

## CONTRIBUTION TO THE KNOWLEDGE OF TICKS (ACARINA: IXODIDAE) IN GABON

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**ABSTRACT** — Few data are available on the distribution of tick species in Gabon. We report the results of a survey of ticks collected from wild and domestic animals, and in the environment, in several regions of Gabon. We identified four tick species for the first time in Gabon, namely *Haemaphysalis paralaechi*, *Ixodes aulacodi*, *Rhipicephalus annulatus* and *Rhipicephalus simpsoni* and we report 28 tick species for this country.

**KEYWORDS** — tick; Ixodidae; Gabon; distribution; bushmeat

### INTRODUCTION

Several authors have studied the distribution of tick species in Africa (Arthur 1965; Elbl and Anastos 1966a; 1966b; 1966c; 1966d; Hoogstraal 1956; Morel 1965b; Morel 1969; Robinson 1926; Walker *et al.* 2000), especially in Cameroon (Morel and Mouchet 1958; 1965) and the Central African Republic (Cornet 1995).

However, the data are far from complete for most parts of central Africa. We therefore conducted a survey of specimens collected in several regions of Gabon, and updated the list of ticks (Acarida, Ixodidae) in this country.

### MATERIALS AND METHODS

Sampling took place from October 2009 to December 2010. Ticks were collected by direct examination of animals and by the sledge method in the environment (Cornet *et al.* 1984). Wild animals were those captured by hunters for trade and consumption as bushmeat in villages. Domestic animals were free-roaming in villages. On bushmeat animals, ticks were collected within 12 to 72 hours after death. All specimens were preserved in 75 % ethanol until examination.

Speciation was based on the key identification method (Arthur 1965; Elbl and Anastos 1966a; 1966b; 1966c; 1966d; Hoogstraal 1956; Morel 1965b; Walker *et al.* 2000). The references to tick records from old collections (Collection Brumpt, Institut de Parasitologie, Faculté de Médecine de Paris, 1930;

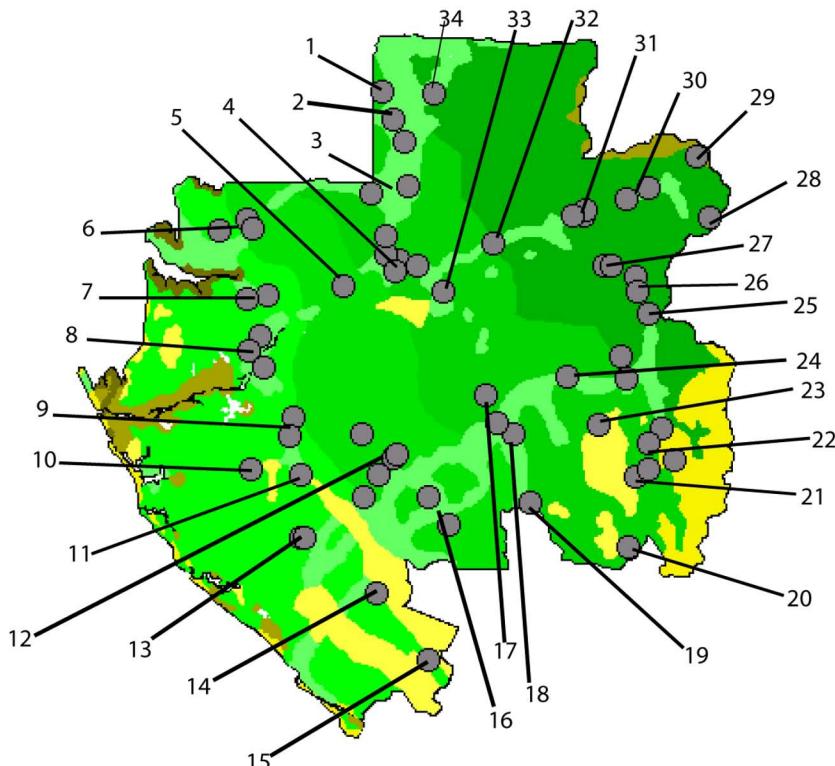


FIGURE 1: Location of the 64 sites (numbered circles) where ticks were sampled in the three main Gabonese ecosystems: forest (green), savannas (yellow) and lakes (brown). 1 – Mbomo; 2 – Oyem, Nkolabona; 3 – Abong Awoum, Akon Ebe; 4 – Zomoko, Trouwaya, Lalaria, Laboka I, Lolo 1; 5 – Mevang; 6 – Lac Nkouvié, Mela, Latta; 7 – Weliga 2, Hevegab; 8 – Lambaréné, Benguié III, Koungoulé; 9 – Mimongo, Mandilou; 10 – Massana; 11 – Guidouma; 12 – Tambi, Mounongou, Boutoumbi, Oyou, Bandi; 13 – Guietsou, Ilendo; 14 – Douvouli; 15 – Bighoundou; 16 – Moloulou, Ongongo; 17 – Baniaty; 18 – Mabimbi, Lemenga; 19 – Dienga; 20 – Doumaï; 21 – Franceville, Ondili; 22 – Kassiélé, Omoy, Onkoua; 23 – Olonga; 24 – Baposso, Antsia, Sebe; 25 – Djounou; 26 – Bakwaka, Yoko; 27 – Zolende, Hendje; 28 – Ekata; 29 – Grand itoumbi; 30 – Zambakaganga, Zadouinde; 31 – Massaha, Nze Vatican, La Scierie; 32 – Afoumadzo; 33 – Lopé; 34 – Mba

Muséum Histoire Naturelle Paris, 1910; Institut Pasteur Paris, 1954) were obtained from Morel (1965b). The mammal nomenclature was based on Wilson and Reeder (2005).

## RESULTS

### Collection sites

Ticks were collected at 64 sites distributed throughout Gabon (Figure 1), as follows: Abong Awoum ( $0^{\circ}58'N$ ,  $11^{\circ}37'E$ ); Afoumadzo ( $0^{\circ}27'N$ ,  $12^{\circ}23'E$ ); Akon Ebe ( $0^{\circ}54'N$ ,  $11^{\circ}18'E$ ); Antsia ( $0^{\circ}34'S$ ,

$13^{\circ}50'N$ ); Bakwaka ( $0^{\circ}9'N$ ,  $13^{\circ}38'E$ ); Bandi ( $1^{\circ}48'S$ ,  $11^{\circ}14'E$ ); Baniyat ( $0^{\circ}54'S$ ,  $12^{\circ}19'E$ ); Baposso ( $0^{\circ}44'S$ ,  $13^{\circ}2'E$ ); Benguié III ( $0^{\circ}23'S$ ,  $10^{\circ}19'E$ ); Bighoundou ( $3^{\circ}15'S$ ,  $11^{\circ}12'E$ ); Boutoumbi ( $1^{\circ}28'S$ ;  $11^{\circ}49'E$ ); Dienga ( $1^{\circ}52'S$ ,  $12^{\circ}43'E$ ); Djounou ( $0^{\circ}10'S$ ,  $13^{\circ}45'E$ ); Doumaï ( $2^{\circ}14'S$ ,  $13^{\circ}34'E$ ); Douvouli ( $2^{\circ}14'S$ ,  $13^{\circ}34'E$ ); Ekata ( $0^{\circ}40'N$ ,  $14^{\circ}17'E$ ); Franceville ( $1^{\circ}40'S$ ,  $13^{\circ}31'E$ ); Grand-itoumbi ( $1^{\circ}14'N$ ,  $14^{\circ}11'E$ ); Guidouma ( $1^{\circ}37'S$ ,  $10^{\circ}41'E$ ); Guietsou ( $2^{\circ}10'S$ ,  $10^{\circ}41'E$ ); Hendje ( $0^{\circ}15'N$ ,  $13^{\circ}22'E$ ); Hevegab ( $0^{\circ}0'53"S$ ,  $10^{\circ}23'E$ ); Ilendo ( $2^{\circ}10'S$ ,  $10^{\circ}43'E$ ); Kassiélé ( $1^{\circ}12'S$ ,  $13^{\circ}52'E$ ); Koungoulé ( $0^{\circ}30'S$ ,  $10^{\circ}13'E$ ); La scierie ( $0^{\circ}42'N$ ;  $13^{\circ}05'E$ ); Laboka I

(0°18'N, 11°33'E); Lac Nkouvié (0°34'N, 9°57'E); Lalara (0°21'N, 11°26'E); Lambéréné (0°40'S, 10°21'E); Latta (0°40'N, 10°12'E); Lemenga (1°25'S, 12°34'E); Lolo 1 (0°16N, 11°42'E); Lopé (0°1'N, 11°59'E); Mabimbi (1°9'S, 12°25'E), Mandilou (1°16'S, 10°35'E), Massaha (0°42'N, 13°11'E), Massana (1°34'S, 10°14'E), Mba (1°74'N, 11°51'E), Mbomo (1°48'N, 11°28'E); Mela (0°35'N, 10°15'E), Mevang (0°5'N, 11°4'E); Mimongo (1°6'S, 10°37'E); Moloulou (1°53'S, 11°49'E); Mounongou (1°26'S, 11°52'E); Nkolabona (1°21'N, 11°59'E); Nze vatican (0°45'N, 13°19'E); Olounga (1°10'S, 13°31'E); Omoy (1°19'S, 13°46'E); Ondili (1°33'S, 13°46'E); Ongongo (2°04'S, 11°58'E), Onkoua (1°47'S, 13°38'E); Oyem (1°33'N, 11°30'E); Oyou (1°37'S, 11°22'E), Scierie (0°42'N, 13°05'E); Sebe (0°45'S, 13°34'E); Tambi (1°15'S; 11°13'E); Trouwaya (0°12'N; 11°31'E); Weliga 2 (0°30'S, 10°12'E); Yoko (0°2'N, 13°39'E), Zadouinde (0°51'N, 13°33'E), Zambakaganga (0°57'N, 13°46'E), Zolende (0°15'N, 13°26'E); and Zomoko (0°31'N, 11°26'E).

#### **Tick species**

##### ***Amblyomma* Koch, 1844**

###### *Amblyomma compressum* Macalister, 1872

This species is found almost exclusively on the three African species of pangolin: *Manis temminckii*, *M. tetradactyla*, and *M. tricuspis*. In Gabon, *A. compressum* had previously been reported in Cap Lopez (Neumann, 1899; as *Amblyomma cuneatum*), Mayumba and Libreville (Fiason, 1943; as *A. cuneatum*) on the three-cusped pangolin (*Manis tricuspis*). We found *A. compressum* in all regions where *M. tricuspis* was sampled (Guetsou, Ilendo, Koungoulé, Weliga 2, Oyem and Massaha).

###### *Amblyomma paulopunctatum* Neumann, 1899

In Gabon, this species has previously been found in Libreville and Tchibanga (1930, Collection Brumpt Institut de Parasitologie, Faculté de Médecine de Paris, CBpt) on *Potamochoerus porcus* bush pigs. The Suidae family is the preferred host.

###### *Amblyomma splendidum* Giebel, 1877

This species is mainly found on the African buffaloes, *Syncerus caffer nanus*. It was first collected in

Gabon in Cap Lopez, and later in Ngomo (Robinson, 1926), Lambaréné, Lastourville, Ndende and Tchibanga (Neumann, 1899). We collected adult and nymph stages of *A. splendidum* by sledge sampling on buffalo ponds in Lopé reserve. This species is probably widespread in Gabon, like its host species. It was occasionally found on *Kobus ellipsiprymnus* in the river Nyanga.

###### *Amblyomma tholloni* Neumann, 1899

This species is commonly found on elephants (*Loxodonta africana*). In Gabon, it has previously been found in Libreville and Tchibanga (1930, CBpt). We collected *A. tholloni* in Lopé from tree branches and by the sledge method. In Sebe, we also collected a male of this species from *Atherurus africanus*.

###### *Amblyomma variegatum* Fabricius, 1794

This species appears to have a broad range of hosts. It has previously been found by Rousselot (1953) and Moubamba (2006) in Libreville, Oyem, Mitzic, Mayumba and Franceville, on cattle and dogs (Moubamba, 2006). We found it on cattle in Franceville.

###### *Amblyomma arcanum* Karsch, 1879

This species was previously considered as *Aponomma arcanum*. *Amblyomma arcanum* feed on reptiles. It has been collected by Morel (1961) on *Varanus niloticus*.

##### ***Dermacentor* Koch, 1844**

###### *Dermacentor circumguttatus* Neumann, 1897

This species, like *A. tholloni*, is found on elephants. It has previously been collected in Lambaréné (1910, MHNp, Muséum Histoire Naturelle Paris) and Tchibanga (1930, CBpt).

##### ***Haemaphysalis* Koch, 1844**

###### *Haemaphysalis hoodi* Warburton and Nuttall, 1909

This species parasitizes birds. It has previously been found in Tchibanga on Coucal birds (*Centropus sp.*) (1910, MHNp) and in Lambaréné on a chicken (1910, MHNp).

*Haemaphysalis leachi* Audouin, 1827

This species was first described in Cap-Lopez on *Manis* sp. (Neumann, 1897), then in Lambaréne on *Genetta* sp. (1910, MHN) and in Mitzic on dogs (1954, IPP, Institut Pasteur Paris). The *leachi* group was later separated into different species (Apanaskevich et al., 2007). We found one *H. laechi* male on a *Herpestes sanguineus* in Bengue 2.

*Haemaphysalis paraleachi*

Camicas, Hoogstraal and El Kammah, 1983

We detected this species in Gabon for the first time. It was found only at adult stages on domestic dogs in Dienga. Interestingly, all dogs sampled were parasitized by this species, but no specimens of *Rhipicephalus sanguineus* were found.

*Haemaphysalis parmata* Neumann, 1905

In Gabon, this species was first described in Lambaréne (1910, MHN) and then in Tchibanga (1930, CBpt) on *Potamochoerus porcus*. We often found it, at all stages, on wild and domestic ungulates in almost all the regions studied: *Cephalophus dorsalis* and *Philantomba monticola* in Bighoundou, Lac Nkouvié, Akon Ebe, Guietsou, Weliga 2, Koungoulé, Zomoko, Oyem, Latta, La Scierie, Massaha, Nze Vatican, Zambakaganka, Mela, Hendje, Zolende, Bakwaka on *Tragelaphus spekii* in Lambaréne and Oyem, on *Hyemoschus aquaticus* in Moukouagni and on *Ovis aries* and *Capra hircus* in Dienga.

*Haemaphysalis punctaleachi*

Camicas, Hoogstraal and El Kammah, 1973

In Gabon, adult specimens of this species were found by Ellenberger in Lambaréne on *Genetta genetta* and on *Nandinia binotata* in Belinga in 1962 (Camicas J.L. et al., 1973). We also collected adult stages from *Nandinia binotata* in Olounga, *Atherurus africanus* in Guietsou, and *Cephalophus dorsalis* in Nkolabona and Guietsou.

***Ixodes Latreille, 1795***

*Ixodes aulacodi* Arthur, 1956

We detected this species in Gabon for the first time in Bighoundou where it was collected at adult and

nymphal stage on his preferred host, the greater cane rat *Thryonomys swinderianus*.

*Ixodes cumulatimpunctatus* Schulze, 1943

This species was firstly collected in Gabon in previous studies in Tchibanga on domestic dog (Morel, 1964, CBpt). We found it on *Cephalophus dorsalis* and *P. monticola* in Hendje, Mandilou, Onkoua and Zambakaganga at adult and nymphal stage. Adult specimens were also collected on *Atherurus africanus* in Sebe, on *Manis tricuspis* in Abong awoum and on *Potamochoerus porcus* in Lolo 1.

*Ixodes muniensis* Arthur and Burrow, 1957

This species was only recorded in Libreville on *Cephalophus* sp. (Morel, 1964, CBpt).

*Ixodes rageaui* Arthur, 1957

This species was collected on *Cercopithecus cebus* in Mokabo (Morel, 1964, CBpt).

*Ixodes rasus* Neumann, 1899

*Ixodes rasus* is one of the tick species most frequently found on a large variety of hosts. In Gabon, it was first collected on *Manis* sp. in Libreville (Fiasson, 1943) on *Civettictis civetta*, and on *Potamochoerus porcus* in Tchibanga (1930, CBpt). We commonly found this species in all regions; on *Atherurus africanus* (adult and nymph specimens) in Massaha, Guietsou, Lalara, Mouloudou and Weliga; on *Atilax paludinosus* (nymphs) in Trouwaya, on *Cephalophus dorsalis*, *C. nigrifrons*, *P. monticola* (larvae, nymphs and adults) in Ekata, Guietsou, Hendje, Hevegab, Latta, La scierie, Massaha, Mbomo, Nkolabona, Nze Vatican, Oyem, Zambakangaka, Zolende and Zomoko; on *Manis tricuspis* (adults and nymphs) in Guietsou, Ilendo, Massaha, Lemenga, Oyem, Weliga; on *Potamochoerus porcus* (adults) in Guietsou; on *Nandinia binotata* (adults, nymphs) in Abong Awoum and Malolo and finally on *Kinixys erosa* (adult) in Nkolabona.

***Rhipicephalus Koch, 1844***

*Rhipicephalus annulatus* Say, 1821

This species was previously considered as *Boophilus annulatus*. *R. annulatus* feed almost exclusively on

domestic ungulates (especially cattle) and also on African buffaloes. We detected *R. annulatus* for the first time in Gabon on cattle in Franceville.

*Rhipicephalus aurantiacus* Neumann, 1907

This species is considered to be a junior synonym of *R. ziemanni* by some authors (Guglielmone *et al.*, 2009). This species was first found in Ngomo on cattle (Neumann, 1908; as *R. cuneatus*) and then in Tchibanga on *Potamochoerus porcus* (1930, CBpt).

*Rhipicephalus cliffordi* Morel, 1965

This species is considered to be a junior synonym of *R. pseudolongus* by some authors (Guglielmone *et al.*, 2009). In Gabon, adults of this species were first collected in Ndendé (Rousselot, 1953; as *R. capensis* and *R. capensis longus*). It was probably confused with *Rhipicephalus pseudolongus* or *R. longus*. *R. cliffordi* has been found on *Potamochoerus porcus* in Tchibanga and on *Syncerus caffer nanus* in Ndendé (Morel, 1965a).

*Rhipicephalus complanatus* Neumann, 1911

This species is commonly found on wild and domestic pigs. It was first detected in Samkita, Lambarené (1913, MNHN) and Tchibanga on *Potamochoerus porcus* (1930, CBpt). We also collected adult stages from *P. porcus* in Djounou, Omoy, Yoko, Guietsou and Lambaréné.

*Rhipicephalus decoloratus* Koch, 1844

This species was previously considered as *Boophilus decoloratus*. This species was described first in Cap Lopez on *Syncerus caffer nanus* (Neumann, 1901) and cattle (Fiasson, 1943), and subsequently in Libreville on cattle (Manning, 1935; Rousselot, 1953). We also found it on cattle in Franceville.

*Rhipicephalus longus* Neumann, 1907

This species is found on various wild and domestic ungulates and other mammals. In Gabon, it was first found in Franceville on domestic pigs (1926, CBpt) and in Tchibanga on dogs (1930, CBpt).

*Rhipicephalus pseudolongus* Santo Dias, 1953

This species is often confused with *R. longus*. We found adult specimens of *R. pseudolongus* on cattle in Franceville.

*Rhipicephalus sanguineus* Latreille, 1806

This common species is mainly associated with domestic dogs. It has been collected in Libreville on dogs (Morel and Vassiliades, 1963; Moubamba, 2006). We also found it, at all stages, on domestic dogs in Franceville.

*Rhipicephalus simpsoni* Nuttall, 1910

We found adult *R. simpsoni*, for the first time in Gabon, on the greater cane rat *Thryonomys swinderianus* in Bighoundou.

*Rhipicephalus sulcatus* Neumann, 1908

In Gabon, this species has only been described on domestic dogs in Tchibanga, 1930 CBpt).

*Rhipicephalus ziemanni* Neumann, 1904

This species was first detected on cattle in Ngomo (Neumann, 1908; as *R. cuneatus*). We frequently found adult *R. ziemmanni* in all regions of Gabon, on many animal species: *Cephalophus dorsalis*, *C. callipygus*, *P. monticola*, *Hyemoschus aquaticus* and *Tragelaphus spekii* in Doumaï, Djounou, Guidouma, Guietsou, Kassiélé, Koungoulé Massaha, Lambaréné, Ondili and Oyou; on *Ovis aries* in Dienga; on *Potamochoerus porcus* in Djounou and Omoy; on *Nandinia binotata* in Olounga and Moloulou; and finally on *Atherurus africanus* in Mandilou.

## CONCLUSION

This survey identified four tick species for the first time in Gabon, namely *Haemaphysalis paralaechi*, *Ixodes aulacodi*, *Rhipicephalus annulatus* and *Rhipicephalus simpsoni*. So far, 28 species of the Ixodidae ticks have been recorded in this country. In the central African region, 53 species Ixodidae tick have been reported in Cameroun (Morel and Mouchet 1965) and 46 in the Central African Republic (Corbet 1995). It is thus highly probable that more tick species are present in Gabon, particularly those belonging to the genus *Rhipicephalus*, which is the most diverse group of afrotropical ticks. No ticks of the genus *Hyalomma* have been reported, probably because they are mainly associated with arid tropical climates. However, they might possibly be present in savannas of southern Gabon.

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