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DISTRIBUTION OF IXODID TICKS AMONG DOMESTIC AND WILD ANIMALS IN CENTRAL IRAQ

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ABSTRACT

A total of 228 domestic and wild animals, including sheep, goats, cows, buffaloes, camels, horses, donkeys, dogs, cats, wild hares, Asiatic jackals, and red foxes were examined for ixodid ticks in the central region of Iraq. Nine species of ixodid ticks belong to two genera namely *Hyalomma anatolicum* Koch, 1844, *H. excavatum* Koch, 1844, *H. turanicum* Pomerantsef, 1946, *H. scupense* Delpy, 1946, *H. dromedarii* Koch, 1844, *H. schulzei* Olenev, 1931, *Rhipicephalus annulatus* (Say, 1821), *R. turanicus* Pomerantsef & al., 1940 and *R. leporis* Pomerantsef, 1946 were recovered. Their distribution among hosts and infestation rates were discussed with the pertinent literature.

Keywords**:** Ixodidae, ticks, domestic animals, wild animals.

INTRODUCTION

Ticks are obligatory parasites of terrestrial vertebrates including mammals, birds, reptiles and few records from amphibians (Morel, 1967; Maldonado-Capriles and Medina-Guad, 1977; Woods and Sergile, 2001, Dantas-Torres *et al.*, 2008). The Ixodids or hard ticks are with a cosmopolitan distribution, especially in the temperate regions (Service, 2012). They are of extreme medical and veterinary importance in view of transmitting many protozoal, bacterial and viral disease agents to man and animals.

In Iraq, a review of ixodid ticks studies is rather well documented in Shubber *et al.* (2014); however most of these studies are of general survey type for whole Iraq and concentrated mainly on domestic hosts with few exceptions that confined to a selected area or dealt with wild animals (Mohammad, 1996).

The central region of Iraq falls in its most areas in the Tigris-Euphrates Alluvial Salt Marsh ecoregion (PA 0906) which is characterized by marshlands and seasonally inundated plains bounded by deserts and dry shrub land and its vegetation is dominated by aquatic plants such as reeds *Phragmites australis* and rushes *Typha* sp. (Anonymous, 2010).

The aim of the present study is to know the distribution of the ixodid tick species parasitizing the domestic as well as wild animals in central provinces of Iraq.

MATERIALS AND METHODS

The study area lies approximately between 44°-48° longitude and 30°-33° latitude including Baghdad, Kerbala, Wasit, Babil, and Al-Qadisiya provinces (fig. 1), it is of continental

climate. The mean annual precipitation ranges 60-200mm and the temperature exceeds 50° C in the long dry summer and rarely drops below 0 ℃ in the short wet winter (Iraq Ministries, 2006). This survey was undertaken from January 2014 to December 2014. The animals examined were 93 sheep *Ovis aries*, 26 goats *Capra hircus*, 50 cows *Bos taurus*, 10 buffaloes *Bubalus bubalis*, 15 camels *Camelus dromedarius*, 8 horses *Equus caballus*, 6 donkeys *Equus asinus*, 6 dogs *Canis familiaris*, 3 domestic cats *Felis catus*, 4 wild hares *Lepus capensis*, 4 Asiatic jackals *Canis aureus* and 3 red foxes *Vulpes vulpes*. The recovered ticks were removed carefully from the infested animal by hand with the aid of forceps and kept in 70% alcohol. Identification was done following the keys provided by Mohammad (1996) and Shubber (2014).

Fig. 1: map of Iraq showing the study area in central of Iraq.

RESULTS AND DISCUSSION

Table 1 summarizes the results of surveying the domestic and wild animals for ixodid ticks in central Iraq. This would shows that 97 (42.5%) out of 228 animals examined were infected with one or more species of ticks. This result was in general agreement with Shubber (2014) and Shubber *et al.* (2014) who found that the infestation rate in the middle provinces was 46.36%.

Present results showed that the infestation rates in the examined wild animals exceed those recorded for the domestic hosts, the same conclusion had been suggested by Shamsuddin and

Mohammad (1988), Abdul-Rassoul and Mohammad (1988), Mohammad (1996), Shubber *et al.* (2013), Shubber (2014) and Shubber *et al.* (2014). It may be related to the better sanitation conditions of the domestic animals provided by owners especially for dogs, cats, horses and donkeys.

Table 1: Host common names, no. examined and no. infested animals with ixodid ticks in central Iraq.

Animal name	Ex.	Inf.	%
Sheep	93	30	32.3
Goat	26	8	30.8
Cow	50	31	62
Buffalo	10	2	20
Camel	15	12	80
Horse	8	1	12.5
Donkey	6	1	16.7
Dog	6	1	16.7
Domestic cat	3	1	33.3
Wild hare	4	3	75
Asiatic jackal	4	4	100
Red fox	3	3	100
Total	228	97	42.1

In regard to tick species, nine were recorded (table 2), six of them belong to genus *Hyalomma* namely *H. anatolicum* Koch, 1844, *H. excavatum* Koch, 1844, *H. turanicum* Pomerantsef, 1946, *H. scupense* Delpy, 1946, *H. dromedarii* Koch, 1844, *H. schulzei* Olenev, 1931, *H. anatolicum* was found to be the most common tick species parasitizing the examined domestic animals and successfully survives in diverse habitats extending from central parts of the Sudan to North Africa, Southern Europe, the Middle East, Russia, China and India, and economically important tick species (Latif *et al.*, 2005; Haque *et al.*, 2011; Jafarbekloo *et al.*, 2014). The rest three species belong to genus *Rhipicephalus* namely, *R. annulatus* (Say, 1821), *R. turanicus* Pomerantsef & al., 1940 and *R. leporis* Pomerantsef, 1946.

For sheep and goats, results show that they were infested with five tick species namely *Hyalomma anatolicum*, *H. excavatum*, *H. turanicum*, *H. scupense* and *Rhipicephalus turanicus*. This is in accordance with Mohammad and Jassim (2011) but differs from Omer *et al.* (2007) who studied the ticks of cattle, sheep and goats in the Dohuk Governorate, far north of Iraq and differs also from Awad and Abdul-Hussein (2006) who found that the sheep in Basra in the extreme south of Iraq were infected with *R.turanicus* and *R. annulatus* only. This is probably because of the wide difference in the study areas. The infestation rates in sheep and goats are almost equal from 32.3% and 30.8% respectively. This is in disagreement with Muhaidi *et al.* (2010) who found that the infestation rates for sheep and goats in Falloja, about 60km west of Baghdad were 57% and 53% respectively. It disagrees also with Shubber (2014) and Shubber *et al.* (2014) who found that infestation rates were 48.6% and 22.7% in sheep and goats respectively in the middle region of Iraq. Present results of Zangana *et al.* (2013) are in disagreement also with Shubber (2014) and Shubber *et al.* (2014). They found 46.7% and 34.9% of sheep and goats in Duhok in the far north of Iraq infested with ticks respectively. On the other hand, Hussien and Yaqub (2010) and Hasson and Al-Zubaidi (2012) recorded 7.6% and 18.9% infestation rates respetively. These are low rates of infestation compared to present results and those of Tuama *et al.* (2007), Muhaidi *et al.* (2010), Kadir *et al.* (2012), and Zangana *et al.* (2013). This is probably related to different

animal raising conditions between different ecosystems of the studied areas of previous works as well as climate fluctuation from year to another.

Cows were infested with *H. anatolicum*, *H. turanicum*, *H. scupense*, and *R.* (*Boophilus*) *annulatus*. This is in accordance with Shubber (2014) and Shubber *et al*. (2014). Infestation rate in the present study is 62%. This is near the rate of 54.3% recorded by Al-Ramahi (2011) but differs from 48.2% of Tuama *et al.* (2007) and from 27.8% of Hasson (2012). This fluctuation in infestation rate may be a result of animal raising practices and treating or no treating the animals with acaricides, difference in plant cover from year to year and the ecological conditions in the collection sites.

Buffaloes were found infested with two species only *H. anatolicum* and *H. turanicum*, these species were recorded by Shubber (2014) and Shubber *et al.* (2014). The infestation rate in the present study is 20%. This differs from 38.5% and 42.2% infestation rate recorded by Shubber *et al.* (2013, 2014) in the middle of Iraq.

Camels were infested with *H. anatolicum*, *H. excavatum*, *H. turanicum*, *H. dromedarii*, and *H. schulzei*. The infestation with the two latter species in this study is confined to camels only. The infestation rate in camels is very high (80%) indicating that camel acquires more parasitic load of ticks because the type of life practiced by Bedouins who raise huge number of camels and wondering throughout the different ecosystems of the study area including true deserts, semi deserts, alluvial plain, marshes, farms, orchards, villages, towns, and cities making the animal collect high number of ectoparasites and many species of ixodid and argasid ticks. This result is in agreement with Hussein and Al-Fatlawi (2009) who reported infestation rate of 83% in Al-Qadisiya province, and with Champour *et al.* (2013) who recorded infestation rate of 85.5% in Iran, but it relatively differs from that of Shubber (2014) and Shubber *et al.* (2014) who found that 65.77% of camels were infested. However, the present study, Shubber (2014), and Shubber *et al.* (2014) reached to same conclusion that the camel attains the highest tick infestation rate among other domestic animals.

The horses and donkeys were found infested with one species only *R. annulatus*. This tick was recorded by Shubber (2014) and Shubber *et al.* (2014) from horses and donkeys, the infestation rates were 12.5% and 16.7% in horses and donkeys respectively. This result differs from that of Shubber *et al.* (2013) who recorded 50% and 20% respectively. Also dogs and cats were infested with one species *R. turanicus*, the infestation rates were 16.7% and 33.3% respectively. These rates for cat seem high in comparison with Shubber (2014) who recorded 4.9% infestation, and the rate for dogs seems much lower since he recorded a rate of 61.5%. This may related to smaller sample size of this study and this does not reflect the actual infestation rate of these animals. Both studies examined relatively small numbers of hosts and a further study of enough sampling host number is necessary.

Table 2: Distribution of tick parasites species among their domestic and wild hosts.

Host name	*H. anatolicum*	*H. excavatum*	*H. turanicum*	*H. scupense*	*H. dromedarii*	*H. schulzei*	*R. annulatus*	*R. turanicum*	*R. leporis*
Sheep	+	+	+	+	-	-	-	+	-
Goat	+	+	+	+	-	-	-	+	-
Cow	+	-	+	+	-	-	+	-	-
Buffalo	+	-	+	-	-	-	-	-	-
Camel	+	+	+	-	+	+	-	-	-
Horse	+	-	-	+	-	-	+	-	-
Donkey	-	-	-	-	-	-	+	-	-
Dog	-	-	-	-	-	-	-	+	-
Cat	-	-	-	-	-	-	-	+	-
Hare	-	-	-	-	-	-	-	-	+
Jackal	-	-	-	-	-	-	-	+	+
Fox	-	-	-	-	-	-	-	+	+

For the infection in wild animals the infection is represented by two species of genus *Rhipicephalus*, wild hares were infected with *R. leporis* while the Asiatic jackal and the red fox were infected with *R. turanicus* and *R. leporis*. This result was recorded by Mohammad (1996) and Shubber *et al.* (2014). The infestation rates in wild hare, Asiatic jackal, and Red fox were 75%, 100%, and 100% respectively. This is in accordance with Shamsuddin and Mohammad (1988), Shubber (2014), and Shubber *et al*. (2014).

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انتشار القراد الصلب في الحيوانات الأليفة والبرية في وسط العراق

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الخلاصة

تم فحص ما مجموعه ٢٢٨ فردا من الحيوانات الاليفة والبرية مشتملا على الضأن والماعز والبقر والجاموس والجمال والخيول والحمير والكلاب والقطط والارانب البرية وبنات آوى والثعالب الحمر بحثا عن القراد الصلب في منطقة وسط العراق. تم الحصول على تسعة انواع تعود الى جنسين وهي: *Hyalomma anatolicum* Koch, 1844 و *H. excavatum* Koch, 1844 و *H. turanicum* Pomerantsef, 1946 و *H. scupense* Delpy, 1946 و *H. dromedarii* Koch, 1844 و *H. schulzei* Olenev, 1931 و *Rhipicephalus annulatus* (Say, 1821) و *R. turanicus* Pomerantsef & al., 1940 و *R. leporis* Pomerantsef, 1946. نوقش انتشار الانواع بين المضائف ونسب الاصابة في ضوء البحوث ذات العلاقة.