

## Original article

## Description of the male, redescription of the female and 16S rDNA sequence of *Ixodes aulacodi* Arthur, 1956 (Ixodidae)



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## ABSTRACT

*Ixodes (Afrixodes) aulacodi* Arthur, 1956 is a poorly known species that has been recorded predominantly in the wet countries of western and central Africa, mainly associated to the greater cane rat *Thryonomys swinderianus* (Temmink). We herein redescribe the female, describe the male (ascribed to the species from specimens found *in copula*) and provide the 16S rDNA sequence. We also provide complete illustrations of the adults based on specimens found on greater cane rats in Ivory Coast. *Ixodes aulacodi* is included in the group of species of the subgenus *Afrixodes* that have horseshoe shaped anal groove, and which lack auriculae and cornua. The female is easily separated when compared with other species because of a unique combination of characters: All the coxae have internal spurs, coxa II has two external spurs, syncoxae are absent, and trochanters I–III have one spur each. The male has a notched hypostome and lacks syncoxae, auriculae and cornua.

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### 1. Introduction

Available information on the tick *Ixodes (Afrixodes) aulacodi* Arthur, 1956 consists merely of the hosts and localities of collections (Clifford and Anastos, 1962; Morel, 1966; Arthur, 1965; Campbell et al., 1976), together with schematic drawings and descriptions of the female and the larva. It is commonly reported on the greater cane rat, *Thryonomys swinderianus* (Temmink, 1827), a rodent widely distributed across the humid regions of sub-Saharan Africa. The tick was described by Arthur (1956) from the holotype female collected on *T. swinderianus*. A redescription was done by Arthur (1965) on the same specimen and additional females reported on *Viverra civetta* (Clifford and Anastos, 1962) which were collected in Democratic Republic of Congo. The larva was later described by Morel (1966). Males and nymphs are yet to be described, although the life cycle of the tick has been already reproduced in the laboratory and published (Ntiemoa-Baidu, 1987). Furthermore, existing descriptions of the female are inadequate for

the current standards of the tick taxonomy. We herein describe the male and redescribe the female of *I. aulacodi*, from material collected on the cane rat, *T. swinderianus*, the most commonly reported host for this tick. We further provide the 16S rDNA sequence for this species, aimed to complete the picture of the existing information of this representative of the subgenus *Afrixodes*.

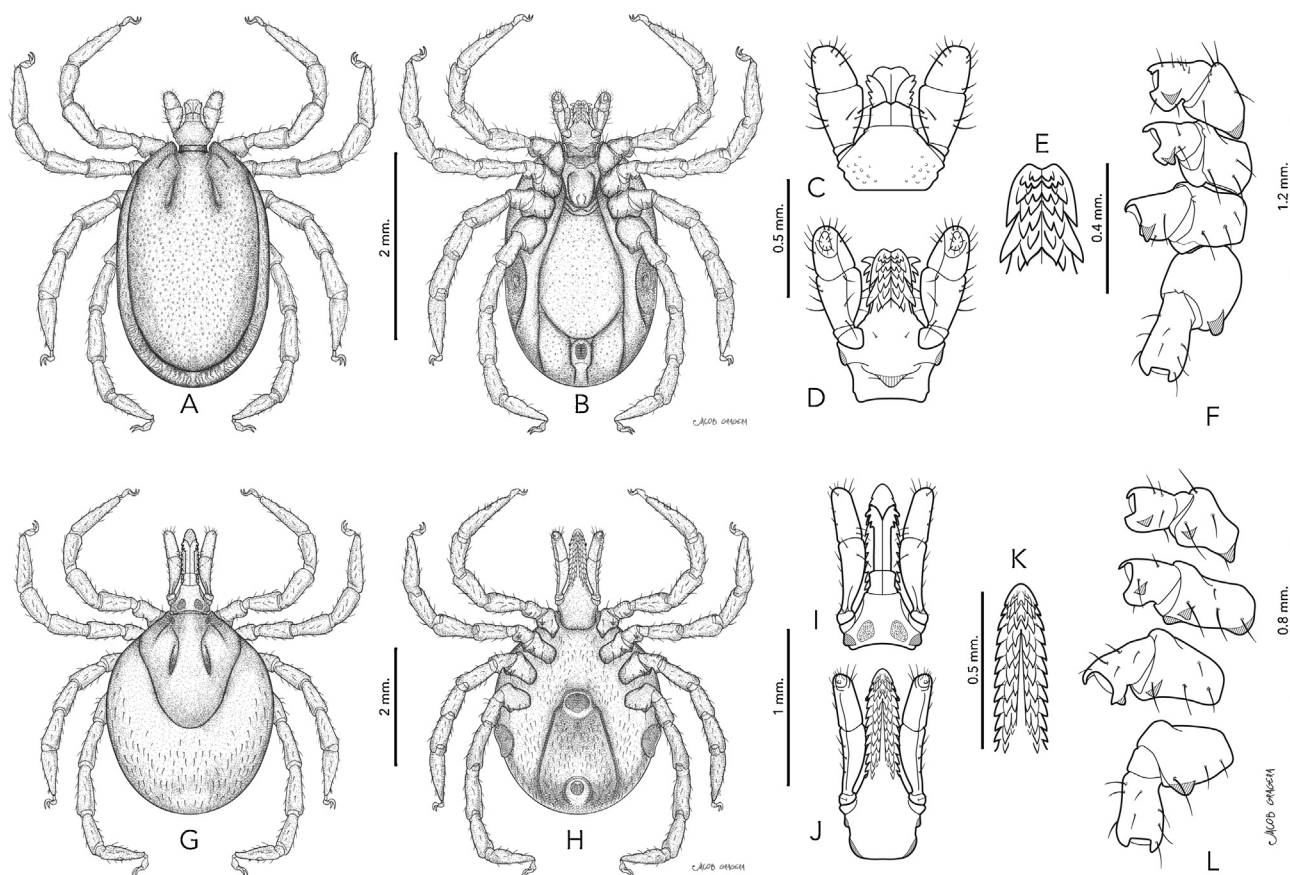
### 2. Description

*I. aulacodi* Arthur, 1956 (all the measurements are in millimetres; included are the range and the mean).

Male (Fig. 1A–F). Two specimens measured, collected *in copula* with females on *T. swinderianus*. Length from scapular apices to posterior idiosomal margin 2.21–2.25 (2.23), breadth 1.39–1.43 (1.41), ratio of idiosomal length/width: 1.57–1.58. Outline elongate, broadest at the level of the coxae IV. Scutum (Fig. 1A) with scapulae bluntly rounded. Lateral carinae absent. Cervical grooves wide, relatively deep, short, well visible, slightly diverging backwards. Punctuations numerous, small, and homogeneously distributed over the central dorsal surface, associated in most cases with very small setae. Dorsal punctuations are more numerous laterally along marginal groove, few and shallow over the anterior medial scutal area. Several rows of longer conscutal setae at the lateral

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**Fig. 1.** Male (A–F) and female (G–L) of *Ixodes aulacodi* Arthur. (A) Male, dorsal view. (B) Male, ventral view. (C) Male, capitulum, dorsal view. (D) Male, capitulum, ventral view. (E) Male, hypostome. (F) Male, coxae and trochanters. (G) Female, dorsal view. (H) Female, ventral view. (I) Female, capitulum, dorsal view. (J) Female, capitulum, ventral view. (K) Female, hypostome. (L) Female, coxae and trochanters.

margins of the body, at the marginal ridge, are present, associated to a pattern of cuticular striations observed at the posterior portion of the dorsum, at the marginal ridge. Venter (Fig. 1B) as illustrated. Pre-genital and median plates with small punctuations; length and breadth of each: pregenital 0.28–0.37 (0.32) × 0.19–0.23 (0.21) (ratio: 1.46), median 0.89–0.99 (0.93) × 0.65–0.71 (0.68) (ratio: 1.31), adanal 0.61–0.68 (0.64) × 0.25–0.27 (0.26) (ratio: 2.2), anal 0.31–0.37 (0.35) × 0.29–0.37 (0.33) (ratio: 1.12). Genital aperture at level between the coxae II and III. Spiracular plates (Fig. 1B) large, clearly elongate, 0.69–0.70 long, 0.35–0.37 broad (ratio: 1.89–1.97). The spiracular plate has seven to nine concentric rows of goblets, each of similar size.

Gnathosoma dorsally (Fig. 1C), length from palpal apices to posterior margin of basis 0.42–0.51 (0.46). Basis capituli (Fig. 1C) 0.24–0.27 (0.25) long, 0.29–0.32 (0.31) broad, ratio length/width: 0.82–0.84, posterior margin straight, external margins diverging anteriorly; cornua absent. Ventral outline as illustrated (Fig. 1D) with slight lateral cuticular projections and one central projection posteriorly produced. Palpi length 0.31–0.33 (0.32), breadth 0.14–0.17 (0.15), ratio length/width of palpi: 1.94–2.26. Setae as illustrated. Hypostome slightly bilobed (Fig. 1E) 0.14–0.21 (0.17) long, 0.11–0.14 (0.13) broad (ratio length/width 1.21), with a dental formula of 3/3 in most rows, with irregular rows of median smaller crenulations in the apex, two lateral denticles larger and more angular than those in internal rows.

Legs (Fig. 1F) moderately long, darker than the rest of the body. Coxae I and IV without syncoxae. Coxae I and II each with one moderate, blunt, internal spur. Spur in coxa II small, like a large cuticular ridge. Coxa IV with an external broad spur. All the other coxae without external spurs, although the posteroexternal edge of coxae II

and III has a cuticular ridge. Trochanters I–III with spurs of approximately the same size as of internal spurs in coxa I. Length of tarsus I: 0.49–0.54 (0.52) long; length of tarsus IV: 0.46–0.51 (0.59).

### 3. Redescription

Female (Fig. 1G–K, four specimens measured, collected from *T. swinderianus*). Length from scapular apices to posterior idiosomal margin 2.45–3.03 (2.74), breadth 1.36–1.59 (1.49), ratio idiosomal length/width 1.8–1.9 (1.84). Scutum (Fig. 1G) outline broadly oval, 1.24–1.37 (1.34) long, 1.02–1.04 (1.03) broad (ratio length/width scutum: 1.21–1.31). Scutum widest well before its mid-length, at the level of coxae II, then abruptly narrowing towards its posterior margin, which is rounded. Cervical grooves indistinct anteriorly, then produced into long, shallow depressions extending posteriorly to more than the scutal mid-length, not reaching the posterolateral borders of the scutum. Scapulae short, rounded. Scutal punctuations very small. Dorsal body setae abundant, short, randomly distributed, with an area without setae around and behind the dorsal scutum. Marginal groove absent.

Genital aperture at level of coxae IV. Preanal groove widely rounded, incompletely closed, opened at its posterior margin, in a portion of approximately the same size that the anus. Spiracular plates sub-circular, concave, 0.44 long, 0.42 wide (ratio length/width: 1.01). Gnathosoma: length from palpal apices to posterior margin of basis 1.02–1.19 (1.12). Basis capituli dorsally (Fig. 1I) clearly triangular, 0.42–0.46 (0.43) long, 0.47–0.49 (0.48) broad; ratio gnathosomal length to basis capituli width 0.89. Lateral margins very short, essentially straight or slightly converging posteriorly. Posterior margin broadly concave, cornua absent, but

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