



Type specimens of ixodid ticks (Acari: Ixodidae) in the “Neumann Collection” of the National Veterinary School of Toulouse, France

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Abstract

The École Nationale Vétérinaire de Toulouse (ENVT) holds the Neumann’s collection of parasites. The depository, created by Louis Georges Neumann at the end of the 19th century, contains a large number of ixodid specimens and primary types, all listed in an accession book by Neumann himself. In an effort to enhance the visibility and accessibility of this collection for the scientific community, the curatorial personnel of the collection recently transferred all accession data to an electronic database and began inventorying the specimens that are still available. This offered us with an opportunity to examine all remaining primary types of Ixodidae in the collection and write this catalogue.

Key words: Types, Ixodidae, Neumann collection, École Nationale Vétérinaire de Toulouse

Introduction

The National Veterinary School of Toulouse (École Nationale Vétérinaire de Toulouse—ENVT) was established in 1825 and, since then, has been one of the most distinguished veterinary schools in France. Louis Georges Neumann (1846–1930) was professor of parasitology at ENVT from 1880 until 1914, the year of his retirement. He was appointed there after graduating in 1868 from the National Veterinary School of Maisons–Alfort and after spending several years in the army as a military veterinarian and teacher at the Saumur Cavalry Academy (Touratier 1989).

Neumann was one of the most prominent acarologists of his era; he published a large number of tick descriptions and ground–breaking revisions of tick systematics and classification (Neumann 1897; 1899; 1901; 1902; 1904; 1905; 1906; 1907a, b; 1908a, b, c; 1909a; 1910a, b; 1911a, b; 1913a, b). During his active years, he was in contact with most of the contemporary tick taxonomists, with whom he frequently corresponded and exchanged specimens. He also developed a large ethanol-preserved and slide-mounted collection of parasites, with collection data meticulously documented in an accession book with each entry associated with a unique accession number. The wet collection, organized by accession number, contained mostly ixodid ticks and nematodes.

Curiously enough, the collection whereabouts had eluded the scientific community for some years possibly because it wasn’t widely known that the collection had been cared for and curated at ENVT since Neumann’s retirement and not at the Muséum de Toulouse, as many believed. The collection, called the “Neumann Collection” is still hosted inside the ENVT Parasitology Department, but little information about its holdings was available until recently, when the curator of the collection (coauthor E.B) began inventorying what is still accessible. The collection

data pertaining to the ixodid holdings, with their accession numbers, have now been transferred from Neumann's accession book to an electronic database. Information will be provided upon request to the curator, while waiting for the database to be made available online.

The focus of our work was to identify all remaining tick primary types. While all the collection vials were clearly labeled and organized by accession number, type-containing vials were not singled out in any way nor did the accession notes and the labels inside the vials mention type status. Also, unfortunately, Neumann never mentioned accession numbers in his original descriptions. For this reason, every vial had to be individually examined and types identified based on published collection data (sex or stage of the ticks in the type series, geographical origin, host, notes inside the vials or in the accession records, and/or name of collector).

Vials containing primary types of tick species have now been identified, examined, labeled, and separated from the other holdings. Type specimens and the old labels inside the vials have been photographed. The images are not of publication quality, but can be obtained upon request to the curator, for preliminary comparative purposes. Appropriate type status has been assigned by us to specimens within each vial, when necessary (i.e. holotype, paratype, lectotype, paralectotype, syntype). Herein, we provide what, to the best of our knowledge, is the updated inventory of Neumann's accounted for primary and secondary ixodid types (Acari: Ixodidae) at ENVT.

Organization of the catalogue

Entries are given as species name (in bold if valid), author name (s), date; reference of original description, pages of specific description within reference; type locality (in English) as indicated in original descriptions, sometimes completed for ease of understanding; type material with accession numbers in ENVT and type designation. Because Neumann had not specifically identified primary or secondary type specimens, we have now assigned type status to some of them (either the last specimen left from a type series or the best preserved one) in conformity with the International Code of Taxonomic Nomenclature (ICZN 2000). Notes written by Neumann and, subsequently, other taxonomists in Neumann's accession book helped make informed decisions. The host names correspond to names valid at the time of the descriptions, and do not necessarily match current nomenclature. Remarks are provided when clarifications are needed. Further information about additional specimens, belonging to Neumann's type series deposited in other tick collections, can be found in Robbins *et al.* (2025).

Depository abbreviations:

ENVT: Neumann Collection, École Nationale Vétérinaire de Toulouse, France

BMNH: British Museum of Natural History, London, UK.

MNHN: Museum National d'Histoire Naturelle, Paris, France.

OVI: Onderstepoort Veterinary Research Institute, Onderstepoort, South Africa.

USNTC: U.S. National Tick Collection, Statesboro, USA.

ZIAC: Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia.

ZMA: Zoological Museum, Amsterdam, The Netherlands.

ZMB: Zoologischen Museums Berlin, Berlin, Germany.

ZSH: Zoologischen Staatsmuseum Hamburg, Hamburg, Germany,

Alphabetical list of types with valid names in bold

***aculeata* Lavarra, 1904**

Haemaphysalis aculeata—Lavarra, L. (1904) Sopra una nuova specie di *Haemaphysalis*. *Bolletino della Società Zoologica Italiana*, 5, 255–258.

Type locality: East Indies.

Type material: ENVT 1368, paralectotype (male), ex. *Tragulus meminna*.

Remarks: Lavarra sent two of the 16 males used to describe *H. aculeata* to Neumann (Lavarra 1904) and one to Nuttall at the BMNH (Nuttall & Warburton 1915). Trapido (1965) examined the samples at the BMNH and ENVT; he assigned lectotype status to the specimen at BMNH. He also established that the two specimens in Neumann's collection corresponded in fact to two different species, *H. aculeata* (paralectotype) and *Haemaphysalis cuspidata* Warburton, 1910. The ticks were removed from a *Tragulus* imported from the East Indies to the Zoological Museum of Roma (Italy) (Lavarra 1904) and not, as stated by Trapido (1965), from India. While India was part of the East Indies, the East Indies were spanning over a much larger area which included many other far east Asian countries and Islands around the Indian Ocean.

***affinis* Neumann, 1899**

Ixodes affinis—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 120–121.

Type locality: Costa Rica.

Type material: ENVT 706, 1 lectotype (female), 2 paralectotypes (females), ex. *Felis pardalis*.

Remarks: The two females from the syntype series found by Nava *et al.* (2023) in the USNTC are now paralectotypes.

***albopictum* Neumann 1899**

Amblyomma albopictum—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description p. 244.

Type locality: Havana, Cuba.

Type material: ENVT 897, lectotype (male), 2 paralectotypes (males), ex. *Cyclura harlani*.

Remarks: Lucas (1852) described this species under the name *Ixodes variegatus* from ticks collected in Havana, Cuba. Because the name was preoccupied, when Neumann (1899) received Lucas' types (ENVT 897) he redescribed the species, assigned it to the genus *Amblyomma*, and named it *A. albopictum*. The label in vial 897 and Neumann's accession book clearly state that these are Lucas' types and indicate that the host was *Cyclura harlani*; nevertheless, the geographical origin is given as French Guiana. We believe that this is the result of accidental mislabeling, because *Cyclura* spp. are Caribbean reptiles not known to occur in French Guiana as already mentioned by Keirans & Hillyard (2001). In his description of *A. albopictum*, Neumann (1899) did not mention French Guiana, but included additional males from Cuba (not found in the collection) and one male from Brazil (ENVT854: 1male ex. *Cercolabes villosus*). The tick from Brazil (ENVT 854) is damaged and does not allow for a thorough examination but appears to have ornamentation similar to that of *A. albopictum* albeit with a slightly more elongated body. The species is not known to occur in Brazil (Guglielmo *et al.* 2021); therefore, this is either an undescribed species from Brazil or, more likely, a tick that has been mislabeled.

***appendiculatus* Neumann 1901**

Rhipicephalus appendiculatus—Neumann, L.G. (1901) Révision de la famille des ixodidés (4^e mémoire). *Mémoires de la Société Zoologique de France*, 14, 249–372. Description pp. 270–271.

Type locality: Tanzania

Type material: ENVT 1143, paralectotypes (4 females and 12 males), ex. *Bos caffer*.

Remarks: The specimens in vial 1143 were collected by Schillings. Some of the Schillings specimens were labeled by Zumpt as “kotypen” (label inside the vial). Moritz & Fischer (1981), Keirans & Hillyard (2001), and Walker *et al.* (2000) identified the type locality as “Pangani River, near the Masimani Mountain Range in Tanzania”. The label of vial 1143 and the accession book of Neumann, nevertheless, listed “Tangani” in German East Africa (now Tanzania) as the type locality for the samples collected by Schillings, and not Pangani. The Pangani River is located in the northeastern part of Tanzania, as is Masimani, presently the name of a locality and not of a mountain range in the Kilimanjaro Region of Tanzania. Tangani was, however, the name of a locality in the southeastern part of Tanzania (Lindi Region) during colonial times. We assume that Moritz & Fischer (1981), Keirans & Hillyard (2001), and/or Walker *et al.* (2000) had access to Schillings original collection data and that the Pangani river corresponds, indeed, to the type locality of *R. appendiculatus*, but Tanzania, as type locality, appears to be a safer option. A lectotype (male) and a paralectotype (female) were previously designated by Walker *et al.* (2000) and are deposited in the BMNH.

***auritulus* Neumann 1904**

Ixodes auritulus—Neumann, L.G. (1904) Notes sur les ixodidés. II. *Archives de Parasitologie*, 8, 444–464. Description p. 450.

Type locality: Punta Arenas, Chile.

Type material: ENVT 751, syntype (female) ex. bird (undetermined species).

Remarks: The capitulum of the syntype female deposited in ENVT is missing. The *I. auritulus* from Chile was originally identified by Neumann (1899) as *Ixodes thoracicus* Koch, 1884, a Brazilian tick. Later, Neumann (1904) decided that the species from Chile was different from that described by Koch and named it *I. auritulus*. *Ixodes thoracicus*, described in Koch (1844) is treated as a *nomen dubium* in Guglielmone & Nava (2014). The description of Neumann (1904) was based on four females, but we found only one female in ENVT. The remainder three females are allegedly deposited in MNHN (Neumann, 1904) but not found there (Guglielmone *et al.* 2014).

***australiense* Neumann, 1905**

Amblyomma australiense—Neumann, L.G. (1905) Notes sur les ixodidés. III. *Archives de Parasitologie*, 9, 225–241. Description pp. 227–228.

Type locality: western Australia.

Type material: ENVT 1271, lectotype (male), 2 paralectotypes (1 male and 1 nymph), ex. *Echidna aculeata*.

Remarks: A male syntype deposited in BMNH (Robbins *et al.* 2025) becomes a paralectotype.

***australiensis* Neumann, 1904**

Ixodes australiensis—Neumann, L.G. (1904) Notes sur les ixodidés. II. *Archives de Parasitologie*, 8, 444–464. Description pp. 456–457.

Type locality: western Australia.

Type material: ENVT 1256, lectotype (female), ex. *Canis* sp.? [sic] in Neumann (1904)

***bicornis* Neumann, 1906**

Ixodes bicornis—Neumann, L.G. (1906) Notes sur les Ixodidés. IV. *Archives de Parasitologie*, 10, 195–219. Description pp. 196–197.

Type locality: Atoyac, State of Guerrero, Mexico.

Type material: ENVT 1359, lectotype (female) and 1 paralectotype (female), ex. *Felis onca*; ENVT 1360, 1 paralectotype (female), ex. *Homo sapiens*.

Remarks: According to Kohls (1956) *I. bicornis* is a synonym of *Ixodes boliviensis* but it is considered a provisional synonym in Guglielmone *et al.* (2021) and in this publication.

***boliviensis* Neumann, 1904**

Ixodes boliviensis—Neumann, L.G. (1904) Notes sur les ixodidés. II. *Archives de Parasitologie*, 8, 444–464. Description pp. 457–458.

Type locality: Charuplaya, Bolivia.

Type material: ENVT 1251, lectotype (male), 2 paralectotypes (1 female and 1 nymph), ex. *Speothos venaticus*.

Remarks: *Ixodes boliviensis* is not considered valid in Camicas *et al.* (1998) but accepted as valid in Guglielmone *et al.* (2021).

***boueti* Morel, 1957**

Rhipicephalus boueti—Morel, P.C. (1957) *Rhipicephalus boueti* n. sp. (Acarina, Ixodidae) parasites des damans du Dahomey. *Bulletin de la Société de Pathologie Exotique*, 50, 696–700.

Type locality: Agouagon, Benin (as Dahomey).

Type material: ENVT 1778, holotype (male) and 1 allotype (female), ex. *Procapra ruficeps*.

Remarks: The vial also contained a specimen of *Rhipicephalus sanguineus* sensu lato.

***brimonti* Neumann, 1913**

Amblyomma brimonti—Neumann, L.G. (1913a) Un nouveau sous-genre et deux nouvelles espèces d'ixodidés. *Bulletin de la Société Zoologique de France*, 38, 147–151. Description pp. 150–151.

Type locality: Saint Laurent du Maroni, French Guiana.

Type material: ENVT 1803, lectotype (female) and 1 paralectotype (female), ex. *Testudo tabulata*.

Remarks: A synonym of *Amblyomma humerale* Koch, 1844 (Aragão & Fonseca 1953; Guglielmone *et al.* 2021).

calcarata Neumann, 1902

Haemaphysalis calcarata—Neumann, L.G. (1902) Notes sur les ixodidés. *Archives de Parasitologie*, 6, 109–128. Description 113–115.

Type locality: Abyssinia (“Sichi Balz” on label), now Ethiopia.

Type material: ENVT 1292, lectotype (male), 2 paralectotypes (males), ex. *Sciurus (Spermosciurus)* sp.

Remarks: In Neumann (1902), the host was described as “petit écureuil” (meaning “small squirrel”); the label of 1292 indicates *Sciurus (Spermosciurus)* sp. A male syntype deposited in BMNH (Robbins *et al.* 2025) becomes a paralectotype.

calcaratum Neumann, 1899

Amblyomma calcaratum—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 226.

Type locality: Brazil.

Type material: ENVT 828, lectotype (male), 13 paralectotypes (8 males and 5 females), ex *Myrmecophaga tetradactyla*

Remarks: The description did not mention specific Brazilian localities, but the label in 828 indicates “Colonia Alpina”, Brazil as the site of collection. Syntypes deposited in BMNH and ZSH (Robbins *et al.* 2025) become paralectotypes.

coelebs Neumann, 1899

Amblyomma coelebs—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 223

Type locality: Guanajuato, México.

Type material: ENVT 824, lectotype (male); host unknown.

Remarks: A male syntype deposited in BMNH (Robbins *et al.* 2025) becomes a paralectotype.

compactus Neumann, 1901

Dermacentor compactus—Neumann, L.G. (1901) Révision de la famille des ixodidés (4^a mémoire). *Mémoires de la Société Zoologique de France*, 14, 249–372. Description pp. 268–269.

Type locality: Borneo.

Type material: ENVT 1049, lectotype (male), 8 paralectotypes (3 males and 5 females), ex. *Sus larvatus*.

Remarks: Wassef & Hoogstraal (1983) designated 1 male lectotype and male and female paralectotypes within vial 1049. Vial 1049 presently contains two broken smaller vials, one labeled lectotype the other paralectotypes. The lectotype vial contains 5 females and the other vial 4 males. It is likely that, when the smaller vials broke, samples that had been separated into lecto/paralectotypes ended up being jumbled again. We assigned lectotype status to one of the males, and paralectotype status to the other specimens. In Neumann’s accession book, vial 1049 was listed as containing *Dermacentor auratus* Supino, 1897 and not *D. compactus*. Our examination confirmed that these ticks are *D. compactus* and not *D. auratus* (following Wassef & Hoogstraal 1983, 1984) and that, disagreeing with Guglielmone *et al.* (2014) and Robbins *et al.* (2025), they are valid type specimens. Syntypes deposited in ZMB are now paralectotypes. The original description also included type material from Sumatra, Java, and East Indies.

concolor Neumann, 1899

Amblyomma concolor—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 222.

Type locality: Belém, Pará, Brazil.

Type material: ENVT 823, lectotype (male) and 3 paralectotypes (females), ex. armadillo.

Remarks: *Amblyomma concolor* is a synonym of *Amblyomma auricularium* (Conil, 1878) (Keirans & Hillyard 2001; Guglielmone & Nava 2014), but Guglielmone *et al.* (2021) stated that this synonymy should be reexamined,

because the taxonomic status of *A. auricularium* needs reassessment. A male syntype deposited in BMNH (Robbins *et al.* 2025) becomes a paralectotype.

cornigera Neumann, 1897

Haemaphysalis cornigera—Neumann, L.G. (1897) Révision de la famille des ixodidés (2^e mémoire). *Mémoires de la Société Zoologique de France*, 10, 324–420. Description pp. 350–352.

Type locality: Borneo

Type material: ENVT 1007, paralectotype (male), host unknown, from Singapore.

Remarks: Trapido visited Neumann’s collection in 1963 and reported that he had assigned lectotype status to one of the two male specimens in vial ENVT 1008 from Borneo (Trapido 1965). He had also examined one conspecific male from Singapore in vial ENVT 1007. However, a label handwritten by Trapido in 1963 and placed in vial ENVT 1007 indicates that the “1007” male was the lectotype of *H. cornigera*. Vial ENVT 1008 could not be located among the ENVT holdings, but the second 1008 male is a paralectotype deposited in the BMNH (Nuttall 2883) (Trapido 1965; Keirans & Hillyard 2001). We can assume that ENVT 1007 was accidentally mislabeled. A type locality listed in the original description, Judaea (now in Israel), is unlikely to be correct and Trapido (1965) who saw the tick in the MNHN, identified it as *Haemaphysalis spinigera* Neumann, 1897.

cruciferum Neumann, 1901

Amblyomma cruciferum—Neumann, L.G. (1901) Révision de la famille des ixodidés (4^e mémoire). *Mémoires de la Société Zoologique de France*, 14, 249–372. Description pp. 302.

Type locality: Haiti.

Type material: ENVT 847, lectotype (male), ex. *Metopoceros cornutus*.

Remarks: The label in vial 847 indicated that the specimen had been donated to Neumann by ZMB. Syntypes in ZMB (Robbins *et al.* 2025) become paralectotypes.

deminutivum Neumann 1899

Amblyomma deminutivum—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description p. 221.

Type locality: Colombia.

Type material: ENVT 891, lectotype (female), ex. unidentified snakes.

Remarks: Currently a synonym of *Amblyomma dissimile* Koch, 1844 (Aragão & Fonseca 1953; Guglielmone & Nava 2014). The specimens were a gift from MNHN; the syntypes deposited there are now paralectotypes.

dubitatum Neumann, 1899

Amblyomma dubitatum—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 234–235.

Type locality: southern Spain.

Type material: ENVT 843, holotype (female), host unknown

Remarks: This specimen corresponds to a tick species with Neotropical distribution, as already mentioned by Estrada-Peña *et al.* (2002). The geographical origin of “southern Spain”, reported in Neumann’s note book and on the label, is obviously incorrect, because no *Amblyomma* ticks are known to naturally occur in Europe.

ecinctum Neumann 1901

Aponomma ecinctum—Neumann, L.G. (1901) Révision de la famille des ixodidés (4^a mémoire). *Mémoires de la Société Zoologique de France*, 14, 249–372. Description pp. 293–294.

Type locality: New South Wales, Australia.

Type material: ENVT 792, lectotype (male), 2 paralectotypes (males), ex. Coleoptera (see remarks).

Remarks: The collector, W.W. Froggatt, told Neumann that the tick is often found on beetles of the family Passalidae (*Aulacocyclus kaupii*), and the label inside the vial lists “Coleoptera” as host. Insects are, nevertheless, exceptionally rare, incidental hosts for ticks. The family Megisthanidae, the largest of all Mesostigmata, are readily found on Passalidae and are sometimes called ticks by those unfamiliar with mites (Seeman 2017, 2019). We speculate that Froggatt sent Neumann these mites with these collection data, but the label accidentally became associated with the

types of *A. ecinctum*. Further complicating matters, the beetle is probably not *A. kaupii* as *Aulacocyclus* has never been found with Megisthanidae in New South Wales, and is more likely to be *Mastachilus* or *Pharochilus* (Seeman 2017, 2019). Presently a synonym of *Amblyomma fimbriatum* Koch, 1844 (Roberts 1964; Guglielmone & Nava 2014). Syntypes in ZMB and BMNH (Robbins *et al.* 2025) become paralectotypes.

elegans Neumann, 1910

Ixodes elegans—Neumann, L.G. (1910a) Sur quelques espèces d’Ixodidae nouvelles ou insuffisamment connues. *Annales des Sciences Naturelles Zoologie, Série 9*, 12, 161–176. Description pp. 161–163.

Type locality: Chile.

Type material: ENVT 1744, lectotype (female), 1 paralectotype (female), ex. *Pudua humilis*.

Remarks: After describing *Ixodes elegans* (Neumann, 1910a), Neumann realized that the name was preoccupied and, therefore, renamed it *Ixodes stilesi* (Neumann 1911b; Guglielmone & Nava 2014) (see *stilesi*). The two females in vial 1744 correspond in all points to the redescription of *Ixodes stilesi* of Guglielmone *et al.* (2007). The remaining syntypes (Robbins *et al.* 2025), originally deposited at MNHN, become now paralectotypes.

elongata Neumann, 1897

Haemaphysalis elongata—Neumann, L.G. (1897) Révision de la famille des ixodidés (2^e mémoire). *Mémoires de la Société Zoologique de France*, 10, 324–420. Description pp. 354–356.

Type locality: Madagascar.

Type material: ENVT 1010, lectotype (male) and 1 paralectotype (male), ex. *Centetes ecaudatus*; 1009, 2 paralectotypes (males), ex. *Centetes madagascariensis*; 1011, 1 paralectotype (female), ex. *Erinaceus* sp.

Remarks: Collection localities are indicated on the labels of vial 1009 and 1010, as “Zura, Madagascar” and “Tandrak, Madagascar” respectively. These localities do not appear to presently exist in Madagascar. Because “tandrak” means tenrec, in a Malagasy language, a confusion between hosts and geographic sites might have occurred. Syntypes specimens deposited in BMNH (Robbins *et al.* 2025) become lectotypes.

falcatus Neumann, 1908

Rhipicephalus falcatus—Neumann, L.G. (1908a) Notes sur les ixodidés. XI. *Notes from the Leyden Museum*, 30, 73–91. Description pp. 77–79.

Type locality: North of Lake Nyassa (Malawi or Tanzania).

Type material: ENVT 1438, lectotype (male), 2 paralectotypes (females); host unknown.

Remarks: *Rhipicephalus falcatus* is a synonym of *Rhipicephalus longus* (Walker *et al.* 2000). The ticks were a gift from BMNH to Neumann. The original description also included type material from Liberia.

flava

Haemaphysalis flava—Neumann, L.G. (1897) Révision de la famille des ixodidés (2^e mémoire). *Mémoires de la Société Zoologique de France*, 10, 324–420. Description pp. 333–336.

Type localities: Saga, Japan.

Type material: ENVT 991, holotype (male), from vegetation; 992, approx. 100 larvae and 4 nymphs paratypes, ex *Bos taurus*, and 989, 1 paratype (female), ex. *Equus caballus*.

Remarks: The specimen with a long spur on coxa IV and collected in Saga (ENVT 991) was designated as the holotype by Trapido (note in the vial). Vial 991 contains a second label with the inscription “*Haemaphysalis flava* var. *armata*”. Neumann (1905) explained that he initially included in his description of *H. flava* samples with long and short spurs on coxa IV, and that he had established the variety “*armata*” to identify the samples with long spurs. The morphology of the nymphs of vial 992 (samples from Tokyo) is compatible with that described in Yamaguti *et al.* (1971) for *H. flava*. Warburton (1908) described *Haemaphysalis campanulata* Warburton, 1908 from Chinese specimens and specimens that Neumann had tentatively assigned to *H. flava* (possibly the specimens with shorter spur on coxa IV). The *H. flava* of vial 990 (from Tokyo on *C. familiaris*) were reassigned to *H. campanulata* by Trapido (note in the vial). The original description also included type material from Sendai, Japan.

formosensis Neumann, 1913

Haemaphysalis formosensis—Neumann, L.G. (1913b) Pediculidae, Siphonaptera, Ixodidae. *Entomologische Mitteilungen 2, Supplementa Entomologica*, 2, 134–137. Description 135–137.

Type locality: Kosempo, Formosa (Taiwan).

Type material: ENVT 1792, lectotype (male), 4 paralectotypes (males), ex. *Canis familiaris*.

Remarks: Syntypes in BMNH (Robbins *et al.* 2025) become paralectotypes.

fossum Neumann, 1899

Amblyomma fossum—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 217–218.

Type locality: Costa Rica.

Type material: ENVT 821, lectotype (male), 2 paralectotypes (females), host unknow.

Remarks: *Amblyomma fossum* is a synonym of *Amblyomma ovale* (Robinson 1926; Guglielmone *et al.* 2021). The ticks were a gift from the MNHN. The specimens at MNHN are now paralectotypes.

fulvus Neumann, 1913

Rhipicephalus fulvus—Neumann, L.G. (1913a) Un nouveau sous-genre et deux nouvelles espèces d'ixodidés. *Bulletin de la Société Zoologique de France*, 38, 147–151. Description pp. 147–149.

Type locality: Matmata, south of Gabés, Tunisia.

Type material: ENVT 2200, holotype (male), found on ground.

Remarks: The label inside the vial indicated that the tick was collected on the Island of Djerba in Tunisia. Nevertheless, Neumann (1913a) wrote that the collector, M. Weiss, was from Djerba while the ticks came from Matmata. Unfortunately, there was no entry about this tick in Neumann's accession book.

geayi Neumann, 1899

Amblyomma geayi—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 223–224.

Type locality: Pará, Brazil.

ENVT 825, lectotype (male); host unknown. The original description also included type material from “Darien”, in Panamá or Colombia.

goeldii Neumann, 1899

Amblyomma goeldii—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 238–239.

Type locality: Belem, Pará, Brazil.

Type material: ENVT 849, lectotype (male), 4 paralectotypes (males); ex. *Myrmecophaga tetradactyla*.

Remarks: The three female ticks in ENVT 848 from *Bufo aqua*, Pará, Brazil, were included in Neumann's description of *A. goeldii* (Neumann, 1899); nevertheless, these samples should not be treated as syntypes, because they are all *Amblyomma rotundatum* Koch, 1844 as was determined by Keirans (1985) after examining the specimens of ENVT 848 deposited in the BMNH. There is a female in vial 849, but this specimen corresponds to *A. rotundatum* (determined following Barros-Battesti *et al.* 2006), therefore it was excluded from the type series of *A. goeldii*. Syntype males deposited in BMNH (Robbins *et al.* 2025) become paralectotypes.

incisum Neumann, 1906

Amblyomma incisum—Neumann, L.G. (1906) Notes sur les ixodidés. IV. *Archives de Parasitologie*, 10, 195–219. Descriptions pp. 206–207.

Type locality: Bolivia.

Type material: ENVT 1371, lectotype (male), ex. *Tapirus* sp.

Remarks: The morphology of the lectotype corresponds to that of *A. incisum* in Labruna *et al.* (2005). Male syntypes in the BMNH holdings (Robbins *et al.* 2025) become paralectotypes. The original description also included type material from Cuenca, Ecuador.

inflatum Neumann, 1901

Amblyomma inflatum—Neumann, L.G. (1901) Révision de la famille des ixodidés (4^e mémoire). *Mémoires de la Société Zoologique de France*, 14, 249–372. Description pp. 312–313.

Type locality: Chile.

Type material: ENVT 901 (see remarks).

Remarks: Vial 901 contains 4 nymphs. One of these was molting and its exoskeleton could easily be separated from the fully-formed adult female. The specimen is close to *Dermacentor dissimilis* Cooley, 1947; nevertheless, the spurs on coxa II–IV appear to be longer than in *D. dissimilis*. Based on the shape of the scutum and the basis capituli, the morphology of two nymphs corresponds to the description of *A. inflatum* in Neumann (1901), but the samples are very damaged and, in their present state, cannot be further characterized. The fourth nymph is an *Amblyomma*, clearly different from *A. inflatum*, but impossible to identify as any of the known South American *Amblyomma* nymphs. The label and the accession records of ENVT 901 list “*Meriones* (?)” as the host. This is not likely because this African genus of rodents does not occur in Chile. For the time being, *A. inflatum* must remain a name *incertae sedis* as stated in Guglielmone & Nava (2014). With all this in mind, we decided not to select types for *A. inflatum*.

limbatum Neumann, 1899

Amblyomma limbatum—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 231–232.

Type locality: King Island, Australia

Type material: ENVT 894, lectotype (male), 1 paralectotype (male); hosts unknown.

Remarks: The two specimens designated here as lectotype and paralectotype were collected from King Island, Australia and were donated to Neumann by MNHN.

loricatus Neumann 1899

Ixodes loricatus—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 139–142.

Type locality: unspecified Brazilian locality, southern Brazil.

Type material: ENVT 743, holotype (female), 2 paratypes (male and female), ex *Didelphys quica*; ENVT 744, 2 paratypes (nymphs) ex *Microdelphys sorex*.

Remarks: The original description also included type material from Buenos Aires, Argentina.

multipunctum Neumann, 1899

Amblyomma multipunctum—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 226–227.

Type locality: North America.

Type material: ENVT 830, lectotype (male), ex *Tapirus* sp.; ENVT: 831: 1 paralectotype (male), ex *Dicranoceros furcatus*.

Remarks: Both the type locality and the host, *Dicranoceros furcatus*, are probably wrong as stated in Guglielmone *et al.* (2021), because *A. multipunctum* does not occur in North America and *Dicranoceros* is an extinct genus of deer.

neumannii Donitz, 1905

Haemaphysalis neumannii—Dönitz, W. (1905) Die Zecken des Rindes als Krankheitsüberträger. *Sitzungsberichten der Gesellschaft Naturforschender Freunde zu Berlin*, (4) 105–134. Description pp. 127–130.

Type locality: Unknown locality in Japan

Type material: ENVT 1425, lectotype (female), 6 paralectotypes (4 females and 2 males), ex horse.

Remarks: The female lectotype was designated by Trapido (1965). *Haemaphysalis neumannii* is a synonym of *Haemaphysalis longicornis* Neumann, 1901 (Hoogstraal *et al.* 1968). Paralectotypes are also held in BMNH and ZMB (Robbins *et al.* 2025).

nodosum Neumann, 1899

Amblyomma nodosum—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 14–15.

Type locality: Costa Rica.

Type material: ENVT, 903, lectotype (female), host unknown.

Remarks: Syntypes deposited in MNHN and BMNH (Robbins *et al.* 2025) become paralectotypes. The original description also included type material from Brazil.

numidiana Neumann, 1905

Haemaphysalis numidiana—Neumann, L.G. (1905) Notes sur les ixodidés. III. *Archives de Parasitologie*, 9, 225–241. Description p. 230.

Type locality: Tebessa, Algeria.

Type material: ENVT 999, lectotype (male), 1 paralectotype (female), ex *Erinaceus* sp.

Remarks: *Haemaphysalis numidiana* is a synonym of *Haemaphysalis erinacei* (Camicas *et al.* 1998; Keirans & Hillyard 2001). Syntypes deposited in BMNH (Robbins *et al.* 2025) become paralectotypes.

oudemansi Neumann, 1910

Aponomma oudemansi—Neumann, L.G. (1910b) Description de deux nouvelles espèces d’Ixodinae. *Tijdschrift voor Entomologie*, 53, 11–17. Description pp. 11–12.

Type locality: FakFak, New Guinea, Indonesia.

Type material: ENVT 1755, 8 paralectotypes (7 males and 1 nymph), ex. *Zaglossus (Proechidna) bruyini nigroaculeatus*.

Remarks: It is currently a synonym of *Bothriocroton oudemansi* (Beati *et al.* 2008). The lectotype and some of the paralectotypes, designated by Santos Dias (1993), are deposited in the ZMA, and additional paralectotypes in the BMNH (Robbins *et al.* 2025).

parmata Neumann, 1905

Haemaphysalis parmata—Neumann, L.G. (1905) Notes sur les ixodidés. III. *Archives de Parasitologie*, 9, 225–241. Description pp. 228–230.

Type locality: Cameroon

Type material: ENVT 1288, lectotype (male) ex *Bos taurus*, 6 paralectotypes (5 males and 1 female), ex. cattle, sheep, goats, and pigs.

Remarks: Syntypes deposited in BMNH (Robbins *et al.* 2025) become paralectotypes.

parumapertus Neumann, 1901

Dermacentor parumapertus—Neumann, L.G. (1901) Révision de la famille des ixodidés (4^e mémoire). *Mémoires de la Société Zoologique de France*, 14, 249–372. Description pp. 267–268.

Type locality: Lakeside, California, USA.

Type material: ENVT: 1048, lectotype (female), host unknown

Remarks: Neumann described *D. parumapertus* in 1901 (Neumann 1901). Later, he reduced it to a variety of *D. electus* Koch, 1844 (Neumann 1905) and, after *D. electus* became a synonym of *Dermacentor variabilis* Say 1821, Neumann (1911a) named this tick as *D. variabilis parumapertus*. The ENVT vial, donated to Neumann by the Smithsonian, is labeled “*D. electus* Koch var. *parumaperta*”. Three additional syntypes supposedly hosted by the Smithsonian have probably been lost as they have not been mentioned in the type list of the USNTC by Keirans & Clifford (1984).

parviscutatum Neumann, 1899

Amblyomma parviscutatum—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 208–209.

Type locality: Brazil (S. Antonio written in record book, but not on label and not in publication).

Type material: ENVT 889, holotype (female), ex. *Myrmecophaga tridactyla*

Remarks: Neumann (1899) described *A. parviscutatum* and commented about the similarities between this tick and *Amblyomma cajennense* (Fabricius, 1787). Later, in 1905, he renamed it *A. cajennense parviscutatum*. The collection records and the label inside vial 889 named the tick *Amblyomma cajennense* var. *parviscutata*. Nava *et al.* (2014) listed *A. parviscutatum* as a *nomen dubium*, but our examination of the specimen shows that this is a synonym of *Amblyomma sculptum* Berlese, 1888 as redescribed in Nava *et al.* (2014).

pattoni Neumann, 1910

Aponomma pattoni—Neumann, L.G. (1910) Sur quelques espèces d’Ixodidae nouvelles ou insuffisamment connues. *Annales des Sciences Naturelles, Zoologie, Série 9*, 12, 161–176. Description pp. 163–165.

Type locality: Saidapet, India.

Type material: ENVT 1761, lectotype (male), and 2 males paralectotypes, ex. snake.

Remarks: *Aponomma pattoni* is now a synonym of *Amblyomma pattoni* (Guglielmone & Nava 2014). In the accession book of Neumann, a note states that vial ENVT 1761 contained 6 males and 1 female of *Ap. pattoni* and that one male was donated to Nuttall (BMNH). On the label inside vial 1761, 6 males are listed, but now the vial contains one female and 3 males. In his description, Neumann stated that he had described *Ap. pattoni* from 7 males collected in Saidapet (India) from a snake by Patton. The morphology of the female corresponds to *A. pattoni* as illustrated in Kaufman (1972). Syntypes males deposited in MNHN and BMNH (Robbins *et al.* 2025) become paralectotypes.

pilosus var. **howardi** Neumann, 1909

Ixodes pilosus howardi—Neumann, L.G. (1909) A new variety of *Ixodes pilosus* (Koch). *Transactions of the Royal Society of South Africa*, 1, 125.

Type locality: Durban, South Africa.

Type material: ENVT 1414, lectotype (male), 3 paralectotypes (1 male and 2 females), ex. *Canis familiaris*.

Remarks: The types of this species were supposed to be in vial 1414 (Durban, South Africa) and 1415 (Leydsdorp, South Africa). We could not locate vial 1415. “*Ixodes pilosus* var. *howardi*” is considered to be a *nomen dubium* (Guglielmone & Nava 2014); nevertheless, the very well-preserved male in particular appears to correspond to the morphotype I of *I. pilosus* Koch, 1844, *sensu* Horak *et al.* (2018) (the capitulum of the females is damaged).

planus Neumann, 1910

Rhipicephalus planus—Neumann, L.G. (1910) Sur quelques espèces d’Ixodidae nouvelles ou insuffisamment connues. *Annales des Sciences Naturelles, Zoologie, Série 9*, 12, 161–176. Description pp. 165–168.

Type locality: Ivindo Basin, southern Cameroon

Type material: ENVT 1722, lectotype (male), ex. wild boar

Remarks: Currently a synonym of *Rhipicephalus complanatus* (Neumann, 1911b; Guglielmone & Nava 2014); not to be confused with *Rhipicephalus planus* Neumann, 1907, originally described as *R. simus planus* (Neumann 1907; Walker *et al.* 2000). Neumann received what he identified as a “type” in his notes from Dr. Gravot (MNHN). Specimens deposited as syntypes at MNHN (Robbins *et al.* 2025) become paralectotypes.

rasus Neumann, 1899

Ixodes rasmus—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 137–139.

Type locality: Congo (former French Congo)

Type material: ENVT 740, lectotype (male), 1 paralectotype (female), ex. “Daman”

Remarks: “Daman” refers to one (or more) of the species of African Procavidae. Because the wide area occupied by former French Congo is now split into different countries, it is impossible to better pinpoint the geographical origin of these ticks.

rubicundus Neumann, 1904

Ixodes rubicundus—Neumann, L.G. (1904) Notes sur les ixodidés. II. *Archives de Parasitologie*, 8, 444–464. Description pp. 460–462.

Type locality: Grahamstown (now Eastern Cape Province and currently named Makhanda), South Africa.

Type material: ENV 1253, lectotype (female), 4 paralectotypes (females), ex. *Ovis aries*.

Remarks: Neumann (1904) described the male and the female, but there are only 5 females left in the vial. In his description, Neumann (1904) listed as type locality the eastern part of the Cape of Good Hope Colony; however, in the accession book and on the label, it’s clearly stated that the ticks were collected in Grahamstown. Because the label and the book do not mention male specimens, at first, we were not sure that the vial corresponded to the types, but Nuttall & Warburton (1911) examined type material with the same accession number (ENVT 1253). Syntypes deposited in OVI (Robbins *et al.* 2025) become paralectotypes.

rubidus Neumann 1901

Ixodes rubidus Neumann, L.G. (1901) Révision de la famille des ixodidés (4^e mémoire). *Mémoires de la Société Zoologique de France*, 14, 249–372. Description p. 282.

Type locality: Guanajuato, Mexico.

Type material: ENVT 713, holotype (female), 1 paratype (nymph); ex. *Bassaris astuta*.

scutatatum Neumann, 1899

Amblyomma scutatatum—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294. Description pp. 237–238.

Type locality: Guatemala

Type material: ENVT 896, lectotype (female); 3 paralectotypes (1 female and 2 males), ex. “lézard bariolé” (term used in French for many *Ameiva* spp.).

Remarks: Neumann (1899) described *A. scutatatum* on the basis of adult specimens from Guatemalan lizards (ENVT 896) and from specimens collected from *Iguana tuberculata* in Champerico, Guatemala deposited at ZHS, and on one male from a North-American white-tailed deer collected at the Hamburg Zoo in Hamburg, Germany. The other localities listed in the original description refer to collections of nymphs from a bat in Paraguay, and from a Brazilian vulture (ENVT 846), opossum (ENVT 844) and agouti (ENVT 845). The nymphal morphology was, however, not included in Neumann’s description; he only described male and female specimens. Considering that it is unlikely for a reptile tick such as *A. scutatatum* to feed on deer, and because the nymphs were not described, we can safely dismiss all type localities, with the exception of Guatemala (ENVT 896) and Champerico, Guatemala. Specimens from vial 896 were deposited as syntypes in the BMNH (Neumann 1899; Keirans & Hillyard 2001). The specimens are in excellent condition and can be used to generate a much-needed definitive description of the taxon, because the many available illustrations of *A. scutatatum* (Robinson 1926, Hoffmann 1946; Volzit 2007) are inconsistent with each other (Guglielmone *et al.* 2021). Syntypes deposited in ZSH and BMNH (Robbins *et al.* 2025) become paralectotypes.

signatus Birula, 1895

Ixodes signatus—Birula, A. (1895) *Ixodidae novi vel parum cogniti Musei Zoologici Academiae Caesareae Scientiarum Petropolitanae*. I. *Izvestiya Imperatorskoy Akademii Nauk, Series 5*, 2 (4) 353–364. Description pp. 357–358.

Type locality: Unalaska Island, Aleutian Islands, Alaska, USA.

Type material: ENVT 1255, 1 paralectotype (female).

Remarks: The female specimen in vial 1255 is part of Birula’s (1895) type series of *I. signatus*. Birula (1895) described the female based on several specimens. The lectotype and other paralectotypes are deposited in ZIAC (Filippova 2008) and BMNH (Keirans & Hillyard 2001, as syntype). The type material in ZIAC also included a nymphal paralectotype (singular in the text of Birula) that was, however, not described. The species was considered a subspecies of *I. eudyptidis* by Neumann (1904; 1911a) and named *Ixodes eudyptidis* var. *signata* in Neumann (1904) and *Ixodes eudyptidis signatus* in Neumann (1911a). The name *Ixodes eudyptidis signata* is currently a synonym of *I. signatus* (Camicas *et al.* 1998; Guglielmone & Nava 2014).

simplex Neumann, 1897

Haemaphysalis simplex—Neumann, L.G. (1897) Révision de la famille des ixodidés (2^e mémoire). *Mémoires de la Société Zoologique de France*, 10, 324–420. Description pp. 345–346.

Type locality: Madagascar.

Type material: ENVT 998, lectotype (male), 5 paralectotypes (males); ex. *Erinaceus* sp.

Remarks: Syntypes deposited in BMNH (Robbins *et al.* 2025) become paralectotypes

spinosus Neumann, 1899

Ixodes spinosus—Neumann, L.G. (1899) Révision de la famille des ixodidés (3^e mémoire). *Mémoires de la Société Zoologique de France*, 12, 107–294.

Type locality: Brazil.

Type material: ENVT 750, lectotype (female), ex *Dasyprocta aguti*, 9 paralectotypes (2 females, 4 nymphs, and 3 larvae).

Remarks: The female, determined by Neumann as *I. fuscipes* (as indicated on the label of vial 750), corresponds in fact to the lectotype of *I. spinosus*, currently a valid species, as indicated in Labruna *et al.* (2020). After describing *I. spinosus* (Neumann 1899), Neumann later synonymized it with *I. fuscipes* (Neumann 1911a).

stilesi Neumann, 1911

Ixodes stilesi—Neumann, L.G. (1911) Note rectificative à propos de deux espèces d’Ixodinae. *Archives de Parasitologie*, 14, 415.

See *elegans*

sulcatus Neumann, 1908

Rhipicephalus sulcatus—Neumann, L.G. (1908b) Description d’une nouvelle espèce d’ixodiné. *Bulletin du Muséum National d’Histoire Naturelle de Paris*, 14, 352–355.

Type locality: “Congo” (see remarks below)

Type material: ENVT 1439, lectotype (male), 1 paralectotype (female); ex. *Homo*.

Remarks: In Neumann’s accession book, “Congo” referred consistently to localities in former French Congo (a wide area that included, among others, modern Gabon, Republic of the Congo, and Central African Republic) and “Belgian Congo” to what is now called the Democratic Republic of Congo. Therefore, it is improbable that the type locality is the Democratic Republic of Congo as stated in Walker *et al.* (2000) and repeated in Robbins *et al.* (2025). There was no mention of host in Neumann’s original description: nevertheless, on the label inside vial 1439, the host is listed as “*Homo*, etc.”. On the label, Neumann also identified the specimens, gifted by the MNHN, as “types”. Samples left at MNHN (Walker *et al.* 2000) and those donated by Neumann to Nuttall (BMNH) become now paralectotypes.

unicavatus Neumann, 1908

Ixodes unicavatus—Neumann, L.G. (1908a) Notes sur les ixodidés. VI. *Archives de Parasitologie*, 12, 5–27. Description pp. 5–6.

Type locality: Firth of river Forth, Scotland, Great Britain.

Type material: ENVT 1411, lectotype (female), 1 paralectotype (nymph), ex. *Phalacrocorax carbo*.

Remarks: We found a larva in vial 1411.

variegatus (Lucas, 1852)

Ixodes variegatus—Lucas, H. (1852) *Ixodes variegatus*, Lucas. *Bulletin de la Société Entomologique de France, Série 2*, 7, 88–89.

see *albopictum*

vicinus Neumann, 1908

Rhipicentor vicinus—Neumann, L.G. (1908c) A new species of tick from the Transvaal. *Annals of the Transvaal Museum*, 1, 170–172.

Type locality: Pretoria, Transvaal, South Africa.

Type material: ENVT 1727, lectotype (female), 1 paralectotype (male), ex. *Erinaceus frontalis*.

Remarks: Currently a synonym of *Rhipicentor nuttalli* (Camicas *et al.* 1998, Keirans & Hillyard 2001). Syntypes deposited in the BMNH (Robbins *et al.* 2025) become paralectotypes.

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