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Original Article

Hyalomma aegyptium on Spur-thighed Tortoise (*Testudo graeca*) in Urmia Region West Azerbaijan, Iran

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Abstract

Background: Ticks are obligate blood feeders that parasitize a wide variety of animals. *Hyalomma aegyptium*, parasitize tortoises and other small wild life and livestock. This study was carried out to determine spur-thighed tortoise (*Testudo graeca)* infestation to *H. ageyptium* in Urmia region West Azerbaijan of Iran.

Methods: The study was carried out over a 16 month period from the spring of 2004 to the fall of 2005. A total of 32 tortoises were sampled.

Results: The results indicated that 14 tortoises infected with ticks. A total of 117 ticks were collected from infested animals, the minimum and maximum tick infestation was 1-60. Ticks were attached to the axilla of fore and hind legs of tortoises. All ticks were determined to be *H. aegyptium.*

Conclusion: *H. aegyptium* was the most common tick species in the study area. Due to tendency of some people to keeping tortoise as pet animal, more attention must be done to tortoise's tick infestation. Due to existence of *H. aegyptium* on tortoises in this region more study will need to evaluate presence of this tick on other animal species and its role on transmission of diseases.

Keywords: *Ticks, Spur-thighed tortoise,* Hyalomma ageyptium*, Iran*

Introduction

Testudo graeca Linnaeus 1758, or the spur-thighed tortoise, is an endangered species with a broad distribution range. It can be found in northern Africa (e.g. Morocco, Algeria, Tunisia and Libya), the Middle East (e.g. Lebanon, Jordan, Syria, and Iraq), Europe (Bulgaria, Romania, Turkey, Greece, and multiple introductions into Spain and Greece), and in Asia (e.g. Armenia, Azerbaijan, Georgia, Turkmenistan, Iran, and possibly Afghanistan) (1-3).

Ticks are obligate blood feeders that parasitize a wide variety of terrestrial and flying vertebrates and a few marine snakes and lizards (4). More than 800 tick species have been described in the world (5, 6). Ticks are vectors of more kinds of microorganisms (5, 7). The vast literature regarding ticks has centered mostly around 10% of the world tick fauna, which have been well recognized for their medical and veterinary significance. However, a comprehensive knowledge of the ecology of important ticks and tick borne-diseases are best achieved by knowing the biological and physiological similarities and differences between all species, in relation to their hosts and to the environment. Knowledge of biological models of tick parasitism of wildlife is very useful to clarify factors that have permitted a few tick species to become economically important pests and vectors of disease agents to man and animals (4).

Hyalomma ticks are often the most abundant tick parasites of livestock, in warm, arid, and semiarid, generally harsh lowland and middle altitude biotopes, and those with long dry sea-

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sons, from central and southwest Asia to southern Europe and southern Africa. Of the 30 known *Hyalomma* spp., ≥15 are important vectors of infectious agents to livestock and humans. Hyalommines are mostly moderately large to large ticks with long mouthparts (8).
The subgenus *Hyalomma* contains 15 species of veterinary and public health importance. Three of the 15 species have 2, 3, and 4 subspecies, respectively. *H aegyptium*, parasitize tortoises and small wildlife and livestock from Pakistan to both sides of the Mediterranean basin, and Russia (8, 9). Adults are specific for tortoises.
This study was carried out to determine tortoise's infestation to *H. ageyptium* in Urmia region, West Azerbaijan of Iran.

Materials and Methods

This study was carried out over a 16 month period from the spring of 2004 to the fall of 2005, in Urmia West Azerbaijan Province, North West of Iran. This area is semi-humid, with mean rainfall of about 350 mm with the maximum mean temperature of 28.3° C in August and the minimum mean monthly temperature of -5 ° C in January. Tortoise from suburb Urmia city, were captured and inspected for ticks. Captured tortoises were restrained and given a thorough physical examination. Ticks collected with forceps on the tortoises were immediately placed into screw-capped tubes containing several minute holes. Vials were properly identified and conditioned under room temperatures for few days or weeks, and then they were sent to the laboratory. The purpose of this procedure was to try to maintain ticks alive inside the vials until arriving at the laboratory for taxonomic identification. Adult ticks were morphologically examined under the stereo microscope and identified using the keys of Hoogstraal and Kaiser and Hillyard (10, 11).

Results

A total of 32 tortoises were sampled. The results indicated that 14 tortoises infected with ticks. A total of 117 ticks were collected from infested animals, the minimum and maximum tick infestation was 1-60. Ticks were attached to the axilla of fore and hind legs of tortoises (Fig. 1). All ticks were determined to be *H. aegyptium*, a common tortoise parasite (Fig. 2, 3, 4 & 5).

Fig.1: *H. aegyptium* ticks attached to axilla of hind leg

Fig. 2: *H. aegyptium* male tick, dorsal view

Fig. 3: *H. aegyptium* female tick, dorsal view

Fig. 4: *H. aegyptium* male tick, ventral view, arrow show short external spur of coax I.

Fig. 5: *H. aegyptium* male tick, ventral view, arrow show broad adanal plats and reduced subanal plates.

Discussion

Ticks biology and their distribution studies in Iran were initiated in 1810 when Dupre visited this country (12). Razi Institute, Pasteur Institute of Iran, Faculties of Veterinary and School of Public Health, continued their works on Iranian ticks (13). In 1935, Brumpt had conducted a study on genus *Ornithodoros* ticks (14). Subsequently, Delpy published a paper on the family of Ixodidae genus *Hyalomma* in 1936 (15). Baltazard explained the characteristics of *Ornithodorus* ticks (16). Abbasian listed the name of Iranian ticks in 1960 (13). The book entitled "Ectoparasites of domestic animals' ticks" was published by Maghami in 1968 (17). Mazlum published his research on the geographical distribution, seasonal activities and host preference of ticks in 1971 (18). Rahbari worked on some ecological aspects of tick fauna of West Azerbayejan, Iran (19). The occurrence of 55 ticks' species was previously reported can be summarized as follow: *Argas* 5 spp., *Ornithodorus* 6 spp., *Hyalomma* 16 spp., *Boophilus* 2 spp., *Haemaphysalis* 11 spp., *Ixodes* 6 spp., *Dermacentor* 4 spp. and *Rhipicephalus* 5 spp.

Ticks are a group of arthropod that can be found on reptiles. These ticks are not usually dangerous to humans, although they can bite humans and family pets, but can carry several different diseases that can infect humans, such as relapsing fever and western equine encephalitis virus. Results of recent studies have shown the ease with which exotic ticks have been introduced into other countries on imported reptiles and disseminated from importers to breeders, zoos, wildlife theme parks, pet stores and private hobbyists (20-22).

It has been known for many years that reptiles imported into other locations were on occasion infested with ticks (23-27). At least eight exotic tick species were being imported into Florida on reptiles (21.28).

New findings demonstrated clearly the potential for at least five of the exotic reptilian ticks to spread rapidly, not only to other reptilian species, but in the case of one also to domestic mammals such as dogs, these ticks have been associated with mammalian diseases, heartwater (29-32) and Q fever (33,34). In addition, these hard ticks species have been reported to be vectors of various haemogregarines of reptiles (35-38),

and in heavy infestation of ticks it cause respiratory distress and even death in monitors (28, 39). Remarkably little data are available on the impact of reptilian ticks on their primary hosts, reptiles. Although parasitaemia may be high and of long duration, there is little documented evidence that haemogregarines are pathogenic to their reptilian hosts (37).

Some studies have documented the frequent occurrence of ticks, specifically *Ornithodoros parkeri*, as ectoparasites of tortoises. Also, tick transmission of mycoplasmas involved in bovine pleuropneumonia disease in Africa has been demonstrated in some earlier experimental studies but not confirmed under natural conditions (16, 40, 41**)**.

In southern Europe the hosts of *H. aegyptium* are primarily tortoises but also lizards, dog, horse, hedgehog, hamster and birds. In Italy *H. aegyptium* has occurred on partridge, in Egypt, on quail, pigeon, chats and warblers (11). *H. aegyptium* were reported from cattle and buffaloes from, Pakistan, Turkey and India (42-44). Vashishta and Mathur and Vashishta *et al.* reported that *H. aegyptium* transmit *Theileria hirci* in goats (45, 46). Our results showed that *H. aegyptium* was the most common tick species in the study area. In our knowledge *H. aegyptium* was not reported from other animals except *Testudo graeca* turtle in Iran (47). As far as we know, *H. aegyptium* is not responsible for any human and domestic animal pathology in North-West Europe (11). In Mediterranean region, it is a vector of protozoa which are blood parasites of land tortoises (38). However, Ece *et al.*, 2003, report a spirochete of the genus *Borrelia* from the hard tick *H. aegyptium* in Turkey (48).

Crimean-Congo hemorrhagic fever virus (CCHFV) is the most often transmitted to man following a tick bite (genus *Hyalomma*) (49). In Iran, *Hyalomma* spp. probably plays the main role in transmitting the infection from animals to humans (50). Due to tendency of some people to keeping tortoise as pet animal, more attention was done to tortoise's tick infestation; however the risk of contracting a disease from a reptile is generally small, as long as owners practice good hygiene. But people with a suppressed immune system are more at risk than the general population. For example, children under 10 and the elderly are considered to be at higher risk. However, by practicing good sanitation and personal hygiene, keeping tortoise out of the kitchen and food preparation areas, it is possible to minimize the risk. It is also important to have all new tortoise examined and tested prior to introducing them to home.

Many insecticide were used for tick control on tortoise for example Amitraz at a concentration of 2 ml litre^{-1} of water successfully induced detachment of *Amblyomma marmoreum* and *Amblyomma hebraeum* ticks from the mountain tortoise, Geochelone pardalis(51).

In conclusion, due to existence of *H. aegyptium* on tortoises in this region more study will need to evaluate presence of this tick on other animal species and its role on transmission of diseases.

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