



Letters to the Editor

Questing *Ixodes frontalis* larvae in a forest close to Berlin (Germany) in November 2018

Letter

Agoulon et al. (2019, in press; ‘Unravelling the phenology of *Ixodes frontalis*, a common but understudied tick species in Europe’) have presented the results of an elaborate field study on the seasonal activities of *Ixodes ricinus* and *I. frontalis* in western France. The latter species is a bird tick that has not been recognised too often in flagging studies, although Heylen et al. (2014) classified it as an exophilic tick. Agoulon and co-workers collected all the postembryonic questing life stages of both species over three years. Quite remarkable is that they collected a large number of *I. frontalis* by flagging, a few adults, some nymphs, and in particular many larvae. They realized the occurrence of *I. frontalis* larvae not from the beginning but only in the course of their study. But this is not to criticize the authors for this but to compliment them that they recognized at all that those larvae collected in the autumn and winter were *I. frontalis* rather than *I. ricinus*. This is a valuable finding. Which investigator in Europe determines all the collected questing tick larvae after a field trip? We argue that field-collected questing larvae are individually determined only in exceptional cases because it is very time consuming and because of the general (easy) assumption that all the questing larval *Ixodes* ticks in large parts of Europe might be *I. ricinus*. However, since at least the proven occurrence of *I. inopinatus* in Germany (Chitimia-Dobler et al., 2018), this assumption has been strongly weakened. Agoulon et al. (2019) provided a further useful example that it cannot be longer accepted in studies that all flagged *Ixodes* larvae in Europe are taken as *I. ricinus* without proper determination.

We would like to add a recent personal experience. There has been an ongoing project with monthly flagging excursions (supported by Pfizer Deutschland GmbH), which includes a location close to Berlin. Whereas all the collected tick nymphs and adults have been counted and morphologically determined down to species level, the overall number of flagged *Ixodes* larvae have only been estimated, without closer determination. It was completely unusual however that, in addition to 2 *I. ricinus* nymphs and 3 *Dermacentor reticulatus* adults, we collected some *Ixodes* larvae on the 28th of November 2018 at ap-

proximately 1 °C, the larvae all with the same drag. In our experience, *I. ricinus* larvae are not active in our area in late November at such a temperature. The senior author of this letter, as the Managing Editor of ‘Ticks and Tick-borne Diseases’ knowing the submitted (but at that time not published) manuscript by Agoulon et al. and inspired by it, immediately thought that these larvae could be *I. frontalis*. So, against the project rule, the larval ticks (n = 10) were removed from the cloth and morphologically determined after Estrada-Peña et al. (2017), Heylen et al. (2014) and Filippova (1977). All the 10 larvae were found to be *I. frontalis*.

This example emphasizes how important it is to determine field-collected ticks down to species level, a point that was also emphasized by Agoulon et al. (2019, in press) and Heylen et al. (2014). With the negligent approach assuming that all flagged *Ixodes* larvae are *I. ricinus*, numerous *I. inopinatus* and perhaps also members of some other *Ixodes* species might erroneously be scored as *I. ricinus* in many field studies and completely missed in certain areas. It is quite obvious that *I. frontalis*, a tick that has only rarely been found in Germany so far (Schorn et al., 2011), may be much more common here than so far thought. One of the authors of this letter (O.K.) found an unfed *I. frontalis* female in a Berlin city park in 2016. It seems that *I. frontalis* occurs quite often in park-like areas, not only in forests (Schorn et al., 2011; Agoulon et al., 2019, in press; Agoulon et al., 2019; Agoulon et al., 2019, in press).

The 10 Berlin *I. frontalis* larvae were collected in the same season of the year as Agoulon et al. (2019) noticed the *I. frontalis* larval bulk seasonal activity in Nantes, which is approximately 1200 km away from Berlin. It seems obvious now that this kind of seasonality is a general trait of the larval stage of *I. frontalis* in Europe, and also other researchers should be especially alert if they collect larval *Ixodes* ticks in the autumn or winter and should at least determine some specimens down to species level.

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