Clinical Bovine Piroplasmosis Caused by *Babesia occultans* in Italy

Nicola Decaro,a Vittorio Larocca,a Antonio Parisi,b Michele Losurdo,a,b Riccardo Paolo Lia,a Maria Fiorella Greco,a Antonio Miccolis,c Gianpiero Ventrella,a Domenico Otranto,a Canio Buonavogliaa

Department of Veterinary Medicine, University of Bari, Valenzano, Italy; Istituto Zooprofilattico Sperimentale di Puglia e Basilicata, Foggia, Italy; Veterinary Practice, Bari, Italy

A clinical outbreak of bovine piroplasmosis was reported in Italy. The etiological agent was characterized as *Babesia occultans*, a parasite regarded as apathogenic and never detected before in continental Europe. This report paves the way for further studies to assess the occurrence of this tick-transmitted protozoan in other European regions.

Bovine babesiosis is a tick-borne disease of cattle caused by apicomplexan protozoa of the genus *Babesia* which may induce clinical conditions characterized by hemolytic anemia and fever, with occasional hemoglobinuria and even death of animals. *Babesia* parasites are responsible for severe economic losses in cattle industry, with large social and epidemiological impacts (1). Among the main *Babesia* species infecting cattle, *Babesia bovis* and *Babesia bigemina* cause a severe and often fatal disease in untreated cattle of tropical and subtropical regions whereas *Babesia divergens* is associated with bovine and human infection in Europe (2). In addition, *Babesia major* (3) and *Babesia occultans* are less pathogenic. The latter species was detected more than 30 years ago in southern Africa, being transmitted by a *Hyalomma marginatum* tick (4). *Babesia occultans* has never been associated with clinical signs in animals, even after experimental infection of splenectomized individuals (4). For a long time, the distribution of *B. occultans* was believed to be confined to sub-Saharan Africa (4, 5), and this protozoan was detected only recently in *H. marginatum* in Tunisia (3) and in cattle in the Balearic Islands (6). However, even in this case, clinical disease was not associated with *B. occultans* infection. This study reports on a clinical outbreak of bovine piroplasmosis by *B. occultans* in continental Europe.

In May and June 2012, an outbreak of clinical piroplasmosis occurred in a cattle herd from the Apulia region of southern Italy following a severe tick infestation. At that time, the herd consisted of 26 lactating cows (mainly primiparous animals) and consisted of marked paleness (4). For a long time, the distribution of *B. occultans* was believed to be confined to sub-Saharan Africa (4, 5), and this protozoan was detected only recently in *H. marginatum* in Tunisia (3) and in cattle in the Balearic Islands (6). However, even in this case, clinical disease was not associated with *B. occultans* infection. This study reports on a clinical outbreak of bovine piroplasmosis by *B. occultans* in continental Europe.

In May and June 2012, an outbreak of clinical piroplasmosis occurred in a cattle herd from the Apulia region of southern Italy following a severe tick infestation. At that time, the herd consisted of 26 lactating cows (mainly primiparous animals) and consisted of marked paleness (4). For a long time, the distribution of *B. occultans* was believed to be confined to sub-Saharan Africa (4, 5), and this protozoan was detected only recently in *H. marginatum* in Tunisia (3) and in cattle in the Balearic Islands (6). However, even in this case, clinical disease was not associated with *B. occultans* infection. This study reports on a clinical outbreak of bovine piroplasmosis by *B. occultans* in continental Europe.

In May and June 2012, an outbreak of clinical piroplasmosis occurred in a cattle herd from the Apulia region of southern Italy following a severe tick infestation. At that time, the herd consisted of 26 lactating cows (mainly primiparous animals) and consisted of marked paleness (4). For a long time, the distribution of *B. occultans* was believed to be confined to sub-Saharan Africa (4, 5), and this protozoan was detected only recently in *H. marginatum* in Tunisia (3) and in cattle in the Balearic Islands (6). However, even in this case, clinical disease was not associated with *B. occultans* infection. This study reports on a clinical outbreak of bovine piroplasmosis by *B. occultans* in continental Europe.

In May and June 2012, an outbreak of clinical piroplasmosis occurred in a cattle herd from the Apulia region of southern Italy following a severe tick infestation. At that time, the herd consisted of 26 lactating cows (mainly primiparous animals) and consisted of marked paleness (4). For a long time, the distribution of *B. occultans* was believed to be confined to sub-Saharan Africa (4, 5), and this protozoan was detected only recently in *H. marginatum* in Tunisia (3) and in cattle in the Balearic Islands (6). However, even in this case, clinical disease was not associated with *B. occultans* infection. This study reports on a clinical outbreak of bovine piroplasmosis by *B. occultans* in continental Europe.

In May and June 2012, an outbreak of clinical piroplasmosis occurred in a cattle herd from the Apulia region of southern Italy following a severe tick infestation. At that time, the herd consisted of 26 lactating cows (mainly primiparous animals) and consisted of marked paleness (4). For a long time, the distribution of *B. occultans* was believed to be confined to sub-Saharan Africa (4, 5), and this protozoan was detected only recently in *H. marginatum* in Tunisia (3) and in cattle in the Balearic Islands (6). However, even in this case, clinical disease was not associated with *B. occultans* infection. This study reports on a clinical outbreak of bovine piroplasmosis by *B. occultans* in continental Europe.
100%) to analogous sequences of *B. occultans* retrieved from the GenBank database but not those of other protozoa within the genus *Babesia*. Phylogenetic analysis was carried out on a 1,050-nucleotide sequence generated from sample 366/12-20 (GenBank accession number KC157568), which was considered the prototype strain (Italy-366/12-20). The neighbor-joining tree obtained with the Mega4.1 software (http://www.megasoftware.net/mega4/mega41.html) over 1,000 replicates showed that strain Italy-366/12-20 clustered with the *B. occultans* clade, which also comprises *Babesia orientalis*, *Babesia sp. Kashi 1*, and *Babesia sp. Kashi 2*, but not with other piroplasms (Fig. 1). *Babesia sp. Sable antelope* and *Babesia sp. Anglona*, which was recently isolated from pigs in Italy (16), were also strictly related to the *B. occultans* cluster. This pattern of segregation was confirmed by the maximum-parsimony method (data not shown).

In this article, we report a clinical outbreak of bovine piroplasmosis caused by *B. occultans*. Although there was no evidence of coinfections with other pathogens, less-common infectious agents of bovine anemia were not able to be ruled out definitively. *Babesia occultans* is considered a completely apathogenic or low-pathogenic parasite of cattle with a geographical distribution restricted to sub-Saharan Africa (4, 5). Although this piroplasm has been recently detected in the Balearic Islands (3, 6), no reports from continental Europe were available. Nonetheless, *H. marginatum* is diffused in southern Italy, where the infection by *B. occultans* might be more spread out than currently acknowledged (17). *Babesia occultans* was molecularly detected in cows that displayed fever, anemia, and severe alteration in the hematological parameters. Circumstantial evidence for the condition caused by this protozoan is also represented by the efficacy of imidocarb dipropionate in the animals’ recovery. Phylogeny showed that other *Babesia* strains that have not been classified so far may likely belong to the species *B. occultans*. Importantly, the detection of this protozoan in continental Europe suggests that thorough surveil-
lance programs should be undertaken for this tick-borne disease in order to implement effective control measures in cattle populations in which the proper tick species and the vectored pathogen occur.

REFERENCES

17. Dantas-Torres F, Otranto D. 2013. Species diversity and abundance of ticks in three habitats in southern Italy. Ticks Tick Borne Dis. 4:251–255.