

## Effect of Neem Azal (*Azadirachta indica*) Extracts on the Mortality and Fecundity of *Hyalomma dromedarii* Females

Laila M. I. Oyouun<sup>\*</sup>; Ebtesam M. Almatha<sup>1\*\*</sup> and Hanan S. M. Gabr<sup>\*</sup>

<sup>\*</sup>Zoology Dept., Faculty of Agric., Cairo Univ., Egypt. laila\_laila12342000@yahoo.com

<sup>\*\*</sup>Zoology Dept., Faculty of Science for Girls, King Faisal Univ., Saudi Arabia.

### ABSTRACT

Effect of the two Neem, *Azadirachta indica* extracts, Neem Azal F and T on fed *Hyalomma dromedarii* (Koch) females and their fecundity under laboratory conditions was studied. Females mortality rate increased gradually as Neem extract concentration increased (i.e. 0.2 to 0.8%). The LC<sub>50</sub> values were 0.8 and 0.6% post treatment of Neem Azal F and T, respectively at the 11<sup>th</sup> day. Treated females laid fewer eggs than those of the control. The concentrations 0.2, 0.4, 0.6 and 0.8 % of Neem extract decreased the percentage of hatching eggs from (46.38 to 10.56) and (35.4 to 8.42) and increased the larval mortality rate from (56.46 to 80.34) and from 87.15 to 94.53 for Neem Azal F and T, respectively.

**Key Words:** *Hyalomma dromedarii*, *Azadirachta indica*, Plant extract, Fecundity, Hatchability.

### INTRODUCTION

Ticks are economically important pests all over the world. Tick species are vectors of different animal and human disease agents such as bacteria, protozoa, rickettsia and viruses (Darwish & Hoogstraal 1981 and Pegram *et al.*, 1988).

Diseases such as lyme, borreliosis and tick-borne encephalitis in humans, and spirochetosis, babesiosis and theileriosis in domestic animals are known to be transmitted by ticks (Madbouly *et al.*, 1990, Oyouun *et al.*, (1996-1998), and El Kammah *et al.*, 2001 & 2007)

Tick infestation is mainly reduced by spraying or dipping the animals in chemical acaricides. These control methods may lead to environmental pollution and toxicity to animal tissues. Therefore, vaccination, immunological methods, safe environment and human resources protection methods of biological control or none chemical control must be utilized for tick control (Sivaramakrishnan *et al.*, 1996, Abdel Wahab *et al.*, 2000 & 2004, El Kammah & Abdel Wahab 2003, Sayed *et al.*, 2004, and El Kammah *et al.*, 2006). The use of predators, parasites, active chemicals from natural source of plants, fungi and bacteria is what ment by non chemicals control, (Kaya & Hassan 2000 and El Kammah & Oyouun 2007).

The aim of this study was to control the camel tick *Hyalomma dromedarii* (Koch) which also known to infest different farm animals using Neem plant extract products.

### MATERIALS AND METHODS

Engorged *H. dromedarii* females were collected from camels in Damam region (Kingdom of Saudi

Arabia) from September to December 2007 and identified according to Hoogstraal *et al.*, 1981. Two chemical extracts from Neem plants *Azadirachta indica* seeds: Neem Azal F (contains 5% Azadirachtin) and Neem Azal T (contains 1% Azadirachtin) were applied against *H. dromedarii* females and eggs. Experiments were carried out by dipping females and eggs in different concentrations of these Neem extracts for 30 seconds then dried on filter papers. The control was conducted by dipping similar stages in water for 30 seconds. Tested concentrations of each Neem extract were 0.2, 0.4, 0.6 and 0.8 %. Three replicates were applied for each concentration. Ten treated and control females and eggs were kept in rearing tubes, incubated at 30°C and 75% R.H. and observed daily for oviposition, longevity and hatchability.

### RESULTS AND DISCUSSION

The effect of two Neem extracts, Neem Azal F (NAF) and Neem Azal T (NAT), applied on fed *H. dromedarii* females and their fecundity under laboratory conditions, are shown in Tables 1 & 2. No effect of NAF or NAT was observed on the mortality rates of *H. dromedarii* females till the 4<sup>th</sup> day of treatment. NAT had stronger effect, especially since the 7<sup>th</sup> and 9<sup>th</sup> days of treatment, but equalized after the 11<sup>th</sup> and 13<sup>th</sup> days of treatment.

Abdel Shafy (2000) found that *Boophelus annulatus* (Say) females mortality was recorded after 7 and 9 days of treatment with NAT and NAF respectively. Similarly to *H. dromedarii* mortality rate increased gradually from lower concentration to higher ones and from the 7<sup>th</sup> day until the 13<sup>th</sup> day.

Table 2, shows that the effect of both Neem extracts on oviposition of *H. dromedarii* proved that, all recovered treated females laid fewer eggs

Table (1): Effect of Neem Azal F and Neem Azal T on mortality rate of the *Hyalomma dromedarii* females under laboratory condition

Days Post Treatment	Mortality Percent								Control
	Neem Azal F Concentrations				Neem Azal T Concentrations				
	0.2%	0.4%	0.6%	0.8%	0.2%	0.4%	0.6%	0.8%	
1 <sup>th</sup>	0	0	0	0	0	0	0	0	0
2 <sup>nd</sup>	0	0	0	0	0	0	0	0	0
3 <sup>rd</sup>	0	0	0	0	0	0	0	0	0
4 <sup>th</sup>	0	0	0	0	0	0	0	0	0
5 <sup>th</sup>	0	0	0	4.56±2.53	0	2.12±2.1	3.42±1.31	6.20±0.11	0
7 <sup>th</sup>	0	3.1±1.81	3.42±2.45	5.36±4.22	3.11±2.12	4.64±3.22	9.4±3.43	10.54±4.32	0
9 <sup>th</sup>	0	4.31±3.21	5.45±2.51	6.32±3.53	9.13±3.21	10.11±4.41	11.11±4.31	12.5±3.3	4.01±2.51
11 <sup>th</sup>	35.91±11.3	44.32±9.21	40.42±8.44	50.81±9.71	35.43±10.2	41.51±9.45	50.72±10.5	54.63±8.34	24.68±5.44
13 <sup>th</sup>	60±9.8	56.4±10.2	66.4±11.2	67.32±8.41	66.23±9.42	67.12±8.23	66.54±10.7	68.71±11.2	45.31±6.87

Tabel (2): Effect of Neem Azal F and Neem Azal T on the fecundity of *Hyalomma dromedarii* female under laboratory condition.

Days	Number of eggs/ femal( mean±sd )								Control
	Neem Azal F concentrations				Neem Azal T concentrations				
	0.2%	0.4%	0.6%	0.8%	0.2%	0.4%	0.6%	0.8%	
1 <sup>st</sup>	60±50	47±73	57±64	12±25	12±25	10±15	10±11	14±25	100±46
2 <sup>nd</sup>	310±120	230±130	360±260	150±210	45±20	80±45	140±102	25±30	350±210
3 <sup>rd</sup>	1230±570	1120±560	1320±430	1100±940	1006±810	1154±802	1200±780	1001±601	1400±450
5 <sup>th</sup>	7800±1005	6466±890	5644±950	6931±1002	8110±540	7921±420	7820±1220	6831±110	8503±1320
7 <sup>th</sup>	5836±622	5870±432	5600±823	4751±745	5600±833	5230±941	4400±674	4132±689	5920±720
9 <sup>th</sup>	3250±102	3100±230	2970±420	2150±320	2220±210	1563±310	1320±390	1123±450	3140±520
11 <sup>th</sup>	820±262	740±340	650±260	540±201	1020±305	950±190	840±180	720±100	954±255
13 <sup>th</sup>	320±84	220±82	110±72	98±75	230±64	190±90	180±110	120±100	240±60
Total	19626±1000	17793±911	16711±813	15732±1200	18243±1110	17098±1430	16010±940	13966±1210	20607±2210

Table 3: Effect of different concentrations of Neem Azal F and Neem Azal T on *Hyalomma dromedarii* eggs hatchability and mortality of unfed larvae under laboratory condition.

Concentration %	Hatching and mortality %			
	Neem Azal F Mean ±sd		Neem Azal T Mean ±sd	
	Hatched eggs	Dead larvae%	Hatched eggs	Dead larvae%
0.2	46.38±11.33	56.46±12.39	37.40±14.41	47.11±20.76
0.4	38.45±10.32	65.34±13.27	30.65±11.51	70.32±17.52
0.6	20.65±5.45	78.43±10.53	25.35±7.51	80.44±19.45
0.8	10.56±2.34	80.34±15.32	8.42±2.33	94.53±21.31
Control	100±0	24.45±4.33	100±0	35.34±8.34

compared with those of the control. The number of eggs increased from the 1<sup>st</sup> until the 5<sup>th</sup> day for each extract then decreased from the 7<sup>th</sup> day until 13<sup>th</sup> as in the control. This result agrees with those of Abdel Shafy (2000), who recorded the mortality rate after 7 and 9 days post treatment in NAT and NAF respectively on *B. annulatus* females. The decrease is distinct in the total number of eggs under 0.8% concentration of the two extracts compared with the others.

Several trials were conducted successfully against *B. microplus* in the field or under laboratory condition (Williams, 1991 & 1993). However, the Neem extract did not show significant effect on *B. annulatus* (Abdel Shafy 2000).

Effect of Neem extracts on embryogenesis of *H. dromedarii* eggs is shown in Table 3. The percentage of hatching eggs treated with 0.2% concentration was significantly higher than those treated with the others and the least was that of NAF and NAT at 0.8% concentration. Similar results were observed by Abdel Shafy (2000) who treated *B. annulatus* eggs with Bio Dux. The LC<sub>50</sub> values of Neem Azal F and T were 0.8 and 0.9 respectively. The concentrations 0.2, 0.4, 0.6 and 0.8 % of NAF and NAT decreased percentage of hatching eggs and increased larvae mortality rate. The mortality rate of hatched larvae recorded 56.4, 65.3, 78.4 and 80.34% treated with 0.2, 0.4, 0.6 and 0.8% NAF and 87.1, 70.3, 80.4 and 94.5 % under the same NAT concentrations, respectively. These results agree with those of Davey and Ahrens (1983), while Carrol *et al.*, (1989) found that the extract of myrrh was less effective as a larvicide against *Amblyomma americanum* (Koch).

Finally, it could be concluded that using Neem extracts of both NAT and NAF to control the camel tick *H. dromedarii* with concentration 0.6 % and 0.8 % are effective against all stages which encourage the need for further studies.

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