

Epidemiological Study on the Hard Ticks of Some Domestic Animals in Basrah

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Abstract

A survey of the hard ticks, infected some animals in Basrah was carried out during the period from 1/1/2004 till 30/12/2004.

Results revealed the presence of three genus of the hard ticks namely *Hyalomma*, *Rhipicephalus* and *Boophilus*. The *Hyalomma* was the dominant during the study with three species and three subspecies, there are: *H.detrutum*, *H. asiaticum*, *H. dromedarii*, *H. anatolicum anatolicum*, *H.a.excavatum*, *H. marginatum turanicum*. *Rhipicephalus* has two species, these are: *R. turanicus* and *R. sanguineus*. *Boophilus* has one species that is *B. annulatus* . It was found that *H. a. excavatum*, *H. m. turanicum* and *R. turanicus* scattered in most animals examined while *H. asiaticum*, *H. dromedarii* and *B. annulatus* infected one host only. The area under the tail gained the highest percentage of ticks (45.7%). Cow acquired the highest percentage of infection (55.2%). The highest percentage through out the year was (28%).

The present study shows fluctuation of means and percentage of infection in different animals. Buffalo acquired the highest mean of infection that was (8.6.) Cow acquired the highest percentage of ticks (male, female and nymph) these were (29.8%), (32.5%), (34%) respectively. Hartha was acquired the highest percentage of infection (52.7%) while Zubair was the lowest (13%).

Highest percentage of infection was recorded in Summer (44.6%) while the lowest was in Winter (22.7%). The current study showed relationship between the temperature and the infection.

دراسة وبائية للقراد الصلب على بعض الحيوانات الداجنة في البصرة

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الخلاصة

أجري مسح شامل لأنواع القراد الصلب المتطفل على بعض الحيوانات الداجنة في محافظة البصرة للفترة من 2004/1/1 ولغاية 2004/12/30. اظهرت النتائج وجود ثلاث أجناس رئيسة من القراد الصلب وهي *Hyalomma* و *Rhipicephalus* و *Boophilus* وكان الجنس الأول هو السائد خلال فترة الدراسة وبنسبة 73.6% وسجلت ثلاثة أنواع وثلاثة نويغات منه هي *H. detritum* , *H. m.turanicum*, *H. a excavatum*, *H. a.anatolicum*, *H. dromedarii*, *asiaticum*, *Rhipicephalus* فُسجل نوعين منه هي *R. turanicus* , *R. sanguineus*. في حين سجل نوع واحد في جنس *Boophilus* وهو *B. annulatus*. ظهر من خلال المسح ان أكثر انواع القراد إصابة للحيوانات الداجنة هي *H. a.excavatum* و *H. m.turanicum* و *R. turanicus*، في حين سجل *H. asiaticum* و *H. dromedarii* و *B. annulatus* اصابتهم لمضيف واحد فقط. جمع القراد من مناطق مختلفة من جسم الحيوان وكانت منطقة ما تحت الذيل أكثر المناطق إصابة بالقراد (45.7%). سجل البقر أعلى نسبة إصابة بالقراد مقارنة بالحيوانات غير المصابة (55.2%) في حين كانت أعلى نسبة إصابة بالقراد. فقد كان أعلى معدل للإصابة (8.6) في الجاموس، في حين كانت نسبة عدد القراد (نكور، إناث، حوريات) في البقر هي (29.8%) و (32.5%) و (34%) على التوالي. أظهرت الإصابة بالقراد تبايناً في المناطق المختلفة في البصرة. كانت الهارثة أكثر المناطق إصابة بالقراد بلغت نسبتها (52.7%) والزبير أقلها (13%). سجلت أعلى نسبة إصابة بالقراد في فصل الصيف (44.6%) وأقلها في فصل الشتاء (22.7%). ظهر خلال الدراسة الحالية وجود ارتباط بين درجة الحرارة والإصابة بالقراد.

Introduction

Ticks are distributed mostly in the tropical and sub tropical areas (Mathason, 1950). Ticks have a medical important for human and domestic animals, sucking blood perminantly. Hunter and Hooker (1907) determinated the quantity of blood which sucking by ticks through a season.

Ticks are vectors of many diseases transmitted by ticks which regards as a serious problem throughout the world (Abuo -El-dobal *et al.*, 2003). The pathogenic agents transmitted by various stages of the species of *Hyalomma* are: *Babesia caballi*, *B.equi*, *Theileria parva*, *T. annulata*, *Rickettsia bovis*, *R. conori*, *Coxiella burnetii*, (Soulsby, 1982; Roberts and Janovy, 1996). *R. sanguineus* transmits canine piroplasmosis or biliary fever (Soulsby, 1982; Roberts and Janovy, 1996). *B. annulatus* transmits Texas Cattle Fever or Red Water Fever and *Babesia. Bigmenia*(protozoa) (Bowman and Lynn, 1995).

Hoogstraal and Kaiser (1958) mentioned many genus of ticks distributed in Iraq and infected many animals there were *Hyalomma*, *Rhipicephalus*, *Boophilus*, *Amblyoma* and *Haemophysalis*. Leiper (1957) in his report for Iraqi government mentioned that *Hyalomma*, *Rhipicephalus* and *Boophilus* had the greatest distribution in the cattle. Robson and Robb (1967); Robson *et al.* (1968, 1969) reported in a survey of some species of hard ticks in Iraq that *Hyalomma* is a cosmopolitan genus. Robson and Robb (1967) mentioned that 80% of *Hyalomma* infected the animals.

A survey carried out on the distribution of ticks in Basrah reported prevalent of *H.a.anatolicum*, *H.m.turanicum*, *R. sanguineus*, and *B.annulatus*, the cattle carried out the highest number of *Hyalomma* while sheep carried the most *Rhipicephalus* and *Boophilus* sp. (Robson and Robb, 1967; Robson *et al.*, 1968, 1969).

Materials and Methods

Eight areas were surveyed weekly for ticks, collection was carried out in Basrah during the period from 1/1/2004 till 30/12/2004. These included Hartha, Dair, Qurna, Mudaina, City center (Mushrak), Abu-ALKasib, Shatt-Al Arab and Zubair.

The barns of the animals in these areas are divided into two types, the type A was opening type, where the earth (mud) was covered with grounds and debris. The walls were made of mud or cement. The type B was covered either with metal plates or wood and date palm leaves, the earth is covered with debris. The walls were made of mud or cement. Information concerning number and genera of ticks was recorded.

A – Ticks collection:

Adult ticks were collected from animals by forcep and cotton containing alcohol. The number of males and females and number of immature stages of ticks were recorded. The specimens were placed in vial's containing 70% alcohol for preservation until identification.

Identification of hard ticks was confirmed by the Iraqi Natural History Museum / Baghdad University.

B – Preparation of microscopical slides:

1. Specimens of ticks containing host tissue in their mouth cleaned by special brush.
2. The specimens were placed in 10% KOH for softening and cleaning, small specimens required 2 days in 35°C, large specimens required 2 weeks in 35°C.
3. The larva and nymph required one day only in 35°C. For adult this process can be accelerated by rising the temperature up to 45°C.

4. The specimens washed several times with distilled water, then placed in the different concentration of alcohol (30%, 50%, 70%, 90%, 100%) for (2-4) hrs to removed water. In case of large specimens slow press by blunt forcep on dorsal and ventral of ticks was required.
5. The specimens placed in 50% lactic acid at (40-45)°C for (2-3) days and mounted in Hoyer's medium under dissecting microscope.
6. The slide placed on a hot plate for 2 days in 45°C to drying.

Results

The survey of hard ticks which carried out in Basrah on different animals (Cows, Buffalos, Sheeps, Goats, Horses, Cats, Dogs, Camels and Donkeys) revealed the presence of three genera, these are [*Hyalomma* (3 species and 3 subspecies), *Rhipicephalus* (2 species) and *Boophilus* (1 species)]. *Hyalomma* showed high percentage 73.6% among the total hard ticks, followed by *Rhipicephalus* 35.3% and *Boophilus* 1.1%.

It was found that different species of hard ticks was distributed in different host animals. The hard ticks which include *H.a.excavatum*, *H.m.turanicum* and *R.turanicus* acquired the highest common species while *H.asiaticum*, *H.dromedarii* and *B.annulatus* acquired the lowest (table 1).

Ticks were collected form different parts of the host body. The area under the tail accupied by the highest percentage 45.7%, followed by the breast with 20.3%, ear with 14.8%, left legs with 14.5%, and neck with 4.7%. Table (2) showed that cow acquired the highest percentage 55.2%, 28%, and donkey acquired the lowest 1.8%, 0.2% respectively (Fig. 1).

Buffalo acquired the highest mean intensity of infection (8.6) while the dog acquired the lowest (3.2). The cow acquired the highest percentage of ticks throughout the year (males 29.8%, female 32.5% and nymph 34%)

while the donkey acquired the lowest percentage (males 0.2% and females 0.04%) (Table 3,4, Fig. 2,3).

Also the study showed Hartha acquired the highest percentage of infection (52.7%) while Zubair acquired lowest (13%) (Fig. 4).

The highest intensity (44.6%) was found in Autumn and the lowest (22.7%) was in Winter. It was found that the temperature has the major effect on the percentage and mean intensity of infection (Fig. 5).

Discussion

In this study three genus of hard ticks *Hyalomma*, *Rhipicephalus*, and *Boophilus* was found in domestic animals in Basrah. *Hyalomma* is more common, this may be due to the comparatively higher relative humidity (Mohammad, 1996).

The current study showed that *H. a. excavatum*, *H. m. turanicum* and *R. turanicus* are among the common species infected many hosts, this was somehow agree with Mohammed (1996) who mentioned that *H. a. excavatum* infected sheep, horse and camel while *H. m. turanicum* infected sheep, goat, buffalo, camel and hare. *R. turanicus* infected sheep, cow and cat. *H. detritum* is less common and infected sheep, goat, cow, buffalo, horse and donkey.

The present study revealed that *H. asiaticum*, *H. dromedarii* and *B. annulatus* infected one host, this was not agree with Mohammad (1996) who reported that *H. asiaticum* infected sheep and cow in Mousil. *H. dromedarii* infected sheep, goat, cow, camel, horse and donkey in the middle, south and west of Iraq, it was less specific for primary host (camel). *B. annulatus* infected sheep, cow, buffalo, horse and donkey. Mohammed (1996) mentioned *B. annulatus* as cosmopolitan but with little numbers. Similar result was reported by Robson and Robb (1967) but Ali (1990)

collected more specimens from Baghdad city. *R. sanguineus* was found in the middle and north of Iraq and highly specific for dog (Hoogstraal and Aeschlimann, 1982a,b; Pomerantzev, 1950). Ticks were collected from different parts of the host body, the area under the tail was the more common for ticks, this may be due to the high relative humidity, dark and less effect by external conditions. Cow acquired the highest percentage (28%) of infection. Mohammed (1996) declared the differences between Cow mostly kept in the barns which is far from influence with the outer temperature compared with animals living in opening environment which is directly effected with outer temperature.

Buffalo acquired highest mean intensity of infection 8.6. Cow acquired highest percentage for (male, female, nymph) and donkey acquired lowest. The number of male is larger than females throughout the year, this may be due to the continue dropping off engorge female for laying eggs, while most of male remain on the host. The number of nymph stages is fluctuated throughout the seasons, this may be due to the type life cycle of hard ticks. Some life cycles of ticks required three hosts as *Rhipicephalus* sp., other two hosts as *Hyalomma* sp., while *Boophilus* sp. has one host (Mohammed, 1996). Norval (1979) reported that larval stages of ticks which parasitic on the cattle as primitive hosts present with high number of species. Fluctuation in percentage infection was quite clear throughout the areas in Basrah. Hartha acquired highest percentage 52.7%. The increase infection in Hartha, Mudaina, Qurna and Dair compared with other areas may be due to the financial and healthy educational status of the people, type of barns building and presence of few numbers of veterinarians shops compared with other areas. Seasonal fluctuation in percentage infection was quite clear in the present study. The highest intensity of infection was recorded in Autumn and the lowest in Winter. The moderate temperature in

Autumn and spring may cause the increase in number of ticks in domestic animals. Similar result was reported by LeRiche *et al.* (1974) in Cyprus. This study showed the close relationship between temperature and infection of ticks among the year. Highest percentage infection was found in Autumn with 31°C. The normal temperature and humidity causing increase number of ticks in domestic animals (Mohammed, 1996).

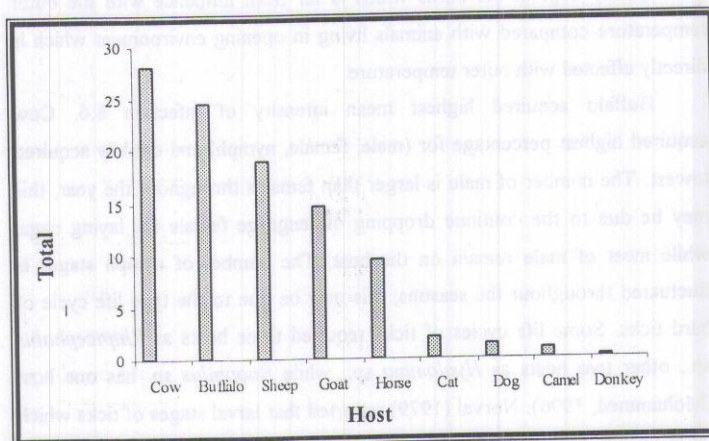


Fig. 1: The total percentage infection of different hosts with ticks in Basrah

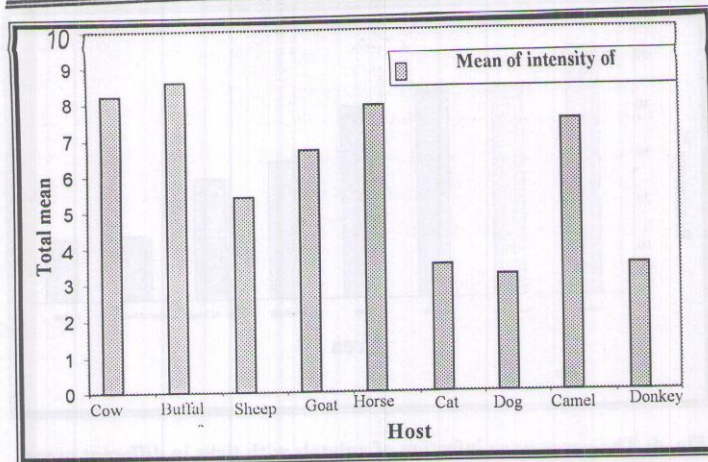


Fig. 2: The total mean intensity of infection of animals with ticks in Basrah

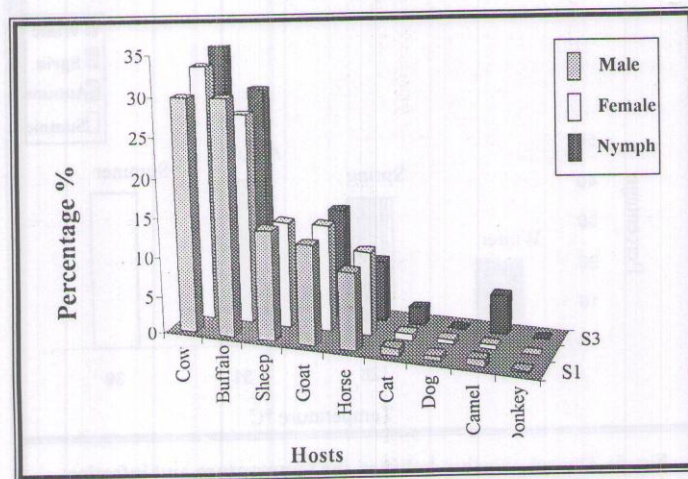


Fig. 3: The percentage infection of ticks (male, female, nymph) in different hosts in Basrah

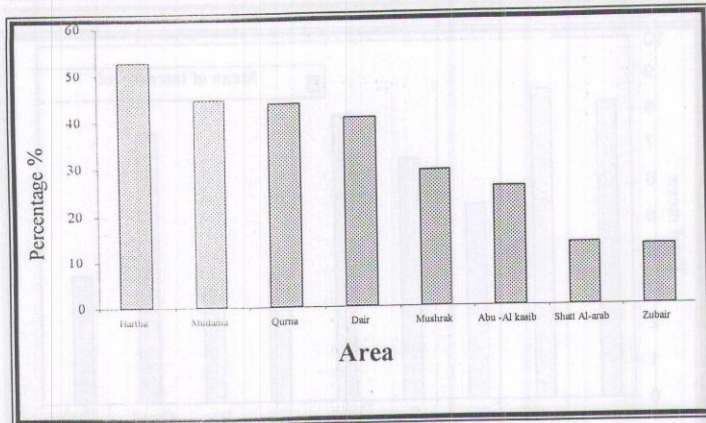


Fig. 4: The percentage infection of animals with ticks in different areas in Basrah

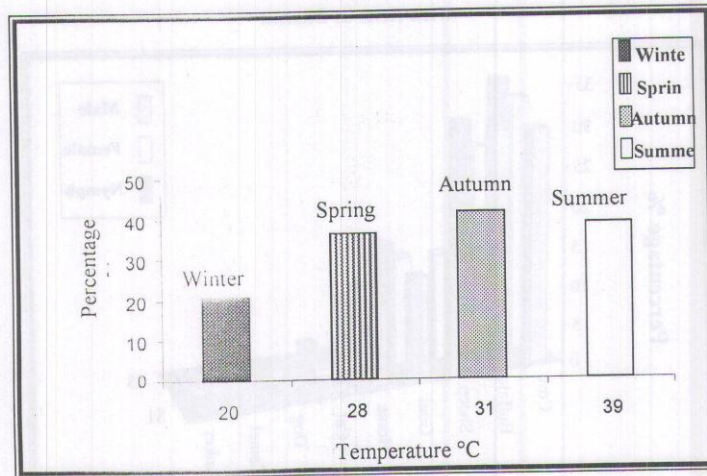


Fig. 5: The relationship between the temperature and infection in Basrah

Table (1): The percentage infection of hard ticks species in different hosts in Basrah

Species of ticks	Host												Total						
	Cow		Buffalo		Sheep		Goat		Horse		Cat		Dog		Camel		Donkey		
	No. ticks	%	No. Ticks	%	No. ticks	%	No. ticks	%	No. ticks	%	No. ticks	%	No. ticks	%	No. ticks	%	No. ticks	%	
<i>H. anatolicum</i>	20	23.5	-	-	55	64.7	10	11.8	-	-	-	-	-	-	-	-	-	-	85
<i>H. excavatum</i>	7	9.7	37	51.4	-	-	-	-	19	26.4	-	-	-	-	4	5.6	5	6.9	72
<i>H. m. turanicum</i>	49	40.8	32	26.7	-	-	10	8.3	23	19.2	-	-	-	-	6	5	-	-	120
<i>H. dentum</i>	18	54.6	11	33.3	-	-	-	-	4	12.1	-	-	-	-	-	-	-	-	33
<i>H. asiaticum</i>	5	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
<i>H. dramedarii</i>	-	-	-	-	-	-	-	-	4	100	-	-	-	-	-	-	-	-	4
<i>B. annulatus</i>	4	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
<i>R. turanicus</i>	7	5	-	-	55	39.6	20	14.4	-	-	35	25.2	22	15.8	-	-	-	-	139
<i>R. sanguineus</i>	-	-	-	-	-	-	-	-	-	-	15	34.9	28	65.1	-	-	-	-	43
Total	110	-	80	-	110	-	40	-	50	-	50	-	50	-	10	-	5	-	505

Table (2): The percentage infection of animals with ticks in different seasons in Basrah

Host	Season												total		
	Autumn			Winter			Spring			Summer			No. exam.	%	
	No. exam.	No. infect.	%	No. exam.	No. infect.	%	No. exam.	No. infect.	%	No. exam.	No. infect.	%			
Cow	197	145	73.6	165	53	32.1	172	104	60.4	192	99	51.5	726	401	55.2
Buffalo	189	102	53.9	155	41	26.4	185	75	40.5	195	132	67.6	724	350	48.3
Sheep	184	95	51.6	132	30	22.7	179	85	47.4	182	61	33.5	677	271	40
Goat	170	65	38.2	80	15	18.7	180	55	30.5	176	75	42.6	606	210	34.6
Horse	95	92	30.5	87	19	21.8	104	43	41.3	98	47	47.9	384	138	35.9
Cat	53	9	16.9	27	1	3.7	51	14	27.4	49	5	10.2	180	29	16.1
Dog	51	6	11.7	26	1	3.8	48	11	22.9	46	3	6.5	171	21	12.2
Camel	21	4	19	12	-	-	19	2	10.5	24	6	25	76	12	15.7
Donkey	61	1	1.6	30	-	-	64	3	4.6	58	-	-	213	4	1.8
Total	1021	456		714	160		1002	394		1020	428		3757	1436	

Table (3): The total mean intensity of infection of animals with ticks in Basrah

Host	Seasons												Total		
	Autumn			Winter			Spring			Summer			No. of infect. animals	Mean infection	
	No. of infect. animals	No. of ticks	Mean infection	No. of infect. animals	No. of ticks	Mean infection	No. of infect. animals	No. of ticks	Mean infection	No. of infect. animals	No. of ticks	Mean infection	No. of infect. animals	No. of ticks	Mean infection
Cow	145	1305	9	53	152	2.8	104	728	7	99	1089	11	401	3274	8.2
Buffalo	102	918	9	41	123	3	75	525	7	132	1452	11	350	3018	8.6
Sheep	95	665	7	30	50	1.6	85	510	6	61	244	4	271	1469	5.4
Goat	65	455	7	15	23	1.5	55	330	6	75	600	8	210	1408	6.7
Horse	29	203	7	19	38	2	43	387	9	47	470	10	138	1098	7.9
Cat	9	18	2	1	1	1	14	70	5	5	15	3	29	104	3.5
Dog	6	12	2	1	1	1	11	44	4	3	12	4	21	69	3.20
Camel	4	16	4	-	-	-	2	10	5	6	65	10.8	12	91	7.5
Donkey	1	2	2	-	-	-	3	12	4	-	-	-	4	14	3.5
Total	456	3594	49	160	388	12.9	392	2616	53	428	3947	61.8	1436	10545	54.4

Table (4): The percentage infection of ticks (male, female, nymph) in different hosts in Basrah

Hosts	Male ticks		Female ticks		Nymph	
	No. infect.	%	No. infect.	%	No. infect.	%
Cow	1751	29.8	1463	32.5	60	34
Buffalo	1760	30	1207	26.8	51	29
Sheep	837	14.3	619	13.7	13	7.4
Goat	761	13	622	13.8	25	44.2
Horse	594	10.1	490	10.9	14	8
Cat	59	1	41	0.9	4	2.3
Dog	39	0.7	30	0.7	-	-
Camel	55	0.9	27	0.6	9	5.1
Donkey	12	0.2	2	0.04	-	-
Total	5868	100	4504	100	176	100

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