Cowdria ruminantium antibodies in acaricide-treated and untreated cattle exposed to Amblyomma variegatum ticks in The Gambia

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Abstract. An indirect enzyme-linked immunosorbent assay (ELISA), based on the major antigenic protein 1 fragment B (MAP1-B) of Cowdria ruminantium, was used to assess seroprevalence in cattle in The Gambia. Two groups of 20 N’Dama and 20 Gobra zebu cattle were monitored for 12 months with flumethrin treatment and for another 10 months without acaricidal treatment. Two groups of 20 N’Dama and 20 Gobra cattle served as untreated controls. During the period of acaricidal treatment, the cumulative proportions of positive serum samples were 25.6 ± 5.6% (± confidence interval) and 34.7 ± 6.8% in treated N’Dama and Gobra cattle respectively; the proportion of positive sera in untreated cattle was 52.2 ± 6.9% in N’Damas and 61.4 ± 7.3% in Gobras. Within breed, difference in antibody prevalence between treated and untreated cattle was significant (P < 0.001) but between breed differences were not significant. In the 10 months following suspension of acaricide application, there was an increase of proportion of positive serum samples in previously treated N’Dama and Gobra cattle. In both previously treated and untreated animals the peak of positive seroreactions occurred during and subsequent to the period of activity of Amblyomma variegatum adults. Cumulative seroprevalences in previously treated N’Dama and Gobra cattle were 32.6 ± 6.9% and 44.7 ± 8.5%, respectively; in untreated animals seroprevalence was 38.6 ± 7.2% in N’Dama and 65.3 ± 8.4% in Gobra cattle. Throughout the study period, within the N’Dama breed, the seropositive rate in previously treated cattle did not differ from that in untreated animals. Conversely, within the Gobra breed, the number of positive seroreactions was higher (P < 0.002) in untreated animals than in previously treated cattle. These results provide a support for designing A. variegatum and heartwater control strategies, if necessary, in The Gambia in relation to cattle breeds.

Key words: Amblyomma variegatum, Cowdria ruminantium, Gobra zebu cattle, MAP1-B ELISA, N’Dama, The Gambia

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Heartwater (cowdriosis) is a rickettsial infection caused by *Cowdria ruminantium*, affecting wild and domestic ruminants and is transmitted by ticks of the genus *Amblyomma*. Cowdriosis occurs throughout most of sub-Saharan Africa and on several Caribbean islands and it is considered one of the major economically important tick-borne diseases (Provost and Bezuidenhout, 1987).

In West Africa, *A. variegatum* is the main tick species infesting cattle (Koney et al., 1994; Konstantinov et al., 1990), and is the major vector of *C. ruminantium* (Gueye et al., 1993). In Senegal, high mortality due to heartwater was observed in indigenous small ruminants (Gueye et al., 1984). In bovines, lethal cases of heartwater were mainly reported in exotic Red Sindhi × Sahiwal crossbred and pure Montbeliard cattle (Gueye et al., 1982), while a situation of endemic stability appears to be present in indigenous cattle living in *A. variegatum* infested areas (Gueye et al., 1993). In The Gambia, mortality due to cowdriosis was recently reported in Gobra zebu cattle undergoing an experimental trypanosome infection and exposed to natural tick challenge, while no deaths were observed in trypanosome infected N’Dama or uninfected N’Dama and Gobra zebu cattle (Mattioli et al., 1994). Additionally, in indigenous Djallonke sheep and West African Dwarf goats, reared at the International Trypanotolerance Centre (ITC), a substantial proportion of routinely examined Giemsa-stained post-mortem brain smears was positive for *C. ruminantium*, despite regular acaricide treatments (Mattioli and Jaitner, personal observation, 1998).

Intensive and prolonged tick control is likely to affect endemic stability to tick-borne diseases which generally establishes in indigenous cattle following continuous contact with tick-borne micro-organisms (Du Plessis et al., 1992; Norval et al., 1995). With the exception of recent data derived from a study on a small number of cattle monitored for a short period (Mattioli et al., 1994), no further information is available on heartwater in The Gambia. The objective of the present study was, therefore, to investigate the prevalence of *C. ruminantium* antibodies in intensively acaricide-treated and untreated N’Dama and Gobra zebu cattle exposed for approximately two years to natural *A. variegatum* infestation. The effect of suspension of intensive tick control on the occurrence of *C. ruminantium* antibodies was also explored. The results provide basic information on *A. variegatum* and *C. ruminantium* management programmes aimed at developing a sustainable cattle industry in The Gambia.