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## **Survey and population densities of hard ticks infecting cattle at Taraman animal farm, Nag Abdullah, Sohag Governorate**

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### **Abstract**

Cattle are the most common and widely distributed large ruminant livestock species in Taraman animal farm, Sohag governorate. They are liable to be infected with many ectoparasites (e.g., ticks, mites, biting flies, fleas and lice).

The cattle tick, *Rhipicephalus annulatus* is only the hard tick species found most often on cows in the studied farm. Heavy tick burdens on animals can decrease animal production (milk, meat and growth). In addition to hides damage. Moreover, the blood-sucking ectoparasites may act as vector for some diseases. The cattle tick, *Rhipicephalus annulatus* was found abundantly on cattle at this farm, but its occurrence is more frequent on cows. The densities of *R. annulatus* on cows during 2018 and 2019 years were studied, The numbers of it were increased gradually started from the beginning of winter until reached their maximum numbers in spring season, especially in April, followed by the summer season (July), winter season was the last one in the individuals of *R. annulatus* on cow bodies.

### **Keywords:**

Densities, maximum numbers, cattle tick, *Rhipicephalus annulatus*

## INTRODUCTION

Cattle are the most common and widely distributed large ruminant livestock species. They play an important role in nutrient recycling and the conversion of inedible plant components into protein non grass-based systems. Cattle are generally liable to be infected with many ectoparasites (e.g., ticks, mites, biting flies, fleas and lice). Ticks (Acari: Ixodidae) are worldwide prominent pests of medical and veterinary importance (Guglielmone *et al.*, 2014). They transmit diverse pathogens, including bacteria, rickettsiae, viruses, protozoa and helminths (Parola and Raoult, 2001; Labuda and Nuttall, 2004; De la Fuente *et al.*, 2008; Raether and Harder, 2008; Mehlhorn *et al.*, 2009; Eckert *et al.*, 2009 and Donalisio *et al.*, 2020). The cattle tick, *Rhipicephalus annulatus* (Say, 1821) (formerly *Boophilus annulatus* Stiles and Hassal, 1901), is a hard tick found most often on cattle. This species shows a cosmopolitan distribution in tropical and subtropical region of the world. Heavy tick burdens on animals can decrease animal production (i.e. milk, meat and growth). In addition to damage hides. By virtue of ticks protracted feeding period, ticks represent an extreme example of their host's haemostatic defenses and immune response, thus becoming better placed pathogen transmitters than any other arthropod species (Gillespie *et al.*, 2000). In Egypt, the tick fauna have been studied for 3 decades by the Medical Zoology Department of the Naval Army Medical Research Unit No.3 (NAMRU-3). These efforts initiated a very good collection achieved by NAMRU-3 for years; however, most of these works were limited to health related surveillance programs (Liebish *et al.*, 1989). Numerous studies have been made on the medical and veterinary importance of level ticks that infest domestic animals in Egypt (El-Kady, 1998; El-kammah *et al.*, 2001; Adham *et al.*, 2009; Goneim *et al.*, 2017 and Hassan *et al.*, 2017 a, b). Few taxonomical and morphological studies of hard ticks in Egyptian fauna were carried out by Hoogstraal and Kaiser, 1958 and 1959; Abdullah *et al.*, 2016. The hard tick species that infested domestic animals are belonging to four general *Amblyomma*, *Haemophysalis*, *Hyalomma* and *Rhipicephalus* (Allam *et al.*,

2018). The *R. annulatus* was the most medically important tick infesting cattle (Abdal-Shafy *et al.*, 2012) and *R. sanguineus* (Latereille, 1806) was common on dogs (Hoogstraal and Kaiser, 1958; Amin and Madbouly, 1973 and Haridy *et al.*, 2009).

## MATERIALS AND METHODS

### Area of study

The current field study was conducted in the target farm at Taraman village, Nag Abdullah, Sohag Governorate, during the period from 2018 to 2020, this farm, is located on Shandawil Island, the farm is considered as one of the largest livestock farms in Sohag governorate. This farm is one of the old traditional farms with a mixed farming system, as it contains different species of domestic animals such as: cows and buffaloes, which are closely located inside the stables, while sheep and goats are found in a field attached to the farm in guarding dogs.

### Survey of hard tick on cattle

A pilot survey of hard ticks infesting cows was conducted from September, 2018 to August, 2019. For this purpose, ten cows presented in the farm were randomly selected and examined for hard ticks of different stages (adult and nymphal stages), they carefully picked up using blunt forceps, then tick individuals were taken to the laboratory in Petri dishes (9 cm in diameter) for examination by using the stereoscopic microscope of 40 -100 magnification forces.

### Identification

The identification of ticks was based on illustrated keys by Pérez-Eid, 2007 and Okely *et al.*, 2021.

### Population fluctuation of hard tick on cows

To study the numerical oscillations of hard tick on cow, 5 cows from Taraman farm were randomly selected, and adherent ticks on the preferred places in an area of 10 cm<sup>2</sup> marked with a felt - tip pen of the cows body were counted fortnightly during two years (2018/2019 and 2019/2020).

## RESULTS AND DISCUSSION

### Inventory of species and numbers of livestock in Sohag sector at Sohag governorate

According to the Mobilization and Statistics Unit of the Directorate of Veterinary Medicine in Sohag governorate, from Sohag sector data in (Table 1 and Figure 1), show the species and examined numbers of livestock during the period from 2018 to 2020. It notes that the number of livestock is constantly increased, because of the development of registration programs with interested in health care. It also noted that, the number of cows, which is concerned with the current study, was the most abundant animal in Sohag sector, Sohag governorate.

Table 1: Species and examined numbers of livestock in Sohag governorate during 2018-2020.

Livestock species	Years		
	2018	2019	2020
Cow	116975	134 091	149323
Buffalo	68494	70286	85983
Sheep	70187	66926	107461
Goat	53972	48199	56739
Camel	3850	3190	1465
Donkey	37215	44054	42828
The Total	350693	366746	443799

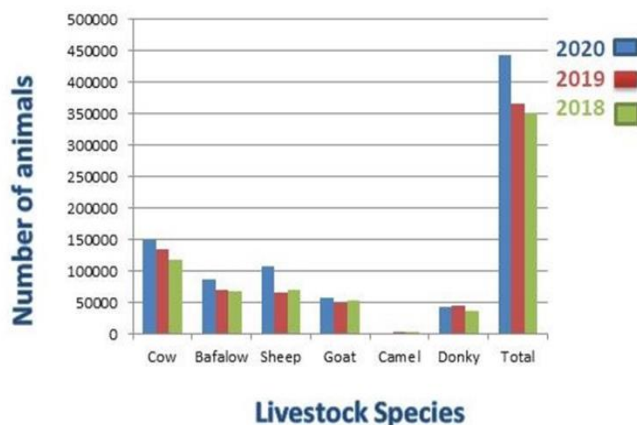


Figure 1: Species and numbers of livestock in Sohag sector at Sohag governorate during 2018-2020.

### Ecological studies

#### 1. Survey of hard ticks at Taraman animal farm:

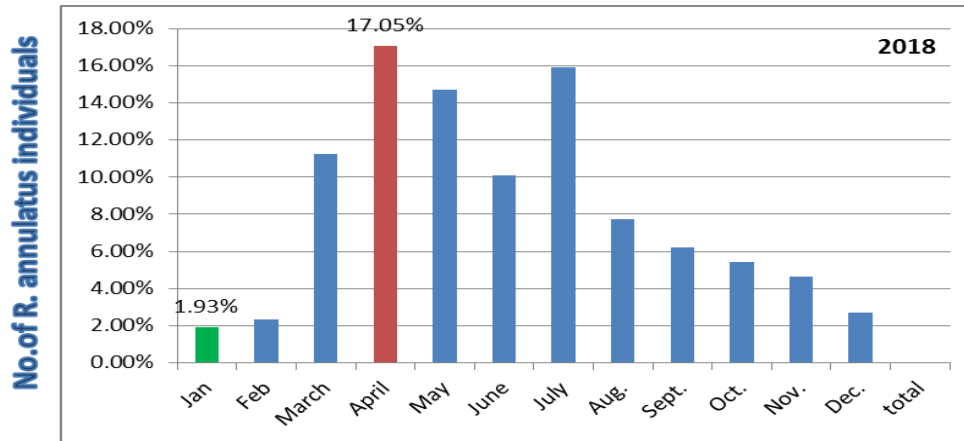
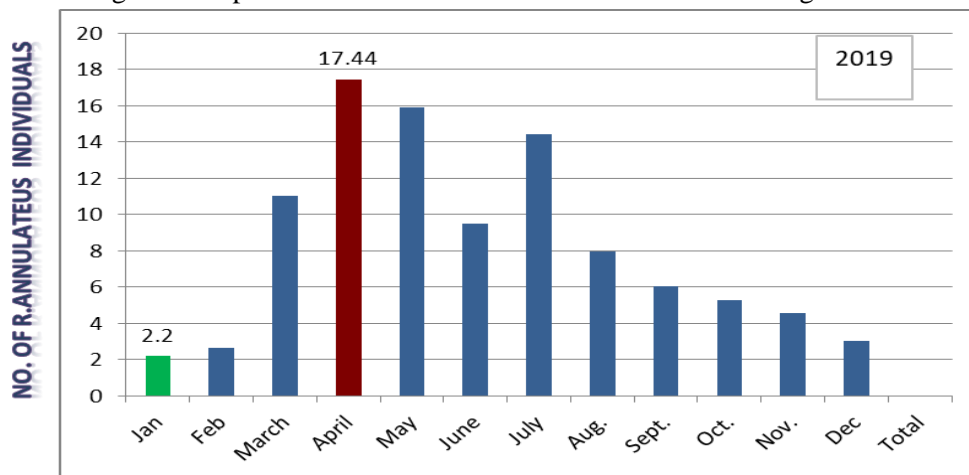
The current study showed the presence of only a single species of hard tick that infects cattle at Taraman farm, Sohag governorate and its presence is more frequent on cows. This species is identified as the cattle tick, *Rhipicephalus annulatus* (Say.1821) (formerly *Boophilus annulatus* Stiles and Hassal.1901).

#### 2. Population fluctuation of *R. annulatus* on cows

Data in (Table 2) and the corresponding (Figure 2 & 3) show the population density of *R. annulatus* on cows during 2018 and 2019 years in Taraman farm, Sohag governorate. The numbers of adults (both sexes) and nymphal stages through the virtual counting in the preferred places on the animals bodies during 2018 and 2019 years was recorded in (Table 2 & Figure 2), where the pest population increased gradually started from winter until reached its maximum number in the spring, especially in April, followed by the summer season (July), winter season was the last one in the number of *R. annulatus* individuals attached on the bodies of cows in Taraman farm.

Table 2: Population densities of *R. annulatus* on cows during 2018 and 2019 years

Month	No. of <i>R. annulatus</i> individuals			
	2018		2019	
	No.	%	No.	%
January	25	1.93	29	2.20
February	30	2.32	35	2.65
March	145	11.24	145	11.00
April	220	17.05	230	17.44
May	190	14.72	210	15.92
June	130	10.07	125	9.48
July	205	15.89	190	14.40
August.	100	7.75	105	7.96
September	80	6.20	80	6.07
October	70	5.42	70	5.30
November	60	4.65	60	4.55
December	35	2.71	40	3.03
Total	1290	100%	1319	100%

Figure 2: Population densities of *R. annulatus* on cows during 2018.Figure 3: Population densities of *R. annulatus* on cows during 2019.

The results obtained in 2019, took the same trend as recorded in 2018 (Table 2 & Figures 2, 3). Perhaps the increased in the number of the pest on animal bodies is due to high temperature in the spring and summer seasons. While, the few numbers of the pest recorded during autumn and winter seasons are due to the fact that, the pest (males and females) leave the bodies of animals after receiving a blood meal, the male and females search for places to lay egg masses. While, few numbers of immature stages on animals were recorded during autumn and winter seasons, in agreement with the findings obtained by Okely *et al.*, 2021.

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## المسح والكثافة السكانية للقراد الصلب الذي يصيب الأبقار بمزرعة طرمان للحيوانات نجع عبد الله بمحافظة سوهاج

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### الملخص العربي

تعتبر الماشية من أكثر أنواع الحيوانات المجترة انتشاراً في مزرعة طرمان للإنتاج الحيواني بمحافظة سوهاج وهي عرضة للإصابة بالعديد من الطفيليات الخارجية مثل: القراد والجرب والذباب الماص والبراغيث والقمل.

قراد الماشية، *Rhipicephalus annulatus* هو غالباً نوع القراد الصلب الموجود فقط على الأبقار في المزرعة المدروسة والإصابة الشديدة بالقراد على الحيوانات يمكن أن تقلل من الإنتاج الحيواني مثل: الحليب واللحوم والنمو، بالإضافة إلى تلف الجلد، علاوة على ذلك، قد تعمل الطفيليات الخارجية الماصة للدم كناقل لبعض الأمراض.

تم العثور على قراد الماشية *Rhipicephalus annulatus* بكثرة على الماشية الموجودة في هذه المزرعة، ولكن الإصابة به كانت متركزة على الأبقار وتمت دراسة الكثافة العددية لتلك الآفة على الأبقار خلال عامي 2018 و 2019، وزادت أعداد هذه الآفة تدريجياً ابتداءً من بداية الشتاء حتى وصلت إلى أقصى أعدادها في فصل الربيع، خاصة في شهر أبريل، يليه موسم الصيف (يوليو)، كان فصل الشتاء هو أقل فصل تواجدت به فصيلة *R. annulatus* على أجساد الأبقار.