

Alternative remedies used by resource-limited farmers to manage ophthalmia in cattle, from Ntabazinduna communal area, Umguza district, Matabeleland North Province, Zimbabwe

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Abstract: Many people around the world depend on cattle for their livelihood as a result farmers have an obligation to properly manage their cattle for maximum production. However, due to limited resources, some farmers cannot afford to use conventional veterinary drugs to manage some cattle diseases. Hence, resource-limited farmers resort to the use of low or non-cost alternative remedies which are cheap and locally available. One disease which has become problematic is ophthalmia which poses an economic threat to the beef industry. The objective of this study was to determine and document the alternative remedies used by communal farmers in Ntabazinduna communal area to manage ophthalmia in beef cattle. The survey was done at ward 5 in Ntabazinduna communal area found in Umguza district of Matabeleland North province of Zimbabwe. A questionnaire was administered to 100 cattle-keeping households in January 2015, to determine alternative remedies used in treating ophthalmia. Ophthalmia was reported to be most prevalent during the rainy season and all respondents (100%) of the respondents considered the disease (ophthalmia) as a common problem in cattle. About 89% of the respondents used alternative remedies, 6% used conventional drugs, while 5% used both to treat ophthalmia. The following alternative remedies were used; *Solanum incanum* (36%), millipede shell (31%), hot wire (17%) while those using sugar granules and Terramycin eye powder were both at 8%. Resource-limited farmers exhibited exceptional knowledge and understanding of alternative remedies and their effective use.

Key words: alternative, documentation, ethnoveterinary remedies, ophthalmia

I. Introduction

Cattle are the most populous livestock species and plays an important role in the socio-economy of the smallholder livestock farmers in the semi arid areas of Zimbabwe, through provision of draught power, milk, meat, occasional sales and use at social functions (Moyo *et al.*, 2014; Masuku *et al.*, 2015). However, prevalence of cattle disease in smallholder livestock sector has been major constraint to increased cattle production, worsened by poor nutrition and management practices (Moyo *et al.*, 2014). This is on the backdrop that commercial veterinary drugs are expensive and unaffordable; hence resource-limited turn to low cost alternatives remedies (Moyo *et al.*, 2015). Furthermore, Mwale and Masika (2009) reported that conventional drugs exacerbate environmental pollution and result in residues in livestock products. In addition, inaccessibility of veterinary offices and animal health management centres lead farmers to use alternative remedies (Moyo *et al.*, 2014). It has been acknowledged that before the introduction of western medicine, all livestock keepers relied on traditional healing practices (Dold and Cocks, 2001).

World Health Organization, estimated that at least 80% of people in developing countries depend largely on these practices for the control and treatment of various diseases that affect both animals and humans (Toyang, 2007; Mwale and Masika, 2009). Ophthalmia is one of the diseases that affect cattle productivity in the smallholder livestock sector in Zimbabwe. Ophthalmia becomes epidemic during late winter and summer (rain season) and it increases the cost of production through labour and animal health care. Cattle with ophthalmia may have reduced value due to scarred or inflamed eyes. Furthermore calves suffering from ophthalmia have reduced weaning weights and may have decreased appetite because of pain or decreased vision that results in an inability to locate feed and water (Huston, 2014).

Ophthalmia has been treated using both conventional drugs and ethno veterinary remedies. Ethno-veterinary medicine encompasses the knowledge, skills, methods, practices and beliefs about animal health care found among the members of a community (Mwale and Masika, 2009). However, there is little if any documentation of the different alternative remedies used by communal cattle farmers to manage ophthalmia cases in Matabeleland North Province of Zimbabwe. Therefore, the objective of this study was to determine and document various alternative remedies used by Ntabazinduna communal farmers to treat ophthalmia in cattle.

II. Materials And Methods

STUDY AREA

The survey was conducted in Ntabazinduna communal area in ward 5 of Umguza district of Matabeleland North province in Zimbabwe. Ntabazinduna is located 32km northeast of Bulawayo in agro-ecological zone IV on latitude 20°2'43"S, 28°58'30"E with an altitude of 1379m above sea level. The zone is characterised by low rainfall of 450mm-650mm per annum with an average temperatures of 24°C. The area is a tree bush savannah having *acacia* spp as dominant trees and *eragrostis* spp and *heteropogons* spp as dominant grasses.

Data collection.

A questionnaire was randomly administered to 100 households that kept cattle in five villages. Data were also collected through direct observations, interviews and meetings with key informants.

Statistical analyses

Data were analyzed using the Statistical Package of Social Scientists (SPSS) version 21 software. Descriptive statistics and cross tabulations were computed.

III. Results

Most households interviewed were headed by males (70%) while females (30%) headed few homesteads (Figure 1). Almost 63% of respondents reported that their herds of cattle were released from kraals in the morning, and herd the cattle till late afternoon, while 37% release the animals to the veld in the morning then collect the animals late in the afternoon. Almost all respondents (98%) indicated that their herds were managed by boys (young men).

Most of the respondents were between the ages of 40-49 years and the age group of 30-39 years was the least (Figure 1).

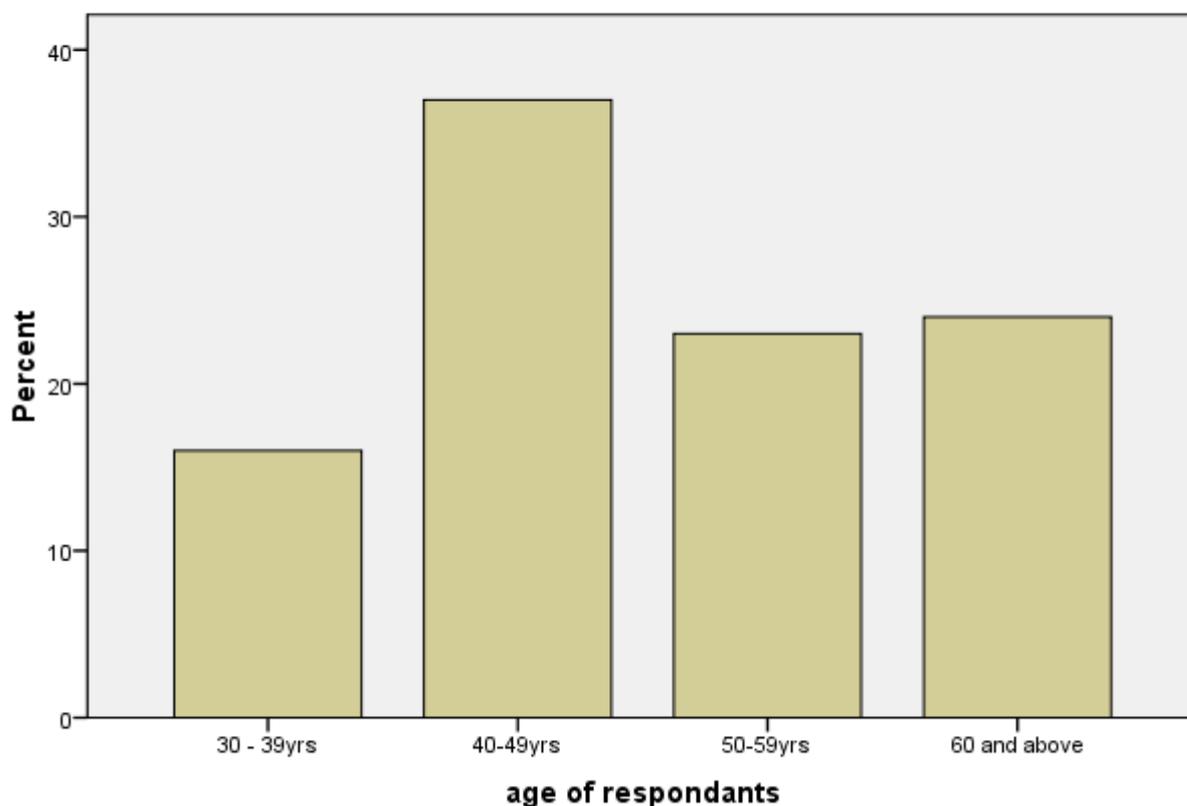


Figure 1 Age of respondents

About 77% respondents reported that ophthalmia caused reduction in carcass quality while the other 23% were indicated that it reduced productivity. All the respondents considered ophthalmia as a problematic disease and they treated/controlled it using both conventional and alternative remedies. About 89% used alternative remedies, 6% used conventional drugs, while 5% used both. The list of alternative remedies used by farmers is shown in Table 1. *Solanum incanum* was the plant used most often (36%), 31% used millipede shell, hot wire was used by 17% and sugar granules was the least used (8%).

Table 1: Ethno veterinary remedies used in ophthalmia treatment and their preparations.

Material/plant spp used	Scientific name	Local/vernacular name	Part used	Method of preparation/application
Hot wire	n/a	<i>Ucingo</i>	Hot rounded part	regional around the eye (once)
Giant African Millipede	<i>Archispirostreptus gigas</i>	<i>Utshongololo</i>	Shell	Crush the shell to powder, then apply powder (pinch) on the eye
Table sugar	<i>Sucrose</i>	<i>Itshukela</i>	Granules	Crush the granules to powder, apply powder (pinch) on affected eye
Bitter apple	<i>Solanum incanum</i>	<i>Intume</i>	Leaves	Place leaves on a clean piece of cloth, then squeeze to get juice, applied topically on the eye (two-three drops)

The knowledge of treating ophthalmia was obtained from different sources that is family elders (40%), friends (24%), neighbours (22%), extension agents (9%) and local leaders (5%). About 8% of the farmers used commercial medicine (Terramycin eye powder-oxetetracycline). All farmers agreed that the alternative remedies used in the absence of commercial drugs were effective. This disease was most prevalent during the rainy season affecting mostly weaners of both sexes and in animals aged between; 3-8years. All farmers perceived ophthalmia to be a threat to cattle productivity. Sixty- eight percent suggested that the government should help by documenting the ethno veterinary methods so that they can be validated.

IV. Discussion

Among cattle producers, household demographic distribution shows that there were more male headed households than female-headed ones in Ntabazinduna area. This supports the fact that, in most African societies, males are the heads of the households (Chimonyo *et al.*, 1999). Cattle were managed by young men (boys) on a daily basis and the respondents reported that they herded their cattle because Ntabazinduna was close to Bulawayo with numerous butchereries and abattoirs, which made it a target for stock-thieves. In addition cattle were herded to prevent them from straying into the highway and crop fields.

Farmers interviewed indicated knowledge of alternative remedies and commercial drugs that were used in the treatment of ophthalmia. They further indicated that alternative remedies were gaining popularity. This was in agreement with Khabir *et al.* (2008) who found out that ophthalmia alternative remedies were popular in developing countries where one-third of the population still lacked access to essential medicines. Most of the traditional knowledge came from family elders, friends and neighbours, most of whom were older people of 50 years and above. This was in agreement with Tabuti *et al.* (2003) who reported that ethno-veterinary information was transmitted orally from generation to generation hence it was in danger of extinction as older people died and the younger generation failed to learn the traditional way of life.

Although the farmers mentioned that they obtained most of their income from agriculture, the major enterprise was cattle production. Ophthalmia is spread by face fly (*Musca autumnalis*); was most prevalent during the rainy season when the conditions were conducive for face fly multiplication. This was in agreement with Chu and Chan, (2013). Most of the farmers felt that ophthalmia reduced productivity in their cattle, because affected animals tended to shy away from light and sought shaded areas where there was no feed, as a result the cattle became emaciated. Alternative remedies are widely used in the smallholder sectors, though there is a perception that farmers' religion and level of education influenced the use of ethno veterinary remedies in the smallholder sector (Gueye, 1999).

Resource limited farmers in rural areas have limited access to veterinary care in terms of support services (from state and private veterinary and animal health technicians), information about the prevention and treatment of ophthalmia. This leads to farmers resorting to the use of ethno veterinary remedies for health management of cattle. This was in agreement with Tipakorn (2002), who reported that ethno veterinary remedies were locally available and culturally acceptable alternatives to commercial drugs. Findings by Matekaire and Bwakura (2004) support the current study; that, although an extensive network of veterinary offices exists, a poor communication infrastructure and shortage of manpower drives livestock owners to treat animals themselves, using ethno veterinary medicines (Moyo *et al.*, 2014), consult neighbours and friends if non in the family has knowledge. According to the current study, ethno-veterinary medicines were easy to apply and

cheap to acquire, this was in agreement with findings by Mwale and Masika, (2009; Moyo *et al.* (2014) and Moyo *et al.* (2015).

The knowledge differed from villages, this was in agreement with Matekaire and Bwakura (2004) who stated that knowledge base differs not only from region to region but also among communities. The materials used in Ntabazinduna in treating ophthalmia were Terramycin eye powder (commercial drugs), *S. incanum*, table sugar, hot wire and millipede shell. Terramycin eye powder (Pfizer laboratories (Pty) LTD, Cape Town, South Africa) is a commercial registered antibiotic for bacterial eye infections. Its active ingredients are oxytetracycline HCL 20mg/g and benzocaine 10mg/g. Its effectiveness in the treatment of ophthalmia depends on the user's ability to follow the manufacturer's instructions. Although all these materials were reported to be effective as perceived by farmers, little of this traditional knowledge has been documented and validated. Ethnoveterinary medicine has no place in the mainstream of veterinary medicine. Interviewed farmers perceived that by burning around the eyes, the white blood cells will concentrate more on the burnt area thereby dealing with bacteria in the eye.

Many of the medicinal uses of *S. incanum* are based on its analgesic properties. *Solanum incanum* contains saponin steroids, in particular glycoalkaloids, present in all parts of the plant, with the fruit having the highest concentration (Kambizi and Afolayan, 2001). The main glycoalkaloid is solasonine. Alkaloids solasodine and solamargine, and the steroidal sapogenins diosgenin are some of the other compounds isolated from the fruits. Alkaloids such as solasodine are used commercially as precursors for the production of steroidal compounds for medicinal use (Fukuhara and Kubo, 1991; Bukenya-Ziraba and Carasco, 1999). The fruits also contain dimethylnitrosamine (Khabir *et al.*, 2008). Solanine and other steroid alkaloids and tannins have been reported to have curative effects on eye inflammations and antibacterial properties (Wyk and Wink, 2005). In Senegal a maceration of the leaves is used as an eye bath to cure ophthalmia; in Malawi fruit sap is rubbed into scarifications around the eye to treat conjunctivitis (Kambizi and Afolayan, 2001; Khabir *et al.*, 2008). According to Kamoga (2010) water extracts of the fruit showed antibacterial activity against *Bacillus subtilis*, *Micrococcus flavus* and *Pseudomonas aeruginosa*. This suggests the potential use of *S. incanum* as an antibiotic. In addition, Sandhu (2011) reported that *Solanum nigrum*'s berries and the whole plant of *S. surattense* were used to treat eye infection. This possibly supports the claim for the use of *S. incanum* as a remedy for ophthalmia in cattle in Ntabazinduna.

Millipedes are worm-like organisms called arthropods. Millipedes have been used for different ailments. In Nigeria crushed millipedes are used to treat fever and convulsions in children (Lawal and Banjo, 2007) while in Zambia, they used smashed millipede pulp to treat wounds (Costa and Eraldo, 2007). Others used dry millipede smoke to treat haemorrhoids (Negi and Palyal, 2007). Millipede is administered in powder form, this might probably stimulate tears which will keep the eye lubricated and physically clear away foreign particles such as dust or microorganisms. It is speculated that the use of sugar is based on its high osmolarity drawing fluid out of the wound and inhibiting the bacterial growth. This assists in accelerating the healing process (Mphande *et al.*, 2007; Angelos 2013); bacteria need water to survive. On the other hand the veterinarians are against the idea of ethno veterinary remedies citing reasons that there are no proper dosages of the remedies and this is in agreement with Moyo *et al.* (2014) who found that veterinary officers are in different to the utilisation of alternative remedies due to their academic background.

V. Conclusion

Farmers in Ntabazinduna communal area used alternative remedies to treat cases of ophthalmia in their beef herds, this was as a result of rising costs of modern veterinary drugs and the fact that, the veterinary offices were located far away from the settlements. From the current study the ethno veterinary knowledge is likely to go on extinction since the young generation is very ignorant of it and the elders were dying without transmitting the knowledge, therefore documentation is urgently needed.

Acknowledgement

The authors would like to extend their gratitude to the Ntabazinduna cattle farmers.

References

- [1]. Angelos J.A, 2013, Overview of Infectious Keratoconjunctivitis, Merck manuals. 2009-2015 Merck Sharp and DohmeCorp,a subsidiary of Merck and Co,Inc, Whitehouse Station, NJ, USA.
- [2]. Bukenya-Ziraba, R. and Carasco, J.F., 1999. Ethnobotanical aspects of *Solanum* L. (Solanaceae) in Uganda. In: Nee, M., Symon, D.E., Lester, R.N. & Jessop, J.P. (Editors). *Solanaceae 4: Advances in biology and utilization*. Royal Botanic Gardens, Kew, Richmond, United Kingdom. pp. 345–360.
- [3]. Chimonyo M, Kusina N.T, Hamudikuwanda H. and Nyoni O 1999, A survey on land use and usage of cattle for draught in a smallholder farming area of Zimbabwe, *Journal of Applied Sciences in Southern Africa*, 5(2), 111-121.
- [4]. Chu X. C. and Chan C, 2013. Sympathetic ophthalmia: to the twenty first century and beyond, *Journal of ophthalmia inflammation and infection* 3:49

- [5]. Costa, N. and Eraldo, M. 2007. The perception of *Diplopoda* (Arthropoda; myriapoda) by the inhabitants of the country of Pedra Branca, Santa Teresinha, Bahia, Brazil. *Acta Biologica Colombiana*, 12(2); 123-134.
- [6]. Dold A.P. and Cocks M.L. 2001. Traditional veterinary medicine in the Alice district of the Eastern Cape Province. *South African Journal of Science*, 97; 375-379.
- [7]. Fukuhara, K. and Kubo, I. 1991. Isolation of steroidal glycoalkaloids from *Solanum incanum* by two countercurrent chromatographic methods. *Phytochemistry* 30(2): 685–687.
- [8]. Gueye, E.F. 1999. Ethnoveterinary medicine against poultry diseases in Africa villages. *World's poultry science journal* 55:187-198.
- [9]. Huston C, 2014. Extension Service of Mississippi State University cooperates with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, copy write 2014, Mississippi State University.
- [10]. Kambizi, L. and Afolayan, A.J. 2001. An ethnobotanical study of plants used for the treatment of sexually transmitted diseases (njovhera) in Guruve District, Zimbabwe. *Journal of Ethnopharmacology* 77: 5–9.
- [11]. Khabir, A, Mohammed A.K, Mohammed B.Q, Mohammed D.K, Anzam, A. and Clare G. 2008. Use of home remedies and traditional medicines for the treatment of common eye ailments in Pakistan: *Pakistan Journal* vol. 25 No. 1
- [12]. Kamoga, D. 2010. Some pharmacological activities of selected medicinal plant species used for treating cattle diseases in Kabari subcountry, Rakai District, Msc Dissertation, Makerere University, Wandegaya, Kampala, Uganda.
- [13]. Lawal, O.A. and Banjo, A.D. 2007. Survey for the usage of Athropods in Traditional Medicine in Southern western Nigeria, *Journal of Entomology*, 4(2); 104-112.
- [14]. Masuku, J., Dube, A. B. and Moyo, B. 2015. The impact of diptank rehabilitation on the occurrence of ticks and tickborne diseases in Umzingwane district, Matabeleland South, Zimbabwe. *Journal of Agriculture and Veterinary Science*, 8(2), 112-118.
- [15]. Matekaire T. and Bwakura, T.M. 2004. Ethnoveterinary medicine: a potential alternative to orthodox animal health delivery in Zimbabwe: *International Journal of Applied Veterinary Medicine* 2(4), 269-273.
- [16]. Moyo S., Masika, P.J. and Moyo, B. 2015. A survey of external parasites of free-range chickens and their ethno-veterinary control remedies, used by resource-limited farmers in Eastern Cape, South Africa. *Scientific Journal of Veterinary Advances*, 4(2); 13-20.
- [17]. Moyo, B., Ndlovu, S.L., Moyo, S.L., Masika, P.J., Muchenje, V., Ndhlovu, D.N. and Maphosa, V. 2014. Alternative remedies and approaches by resources-challenged farmers in the management of cattle blackleg disease in Umzingwane district, Matabeleland South, Zimbabwe. *International Journal of Livestock production*, 6(6); 97-102.
- [18]. Mphande, A.N., Killowe, C., Phalia, S., Jones, H.W. and Harrison, W.J. 2007. Effect of honey and sugar dressings on wound healing. *Journal of wound care*, 16(7); 317-319.
- [19]. Mwale, M. and Masika, P.J. 2009. Ethnoveterinary control of parasites, management and role of village chickens in rural households of Centane district in the Eastern Cape, South Africa. *Tropical Animal Health and Production*, 41; 1685-1693.
- [20]. Negi, C.S. and Palyal, V.S. 2007. Traditional uses of Animal and Animal products in medicine and rituals by the Shoka tribes of district Pithoragraph, Uttaranchal, India. *Studies on ethno-medicinal* (1); 47-54.
- [21]. Sandhu, P.S., Singah, B., Gupta, V., Bansal, P. and Kumar, D. 2011. Potential herbs used in ocular diseases. *Journal of pharmaceutical sciences and research* 3(4); 1127-1140.
- [22]. Tabuti, J.R.S, Lye K.A. and Dhillion S.S. 2003. Ethnoveterinary medicines for cattle (*Bos indicus*) in Bulamogi County, Uganda: plant species and mode of use. *Journal of Ethnopharmacology*, 88; 279-286
- [23]. Tipakorn, N., 2002. Effects of *Andrographis paniculata* (Burm.F.) Nees on performance, mortality and coccidiosis in broiler chickens. Ph.D. Thesis. Institute of Animal Physiology and Animal Nutrition, Georg-August-Universitat, Göttingen.
- [24]. Toyang, N.J. Wanyama, J. Nuwanyukpa, N. and Django, S, 2007. Ethno veterinary medicine, Digigrafi, Agrodoek 44, Wageningen, Netherlands.
- [25]. Wyk, B.E and Wink, M. 2005. Medicinal plants of the world. An illustrated scientific guide to important medicinal plants and their uses. Timber press, Incl.