

SHORT COMMUNICATION

Tick control: a standardized terminology

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Ticks and tick-borne diseases (TBD) are a serious constraint to increased cattle production in Africa. The introduction of exotic cattle breeds to the African continent during the nineteenth century demanded intensive tick control, a practice which expanded rapidly to include indigenous cattle, and which in many countries was enforced through legislation.

The practice was continued on a wide scale until the past decade, when financial constraints, coupled with increasing cost of acaricide, made it prohibitively expensive. Moreover, several workers began to question the justification for intensive tick control. For example, Tatchell (1984) noted that '... countries lacking large-scale intensive tick control were keen to establish it, whereas those where it was already practised were trying to find ways of stopping it.' Consequently, despite existing legislation, many countries relaxed the requisite for the continuation of compulsory intensive dipping for both economic and technical reasons. The need of countries to recoup the costs of tick control led to changes and then to breakdown of tick control, with severe losses of livestock due to TBD.

In the early 1980s research was designed by scientists and donors to evaluate the problem. This resulted in the revision of control methods in several countries and the introduction of the concepts of integrated tick management, and integrated tick and TBD control (Young *et al.*, 1980; FAO, 1990; Tatchell, 1992). This concept can be summarized as the combination of one or more methods of tick control with methods of control of the pathogens causing TBD in such combination (integration) that maximum benefit is gained for minimum cost.

The introduction of integrated tick and TBD control programmes has contributed to the presentation in the scientific literature of a plethora of ill-defined terms describing the various tick control regimens using acaricide. For example, the term 'tactical' has been used synonymously with intensive, threshold and with strategic. An initial attempt to propose descriptions of the three main tick control options, intensive, strategic and minimal/threshold was made by Pegram *et al.* (1993). In this paper

we propose new standardized definitions for acaricide use and provide a list of obsolete synonyms which we hope will decrease confusion in future scientific literature.

Intensive tick control (obsolete synonyms: short interval, regular, tactical)

Acaricide application aimed at keeping animals totally free of ticks to prevent transmission of pathogens causing TBD; this usually involves frequent applications of acaricide throughout the year.

Strategic tick control (obsolete synonyms: seasonal, reduced, regular, tactical)

Acaricide application aimed at (substantial) reduction of tick populations and consequent reduction of level of transmission of pathogens causing TBD; the timing of acaricide application is based on ecological information on the seasonal numbers of ticks and the frequency of application will vary during the year.

Threshold tick control (obsolete synonyms: minimal, emergency, tactical)

Acaricide application aimed at controlling ticks when they exceed a pre-defined, economically damaging number of adult ticks.

For both intensive and strategic control the timing of the period of treatment or the frequency of treatment (treatment interval), may vary according to the acaricide used, the eco-climatic zone and tick challenge (both in terms of numbers and species), breed and species of livestock and relative costs of control measures and value of animal products and the availability of methods to control pathogens of TBD in livestock. For strategic control the timing is often seasonal in environments which permit only distinctly seasonal peaks of tick numbers. It may be less seasonal, but not intensive in environments which permit

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the ticks to occur more frequently through the year. Annual, or periodic, adjustments may be required based on prevailing cost, climate and the tick challenge. Various studies have demonstrated that in situations where tick control has decreased or stopped completely, then enzootic stability is established and maintained with no subsequent increase in the prevalence of TBD or of significant losses in productivity due to ticks *per se*. In practice, threshold tick control is the most difficult to manage on a scientific basis. Whilst damage coefficients for female ticks in final stages of engorgement (standard ticks) have been used to estimate production losses, these data have not been verified through long-term field trials. Moreover, there is some evidence that indicates that the decrease in weight gain and milk production due to ticks under natural field conditions may not show simple linear relationships (Pegram *et al.*, 1993). In addition, there is a need for further studies to determine tick control thresholds in relation to managing the natural rate of transmission of pathogens of TBD to aid the maintenance of enzootic stability. A variation of threshold control may be instituted, which involves treating the predilection sites of adult ticks such as *Amblyomma* species when abundant on the abdomen and udder.

There remain two other scenarios, one of which is a combination of strategic tick control and threshold tick control. For example, strategic tick control may be practised during the season of high numbers of adults of three-host ticks; during the following season *Boophilus* ticks may become sufficiently numerous to justify additional threshold treatments. The other scenario is based exclusively on the farmer's perception and has been referred to as emergency or tactical treatment. In reality this is a form of threshold treatment, as discriminated by the farmer rather than the scientist. With the philosophy of cost recovery for tick control services, the farmer may in the future more frequently choose the intensity and timing of treatments. Integrated control of ticks and TBD may also involve use of other tick control measures such as pasture management and the resistance of livestock to ticks. There will be the need for further definitions of

these methods and methods of control of the pathogens of TBD diseases such as vaccines and drugs, and livestock resistance to pathogens. It is recommended that, as far as possible, standardized terminology be used in future reports and publications to avoid misunderstanding between policy makers, field veterinary and extension staff, and scientists. Therefore we suggest that the following terms are not used for the description of acaricide application for tick control: short interval, regular, tactical, seasonal, reduced, minimal, emergency.

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