H. schulzei was 72.29, 53.12, 31 and 18.48 days at temperatures 21, 25, 28, and 34°C respectively. The eggs hatching rate was 96.21% at 29°C and humidity 75%. These results are consistent with what was found in the current research, with incubation period (18.33) at 97%. Abdul Husein (2006) reported that incubation of eggs and hatching of species H. marginatum turanicum, H. detritum, H. Anatolicum excavatum (37.5, 32.5 and 27.5) days, whereas hatching rates (98, 99 and 99) respectively were 26°C and 95% humidity (Chen et al. 2009) added that the incubation period of H.asiaticum eggs is 38.8 days at 26°C and 70% humidity. Jaaoluz et al. (2010) confirmed that the incubation time for the Amblyomma was 35.5 days and the hatch rate was 98.8% at 27°C and 80% humidity. Al-Yasiri (2011) reported that the egg hatching of the Rhipicephalus turanicus was obtained in a temperature range between 25-20°C. The eggs failed to hatch in the two degrees (15 and 40°C) and the longest incubation period was 25.75 days at 20°C and 100% of the eggs hatched at (28, 30, 35°C). Therefore, it is possible to say that temperatures significantly affect the incubation period of H.Schulzei tick eggs. The duration of incubation is less with the increase in temperature, while the hatching rate is not affected by the temperature used.

4.1.2. Effect on the duration of the larval and nymphal stage

Table (1) shows the effect of temperature (28, 35 and 40) and humidity 90% RH on the growth of larvae and nymphs. Premouling period larvae (10.7 - 14.7) and (23.2 - 23) days for both, respectively (28°C and 35°C). While the mouling did not occur at 40°C. The results show that the correlation between temperature and premouling time for both stages The results of the statistical analysis showed significant differences The effect of temperature on the pre-mouling period may be attributed to Ahmed and AL-Kheir (2003). He pointed out that the increase in temperature increases the activity and speed of
life events and is linked to the enzymes responsible for completing these processes. Muhammad (1996) stated that the shortest period required by larvae and nymphs of ticks *H. dromedarii*, *H. anatolium*, *R. sanguineus*. Before moulting (6, 13, 5.3, 13.4) and (4) and 13 days at 27 °C. Shoukry et al. (2000) also confirmed that temperatures have an effect on the pre-moulting period of *H. Shulzei*. The shortest (17.98) days while the longest duration (85.08) in the temperatures (34 and 21 °C) respectively. Ogden et al. (2004) found that the period took Larvae before moulting to Nymphs at 30 °C were 27.9 days. Al-khalifa et al. (2006) showed that the shortest pre-moulting period was 4 and 7 days for the larvae and nymphs of *Rhipicephalus turanicus* at 35 °C while the longest duration was 15 and 40 days at 20 °C and different humidity levels Nava (2008) reported that the pre-moulting period of the larvae and nymphs of Amblyomma parvum at 25 °C and humidity of 83-85% was 16.4 and 21.8 days, and Rodrigon et al. (2010) indicated that the pre-moulting period of the larvae and nymphs of Amblyomma parvum was 12.88 and 16.64. Days for the larvae and nymphs of Amblyomma rotundatum at 20 °C and humidity of 85%. Alyasiri (2011) reported that the period of pre-moulting of larvae and nymphs of *R. turanicus*. was (7, 14), (5) and 9 days at temperature 28 and 30 °C.

4.1.3. Effect on preoviposition and oviposition

Table (1) shows the effect of temperature in pre-oviposition and oviposition at temperatures (28, 35 and 40) and humidity 90% where females lay the eggs at 28 and 35 °C while failing to lay eggs at 40 °C and that the temperature has a clear effect on the pre-oviposition and oviposition, the higher the temperature the less time required for that and for a certain amount, the pre-oviposition period 11.33 and 9 days, while the oviposition of eggs was 21) And 19 at temperature (28 and 35 °C) respectively. In this regard, Drummond et al. (1971) mentioned that the length of oviposition is 25.4 days at 27 °C and humidity 90-60% for *A. americanum*. Knight et al. (1978). The pre-oviposition time was 7.1 days for *H. reipus*. Rechv & Kinght (1983) showed that the time required for oviposition was 6 days The oviposition took 26 days for the *R. oculatus* tick. Dipeolo (1983) added that the egg laying period for *H. impletatum* was 7 days at 28 °C Kahali and Hagras (1988) found that the pre oviposition time of *H. impletatum* was 4.2 days, while egg laying time was 15.6 days at 28 °C and 90% humidity. Davey (1988) reported that the longest preoviposition of *B. annulatus* was 16.3 days at 15 °C at 25-40 °C for 2-3 days. Lingen (1999) reported that the preoviposition of *Ixodes rubicundus* 13.3 days at 25 °C and humidity 33% and 68.3 days at 10 °C at humidity 93% Shoukry et al. (2000) noted that *H. shulzei* took 10.72 days before egg laying began. Egg laying required 20.96 days at 28 °C and a75% humidity. This coincides with current results. Ahmed and AlKheir (2003) determined that period for *H. dromedarii* (9.7) days at 28 m and humidity 75%. Anacristina (2006) added that the pre-oviposition was 6.08 days, while eggs were 23.15 days at 25 °C and 95% humidity for *Haemaphysalis leporispalustris*. As reported by the study Nava et al. (2008) that predates egg laying for *A. parvum* 6.5 days at 25 °C and humidity Alyasiri(2011) 83-86%. The period of pre-oviposition for *R. turanicus* was 10.2 days, while oviposition time was 13.7 days at 28 °C in different humidity. The longest period before egg laying was 23.85 days at 20 °C and was shortened. 4.15 days at 35 °C. As for egg laying time, the longest duration of 33.05 days and the shortest duration of 5.65 days at the temperature of the two temperatures respectively.

4.1.4. Productivity

Table 1 shows the number of eggs produced by females. The total number of eggs produced by females was between 6848 and 6850 eggs at temperature 28 °C and 35 °C. The results of the statistical analysis showed significant difference, while females did not produce eggs at 40 °C. Sweatman and Gordan (1968) reported that *H. aegypticum* females failed to lay the eggs at a temperature of (40) °C while the eggs produced by
females reached 5198 eggs at temperature (30-35) °C. Count Drummond et al. (1971) eggs produced by females Amblyomma americanum 6179.9 eggs at 27 °C and humidity 60 - 90%. Rechev and Knight (1981) note that the female population of R. glabroscutatum reached 2044 eggs at a temperature of 26 m. Mohammed (1996) added that female H. dromedarii species come in the forefront of female ticks H.a.excavatum and anatolicum H.a. Where it laid 657.9 eggs at a temperature of 27 °C and humidity 93%. Yeruham and Hadani (2000) reported that female R. burrsa ticks 8469.6 eggs at 28 °C and 89% humidity. Shoukry et al. (2000) reported that the female tick H.schulzei placed 6888 eggs at a temperature of 29 m and humidity 75%. Ahmed and Kheir (2003) reported that the productivity of female H.dromedarii at 25 °C and humidity of 85% was 8076 eggs. Jacobs et al. (2004) estimated that the productivity of female Haemaphysalis leachi was 3232 eggs at temperature 25 m. The number of eggs produced by female H.anatolicum was 4881.8 eggs (Ahmed et al., 2011)

4.1.5. Food conversion efficiency

Table (1) indicates the efficiency of filled females in the conversion of the blood meal to eggs. The value of the food conversion did not differ in the two temperature (28, 35) °C And the value was 56.8%, while females failed to convert the blood meal at temperature 40 °C, which is due to the fact that the heat affects the physiological events and increase their speed within the that inhibit the vital action. Ahmed and Kheir (2003). Koch (1982) explained that F.U.E. 74% R. turanicus and 79% for species H.dromedarii Hagars and Khalil, 1988), 56% for R. appeniculatus (Colborne, 1985) and 72% for H.impeltatum. (Kahlil and Hagars, 1988) and Davey (1988) reported the value of F.U.E. for the tick B. annulatus did not differ in different temperatures used, reaching 55% at temperature (20-30) °C. While Linthicum et al. (1991) indicated that the value of 56 R.E.I% for type H.truncatum. Al-Asgah (1992) reported that it was a tick of H. schulzei 57%. While Lingen et al. 1999 The value of type I. rubicundus was (43.1-54.4%) in humidity (93.5%) and (34.1-42.5%) in humidity (33%), Shoukry et al. (2000) reported that it was 56.1%. Table (1) The effect of some temperatures and relative humidity is 90% in the tick life cycle H.shulazei

| Standard of living                        | Temperature     | L.S.D |
|------------------------------------------|-----------------|-------|
|                                          | 28              | 35    | 40   |
| Prioviposition (day)                     | 11.33           | 9     | 0    | 3.5 |
| Oviposition (day)                        | 21              | 19    | 0    | 2.4 |
| Duration of incubation (day)             | 30.66           | 18.33 | 0    | 0.15|
| Hatching %                               | 97              | 97    | 0    | 0.21|
| Pre-molting period Larvae to Nymphs (Day)| 14.7            | 10.7  | 0    | 0.747|
| The Pre-molting period of the nymphs to adults (day) | 23               | 18.2  | 0    | 1.57|
| Female productivity (egg)                | 6848            | 6850  | 0    | 2.59|
| Food conversion efficiency%             | 56.8            | 56.8  | 0    | 1.7 |

4.2. Effect of alkaloids, phenolic and terpenoid

4.2.1. Effect of alkaloids, phenolic and terpenoid

On the eggs

Table (2) shows the effect of raw secondary compounds on egg mortality All the eggs treated with different concentrations of alkaloids, phenolic , and terpenoid were died , whereas all the eggs were hatched in the treatment of control and the results of the statistical analysis showed that there were significant differences and that the cause of the mortality was due to the formation of an insulating layer on the crust, which prevents the gas exchange between the egg embryo and its surroundings (Aladil, 1979) or because of the deposition of the extracted material into the egg shell, and their
conflict with vital systems and Some of these substances impede gas exchange within the egg (Baroni, 1991). Al-Jourani (1991) explained that the oil of *Myrtus communis* has reduced the ratio of eggs hatching for *Trogoderma granarium* Everts and the major wax worm. Al-Rubaie (1999) pointed the role of alkaloids compounds isolated from the leaves of *Datura innoxia* flowers and fruit in the rates of the mortality of *M. domestica*, where the percentage of mortality increased from (17% in the control to 23.2), 24.8% and 27.2% respectively and increased concentrations of the extract to (20) mg / ml . Shafy and Zayed-Abdel (2002) reported that *H.anatolicum excavatum* did not hatch when treated with Neem seed oil extract. Hassan (2003), *Oryzaephillus surinamensis* embryos failed to complete their life cycle when treated with cider oil in concentrate (1%). Al-Fatlawi (2005) reported a 95% mortality of *T. granarium* eggs in the alkaloid raw extraction of the castor plant in the concentration of 20 mg / ml. Martins (2006) said that *Cymbopogon winterianus* (poaceae) oil inhibited egg hatching when treating the fed females of *B.microplus* ticks and 100% at 7% concentration. The phenolic extract of the leaves and roots of *Asphedolus estivus* Brot caused the failure of hatching eggs of *Tertanychusurticae* Koch (Genosoylu, 2007). Al-Yasiri (2011) pointed that mortality of was tool for *R. turanicus*, treated with various concentrations of alkaloids, terpenoid and phenolic compounds of *C. calyco cynthese* seeds. Ashour (2012) added that the terpenoid and phenolic compounds of the leaves of the jasmine plant had caused the mortality of *R. turanicus* eggs by 100%, corresponding to the current research results.

| Mortality Percentages | Extract Con. | Alkaloid | Phenolics | Terpenoid |
|-----------------------|--------------|----------|-----------|-----------|
| 70 mg / ml            | 90           | 90       | 90        |           |
| 50                    | 90           | 90       | 90        |           |
| 30                    | 90           | 90       | 90        |           |
| 10                    | 90           | 90       | 90        |           |
| control               | 0            | 0        | 0         |           |

L.S.D=  4.22

4.2.2. Effect of secondary compounds (alkaloids, phenolics and terpenoid) on developmental stages of *H. schulzei*

The results shown in Table (3) indicate that alkaloids have the most effect on the mortality of the different life stages of the tick. The effect of the terpenid and phenolic compounds was limited to the larva only and did not affect the other stages due to the alkaloids efficiency

In this regard, Weissenberg et al. (1998) confirmed that the alkaloid extraction of *Solanum spp* inhibited the growth of the larval of the *Tribolium castaneum* in the concentration of 1 mg / ml. Al-Rubaie (1999) noted that the raw alkaloid extract of leaves, flowers and fruit of the *Datura* caused mortality of the larvae of the *M. domestic* it reached (32.2, 43.6 and 49.2%) in the concentration of 20 mg / ml. Al-Rajha *et al.* (2003) showed that the compound cardic glycoside (Alkaloid) which is isolated from the azaadrcacha plant, showed more efficacy than other extracts Plants in the experiment as a larvicide and caused a decrease in the productivity of ticks.
Zhang et al. (2008) Kumral and Cobanogolu (2010) indicated that the rate of the mites mortality reached 100% when treated with alkaloids extract for the following plants, Artemisia annua, Lycopersicon hirsuum and Datura stramonium. Al-Moussawi (2010) added that the alkaloids extracted from the flowers of the cloves Dianthus caryophyllus L. had a significant effect on the different stages of the beetle T. granarium. AL-Yassari (2011) confirmed that mortality all fed and starved larvae of R. turanicus after 24 hours of exposure to the raw alkaloids extract of C. cocoyntus seeds and all concentrations while the fed and starved nymphs died after 48 hours of exposure to concentrations 80 and 60 And 40 mg / ml were adopted and the percentage of the mortality of fed and starved females over the exposure duration of the extract was lost at a concentration of 80 mg / ml after 48 h and the fed and starved took a similar course to that of females in the concentrations. Moussawi and Araji (2012) added that the cloves of carnation flowers D. caryophyllus L caused the different roles of the T. musus. Al-slami (1998) shows that phenolic compounds isolated from onvolvulusa arvensis L led to the death of nymphs of Schizaphis graminum that the mortality rate reached (65.35) Al-Fatlawi (2005) explained that some of the pupa of the Khabra insect died one day after treatment with the phenolic extract of the plant with a concentration of 500 micrograms / insect. Suszko and Tomczyk (2010) that the phenolics compounds Via officinalis L and Matricaria chamomilla L caused the destruction of larvae and adults and also reduced the fertility of female Tetranychus urticae. Al-Yasiri (2011) pointed out that the phenolic extract of C.colycynthus seeds caused the mortality of larvae and nymphs that were not fed to R. turanicus rats by 100%. The fed nymphs had a 100% mortality of 60 mg / ml As well as adults achieved the same proportions, but with different time length. Ashour (2012) found that all larvae (fed and non-fed) to R. turanicus rates were all 100%, while adults mortality did not exceed 35% and for both sexes when treated with phenol extract for jasmine leaves. Abdel-Shafy and Zayed (2002) found that 100% non-fed H. anatolicum excavatum was mortality 15 days after exposure to Neem seed oil with concentrations (16 and 12.8 mg / ml). Al-Aqili (2002) also showed that the raw terpenes of the Datura plant caused an increase in the cumulative mortality of immature roles of domestic flies.

**Table (3):** Effect of secondary compounds (alkaloids, phenolics and terpenoid) on the stages of H. schutzet

| Alkaloid Extract | Concentration | Mortality % | Nymphs | Males | Females |
|------------------|---------------|-------------|--------|-------|---------|
|                  |               | The larvae  |        |       |         |
|                  |               | N-F-S       | F-S    | N-F-S | F-S     | N-F-S | F-S |
|                  |               | Septic      |        |       |         |
| 70               | 90            | 90          | 74.21  | 66.41 | 63.93   | 55.07 | 52.86 |
|                  | 90            | 90          | 65.85  | 50.85 | 51.14   | 42.08 | 44.70 |
| 30               | 90            | 90          | 48.93  | 35.21 | 37.14   | 26.07 | 23.36 |
| 10               | 90            | 90          | 39.23  | 26.07 | 28.9    | 17.21 | 15    |
| Terpenoid Extract| 70            | 90          | 90     | 0     | 0       | 0     | 0     |
|                  | 90            | 90          | 83.85  | 0     | 0       | 0     | 0     |
| 30               | 90            | 90          | 77.70  | 0     | 0       | 0     | 0     |
| 10               | 90            | 90          | 0      | 0     | 0       | 0     | 0     |
| Phenolic Extract | 70            | 90          | 90     | 0     | 0       | 0     | 0     |

Al-Yassari (2011) confirmed that mortality all fed and starved larvae of R. turanicus after 24 hours of exposure to the raw alkaloids extract of C. cocoyntus seeds and all concentrations while the fed and starved nymphs died after 48 hours of exposure to concentrations 80 and 60 And 40 mg / ml were adopted and the percentage of the mortality of fed and starved females over the exposure duration of the extract was lost at a concentration of 80 mg / ml after 48 h and the fed and starved took a similar course to that of females in the concentrations. Moussawi and Araji (2012) added that the cloves of carnation flowers D. caryophyllus L caused the different roles of the T. musus. Al-slami (1998) shows that phenolic compounds isolated from onvolvulusa arvensis L led to the death of nymphs of Schizaphis graminum that the mortality rate reached (65.35) Al-Fatlawi (2005) explained that some of the pupa of the Khabra insect died one day after treatment with the phenolic extract of the plant with a concentration of 500 micrograms / insect. Suszko and Tomczyk (2010) that the phenolics compounds Via officinalis L and Matricaria chamomilla L caused the destruction of larvae and adults and also reduced the fertility of female Tetranychus urticae. Al-Yasiri (2011) pointed out that the phenolic extract of C.colycynthus seeds caused the mortality of larvae and nymphs that were not fed to R. turanicus rats by 100%. The fed nymphs had a 100% mortality of 60 mg / ml As well as adults achieved the same proportions, but with different time length. Ashour (2012) found that all larvae (fed and non-fed) to R. turanicus rates were all 100%, while adults mortality did not exceed 35% and for both sexes when treated with phenol extract for jasmine leaves. Abdel-Shafy and Zayed (2002) found that 100% non-fed H. anatolicum excavatum was mortality 15 days after exposure to Neem seed oil with concentrations (16 and 12.8 mg / ml). Al-Aqili (2002) also showed that the raw terpenes of the Datura plant caused an increase in the cumulative mortality of immature roles of domestic flies.
Pamo et al. (2005) indicated that the oil extract of *A. tonium* leaves caused mortality rates in the adult ticks of *B. annulatus* reached 95% and 100% Chot et al. (2004) also showed that the oil isolated from *Salvia officinalis* and *Matricaria chamomilla* had a toxic effect for *T. cinnabarinus*. Adults and John et al. (2006) explained that terpenes callicarpenal and intermedeol from *Callicarpa americana* had an inhibitory effect for *I. Scapularis* and 98% and 96% for both of these compounds, respectively. He added that two compounds were less effective in the *A. manicatum*. Ebadi and Idan (2008) also showed the effect of *D. caryophyllus* oil, where the mortality percentage was 40-100% for the adult of the beetle *T. confusum* the oil of *Myrtus communis* L also showed an repellent effect on the insect. Oliveira et al. (2009) reported that Thymol was not effective on the adults ticks of *R. sanguis*, whereas The mortality percentage of the compound on the the nymphs of the same fed species 100% in the concentrations 1.5, 1 and 0.5 mg / ml. Sertraya et al. (2010) confirmed that the oil isolated from several plants *Mentha spicata, Thymbra spicata* and *Lavendula stoechas* on *T. cinnabarinus* Al Yassari (2011) also noted that the Terpenoid seed extract was shown to be toxic to larvae only for *R. turancius*. Ashour (2012) showed that the Terpenes extracts of the jasmine plant resulted in the destruction of the larval role of *R. turancius* rates by 90% and in all concentrations, and the percentage of loss of the non-nourished nymphs was 90% and 39.23%, while the adults recorded mortality rates for the starved males 81.04% and the fed males 66.14% whereas the non-fed females were 45% and the fed 41% in the concentration 60 Mg / ml .H (98, 99 and 99% respectively) at 26 C and humidity 95%.

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