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Factors affecting the sustainability of tick and tick-borne disease control in Uganda and malpractice associated with acaricide use

J. Okello-Onen, C.M.B. Ssekitto and W. Mwayi
Livestock Health Research Institute, P.O. Box, 96, Tororo, Uganda

Abstract

Country-wide surveys were conducted in Uganda from 1996 to 2000 to understand the current ticks and tick-borne diseases (T and TBD) control practices and constraints to control, so as to develop appropriate intervention measures. The present paper reports on the malpractice associated with the use of acaricides, as one of the major factors affecting the sustainability of T and TBD control in Uganda. Six major types of malpractice were identified. These include delivery of acaricides, choice of acaricides, their dilution rates, methods of application, frequency of application and storage and disposal. The possible causes of malpractice and their consequences are discussed. The need to rationalize T and TBD control is suggested and some key intervention strategies are recommended.

Key words: Appropriate interaction measures, livestock management

Introduction

Ticks and tick-borne diseases (T and TBD) constitute the single most important health impediment to the improvement and development of viable livestock industry in Africa, due to the high economic costs (losses) they impose to farmers and national economies (Mukhebi *et al*., 1992). Ticks of economic importance and the diseases they transmit are *Rhipicephalus appendiculatus* (East Coast Fever, Corridor disease); *Amblyomma variegatum* (Cowdriosis) and *Boophilus decoloratus* (Babesiosis, Anaplasmosis). These diseases cause serious debility, morbidity, mortality and production losses in susceptible taurine cattle (*Bos taurus*), their crosses as well as in indigenous breeds of cattle (*Bos indicus*) raised in non-endemic areas (Henning, 1932; Yeoman, 1966). Generally, the animals that recover from TBD infections may suffer from weight loss, low milk yields, low draught power, reduced fertility and delayed maturity. In case of ECF, these animals remain carriers and may serve to disseminate infection (Brown, 1985).

One important aspect of the impact of T and TBD is the loss of potential increased production caused by the hindrance of introduction of livestock production schemes based on exotic, more productive but susceptible stock (De Castro, 1997). The global losses due to T&TBDs are estimated at US$ 13.9 – 18.7 billion (De Castro, 1997). In 11 countries of eastern, central and southern African countries, the total direct cost of theileriosis is estimated at US$ 168 million annually, including an estimated mortality of 1.1 million cattle (Mukhebi *et al.*, 1992).

In Uganda, the control of T and TBD has relied heavily on the use of synthetic acaricides to control ticks on livestock. The acaricides are popularly applied on animals in dips or as sprays and pour-ons at frequencies of once or twice a week. This method was introduced in Uganda in 1930's and its popularity led to the introduction of compulsory tick control policy in 1968 (Okello-Onen *et al*., 1992). The policy embraced all breeds of cattle simply because the indigenous breeds of cattle were considered to be reservoirs for T and TBD for the exotic breeds of cattle.

Initially, T and TBD control programme was heavily subsidized by the government as an incentive for the farmers. The subsidy was estimated at US $ 10 - 26 million annually (Okello-Onen and Nsubuga, 1997). However, due to economic constraints and economic liberalisation policy, this subsidy scheme was withdrawn. Subsequently, there was a general decline in the back-up services such as dipwash analysis, acaricide resistance testing and general technical and supervisory services. As a result, many tick control facilities fell into a state of disrepair. Most of the communal dips became non-functional; the functional ones being under private ownership, but poorly managed. The majority of farmers, therefore, resorted to hand spraying their animals, a practice that is not efficient at all for large herds of animals (Okello-Onen *et al*., 1997).

Materials and methods

Surveys were conducted country-wide to collect data on the current T and TBD control practices and constraints to control. Semi-structured questionnaires were administered

to farmers and extension workers. Key informant interviews were held with representatives of Farmer's organizations, extension workers, NGO's, civic leaders, drug companies and drug dealers.

The different types of acaricides on the market and their trade names were documented. Practical observations were made on the procedures of acaricide use by farmers, especially the dilution and animal spraying techniques.

Results

Major malpractice associated with acaricide use

Six (6) major types of malpractice associated with acaricide use were identified in the country. These include the delivery of acaricides, choice and consistency of acaricide use, dilution rate, methods of application, frequency of application and storage and disposal.

Delivery of acaricides

Following the adoption of liberalized economic policy, the government ceased to have a monopoly on importation and distribution of acaricides. The drug companies and dealers are free to import any type of registered acaricides into the country. The imported acaricides end up in drug shops in different urban centers in the country, from where they are purchased by the farmers or third parties. During this transition, a number of acaricides get adulterated with other products, thus affecting their quality.

Choice of acaricides

Currently, over 15 types of acaricides are being used by farmers, that belong to 3 major chemical groups; organophosphate, amidine and synthetic pyrethroids (Table 1). Each chemical group contains a number of products with different trade names, the predominant products being the amidine and pyrethroid groups. However, the farmers are not adequately guided on how to differentiate these products. Over 60% of farmers interviewed use acaricides indiscriminately without following the recommended hierarchical order of use. In addition, many of them are not consistent in their choice of acaricides; they often change from one acaricide to another without any justifiable cause.

Dilution rate of acaricides Many farmers are not familiar with the dilution rates of most acaricides (Table 2). A number of them use wrong measurements either deliberately to economize on acaricides or through ignorance. However, several farmers are familiar with the measurements for organophosphates, which have been on the market for a long time. As a result, they tend to confuse the measurements for organophosphates with those of other products. Among the pastoralist community in Mbarara district, about 85% of routine acaricide dilutions was reported far below the normal strength (Okello-Onen et al., 1997). This has wide implications for development of acaricide resistance in ticks. In some cases, acaricides are mixed with the bare hand, thus posing serious health hazards to the users.

Method of acaricide application

There are three (3) methods of acaricide application; spraying, dipping and pour-on. Spraying is the most popular method of acaricide application. However, most animals, especially the indigenous breeds, are not sprayed in crushes, but in enclosures (*kraal*) in a haphazard manner without paying any particular attention to the pre-dilection sites for tick attachment (Okello-Onen *et al*., 1997). The crushes or enclosures are usually cited near water points for easy access to water. This can cause serious pollution in the water bodies. For economic reasons, a number of farmers use poor types of spray pumps, some of which are for crops. In addition, some farmers administer low volumes of acaricide wash on animals, that can hardly provide adequate wetting of animal body and is ineffective for tick control. During spraying, the farmers hardly wear any protective gears, and most of the acaricide wash get wasted on the ground.

Most dips are not calibrated due to shortage of experienced extension staff. In addition, the dipwash samples are not analysed regularly because of remoteness of analytical laboratories at Entebbe or Kampala, delays in sample analysis and costly charges for samples. As a result, most dipwash concentrations are at understrength. The pour-on methods are not always used as recommended. At times, either lower doses are used or the product is diluted with water.

Frequency of acaricide application

The recommended frequencies of acaricide application are not always adhered to. In most cases, the frequency of treating animals is influenced by the level of tick challenge and seasons (Okello-Onen et al., unpublished report).

Storage and disposal of acaricides

Several farmers store acaricides carelessly in their houses at the risk of family health. However, the most serious concern is the disposal of acaricides and their containers. Many farms with dips do not have soak pits for disposing dip contents. In some cases, the soak pits have silted due to lack of maintenance. As such, the old dip contents are disposed onto the ground. The acaricide containers are disposed of carelessly on the compounds. Sometimes, the containers are used for storing water and drinks.

Discussions

This paper provides highlights on malpractices associated with acaricide use, so as to influence future policies on T and TBD control. The results show that malpractice in T and TBD control is caused mainly by socio-economic issues, ignorance, lack of professional guidance, government policies, marketing pressures from drug companies and water supply. The prevailing socio-economic situation in

Table 1. The types of acaricides currently in use in the country

Formulation	Chemical group	Trade name of acaricides	Scientific name
Single	Organophosphate	Supona	Chlorfenvinfos
		Steladone	- do -
	Formamidine	Taktic	Amitraz
		Bimatraz	- do -
		Milbitraz	- do -
		Norotraz	- do -
		Almatix	- do -
		Amitix	- do -
		Bombard	- do -
		Triatix	- do -
	Synthetic pyrethroids	Decatix	Deltamethrin
		Renegade	Alphacypermethrin
		Tsetse tick	Cypermethrin
		Blitzdip	Cypermethrin
		Bayticol	Flumethrin
		Ectomin	Cypermethrin
		Ectopor	- do -
Combined	Synthetic pyrethroids and Formamidine	Ektoban	Cypermethrin and Amitraz

Table 2. The concentrations of different acaricides used in Ankole Ranching Scheme, Mbarara

	Concentrations			
Acaricides	Above normal (%)	Normal (%)	Moderate (%)	Below normal (%)
Taktic	-	11.3	10.2	78.4
Ectomin	-	100.0	-	-
Steladone	-	4.7	71.4	23.4
Decatix	27.7	38.8	5.5	27.7
Supona	15.4	84.6	-	-
Bayticol	-	50.0	-	50.0

Source: Rutagwenda and Okello-Onen (1997).

the country has had a negative effect on livestock farmers. Several farmers cannot afford to administer acaricides and drugs as recommended. In some cases, some farmers are ignorant on the appropriate methods of using acaricides and drugs. This could be attributed to lack of effective extension guidance. It is acknowledged that a number of extension staff have recently been retrenched. The remaining few are poorly motivated and cannot effectively provide professional guidance on tick control.

Some of the malpractice are partly due to the government policies and legislation that are outdated. The recently revised policy on T and TBD control (MAAIF, 1997) has not been implemented. Further, the liberalized economic policy has relaxed regulatory mechanisms on importation and distribution acaricides and drugs on the market. The policy has provided the drug companies and their agents with an unlimited latitude in importation of acaricides and drugs. A recent survey confirmed a diverse range of products on the market with different trade names, but belonging to the same generic compounds. This scenario has made the farmers confused on the choice of appropriate products. The situation is further exacerbated by marketing pressure from the drug companies and their agents. The farmers are lured to change to a new product that may belong to the same generic compound with that he had been using previously. As observed by de Castro (1997), the farmers are pressurized to use chemicals, often in greater amounts and frequency that would be needed.

Other malpractice are also due to poor packing of products that predisposes them to easy adulteration. Several products are not labeled in local languages, thus making it difficult for some farmers to follow instructions. Some malpractice occur due to shortage of labour and lack of water, especially during dry seasons. These problems make the farmers to administer low volumes of acaricide wash on animals.

Conclusion

Based on the highlights of malpractice associated with acaricide use, there is an urgent need to rationalize T and TBD control programme in the country, so as to avoid development of widespread acaricide resistance in all the groups of compounds currently in use. This is essential since several drug companies are not willing to invest in future development of drugs due to its prohibitive cost estimated at US$ 230 million (De Alva, 1995). Some of the measures to rationalize T&TBD control include;

- Providing training for farmers and extension workers on appropriate methods of using acaricides
- Targeting control strategies to the production systems and cattle populations at high risk of TBDs.
- Encouraging drug companies to provide back-up services to farmers e.g. calibration of dips and charging, collecting dipwash samples for testing
- Decentralizing back-up services like dipwash analysis and acaricide resistance testing
- Strengthening the regulatory mechanisms on importation and distribution of acaricides. The number and variety of acaricides on the market should be restricted
- Establishing mechanisms of monitoring the use of acaricides and their effectiveness
- Developing alternative (non-chemical) methods of controlling T and TBD.

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