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Letter to the Editor

## Fortuitous infestation or wide host range? The case of Spinturnicidae and their bat hosts: Reply to Guiller and Deunff (2010)

Nadia Bruyndonckx<sup>a,\*</sup>, Sylvain Dubey<sup>b</sup>, Philippe Christe<sup>a</sup><sup>a</sup> Department of Ecology and Evolution, University of Lausanne, CH 1015 Lausanne, Switzerland<sup>b</sup> Heydon-Laurence Bld., A08, Science Road, School of Biological Sciences, University of Sydney, NSW 2006, Australia

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## ABSTRACT

Defining the degree of host specificity in host–parasite studies can greatly inform cophylogenetic history. In a recent paper, Guiller and Deunff (2010) cast doubt on some points and conclusions drawn from a cophylogenetic study between European bats and Spinturnicid mites (Bruyndonckx et al., 2009a). Here we answer their criticisms and discuss the notion of specificity in Spinturnicid mites.

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In a Letter to the Editor, Guiller and Deunff (2010) raise criticisms about the conclusions we draw on the coevolutionary processes acting between Spinturnicid mites and their bat hosts (Bruyndonckx et al., 2009a). Although some questions raised by Guiller and Deunff (2010) are interesting to debate, we find dishonest and unfair the basis of their major argumentation, which is basically that we “do not understand some significant features of the life-cycle of Spinturnicid mites (...)” and that the paper reflects “a lack of knowledge of the basic biology and ecology of Spinturnicidae”. Most of the authors’ comments are irrelevant, for example the criticism of the use of the term *larval stage* in a paper from 2004. This comment is off the subject as this term was never used or discussed in the original paper. What is fundamental in the coevolutionary process acting in this host–parasite relationship is not the vocabulary used, but rather the absence of a free-living stage and the absence of intermediate hosts, two traits that are themselves often shaped by coevolution (Thompson, 1994). Secondly, whereas we wrote in the paper that “*Spinturnix bakeri* is not included in our study”, Guiller and Deunff (2010) translated this as “the authors are surprised at not finding *S. bakeri* in Europe, whereas the specie’s range is limited to America”. Unless it results from a misidentification, *S. bakeri* is not restricted to America and has been also found in Azerbaidjan on *Pipistrellus kuhlii* (Lanza, 1999; Stanyukovich, 1997). Nevertheless Guiller and Deunff (2010) correctly mentioned that this species is not strictly specific

to *P. kuhlii* contrary to what was stated in our paper (Bruyndonckx et al., 2009a). Finally, we speculated in our original paper that competitive exclusion may be responsible for the single mite/single host observed in our study, an hypothesis judged as “irrational” by Guiller and Deunff (2010). The counter-example they give of one Spinturnicid species living on uropatagium and another living on patagium within the same individual may nevertheless be interpreted as a good illustration of the competitive exclusion principle.

Another point raised in their comment is that “Molecular systematic analysis is unfortunately inadequate for addressing questions of host–parasite associations”. If this assertion is correct, it casts doubt on many stimulating papers related to host–parasite interactions (see for example Johnson et al., 2007; Light et al., 2008; Page et al., 2004) and we let the readers of MPE judge the pertinence of this point of view.

Previous experiments have demonstrated that *Spinturnix* cannot survive more than a few hours out of their hosts (Giorgi et al., 2004). Therefore, this result suggests that successful interspecific transmission of *Spinturnix* requires direct contact between host species. Based on this consideration, Guiller and Deunff (2010) suggested that we should have retained in our analyses only *Spinturnix* species found on their major host (i.e., the host on which the parasite species has been named) because other associations may be due to “fortuitous infestation” or “might be explained in simple opportunistic and adventitious terms without evolutionary significance”. Some *Spinturnix* species have indeed been recognized as highly specific based on slight morphological characters and on the biology of their hosts, by making the assumption that some

\* Corresponding author. Fax: +41 216924165.

E-mail address: [nadia.bruyndonckx@unil.ch](mailto:nadia.bruyndonckx@unil.ch) (N. Bruyndonckx).

host species are ecologically isolated from each other (Deunff et al., 1986, 1997). However, previous experiments aiming to evaluate *Spinturnix* survival between native and non-native host have demonstrated that *Spinturnix andegavinus*, considered as highly specific to Daubenton's bat, was able to survive on the greater mouse-eared bats (Christe et al., 2003; Giorgi et al., 2004) whereas *Spinturnix myoti* did not survive on *Myotis daubentoni*. Therefore, the finding of a multi-host parasite species has a biological meaning that cannot be neglected when studying coevolutionary pattern (Refregier et al., 2008). Considering only associations that do not match the view of a very high host specialization as accidental may give erroneous pictures of parasite distribution. Therefore we have decided to integrate all Spinturnicid mites collected on the different bat species we sampled in our phylogeny to put forward the importance of ecological factors (host association) for the understanding of parasite distributions across host species.

Similarly, Guiller and Deunff (2010) proposed "sample contamination" as the best hypothesis to explain the presence of *Spinturnix emarginatus* on *Miniopterus schreibersii*, "since contact is unlikely between populations of *M. schreibersii* and *Myotis emarginatus*". We would like to mention here that the samples analysed in our paper originated from specimens collected on both species in the same cave and that the coexistence of these two species is common and well-documented (Dietz et al., 2009; Krapp, 2001). Finally, although Deunff et al. (1986) have reported the presence of one specimen of *Spinturnix acuminata* on the giant noctule bat in Switzerland, our same finding in Spain is considered by Guiller and Deunff (2010) as a "fortuitous infestation". These examples illustrate the difficulty of naming parasite species on the basis of host biology only, particularly with a group of hosts with cryptic lifestyles that necessitate a certain degree of expertise.

We have a profound respect for the taxonomical studies performed by Jean Deunff on Spinturnicidae (Deunff and Beaucournu, 1981; Deunff et al., 1997, 2004). His work has stimulated our research on the ecology of these wing mites (Christe et al., 2000, 2003, 2007). The cophylogeny we presented in Bruyndonckx et al. (2009a) raised some evolutionary questions that merit addressing in the future. Molecular tools now permit greater insights into the population genetics of some peculiar associations, for example between *Spinturnix bechsteini* and Bechstein's bat (Bruyndonckx et al., 2009b) and between *S. myoti* and its different host species (Bruyndonckx et al., 2010). We strongly believe that Spinturnicidae represents a fascinating group for the study of host–parasite interactions and we welcome future investigations and collaborations between classical systematics and molecular phylogenetics.

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