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Communal farmers' perceptions of tick-borne diseases affecting cattle and investigation of tick control methods practiced in Zimbabwe

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ABSTRACT

Tick borne diseases (TBDs) are responsible for huge economic losses in cattle production in most African countries where the majority of cattle owners are the resource poor communal farmers. Governments have initiated and co-ordinate tick control programs with farmers required to contribute funds for their sustenance. The success of these programs will hinge upon the involvement of communal farmers in their design, implementation and evaluation. To this end, 313 communal farmers (approximately 8.4% response rate) were interviewed and 3 focus group discussions were carried out in the southern low-veld part of Zimbabwe with the objectives of investigating communal farmers' perceptions on TBDs affecting cattle, level of participation in government initiated tick control programs, other tick control methods practiced, types of acaricides used and their perceived effectiveness. There was a general awareness of TBDs with 67.7% ($n = 212$) farmers being able to describe tick diseases with names or clinical and post-mortem signs. The diseases or problems frequently associated with ticks were cowdriosis (38%, $n = 119$), mastitis (36.7%, $n = 115$), anaplasmosis (36.1%, $n = 113$), body damage (28.4%, $n = 89$), babesiosis (24.6%, $n = 77$) and poor body condition (16.6%, $n = 52$). Cattle mortalities due to TBDs were reported by 23.8% ($n = 74$) of the farmers. The plunge dip was consistently used by farmers (70.3%, $n = 220$) to control ticks. Other tick control methods practiced were the hand spraying (67.4%, $n = 211$), hand dressing (16.6%, $n = 52$), traditional methods (5.4%, $n = 17$), use of pour-ons (4.5%, $n = 14$) and smearing (2.2%, $n = 7$). The formamidines were the most common class of acaricide used (59.4%, $n = 186$), followed by synthetic pyrethroids (29.1%, $n = 91$), macro cyclic lactones (12.8%, $n = 40$) and organophosphates (4.5%, $n = 14$). Most farmers (75.2%, $n = 231$) perceived these acaricides to be effective in controlling ticks. The results of focus group discussions showed that a number of factors influenced the success of government initiated tick control programs and these included inconsistent supply of acaricides, unaffordable dipping fees, lack of water, long distance to the dip tank, lack of information on dipping procedures and lack of knowledge on strategies for delaying acaricide resistance. This study demonstrates that while farmers can be a valuable source of information with regards to the epidemiology of tick borne diseases affecting their cattle, there is still need for further training in understanding the TBDs and strategies for their control.

Introduction

Ticks and tick-borne diseases (TBDs) are one of the major constraints to livestock production in the (sub) tropical areas of the world (Jongejan and Uilenberg, 2004). Global economic losses due to ticks and tick-borne diseases have been conservatively put at US$18.7 billion annually (De Clercq et al., 2012). The losses are incurred through the direct effects of ticks as blood sucking parasites and indirect effects as disease vectors which will lead to reduced growth rate, fertility problems, decline in milk production, reduced value of hides and livestock mortalities, notwithstanding the costs associated with treatment and control (Minjauw and Mcleod, 2003). The best way to control TBDs is through the control of the vector ticks (Willadsen, 2006) and various strategies

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have been proposed (Jonsson, 2004; Pegram et al., 2000; Peter et al., 2005). Historically, in most countries, particularly in Africa, the control of ticks and other vectors has been the responsibility of veterinary departments financed by the government but this responsibility has been transferred to livestock owners due to economic structural adjustment programs (Peter et al., 2005). However, this development has led to a widening gap between the veterinary services and livestock owners such that veterinarians and other animal health professionals no longer engage farmers to learn about their views, their problems and disease priorities (Mariner et al., 2011).

Since livestock owners are now playing a pivotal role in the control of TBDs, it becomes important to investigate the farmers' perceptions on the constraints they face and the benefits of the different technologies they use to solve those constraints (IFAD, 2004). This could be best achieved by conducting participatory epidemiological surveys where farmers are involved in defining and prioritizing veterinary related problems and also identifying and developing solutions to those problems (Catley et al., 2012). Studies of this nature will lead to more effective management of livestock diseases. This is so because the priorities of the farmers might be different from the priorities of the national veterinary services and they should be taken into account in the implementation of livestock disease control programs (De Garine-Wichatitsky et al., 2013).

The livestock sector in Zimbabwe is composed of large scale commercial, small scale commercial, the A1 and A2 resettlement as well as the communal farmers (Mavedzenge et al., 2006). The large scale, small scale and resettlement farmers are involved in intensive livestock production for profit. The A1 and A2 resettlement farmers are those that have benefited from the land reform program, with the latter farming on a large scale while the former are predominantly small scale farmers. Farming in the communal sector is largely for subsistence purposes with occasional selling of surplus in times of emergencies. It is important to note, however, that communal farmers in Zimbabwe own the majority of the cattle at more than 80% (Tavirimirwa et al., 2013).

Historically the most important tick borne diseases in the country are cowdriosis, babesiosis, anaplasmosis and theileriosis. The epidemiology of these diseases has been studied in the past (Katsande et al., 1999a; Latif et al., 2001; Norval et al., 1984a; Peter et al., 1998). Tick-borne diseases are responsible for more than 60% of all cattle mortalities in the country (Sungirai et al., 2015). This has led to the government playing a central role in tick control programs in communal areas and A1 resettlement areas, where they co-ordinate the purchase and supply of acaricides. Communal and A1 resettlement farmers are required to pay a fee of USD$2 per animal annually so that they participate in these government initiated programs. In large scale, small scale and A2 resettlement schemes it is largely the prerogative of the farmers to take their own initiatives when it comes to tick control.

In communal and A1 resettlement areas tick control is primarily based on the use of the plunge dip where communal farmers who would have paid dipping fees bring their cattle to a centrally located dip tank and have them submerged in a dip wash with acaricides, which is commonly referred to as 'dipping'. The reduction in government financial subsidies in tick control has been seen to change the attitudes and perceptions of farmers with regards to tick control programs (Pegram et al., 1993). It will be important then to understand whether farmers perceive TBDs the way the government does, investigate their level of participation in tick control programs and their own interventions in as far as tick control is concerned. As highlighted earlier, participatory surveys will be helpful in soliciting such kind of information which will be very useful in sustainable disease control programs (Masika et al., 1997).

Communal farmers can have a large wealth of indigenous knowledge on livestock diseases which could be viewed as a natural extension of the veterinary diagnostic service (Catley and Mariner, 2002). Disease control programs often have failed because the local farmers have not been involved in identifying their problems and selecting, testing and evaluating possible solutions (Minjauw et al., 2002). According to (Chenyambuga et al., 2010) the currently held concept of TBDs control has to be revised and should consider the indigenous knowledge of livestock keepers. Literature search on the involvement of farmers in studying the epidemiology of diseases in Zimbabwe revealed that only a few studies had been conducted (Chikerema et al., 2013; De Garine-Wichatitsky et al., 2013; Mosalagae et al., 2011; Pfukenyi et al., 2010) and none of these have directly looked at TBDs. This is despite the importance placed on TBDs by the government Department of Veterinary Services in the country. Hence the purpose of this study was to investigate the perception of communal farmers with regards to TBDs, level of participation in government initiated tick control programs, extent of practicing other tick control methods and classes of acaricides used. The influence of age, gender, level of education, farmer training and problems of TBDs in the area on the awareness of TBDs was also investigated.

Materials and methods

Study area

The study was carried out in Bikita, a district in Masvingo province of Zimbabwe (Fig. 1).There are three distinct ecological regions in the district (Chikodzi et al., 2013). The north-western part falls under ecological region 3 at an altitude of between 500 and 1000 m above sea level with an average annual rainfall of 650–800 mm. The temperature ranges from 18 to 24 °C. The south-western, central and north eastern part falls under ecological region 4 and this region dominates most of Bikita district. Average rainfall is 400–640 mm per year with an altitude above sea level of 450–900 m. Seasonal droughts are common. The temperature ranges from 20 to 25 °C. The extreme south and south-eastern part falls under ecological region 5. The average annual rainfall is 300–500 mm with an altitude above sea level of 450–500 m. The climate is very hot with a mean temperature range of 22–30 °C. Ecological region 5 of Bikita is largely composed of the Save Valley Conservancy with large tracts of forestry and wildlife areas and low cattle densities and or absence of cattle.

Data collection

The study was carried out in two phases and was designed to be carried out as personal interviews and focus group discussions. Informal discussions were first carried out with key informants in the district on general animal health issues and tick-borne diseases in particular. The key informants included the animal health inspectors, livestock specialists, extension officers, village heads, school teachers. Thereafter a questionnaire was designed and tested amongst veterinary assistants and 30 farmers who were randomly selected in the district. After this initial exercise the questionnaire was re-designed taking into account the inputs and modifications that were identified during the pre-testing stage. The interviewers were selected from local veterinary assistants who were trained in the administration of the questionnaire to solicit information without bias.

The personal interviews were planned such that they occurred on dipping days. It was believed that this was not a significant source of selection bias since most if not all of the communal farmers are expected to bring their cattle to the dip (De

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