

Tick Species Infesting Cattle in Ituri Province, DRC

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ABSTRACT

Species of ticks infesting cattle in Ituri Province, DRC A study on species of ticks their distribution on sites of fixing in cattle dresses in Ituri province was carried out in the Territoires of Aru, Djugu, Irumu and Mahagi. At the end of the observations, the results are that: *Amblyomma variegatum* and *Rhipicephalus microplus* have the moderately infest and very little represented while *Demacentor marginatus* is relatively less abundant but quite common to regions infestation; Female cattle are more infested and adult cattle are the most infested in rainy periods; The predilection regions of the infestation are the head, the neck, the ears, the abdomen and the thighs.

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I. Introduction

A large portion of the world's food is provided by ruminants in general, and cattle in particular (Micol, 1980 ; Kalondji et al., 2005 ; Martineau and Morvan, 2010 ; and Omosombo et al., 2021). However, this production continues to decline in developing countries while their populations continue to grow quite rapidly (FAO, 1976, 2010 and 2020 cited by Omosombo et al., op.cit.; Kalondji et al., op.cit. and Mairie de Bunia, 2024). The limiting factors for livestock production in these countries are diet and disease (Tobback, 1951; Sauveur, op.cit.; Minjaw and Mclead, 2003; Sylla et al., 2009 and Martineau and Morvan, op.cit.).

In the Democratic Republic of Congo, cattle farming is more prosperous in the provinces of Greater Kivu and Ituri (Kalondji et al., op.cit. and Omosombo et al., op.cit.). But in the last decade, following multiple wars of aggression perpetrated by certain neighboring countries, this cattle culture is more threatened by tick-borne diseases (Mongo et al., 2009). Today, the current species of ticks, their sites, the references among cattle victims and distribution by Territory, sex and seasons are little known.

II. Environment

The work was carried out in the four territories of Ituri Province, namely Aru, Djugu, Irumu, and Mahagi. The province is located in the eastern DRC, between 1° and 3° 4' North latitude and 28° and 31° East longitude. It covers an area of approximately 65,658 km². It is bordered by Uganda to the east, South Sudan to the north, Haut-Uélé and Tshopo Provinces to the west, and North Kivu Province to the south.

Its climate is subequatorial (Am3-4) in mid-altitude areas, temperate (Cfb) in high areas, and tropical Sudanese (Aw4) in low-altitude areas according to the Köppen classification. Its vegetation is very varied, including dense forests (mainly the Mambasa Territory and part of Irumu), secondary forests, gallery forests, wooded savannahs and grasslands. There is a great diversity of plant species

(Omasombo et al., 2021). The soils are generally sandy-clay and fertile, thus favoring agricultural and para-agricultural activities throughout the Province (Anonymous, 2020). The relief of Ituri is dominated by stepped plateaus whose altitude varies between 900 m and 2000 m (Omasombo et al., 2021). The Ituri shares its waters with both the Nile River basin and the Congo River basin. In general, Ituri is a well-drained region, providing sufficient water supply to the population practicing agro-sylvo-pastoral activities despite climatic problems (Anonymous, 2021). Finally, the majority of the population lives from primary activities based on land capital (Mongo et al., 2009), including traditional cattle breeding, agricultural and fishing activities, forestry and mining.

III. Materials and Methods

III.1. Study Materials

It consisted of 1,200 tick specimens collected during the rainy and dry periods, as well as 2,652 cattle, mainly from local breeds (Hema, Alur, Lugbara) and Sanga or crossbred cattle from crossbreeds between local cattle and a few male sires of imported breeds as part of herd improvement efforts, which are generally raised in a pastoral system with free range pastures.

III.2. Methods

III.2.1 Tick Collection

Ticks were first collected from each cattle 3 minutes after spraying with the 5% xylol solution. They were then preserved, by anatomical region (ears, head-neck, abdomen-legs, anogenital, thighs and foot), in labeled 250,000,000 IU penicillin-type bottles containing 70% alcohol, bearing the harvest date, the name of the farm or breeder, the Territory, the anatomical region concerned, the age of the cattle (young cattle 0-12 months old, which is the weaning age, and adult cattle > 12 months old), and the sex.

Furthermore, the sample from each Territory was placed in a 10L plastic bucket and tightly covered with a bag on its lid to limit the loss of the preservative used. Instead,

these samples were taken to the laboratory of the Animal Production Section of the ISP - Bunia for analysis.

III.2.2. Identification of Collected Ticks

In the laboratory, tick identification was performed under a Would 2500 binocular microscope. It was based on the morpho-anatomical characteristics described by certain authors (Chartier et al., 2000; Bouattour, 2002; Walker et al., 2003).

III.2.3. Statistical Analysis

The number of ticks collected was recorded in a spreadsheet by species, month, and anatomical region for each Territory. Monthly tick count means for the four Territories were calculated, by species, anatomical region, and/or species, using Microsoft Excel software.

Means were compared after testing for normality. Therefore, the t-test was applied, as was Tukey's HSD test for the significance of differences between means using Statistica 8 software.

IV. Results and Discussion

IV.1. Results

The ticks identified were grouped into six genera divided into ten species, including *Amblyomma hebraeum*, *Amblyomma latum*, *Amblyomma variegatum*, *Dermacentor marginatus*, *Haemaphysalis punctata*, *Hyalomma marginatum*, *Ixodes pilosus*, *Ixodes ricinus*, *Rhipicephalus appendiculatus*, and *Rhipicephalus microplus*.

IV.1.1. Tick Species by Territory at Attachment Sites

The figure below elucidates the sites of infestation by tick species that stress cattle in Ituri Province.

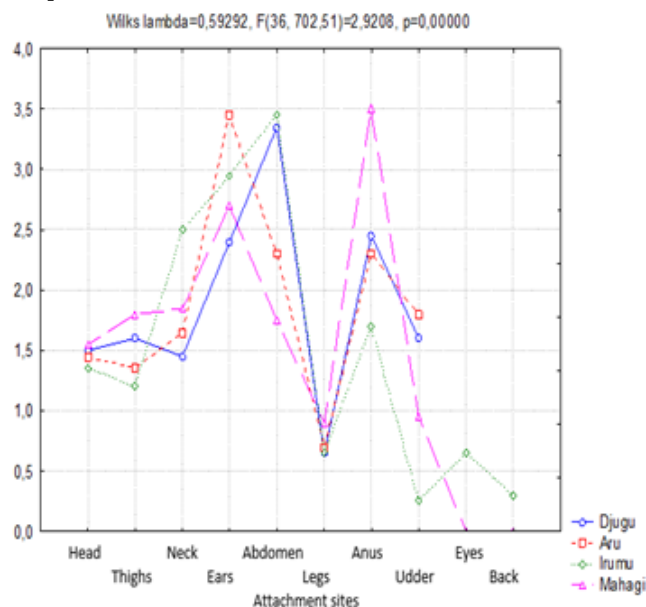


Fig. 1. Tick species by territory at infestation sites

It appears that in the Aru Territory, the different tick species most prefer the ear, abdomen, and anus regions, while those on the neck, head, thighs, udder, and legs are relatively the most preferred. However, the eye and back regions have a lesser predilection.

In Mahagi, ticks most preferred the anal, ear, abdominal, cervical, and interthigh regions, while those on the head, legs, udder, and eyes are the least preferred. However, the dorsal region was not represented. In Irumu, the most infested sites were the abdomen, ears, neck, and anus, while those on the head, interthighs, legs, eyes, udder, and back were the least infested. In Djugu, ticks were more fond of the abdominal, anal, ear and udderregions,while those between the thighs,

head and legs were the least attractive. However, those on the eyes and back were not represented. After analysis, the difference in the use of attachment sites between the territories under study was highly significant (.05; $p = 0.00000$).

The figure 2 amply demonstrates that the distribution of tick species by attachment site is not specific but varies depending on the season and territory. However, the most preferred attachment sites are the neck, ears and anus, the abdomen, and the head, with high numbers of *Amblyomma variegatum*, followed by *Rhipicephalus microplus*. However, *Haemaphysalis puncta*, *Dermacentor marginatus*, *Rhipicephalus appendiculatus*, and *Ixodes ricinus* are absent or poorly represented at the various sites. The least represented sites, with few species, are, in increasing order of size, the back, the eye rims, and the legs.

However, all these attachment sites are more infested during rainy seasons. There are thus interactions between the number of ticks and the attachment sites (the same species can be found on several attachment sites, some ticks being specific).

Analysis of variance of the distribution of tick species by attachment site and by season reveals that the species factor influences 48.45%, the attachment site influences 24.11%, and other factors not elucidated in this study influence 34%.

IV.1.2. Interactions between tick species and attachment sites for all four territories

The degree of association between tick species and attachment sites is shown in the table 1.

The table 1 shows that *Amblyomma variegatum* and *Rhipicephalus microplus* have similar infectivity on cattle and are therefore the most infective of the identified tick species. They are followed by *Amblyomma hebraeum*, *Hyalomma marginatum*, and *Ixodes pilosus*, which have moderately similar infectivity on cattle. On the other hand, *Demacentor variegatus*, although having a rather low hematophagic power, is common to all the infestation sites under study. While the rest of the identified tick species have the most negligible infestation powers.

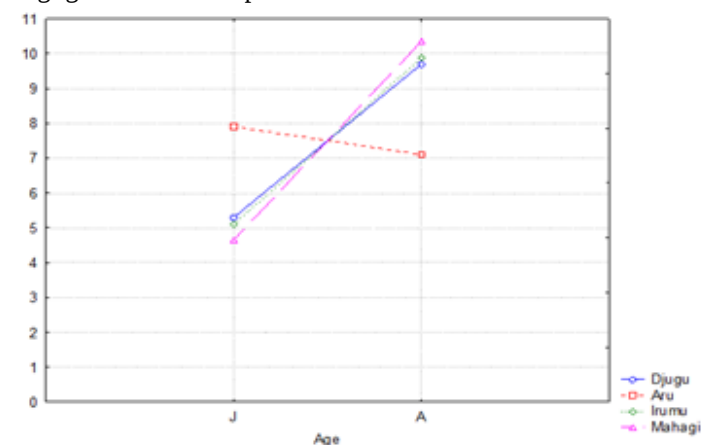


Fig. 3. Cattle infestation level by age and season

Analysis of figure 3 shows that overall, adult cattle are more infested than sub-adult cattle, except in the Aru Territory where these results are reversed. Furthermore, there is no interaction between age and season. However, between age categories, the difference in infestation level is highly significant at the .05 probability level ($p = 0.00531$).

V. Discussion

V.1. Tick species at infestation sites by season and Territory

A total of 10 tick species are identified with varying levels of infestation, but the highest is *Amblyomma variegatum*; species with low levels of infestation were classified differently depending on the Territory. Then, the rainy season had a higher infestation level in all territories and for all species except *Hyalomma marginatum* in Aru and *Ixodes pilosus* in Djugu. Finally, the infestation level and the number of species varied according to the environments and altitude of the territories under study.

These results differ from those of Kalume (2011), who found that *Rhipicephalus appendiculatus* was the most common species (85.228%), followed by *Rhipicephalus decoloratus* (14.76%), and a single *Amblyomma variegatum* tick (0.003%) during a period of low rainfall. They also differ from those of Farougou et al. (2007), who also found ten species of cattle ticks in the Sudanian zone of Benin, where *Amblyomma variegatum* and *Boophilus geigyi* were dominant. Our results also differ from those of Sylla et al. (2022), who, during the identification of parasitic ticks in cattle in Daloa, found that the majority of cattle analyzed had the same species richness of *Rhipicephalus microplus* and *Amblyomma variegatum*, only calves had the additional *Rhipicephalus annulatus*. Similarly, Mebanga et al. (2014) found that *Amblyomma variegatum* was the most abundant species, followed by *Boophilus microplus* and *Rhipicephalus appendiculatus*.

The dominance of *Amblyomma variegatum* during this study is consistent with the results of Koney et al. (1994) in Ghana, Walker and Koney (1999) in Ghana, Kabore et al. (1998) in Burkina Faso, Gueye et al. (1990) in Senegal, Awa (1997) in Cameroon, and Knopf et al. (2002) in Côte d'Ivoire, Bayer and Maina (1984) in Nigeria, Mekonnen et al. (2001) in Ethiopia, and Pegram et al. (1986) in Zambia, who also observed it in several tropical African countries. Walker et al. (2003) argue that the position of *Amblyomma variegatum* in our study is supported by the fact that it is a species generally restricted to savannah zones in semi-arid and humid regions. According to Kalume (2011), in Butembo, *Amblyomma variegatum* was found in a high-altitude area averaging 1000–1850 m, closer to the Graben wooded savannah, but also in mid- and low-altitude areas of Rwanda and Uganda.

Furthermore, according to Barre (1997), the predominance of *Amblyomma variegatum* is primarily due to its resistance to commonly used acaricides, then to its more complex life cycle requiring three different hosts, and finally to the high number of eggs laid per female (10 to 30,000) compared to other species (2,000 to 15,000). Therefore, spraying or tick-dipping only eliminates ticks found on the definitive host, with the other phases of the parasite's evolution remaining entirely favorable to the species' survival in the wild (Mebanga et al., 2014). In any case, *Amblyomma* confirms its role as a ubiquitous species, capable of adapting to varied ecological conditions. These differences can be explained by ecological and climatic conditions that are more favorable or unfavorable to tick development, which can vary depending on the country and the year.

According to Chartier et al. (2000) that climatic variations, mainly linked to rainfall and observed over successive years, can favor or hinder the evolution of the tick population even within a country. Excessive rainfall can be

harmful to free-living forms; ticks are then less abundant in exceptionally rainy regions or years. Similarly, the scarcity of hosts such as rodents over the course of a year can have harmful effects on the development of di- or triphasic ticks and consequently on their abundance.

V.2. Interaction between tick species and attachment sites across all territories

Regarding attachment sites, the results of this study show that the distribution of tick species by infestation site is not specific, with highly significant differences between species, attachment sites, seasons, and environments. However, the most preferred attachment sites are the neck, ears-anus, abdomen, and head, with a high number of *Amblyomma variegatum* and *Rhipicephalus microplus*. However, the least hematophagous sites, with few species, are the back, the eye area, and the legs.

Our results differ from those of Gueye et al. (1993), in whom the most infested animal body parts were the anogenital regions, the abdomen-legs, and the ears. However, *Amblyomma variegatum* is dominant in the head-neck and the anogenital region while *Boophilus geigyi* is fond of the ears and the dorsal region. Also, the tick count in the study by Mebanga et al. (2014) showed that the preferred areas on animals were the head orifices, the skin folds of the neck, along the spine, the abdomen, the udders, the base of the tail and in the sloping areas such as the anterior parts of the shoulder joint and perineum; the preferred tick attachment sites being the groin, the perineum-tail region, the udders and the abdomen. The head, neck, spine and legs remain the least infested. The adults of several tick species present in pastures attach themselves mainly to the legs of animals, in the interdigital spaces, until the animals lie down. Afterwards, they move to their preferred sites (groin, perineum-tail, abdomen, udder) and attach themselves there permanently. They also add that ticks do not attach randomly to the animal, the areas where a high number of ticks are noted (perineum, groin, udders and abdomen) are essentially the sloping parts where the skin is thicker and tender, corresponding to the preferred areas of ticks with a long hypostome (the case of *Amblyomma variegatum*). As for Douffissa (2000), he adds that ticks attach themselves preferably to moist parts protected from the sun such as the vulva, perineum, groin and sloping parts. This further justifies the predominance of *Amblyomma variegatum* over other short-hypostome tick species such as *Rhipicephalus microplus* and *Rhipicephalus appendiculatus*, as also stated by Mebanga et al. (2014).

Also, in cattle, ticks primarily target areas where the skin is thinner and blood circulation is easier, including the abdomen, limbs, topknot, neck, and tail. In addition, Morel (1969), cited by Yapi (2007), states that the location of the tick on the host is linked to the hypostome's penetration abilities. This is why short-billed species (*brevirostra*) generally prefer the head (inside of the articular horn, chignon), the margins of the anus, and the tail furrow, while long-billed species (*longirostra*) attach to the sloping parts (dewlap, ars, groin, udders, testicles, perineum). The level of infestation of these different sites during the rainy season is justified by the fact that during this period, tall, humid vegetation can encourage ticks to ascend to higher areas of the body such as the back and head, whereas in the dry season, ticks often remain at ground level, preferring lower areas such as the thighs, legs, and abdomen.

V.3. Degree of infestation of cattle by age and season

Other results obtained are that adult cattle are more infested than young ones (Level of infestation is > adults > subadults > juveniles). However, the difference in the level of infestation by age is not significant. This difference would be attributed according to Bandombe (2023) to the attention paid more to young animals and the systems as well as the relatively low efficiency of the breeding management of most cattle farmers in developing countries. This opinion was reinforced by Gueye et al. (1993) cited by Fagourou (2011). This is confirmed by Sylla et al. (2022), who state that adult cattle (cows, bulls, heifers) have a higher number of ticks than young cattle (calves). Thus, there is a high distribution of ticks among cows, bulls, and heifers, and a low distribution among calves. This seems to be justified, according to Gharbi and Darghouth (2014), by the fact that cows, bulls, and heifers are frequently in tick habitats to feed, while calves are kept in pens by herdsmen for fear of being injured or lost because they lack the strength to keep up with the larger ones.

The study by Mebanga et al. (2014) also supports that animals over 2 years old (adult cattle) were the most infested with a prevalence of 96.77% and shows that the parasite load

increases with age. Matzigkeit (1997) supports this idea by saying that young cattle are more resistant to ticks than older ones and unweaned calves are more resistant than their mothers. This would be due to the great capacity of older animals to deploy to risk areas, particularly infested pastures, and also to the time of exposure to ticks.

VI Conclusion

This article discusses tick species and tick distribution infesting cattle in Ituri Province to consider highly effective control methods, including highly resilient acarine species. Observations reveal that:

- *Amblyomma variegatum* and *Rhipicephalus microplus* have similar infectivity and are very abundant and more common;
- *A. hebraeum*, *Hyalomma marginatum*, and *Ixodes pilosus*, which are quite abundant, have very moderate infectivity, while *Demacentor variegatus*, with a low hematophagic capacity, is common in all the attachment sites studied;
- Male cattle are more infested than female cattle;
- Adult cattle are more heavily infested than young cattle;
- Preferred areas for tick infestation are the head, neck, ears, abdomen, and thighs;

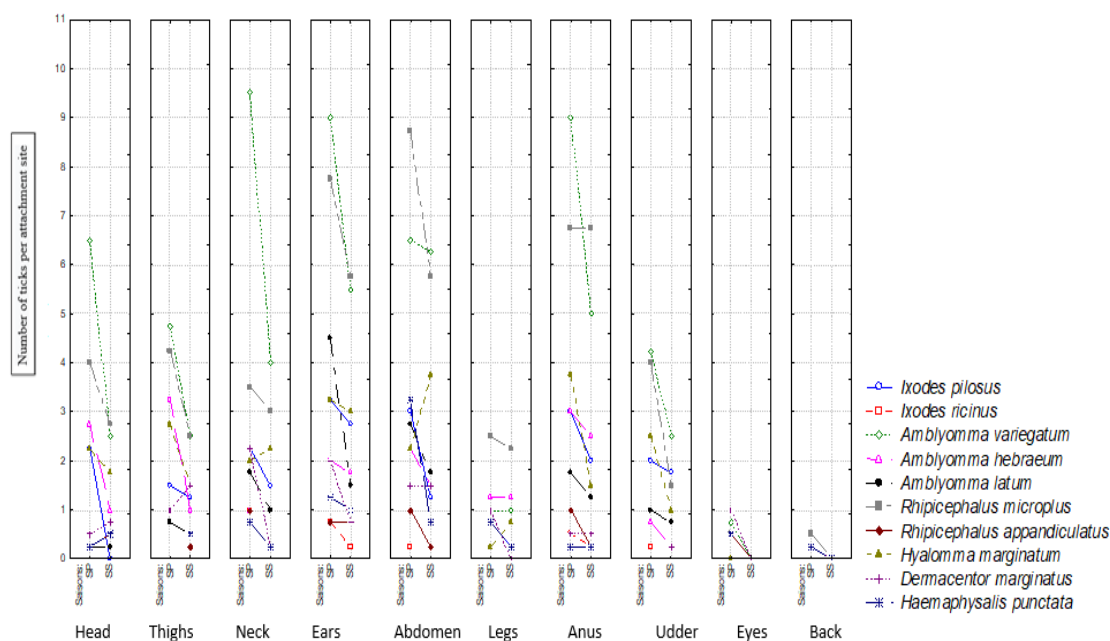


Fig. 2. Distribution of tick species by attachment site and season

Table I. Interactions between tick species and attachment sites for all four territories

Species	Head	Thighs	Neck	Ears	Abdomen	Legs	Anus	Udder	Eyes	Back
<i>Amblyomma hebraeum</i>	+++	+++	+	+++	+++	++	+++	+	-	-
<i>Amblyomma latum</i>	-	+	++	+++	+++	+	++	+	-	-
<i>Amblyomma variegatum</i>	++++ +	+++++	++++ ++	+++++ +	+++++	++	++++ ++	++++	-	-
<i>Dermacentor marginatus</i>	+	+	+	+	+	+	+	-	+	-
<i>Haemaphysalis punctata</i>	-	-	+	+	+	+	-	-	-	-
<i>Hyalomma marginatum</i>	+++	+++	+++	++++	++++	+	+++	+++	-	-
<i>Ixodes pilosus</i>	+	+++	+++	++++	+++	+	+++	+++	-	-
<i>Ixodes ricinus</i>	-	-	+	+	-	-	-	-	-	-
<i>Rhipicephalus appendiculatus</i>	-	-	+	+	+	-	+	-	-	-
<i>Rhipicephalus microplus</i>	++++ +	+++++	++++ +	+++++	+++++	++++	++++ +	+++	-	-

Key: -: Disliked the region (average 0); +: Liked the region (average 0.5); ++: Liked the region (average 1); +++: Liked the region (average 1.5); ++++: Liked the region (average 2); +++++: Liked the region (average 2.5 to 3.5); ++++++: Liked the region (average 4 to 9).

Bibliography

Anonymous, 2019, Ituri Province: Provincial Analysis of Fragility Matrices, Ministry of Planning, Kishasa, DRC, 118 p.

Anonymous, 2021, Child Poverty and Deprivation in the Democratic Republic of Congo: Ituri Province, Provincial Report, UNICEF, Bunia, DRC, 8 p.

Awa, D.N., 1997, Serological survey of heartwater relative to the distribution of the vector *Amblyomma variegatum* and other tick species in northern Cameroon, *Vet. Parasitol.*, 68: 165-173.

Bondombe, W.Y., 2023, Characterization of ticks infesting cattle in the Kisangani region and its surroundings, *Elixir Social Studies*, 167: 4677-4691.

Chartier, C., Itard, J., Morel, P.C. and Troncy, P.M., 2000, Outline of tropical veterinary parasitology, Editions TEC et DOC, Paris, France, 774 p.

Farougou, S., Kpodekon, M. and Tassou, A.W., 2007, Seasonal abundance of ticks (Acari: Ixodidae) parasitic on cattle in the Sudanian zone of Benin: the case of the Borgou and Alibori departments, *African Journal of Animal Health and Production (RASPA)*, Vol. 5, 1-2, 61-67.

Gharbi, M., Darghouth, M. A., 2014, A review of *Hyalomma scupense* (Acari, Ixodidae) in the Maghreb region: from biology to control, *EDP sciences*, 21 (2): 1-12.

Gueye, A., Mbengue, M. and Diouf, A., 1990, Ticks and hemoparasitic diseases in cattle in Senegal. IV: The southern Sudan area, *Rev. Elev. Méd. vét. Pays trop.*, 42: 517-528.

Kalume, J. M., 2011, Seasonal abundance of ticks (Acari: Ixodidae) according to cattle farming systems in the city of Butembo, North Kivu Province, Democratic Republic of Congo, *Parcours et Initiatives*, No. 9, 56-66.

Kalume, M.K., Saegerman, C., Mbahikyavolo, D.K., Makumyaviri, A.M., Marcotty, T., Madder, M., Caron, Y., Léglise, L. and Losson, B., 2013, Identification of hard ticks (Acari: Ixodidae) and seroprevalence to *Theileria parva* in

cattle raised in North Kivu Province, Democratic Republic of Congo, *Parasitology Research*, 112(2): 789-797.

Knopf, L., Komoin-Oka, C., Betschart, B., Jongejan, F., Gottstein, B. and Zinsstag, J., 2002, Seasonal epidemiology of ticks and aspects of cowdriosis in N'Dama village cattle in the Central Guinea savannah of Côte d'Ivoire, *Prev. Vet. Med.*, 53: 21-30.

Koney, E.B., Walker, A.R., Heron, I.D., Morrow, A.N., and Ambrose, N.C., 1994, Seasonal prevalence of ticks and their association with dermatophilosis in cattle on the Accra plains of Ghana, *Revue Elev. Méd. vét. Pays trop.*, 47: 163-167.

Matzigkeit, 1997, *Veterinary Medicine: Control of Tropical Ectoparasites*, ITM Prince Léopold, Antwerp, Belgium, 197 p.

Mebanga, A. S., Agnem, C. E., Gambo, H. and Njan, A. N., 2014, Inventory and prevalence of livestock ticks in Adamawa livestock farms in Cameroon, *Revue Africaine de Santé et de Productions Animales (RASPA)*, Vol.12, N0 1, 15-19.

Mekonnen, S., Hussein, I. and Bedane, B., 2001, The distribution of ixodid ticks (Acari: Ixodidae) in central Ethiopia, *Onderstepoort J. Vet. Res.*, 68: 243-51.

Minjaw, B. and Mcleod, A., 2003, Tick-borne Diseases and Poverty: Impact of Ticks and Tick-borne Diseases on the Livelihoods of Small-Scale and Marginal Livestock Owners in India and Eastern and Southern Africa: Research Report, DFID Animal Health Programme, Centre for Tropical Veterinary Medicine, University of Edinburgh, United Kingdom, 357 p.

Mongo, E., Nkoy, E.D. and Puijenbroek, J., 2009, Land Conflicts in Ituri: The Weight of the Past and Challenges for the Future of Peace, *IKV Pax Christi and Réseau Haki na Amani*, Utrecht, the Netherlands; Bunia, DR Congo, 316 p.

Omasombo, T. J., Léonard, G., Mateso, M. J-P., Umvor, K. G., Mokili, M., Remo, L. D., Krawczyk, J. and Laghmouch, M., 2021, Ituri: Land and identities under tension, *Royal Museum for Central Africa*, Belgium, 573 p.

- Pegram, R.G., Perry, B.D., Musisi, F.L. and Mwanaumo, B., 1986, Ecology and phenology of ticks in Zambia: seasonal dynamics on cattle, *Exp. Appl. Acarol.*, 2, 25-45.
- Sylla, I., Kone, M., Toure, A., Koffi, M.N'G. and Koukougnon, D., 2022, Identification of parasitic ticks in cattle in Daloa (Central-West of Côte d'Ivoire), *African Agronomy*, 34 (1): 45 – 56.
- Tobback, L., 1951, Cattle diseases of the Belgian Congo, 2nd ed., Ministry of Colonies, Brussels, Belgium, 557 p.
- Walker, A.R., Bouatour, A., Camicas, J.L., Estrada-Pena, A., Horak, I.G., Latif, A.A., Pegram, R.G. and Preston, P.M., 2003: Ticks of domestic animals in Africa: a guide to identification of species, *Bioscience Reports*, University of Edinburgh, Edinburgh, UK, 221 p.
- Yapi, A.D.W., 2007: Contribution to the study of parasitic ticks in cattle in Côte d'Ivoire: Cases of four herds in the southern zone, Doctoral thesis, Faculty of Medicine, Pharmacy and Odontostomatology, Inter-State School of Veterinary Sciences and Medicine (E.I.S.M.V.), Cheikh Anta Diop University of Dakar, Senegal, 109 p.
- Micol, D., 1980: Beef Production. Ed. Beef Production. ISBN, INRA, Paris, 504 p.
- Kalondji, M., Bomboko, J.M. and Kabamba, M., 2005. Monograph of the Orientale Province. Ministry of Planning, DSRP, 105 p.
- Martineau, P. and Morva, H., 2010: Practical Manual of Pig Livestock Diseases: Diagnosis, Cause and Progression. 2nd ed. France Agricole, ISBN, 601p.