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## Microscopy and molecular investigation on *Lipoptena* (Diptera: Hippoboscidae) circulating in wild animal species in Italy

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**INTRODUCTION.** *Lipoptena* Nitzsch, 1818, is a blood-sucking ectoparasite of domestic and wild animals as well as, accidentally, of humans. Although unclear, they cause distress and alopecia and are suspected vectors of *Bartonella*, *Rickettsia* spp., *Anaplasma ovis* (Hornok et al., 2011, Vector Borne Zoon. Dis, 10:1319-1321). In Europe, four species of *Lipoptena* have been identified, i.e. *Lipoptena cervi*, *Lipoptena capreoli*, *Lipoptena couturieri* and *Lipoptena fortisetosa*. The aim of the study is to microscopically and molecularly investigate *Lipoptena* species circulating in Northern Italian areas in wild ungulates host species.

**MATERIALS AND METHODS.** A total of 140 specimens from *Rupicapra rupicapra* (n. 23), *Capreolus capreolus* (n.74) and *Cervus elaphus* (n.43), living in seven different areas of the Sondrio province, were collected and microscopically identified. For molecular confirmation, specimens were individually subjected to DNA extraction and PCRs amplification by using generic primers for COI gene (Folmer et al., 1994, Mol. Mar. Biol. Biotech. 3:294-299). PCRs positive samples were then sequenced, aligned each other and phylogenetically analyzed.

**RESULTS AND CONCLUSIONS.** All specimens were identified as *Lipoptena cervi*, males (40%) and females (60%). Out of 140 collected specimens, nine, so far molecularly examined, were positive to PCRs. The percentage of identity of the obtained sequences was 98.5% with *L. cervi*, 90.8% with *L. fortisetosa*, 90.1% with *Lipoptena* sp., 87.1% with *L. depressa* and 86.6% with *L. mazamae*. Phylogenetic analysis showed that sequences cluster with *L. cervi* group with homology of 100%. The results so far obtained highlight the presence of *L. cervi* in all investigated areas and in all investigated species, including chamois, considered by literature as an uncommon host species. Once completed, the molecular investigation may help in: *i*) overcoming potentially wrong identification; *ii*) identifying new unrecorded species in Italy, such as *L. fortisetosa* (recorded in Switzerland, Germany, Poland, Czech Republic and Slovakia), *L. capreoli* (spread in the Mediterranean countries, and apparently recorded (attested?) also in Italy), and the still unconfirmed *L. couturieri* identified in Spain and France; *iii*) understanding their distribution on the Alpine area close to the borders. This is the first epidemiological study in Italy, providing a noteworthy picture of the *Lipoptena* species distribution in Italy, also in the light of their possible zoonotic vector role.