

Is the distribution of *Amblyomma variegatum* influenced by interspecific competition with *Amblyomma hebraeum*? Preliminary study: distribution range in Mozambique

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Widely spread in intertropical and subtropical areas of Africa, the southern distribution of *Amblyomma variegatum* in Mozambique seems to have its limit around the Save River, at the 22nd parallel South. This area also corresponds to the northern limit of another *Amblyomma* tick, *A. hebraeum*. Several authors use to explain the absence of *A. variegatum* more southwards by an interspecific competition with *A. hebraeum*. Whereas only *A. variegatum* is known to favor dermatophilosis, a skin disease that can cause important burden in ruminants, both species are good vectors of *Ehrlichia ruminantium*, the bacteria causing heartwater, a fatal disease of ruminants representing a major constraint for livestock development in Africa. However, their vector competence may be different and vary according to the strain of *E. ruminantium*. As a result, the bio-ecology and distribution of those vectors in the field may result in specific epidemiological patterns for the diseases they transmit and are important to understand to adopt proper sanitary control and prevention measures.

Little information on current (last decade) *Amblyomma* distribution in Mozambique is available, and little is known on the factors influencing their distribution. More especially, the existence of a distribution overlap, as observed in Zimbabwe is not known in Mozambique. Indeed the extent of this overlap and the distribution of *A. variegatum* and *A. hebraeum* in this particular area represent useful information to assess potential interspecific competition. The objective of this study is to assess the current distribution of *A. variegatum* and *A. hebraeum* in this country and to better locate and characterize species limitation ranges around the Save River with a view to further identify the factors influencing their distribution.

First, an exhaustive literature review was made to collect all published and unpublished data relating to the distribution of *A. variegatum* and *A. hebraeum* in Africa. A field entomological survey was then conducted in Mozambique between February and April 2012 to identify ticks collected on cattle, in the Inhambane, Manica and Sofala provinces, nearby the Save River. Sampling sites included dip-tanks and corridors, used for acaricides treatment by neighboring farmers, as well as farms which were selected by the local Veterinary Service. In each study site, about 60 animals were carefully examined for ticks presence and abundance, mostly in corridors and on 10 laid-down animals most heavily infested by ticks. Ticks, males and females, were collected to confirm species identification. Data on domestic ruminant population and movements as well as breeding practices including tick control were also collected through interviews with farmers and local and central veterinary services. The epidemiological unit is the sampling site. A site was considered positive for a given tick species if at least one animal was infested by at least one tick of that species, otherwise, it was considered negative. To better assess species presence in their limit of distribution, an attempt was made to interpret presence and absence data to distinguish well-established or occasionally present population and likely not detected or absent populations. This was done considering sampling method, tick abundance, study period against phenology, as well as other information: last acaricide treatment, animal introduction, etc. Data were entered in Access database and displayed on a Geographic Information System, ArcMap9.3.

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A map of the current *A. variegatum* and *A. hebraeum* distribution was produced and included 103 positive sites out of 113 sampled between 2000 and 2012. The field survey conducted in 30 study sites evidenced a distribution overlap of 30km (western side) to 100km (eastern side) width, along a slanting line northwest-southeast across the Save River, where both species were found in three sites and coinfestation of few animals was observed. The current distribution of *A. variegatum* and *A. hebraeum* seems unchanged compared to the 1950's despite marked evolution of the socio-economic context and political instability during civil war (1977-1992), which led to 80% cattle loss and to subsequent massive animals introduction from neighboring countries for repopulation. In addition, important within-country animal movements exist, especially from North (Tete province) to South of Save River (Inhambane, Gaza, Maputo provinces). Cattle are generally treated against ticks prior movements whereas small ruminants are generally not. However, given the difficulty to get sufficient and regular acaricides supply, tick control in most of Mozambican farms is considered too irregular to provide sufficient barrier to prevent tick spread or introduction with animal movements.

If information on potential introduction of *A. hebraeum* more northwards is scarce, it is highly likely that *A. variegatum* has been introduced in the Southern provinces of Mozambique, where it seems unable to establish. This study allowed a better description of the current distribution of *A. variegatum* and *A. hebraeum* in Mozambique. It showed a distribution overlap area, for which the limitations, as well as the species distribution patterns and interspecific competition should be more precisely studied. The results of this study will be integrated in a broader study of tick species ecological niches to identify factors driving this distribution patterns.