Provided for non-commercial research and education use.

Not for reproduction, distribution or commercial use.

This article was published in an Sjournals journal. The attached copy is furnished to the author for non-commercial research and education use, including for instruction at the authors institution, sharing with colleagues and providing to institution administration.

Other uses, including reproduction and distribution, or selling or licensing copied, or posting to personal, institutional or third party websites are prohibited.

In most cases, authors are permitted to post their version of the article (e.g. in Word or Text form) to their personal website or institutional repository. Authors requiring further information regarding Sjournals´s archiving and manuscript policies encouraged to visit:

http://www.sjournals.com

© 2020 Sjournals Publishing Company

Sjournals
Scientific Journals

Scientific Journal of Veterinary Advances (2020) 9(3) 309-315
ISSN 2322-1879
doi: 10.14196/sjva.v9i3.1514

CODEN (USA): SJVAAS

Contents lists available at Sjournals
Scientific Journal of **Veterinary Advances**
Journal homepage: www.sjournals.com

Original article

Ticks (Acari: *Ixodidae*) infesting cattle in two areas of northeast of Algeria

Matallah Faouzi[a,*], Matallah Saida[b], Mahzem Djamila[a], Layachi Khaoula[a], Medjouel Ilyes[c]
[a]*Department of Veterinary Sciences, Faculty of Science and Life, University Chadli Ben Jdid, El Tarf, Algeria.*
[b]*Department of Agronomy, Faculty of Science and Life, University Chadli Ben Jdid, El Tarf, Algeria.*
[c]*Department of Biology, Faculty of Science, University Senia Oran, Algeria.*

*Corresponding author: fouzi_vet16@yahoo.fr

ARTICLE INFO

Article history,
Received 10 February 2020
Accepted 11 March 2020
Available online 18 March 2020
iThenticate screening 12 February 2020
English editing 09 March 2020
Quality control 16 March 2020

Keywords,
Ticks
Cattle
Infestation
Rhipicephalus annulatus
Algeria

ABSTRACT

Totally 372 ticks from 90 cattle, in two areas of the north east of Algeria were collected. Totally, 83% of ruminants were infected by ticks. All mites were belonged to family *Ixodidae* and classified into three genera and nine species comprising: *Rhipicephalus annulatus*; *Hyalomma impeltatum*; *Rhipicephalus bursa*; *Hyalomma anatolicum; Hyalomma detritum*; *Hyalomma marginatum; Rhipicephalus turanicus*; *Rhipicephalus sanguineus and Haemaphysalis punctata. Rhuipicephalus annulatus, Rhipicephalus bursa* and *Hyalomma detritum* were the majority of ticks (23%, 22% and 18% successively). The most common tick's predilection sites on the cattle body surface were observed on the ears (average of in the two study areas was 80%), followed by low rate on scrutum, udder, neck and Limb. High prevalence of tick infestation (*Rhipicephalus* and *Hyalomma*) in the study areas during spring and summer warrants the need for formulating appropriate intervention strategies to improve control of ticks infestation and awareness among cattles farmers. The removal of ticks by the hands used by breeders can reduce the number of parasites but do not eliminate the transmission of pathogens to cattle.

© 2020 Sjournals. All rights reserved.

1. Introduction

Ticks are haematophagous arthropods parasitizing most of the vertebrate animals. About 880 species have been described worldwide (Nava et al., 2009), of which roughly 80 have widely benefited from agricultural development and animal domestication. Ticks are economically the most important pests of cattle and other domestic species in tropical and subtropical countries (Jongejan and Uilenberg, 2004). The direct and indirect pathogenicity of ticks as an obligate ectoparasites of vertebrates originates from blood and lymph sucking, beside the digested tissues from mammals, birds, reptiles, and amphibians and hence ticks adapted to living in harsh and diversified habitats. In cattle, direct tick infestation could cause anaemia, stress, reduction in milk yield, weight gain hypersensitivity and toxicosis, leading also to secondary infections (Uilenberg, 1995).

Ticks which are of great economic importance world-wide in several ways. Loss of blood, vectors for parasites such as protozoan, rickettsial and viral diseases, their bites also reduce the quality of hides (Pegram et al., 2004; Lefebvre et al., 2010). In Algeria, few studies have been devoted to the study of the parasitic tick population in cattle (Senevet and Rossi, 1924; Yousfi-Monod and Aeschlimann, 1986; Boulkaboul, 2003). Knowledge of ticks and their biology is essential for the study of the epidemiology of transmitted diseases which appear during the period of vector activity and also in the context of prophylaxis. The present study aims to identify the different species of cattle ticks in two areas (Boutheldja and El-Hadjar) in the north-eastern of Algeria and to determine their abundance.

2. Materials and methods

2.1. Areas of study

The study was carried out from December 2016 to August 2017 in two localities in northeastern of Algeria: the commune of Boutheldja (Wilaya of El Tarf) and the commune of El Hadjar (Wilaya of Annaba) (Fig1). The two departments enjoy a Mediterranean-style climate. Boutheldja is characterized by minimum monthly temperatures in January-February 9.42 °C with a maximum temperature of 28.7 °C in August. A calculated precipitation of 668 mm is recorded in this area. The high humidity is remarkable throughout the year (source; subdivision of commune Boutheldja). *Altitude* for Boutheldja: 1m. For El Hadjar: the average temperature is 18 °C (minimum of 12 °C in January and maximum of 22 °C in July-August), the region is richly watered with an average precipitation of 630 mm/year. *Altitude* fo El Hadjar: 11m (sources: agricultural subdivision of two regions).

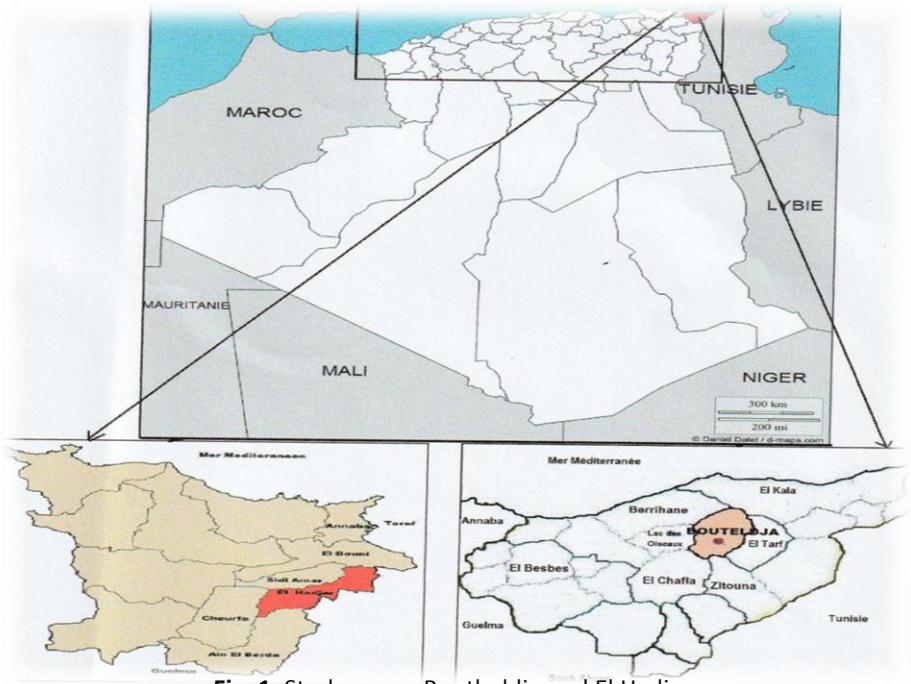

Fig. 1. Study areas: Boutheldja and El Hadjar.

2.2. Collection of ticks

All tick specimens were collected from December 2016 to August 2017. Ticks were collected from cattle after informed consent from the farm owners had been obtained. 90 cattle were the subject of this study divised as follows: 50 cattle in the first area; Boutheldja (30 ♀, 20 ♂) and 40 cattle in El Hadjar (23♀**,** 17♂). These animals lived with other ruminants (sheep and goats) as well as guard dogs. Some cattle presented different clinical signs: mucous paleness, depression, intense weight loss. These farms are extensive, marked by an irregular application of prophylactic and therapeutic measures. Throughout the study, acaricide treatment was not administered to cattle. The manual labeling of ticks by some breeders, is a pratice to prevention against these parasites.

2.3. Identification of ticks

The ticks were removed from each animal by simple extraction after the animal was restrained by the breeders. They were kept in 70 ° ethanol contained in labeled bottle with the date of harvest, sex and age of the animal. Tick samples were shipped to the laboratory of parasitology, Department of science veterinary El Tarf for further morphological identification using taxonomic keys by Hillyard (1996), Estrada-Peña et al. (2004); Morel (1969) and Chartier et al. (2000). The specimens were identified to the species level under a stereomicroscope.

2.4. Statistical analysis

The data collected were recorded according to the sex, age of the cattle and the different months of study.

3. Results and discussion

3.1. Ticks collection

Ninety cattle were randomly examined for ticks of which 75 (83%) were tick infested. 372 ticks were collected during the period study. 3 genera and 9 species of ticks were identified: *Rhipicephalus annulatus*; *Hyalomma impeltatum*; *Rhipicephalus bursa*; *Hyalomma anatolicum; Hyalomma detritum*; *Hyalomma marginatum; Rhipicephalus turanicus*; *Rhipicephalus sanguineus*; *Haemaphysalis punctata. Rhipicephalus annulatus* and *Rhipicephalus bursa* were the predominant ticks (23%, 22% successively). *Hyalomma detritum* was registred with 18% (Fif2).

The 9 tick species have been identified in Boutheldja area, while the same parasitic species has been noted in the second area, except two mites: *Hyalomma detritum* and *Haemaphysalis punctata* (Table1). There was a slight predominance of female ticks for *R. annulatus* with 71 % (60/84), then a majority of female ticks for *R. bursa* (81 % female against 19 % male). There are also a few more females' ticks for *H. detritum* with a rate of 60%.

It has been reported that 80 % of ticks attached on the ears. They were also found a low proportions in the scrutum, udder, neck and Limb. The parasitic load (Number of ticks / Number of parasited cattle) is very low, that to say 1 tick/cattle for *R. annulatus* and *R. bursa.* Tick infestation in sex of animals was also not significantly different ($p > 0.05$). Tick infestation of animals with age showed that there were statistically significant variations ($p < 0.05$).

Table 1
Relative abundance of tick species in the study areas.

Ticks	*R. annulatus*	*R. bursa*	*R. Sanguineus*	*R. turanicus*	*H. impelatum*	*H. detritum*	*H. marginatum*	*H. anatolicum*	*Hae. punctata*
Nb	84	81	18	46	19	65	44	7	8
AR.%	23	22	4	12	5	18	12	2	2

Nb: Number; AR: Abundance relative

3.2. Monthly variations in the infestation of cattle by ticks

A variation in the parasitic infestation of these mites collected from cattle was observed during the eight months of study. Cattle from Boutheldja area are much more infested during the months of May-June- July and August. Also, an association of the 9 tick species was observed during these months. We noted the presence of two ticks throughout the study period: *R. annulatus* and *H. impeltatum*, so the other species appeared gradually from March to have the 9 species in the months of May-June- July and August. Also, for El Hadjar, an infestation

with the 7 species of tick was recorded from the month of June with a dominance of *Rhipicephalus bursa* (24% in this area). During this study, there was higher prevalence of tick infestation in spring and summer season (Fig3, 4, Fig5).

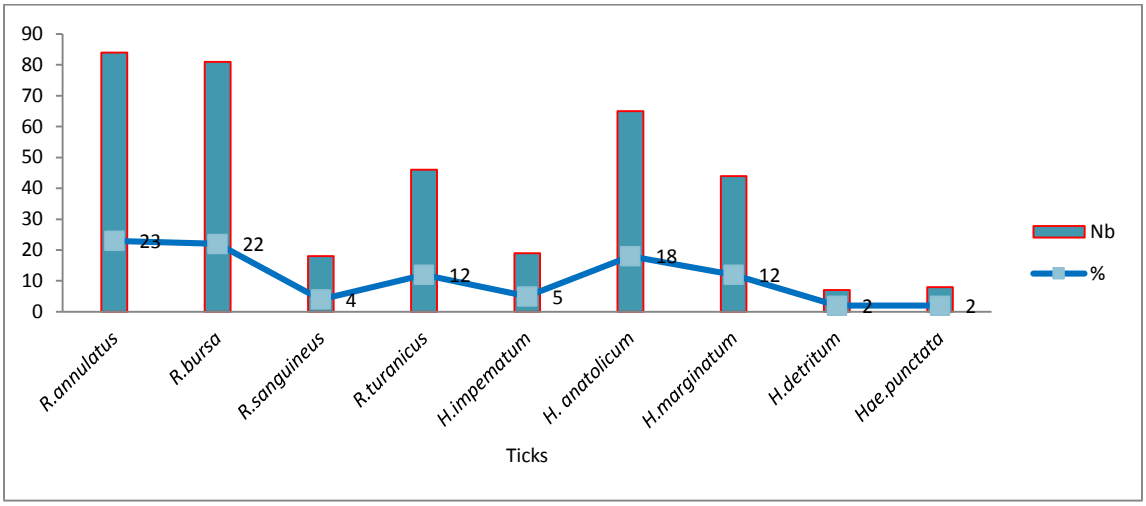

Fig. 2. Abundance relative of ticks during the period study. *R. Rhipicephalus H. Hyalomma Hae. Haemaphysalis*

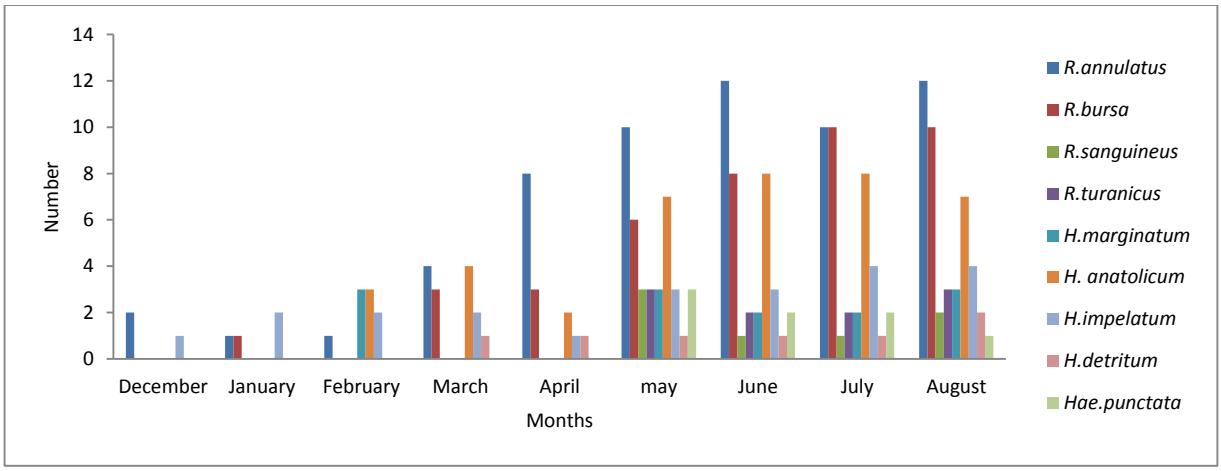

Fig. 3. Monthly cattles infestation by ticks in Boutheldja.

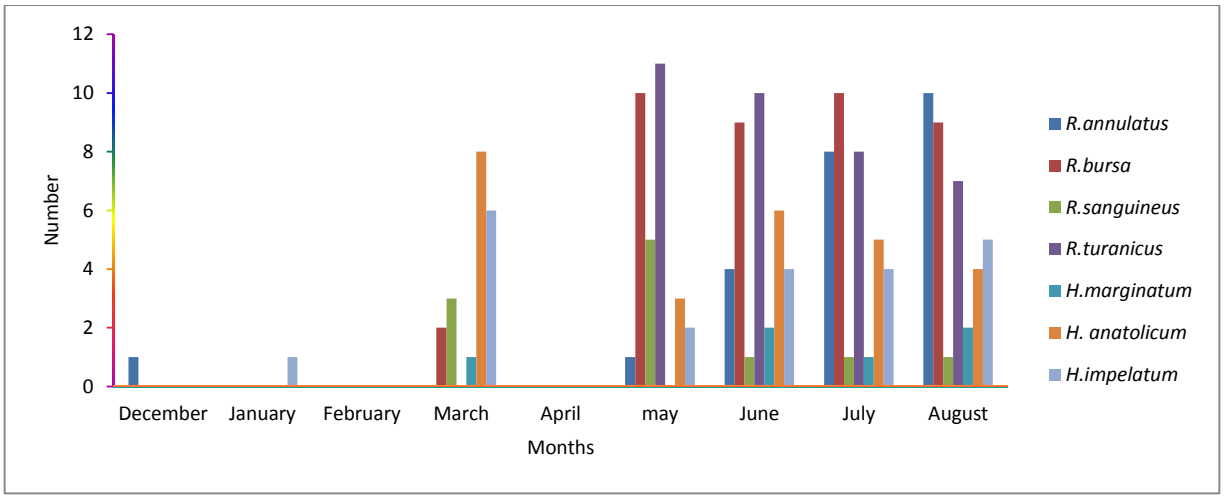

Fig. 4. Monthly cattles infestation by ticks in El Hadjar.

Of the 372 ticks we have counted, 9 species have been identified belonging to the 3 genera: *Rhipicephalus*, *Hyalomma* and *Haemaphysalis*. Our results were reported by Meddour (2000) in the Annaba area, However, Boulkaboul (1993), in Tiaret, reports in addition to the genera we have identified, the presence of the genus *Dermacentor*. We also note the absence of the *Ixodes* genus, the latter was reported by Meddour (2000) in Algeria and Laamri et al. (2012) in Morocco.

The species of the genus *Rhipicephalus* in particular *R. annulatus* and *R. bursa*, very hygrophilic, are more adapted to the humid climate. The two study areas (Boutheldja and El Hadjar), benefiting from a rainfall often greater than 600 mm/year, constitutes an environment favorable to parasitic evolution. The presence of *R. annulatus* has been reported in the Jijel area in eastern of Algeria (Benchiclh, 2007), and also in the area of the Algerian coast from Algiers to the Tunisian border (Boutaleb, 1982). Bioclimatic conditions seem to have a significant effect on the existence or absence of certain species of ticks (Bouattour, 2002).

In our sudy, there has been an infestation of cattles throughout the year with *Rhipicephalus annulatus* and which is the most abundant species, this is also reported by Benchikh-Elfegoun et al. (2007) in Jijel (eastern of Algeria). However, *Rhipicephalus bursa* was too listed with a rate of 9.35%, in second position after the *Rhipicepohalus annulatus* (79.96%). Also, in the area of Boutheldja, ticks of the genus *Rhipicephalus* are more abundant and represented 49% of the population of *Ixodidae* infesting cattle with a clear dominance of the species *Rhipicephalus annulatus* and *Rhipicephalus bursa* by compared to the others: *Rhipicephalus turanicus* and *Rhipicephalus sanguineus* (5 and 13% successively).

Rhipicephalus annulatus has been collected from Morocco, Tunisia and Libya in the humid, sub-humid and higher arid bioclimatic zones (Bouattour, 2002). This tick mainly infects cattle and occasionally sheep, goats, and wild ungulates (Estrada-Pena et al., 2004). In egypt, Nady M.Asma and coll., 2014 identified a majority for this tick collected on Ruminants with a rate of 26.5%. It is considered to be the major vector of *Babésia bovis*, *Babésia bigemina* and *Anaplasma marginale* in cattle (Sahibi et al., 2007).

R. bursa is considered a tick par excellence of cattle, collected by several authors with significant rates with *R. Annulatus* (Laamari et al., 2012; Rahal et al., 2016; Bouattour, 2002). *Hyalomma* also to take into consideration, by their presence in this second position, notably *H. detritum* and *H. marginatum*. To note that *H. detritum* was collected with a very clear predominance (84.3%) in tunisia by Bouattour et al. (1996). The dominance for this genus was reported by Ouhelli and Pandey (1982) in Morocoo with a rate the 30.8%. In this same study *H. marginatum* was identified with 25% and *R. annulatus* was identified with a 29%. Also, H. marginatum was registered in four regions in Morocco with a rate of 25.7% by Rahali et al. (2016).

H. anatolicum is presented with a low rate 2%, so other authors have reported its predominance on ruminants (51.87%) (Biglar et al., 2018) in Iran, also in Pakistan, a dominance of this tick was recorded (Abdul Rehman et al., 2017). Also, *H. anatolicum* was collected from other mammals, especially horses, dogs in the northeast of Algeria (Matallah et al., 2018). This tick was counted with *Rhipicephalus sanguineus* on dogs rural in Pakistan (Ul-Hasan et al., 2012). What the rate of 2 % does not reflect the actual infestation of this tick. In another section and by adding its three-phase cycle and the fact that our terrain is favorable for the development of this tick.

Hae punctata is considered the most frequent among the other species of *Haemaphysalis* ticks. This tick species is reported by different authors (Boulkaboul, 2003; Meddour, 2000), as well as the forest wealth from the areas study provide thermal and hygrometric of the zone and favor the presence the speces of tick. Also, *Rhipicephalus sanguineus* become the most common tick in the tropics and subtropics due to its particular tropism for the domestic dog (Matallah et al., 2012). Indeed, at each sampling site, during our study, we noticed the presence of at least two dogs. Accidental parasitism can explain the presence of these mites on cattle.

R. annulatus, *R. bursa* and *Hyalomma detritum* seem to be the most affecting species of cattle in our study? The dominance of these tick species can be explained by their tropism and the specificity of their biological cycle which makes the bovine the definitive host of adults. In addition to the various other studies, it should be noted that many species of ticks can be collected from cattle, and this increases the risk of transmission of pathogens, in addition to the direct action if the breeder does not do not apply acaricides at optimum times to reduce infestation.

It is important the explain that The removal of ticks by hands applied by breeders seems to be a factor in reducing the number of ticks collected, and the non-identification of other poarasites, notably *Ixodes ricinus* and *dermacentor marginatum*. So the identification of 9 species even with low infestation increases the chances of the indirect role of ticks, and the possibility of transmitting different pathogens.

The presence of all these species, even with small proportions, leads us to pay attention to vectorial diseases especially bovine theileriosis with *theileria annulata* (vector: genus *Hyalomma*); *babesia* to *babesia bovis* (vector: *Rhipicephalus bursa*). It's necessary to use the molecular identification, for a more precise identification of the tick species of cattle in Algeria and especially if all the studies based on the morphological identification which can confuse between parasitic species. Finally, in Algeria, studies remain insufficient to give the real vision of the infestation of bovines by ticks and especially the pathogens vectorized in these animals.

References

Abdul Rehman, Ard M. Nijhof, Carola Sauter-Louis, Birgit Schauer, Christoph Staubach, Franz J. Conraths, 2017. Distribution of ticks infesting ruminants and risk factors associated with high tick prevalence in livestock farms in the semi-arid and arid agro-ecological zones of Pakistan. Parasites & Vectors, 10, 190.

Benchikh-Elfegoun, M.C., Benakhla, A., Bentounsi, B., Bouattour, A., Piarroux, R., 2007. Identification et cinétique saisonnière des tiques parasites des bovins dans la région de taher (Jijel) Algérie. Ann. Méd. Vét., 151, 209-214.

Biglari, P., Bakhshi, H., Chinikar, S., Belqeiszadeh, H., 2018. Hyalomma anatolicum as the main infesting tick in an important livestock rearing region, central area of Iran. Iran. J. Publ. Health, 47(5), 742-749.

Blancou, J. (Ed.), 1994. Ectoparasites of animals and control methods. Office Internationale des Epizooties (OIE), Paris, France. Sci. Tech. Rev., 13(4), 1201-1226.

Bouattour, A., 2002. Clé dichotomique et identification des tiques (Acari: Ixodidae) parasites du bétail au Maghreb. Arch. Inst. Pasteur. Tunis, 79, 43-50.

Bouattour, A., Darghouth, M.A., Ben Miled, L., 1996. Cattle infestation by *Hyalomma* ticks and prevalence of *Theileria* in *H. detritum* species in Tunisia. Vet. Parasitol., 65(3-4), 233-245.

Boulkaboul, 2003. Parasitisme des tiques (Ixodidae) des bovins à Tiaret, Algérie. Rev. Élev. Méd. Vét. Pays Trop., 56(3-4), 157-162.

Boutaleb, 1982. Thèse de Docteur Vétérinaire. Institut Vétérinaire: Constantine, 85p.

Chartier, C., Itard, J., Morel, L.P.C., Troncy, M., 2000. Précis de parasitologie vétérinaire tropicale. Paris Editions Tec et doc., 200p

Estrada-Peña, A., Bouattour, A., Camocas, J.L., Walker, A.R., 2004. Ticks of domestic animals in the Mediterranean region: a guide to identification of species. Zaragoza: University of Zaragoza, ITG Library, 31p.

Faouzi, M., Ahmed, B., Saida, M., 2018. Inventory of ticks on dogs in rural areas of the northeast of Algeria and its relationship with influences some ecological and climatic parameters. Iraq. J. Vet. Sci., 32(2).

Jongejan, F., Uilenberg, G., 2004. The global impor-tance of ticks. Parasitol., 129(Suppl), S3-S14.

Laamri, M., El Kharrim, K., Mrifag, R., Boukbal, M., Belghyti, D., 2012. Dynamique des populations de tiques parasites des bovins de la région du Gharb au Maroc. Rev. Élev. Méd. Vét. Pays Trop., 65(3-4), 57-62.

Lefebvre, P.C., Blancou, J., Chermette, R., Uilenberg, G., 2010. Infectious and parasitic diseases of livestock. 1, 93-128.

Matallah, F., Benakhla, A., Medjouel, L., Matallah, S., 2012. Tick infestation of dogs and prevalence of canine babesiosis in the north-east of Algeria; area of El-Tarf. Am. Eur. J. Sustain. Agr., 6(3), 126-134.

Matallah, F., Hadjaj, S., Matallah, S., 2018. A preliminary study on ticks and equine Babesiosis in rural areas (North-east of Algeria), Algeria. Sci. J. Vet. Adv., 7(9), 247-253.

Morel, P.C., 1969. Contribution à la connaissance de la distribution des tiques (Acarien, Ixodidae et Amblyommidae) en Afrique éthiopienne continentale. Thèse: Sciences. Orsay, 575.

Nady M. Asmaa, Mohammed A. ElBably, Khalied A. Shokier, 2014. Studies on prevalence, risk indicators and control options for tick infestation in ruminants. Beni-Suef Univ. J. Basic Appl. Sci., 3(1), 68-73.

Nava, S., Guglielmone, A.A., Mangold, A.J., 2009. An over-view of systematics and evolution of ticks. Front. Biosci., 14, 2857-2877.

Ouhelli, H., Pandey, V.S., 1982. Prevalence of cattle ticks in Morocco. Trop. Anim. Health Prod., 14, 151-154.

Pegram, P.G., Tatchell, R.J., De Castro, J.J., Chizyuka, M.J., Mc Cosker, P.G., Moran, M.C., Nigarura, G., 2004. Tick control: new concepts.

Rahali, T., Rhalem, A., Sadak, A., Aithamou, S., Saadi, A., Losson, B., Madder, M., Sahibi, H., 2016. Seasonal abundance of ticks (Acari/Ixodidae) infesting cattle in four irrigated regions in Morocco. Rev. Mar. Sci. Agron. Vét., 4(1), 37-45.

Sahibi, H., Rhalem, A., 2007. Tiques et maladies transmises par les tiques chez les bovins au Maroc. Transfert de technologie en agriculture. Bull. Inf. Liaison PNTTA, 151, 1-4.

Senevet, G., Rossi, P., 1924. Contribution à l'étude des Ixodidés (XII° note). Étude saisonnière des Ixodidés de la région de Bouira (Algérie). Archives de l'Institut Pasteur d'Algérie, Alger, Tome II, N° 2, 223-232.

Uilenberg, G., 1995. International collaborative research: significance of tick-borne hemoparasitic diseases to world animal health. Vet. Parasitol., 57, 19-41.

Ul-Hasan, M., Abubakar, M., Muhammad, G., Khan, M.N., Hussain, M., 2012. Prevalence of tick infestation (Rhipicephalus sanguineus and Hyalomma anatolicum anatolicum) in dogs in Punjab, Pakistan. Vet. Ital., 48(1), 95-98.

Yousfi-Monod, R., Aeschliman, A., 1986. Recherches sur les tiques (Acarina, Ixodidae). Parasites de Bovidés dans l'Ouest Algérien. Ann. Parasitol. Hum. Comp., 61(3), 341-358.

How to cite this article: Faouzi, M., Saida, M., Djamila, M., Khaoula, L., Ilyes, M., 2020. Ticks (Acari: *Ixodidae*) infesting cattle in two areas of northeast of Algeria. Scientific Journal of Veterinary Advances, 9(3), 309-315.

Submit your next manuscript to Sjournals Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in DOAJ, and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.sjournals.com