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A double monstrosity in the tick *Rhipicephalus sanguineus*: description of a first teratological case identified in Benin in West Africa

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ABSTRACT

A total of 5329 ticks were collected from 85 dogs in three different municipalities of Benin in West Africa. Among the species of *Rhipicephalus sanguineus* collected in Abomey-Calavi, the presence of a specimen with double monstrosities was revealed. The abnormal tick is a male with four pairs of legs, but the body is double lobed at the back. It has four spiracular plates, two of which are at the base at the level of the festoons and two others at the level of the fourth coxae. The specimen also has two symmetrical anal orifices, each surrounded by two adanal plates and two accessory plates, leading up to a single genital orifice. This specimen contributes to the growing database of teratological ticks.

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Amblyomma variegatum; Benin; *Haemaphysalis leachi*; *Rhipicephalus sanguineus*; teratology

Teratology is defined as the study of monsters. A monster is considered to be any individual that does not conform to the usual structure of the genus to which it belongs, apart from damage (e.g. loss of limb) that may have occurred during its lifetime.

Originally, cases of monstrosities were very rare within Ixodidae and since then have been increasingly described (Keskin 2018). It was in 1899 that Neumann described the first three cases of teratology: the presence of a supernumerary eye in a *Hyalomma* spp., the absence of the first left leg in an *Amblyomma* spp. and the atrophy of the fourth right leg in an *Ixodes hexagonus*. The first and most interesting of these monstrosities has only been observed once in a very long time (Campana-Rouget 1959). The first double monstrosity observed in ticks was reported in 1909 by Warburton and Nuttall (Nowak-Chmura 2012).

During a survey focused on ticks infesting dogs in southern Benin in West Africa, 5329 ticks were collected from April to July 2018 on 85 dogs. Three species, *Rhipicephalus sanguineus*, *Haemaphysalis leachi*, and *Amblyomma variegatum* were identified in this parasite sample. Among these, a teratological *Rhipicephalus sanguineus* with double monstrosities was discovered. The abnormal tick is a male with four pairs of legs but the body is double lobed at the back. It thus has four spiracular plates, two of which are at the base at the level of the festoons (Figure 1A) and two others at the level of the fourth coxae (Figure 1B). These organs are quite distinct and visible from the dorsal, ventral and profile faces. The coxae of the first pair of legs are distinctly bifid, characteristic of the genus *Rhipicephalus* (Figure 1). The monstrous tick split without separating into two distinct individuals from the festoons up to the level of half of the groove which goes from the anal

orifice to the genital orifice. It thus has two symmetrical anal orifices, each surrounded by two adanal plates, two accessory plates and a single genital orifice that remains unique as in a normal *Rhipicephalus sanguineus*. The capitulum and the rostrum did not split, giving the overall impression of a “dividing” tick like seen in some unicellular organisms. Species identity was confirmed using morphological keys (Walker 2003) and the accuracy of identification was confirmed molecularly with several other *R. sanguineus* specimens (Adakal et al. 2013).

In Benin, the first monstrosity described in ticks dates back to 2009 during the first identification of *Rhipicephalus microplus*, where a male with 4.5 rows of teeth was discovered in collections made in the Mono department (Adéhan 2009). A female with seven coxa and seven legs was also identified later in this same department (Madder Pers. comm 2017). Subsequently, several other cases were reported in cross-sectional collections carried out for a study on hybrid ticks of the same genus (Sungirai 2012) In ticks and scorpions, the double monster is the result, not of the fusion of two eggs, but of an early division of the germinal band (Vachon and Serfaty 1950). These splits should form at any level, but only those in the posterior region can lead to the formation of a viable embryo (Galvis and Flórez-D 2016). It is important to note that *Rhipicephalus sanguineus* has developed phenomena of resistance to the use of all ranges of acaricides present on the Beninese market (Yessinou et al. 2021). As monstrosities are not restricted to an embryonic origin and that external agents can play an important role (Balazuc 1948), it could be that overuse of pesticides has resulted in some of the monstrosities discovered in Benin.

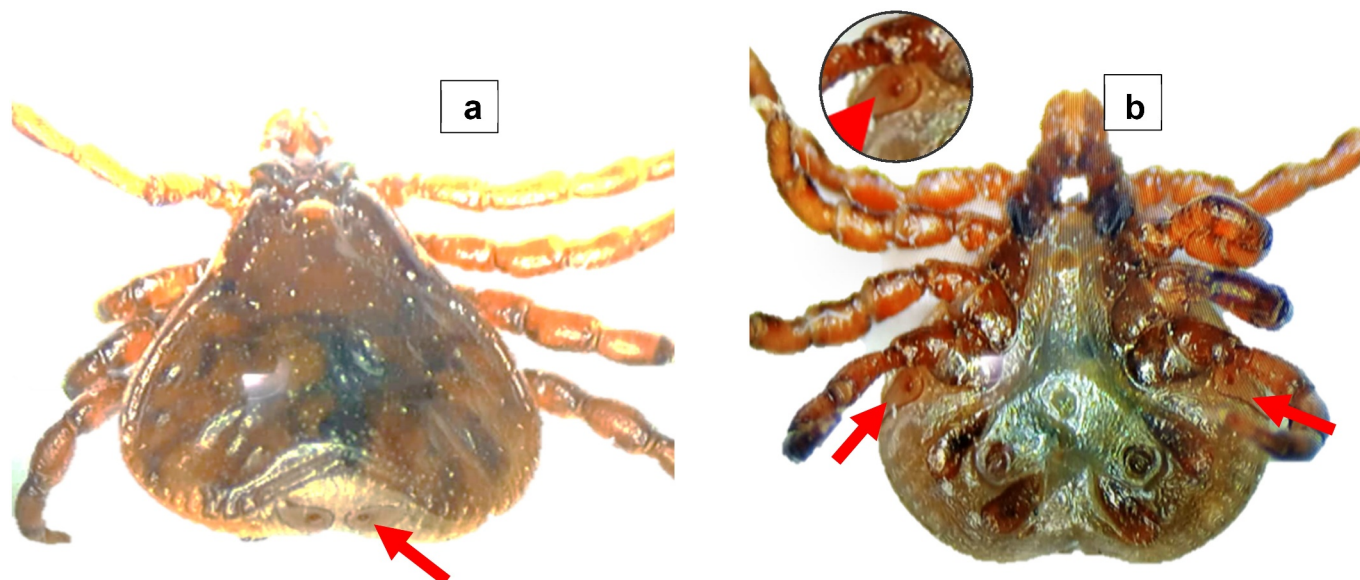


Figure 1. Dorsal (A) and ventral (B) faces of the double monstrosities tick.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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References

- Adakal H, Stachurski F, Chevillon C. 2013. Tick control practices in Burkina Faso and acaricide resistance survey in *Rhipicephalus (Boophilus) geigy* (Acari: Ixodidae). *Experimental and Applied Acarology*. 59:483–491.
- Adéhan S. 2009. *Rhipicephalus (Boophilus spp)* et *Babesia spp* chez le bétail du Département du Mono (République du Bénin) [IMTA-thèse de MSSAT]. (113).
- Balazuc J. 1948. -La Tératologie des Coléoptères et expériences de transplantation chez *tenebrio molitor* L. *Mémoires du Muséum national d'histoire naturelle de Paris, nouv. Série*, 25:1–293, 223 fig.
- Campana-Rouget Y. 1959. La teratologie des tiques. *Annales de Parasitologie Humaine et Comparée*. 34:209–260.
- Galvis W, Flórez-D E. 2016. A new telson teratology in the scorpion *Opisthacanthus* Peters, 1861 (Scorpiones: Hormuridae). *Arachnology*. 17:157–158.
- Keskin A. 2018. New teratological tick specimens (Acari: Ixodidae) from Turkey. *KSÜ Doğa Bilimleri Dergisi*. 21:88–90.
- Nowak-Chmura M. 2012. Teratological changes in tick morphology in ticks feeding on exotic reptiles. *Journal of Natural History*. 46:911–921.
- Sungirai M. 2012. Identification of the four *Rhipicephalus (Boophilus)* ticks species and their hybrids from Benin: morphology versus genetics. ITMA-MSTAH Thesis. 179:55.
- Vachon M, Serfaty A. 1950. Remarques sur les scorpions a deux queues. A propos d'un spécimen anormal appartenant à l'espèce *Buthotus alticola* (Pocock). *Bulletin de la Société Zoologique de France*. 75:91–96.
- Walker AR. 2003. Ticks of domestic animals in Africa: a guide to identification of species. *Bioscience Reports Edinburgh*.
- Yessinou RE, Adoligbe C, Atchade F, Adinci J, Brahi HD, Adehan S, Mantip SE, Farougou S. 2021. Phenotypic and genotypic characterization of dog tick *Rhipicephalus sanguineus sensu lato* (Acari: Ixodidae) resistance to deltamethrin in Benin. *Veterinary Parasitology: Regional Studies and Reports*. 26:100638.