

## Comments on article "First report of *Ixodes frontalis* (Acari: Ixodidae) in Finland, an example of foreign tick species transported by a migratory bird" (Memoranda Soc. Fauna Flora Fennica 85:16–19. 2009)

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In the scope of our study on the ecology of bird-specialized ticks (Acari: Ixodidae) and their role in the spread of tick-borne diseases in Europe, we reviewed the scientific literature on ticks infesting terrestrial songbirds. We came across the article of Laakkonen et al. (2009) in which the authors report the first record of *Ixodes frontalis* (Panzer) in Finland. It concerns two engorged nymphs isolated from the head of a Tree pipit (*Anthus trivialis* L.) on the island of Lågskär in May 2005. When scrutinizing the included photograph (Fig. 1a), we unfortunately concluded that the reported tick only showed diagnostic features of *Ixodes ricinus* (L.), the most abundant tick species in Europe.

Because immature developmental stages of *I. frontalis* have been illustrated relatively seldom in literature, in particular unfed individuals that are not mutilated, and because there is little knowledge on its ecology, we initiated an *I. frontalis* colony. Larvae of two egg batches obtained from *I. frontalis* adult females were exposed to great tits (*Parus major* L.), successfully attached

and engorged. After detachment, the ticks moulted to the nymphal developmental stage. In Fig. 1b we show a photograph of one of those *I. frontalis* nymphs (digital photo from a Nikon Coolpix 995 on a Leica binocular microscope). For comparison with the photograph of Laakkonen et al. (2009) (Fig. 1a) we maintained its orientation and position.

Based on five identification keys (numbered arrows in Fig. 1b; Arthur 1953, 1963; Van Bronswijk et al. 1979; Hillyard 1996; Manila 1998), the following morphological characteristics of *I. frontalis* nymphs can be used as diagnostic features to separate them from *I. ricinus* nymphs (for tick topological terms we refer to (Hillyard 1996)):

1) The external and internal spurs of coxa I are almost equal in size (Fig. 1b). In photo 1a the length of the internal spur of coxa I is moderate in size, however still larger than the external spur, which is characteristic for *I. ricinus*.

2) The angle of the inner margins of the internal spurs is large (almost 90°), leading to a blunt-

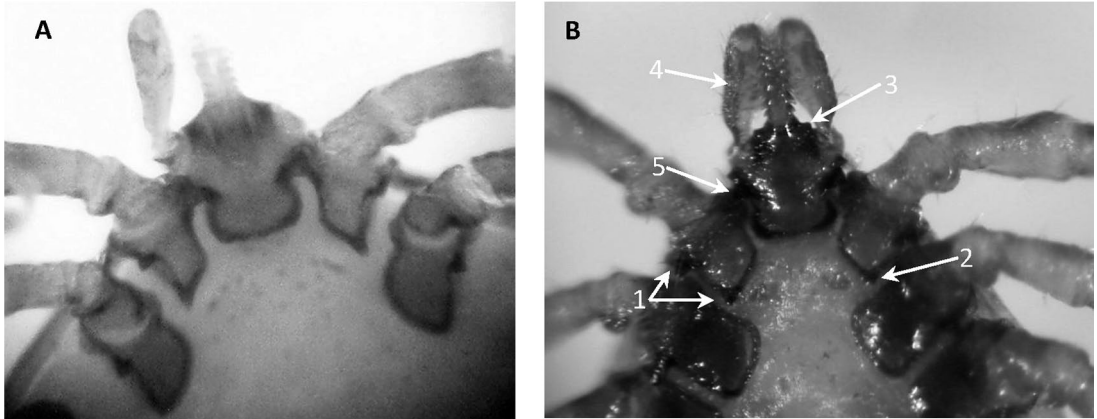


Fig. 1. A) photo published in Laakkonen et al. (2009) (*I. ricinus* nymph, not *I. frontalis*), and B) ventral view of *I. frontalis* nymph obtained from a colony breed (photo: Frank Adriaensen, University of Antwerp).

shaped internal spur (Fig. 1b). The shape of the internal spur in photo 1a is pointed, which is a characteristic feature of *I. ricinus*.

3) The implantation of the hypostome on the basis of the capitulum (i.e. the transition from hypostome to palps) is abruptly stepped (see Fig. 1b, see also illustration in Arthur 1963). In photo 1a the transition towards the palps is smooth and rounded.

4) Palps are club-like and strongly narrowed at the base of article II, division between palp articles II and III is vague (Fig. 1b). Photo 1a shows a clear division between articles II and III (situated in the middle of the palp) which is characteristic for *I. ricinus* nymphs. Furthermore, here article II slowly narrows towards article I.

5) Auriculae are triangular shaped and laterally directed (Fig. 1b). Photo 1a shows clear triangular auriculae, but they are directed posteriorly which is characteristic for *I. ricinus*.

All five diagnostic features lead us to the conclusion that the species in the photo in Laakkonen et al. (2009) (Fig. 1a) concerns a nymph of *I. ricinus* and not *I. frontalis*. This finding leaves open the question whether *I. frontalis* has ever been observed in Finland.

## References

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