Journal of Animal and Veterinary Advances 9 (23): 2951-2954, 2010
ISSN: 1680-5593

Ethnoveterinary Botanicals Used for Tick Control in the Acholi Subregion of Uganda

[1]Robert Opiro, [2]Anne M. Akol and [1]Joseph Okello-Onen
[1]Department of Biology, Gulu University, P.O. Box 166, Gulu, Uganda
[2]Department of Zoology, Makerere University, P.O. Box 7062, Kampala, Uganda

Abstract: A survey was done to document ethnobotanicals for managing and controlling tick vectors of deadly cattle diseases. About 100 respondents aged 45 years and more distributed among 10 sub-counties of Gulu and Amuru districts in Northern Uganda were interviewed for their knowledge of plants with anti-tick properties and/or plant species used to manage ticks on cattle. All respondents were drawn from cattle keeping households. The plants were documented in both local and scientific names. A total of 13 plant species falling into 8 different botanical families were documented as locally known to control ticks. A mechanism for propagating these ethnoknowledge as well as conservation measures particularly for the plant species with high use frequency as reported by the locals therefore need to be developed.

Key words: Ethnoveterinary, ethnobotanicals, ethnoknowledge, indigenous knowledge, ticks, Northern Uganda

INTRODUCTION

Ticks and Tick-Borne Diseases (T and TBDs) are among the most important constraints to improved livestock productivity in most pastoral systems (refs). Ticks and tick-borne diseases cause serious morbidity and mortality in susceptible exotic cattle, their crosses as well as in indigenous breeds of cattle raised in TBD-free areas (Okello-Onen *et al*., 1994). They also restrict the introduction of improved breeds of cattle where the diseases are endemic (Mukhebi, 1992). In Uganda, T and TBDs have been controlled entirely through heavy reliance on acaricides applied in dips or as sprays. The use of acaricides was initially heavily subsidized by the government as an incentive for farmers to manage ticks and improve livestock productivity.

Following the withdrawal of the subsidy scheme as a result of economic liberalization policies, the standard of tick control declined in most areas of the country (Okello-Onen *et al*., 1992). For instance, limited access to acaricides, under-dosing, poor application and disposal of acaricides since, extension agents were often not available to guide farmers (Okello-Onen *et al*., 1997, 2004a). These problems were later exacerbated by the civil strife that prevailed in the region because regular tick management became impossible. Consequently, tick loads in pastoral systems increased and in some cases, acaricide-resistant ticks emerged. Against this background of limited access to effective commercial formulations of acaricides, there is need to develop alternative measures for tick control to eliminate sole reliance on synthetic acaricides while maintaining comparable positive social, economic, epidemiological and environmental outcomes. Participatory workshops held in the Lango and Teso farming systems in Uganda revealed that some livestock farmers (especially those keeping indigenous breeds of cattle) had resorted to using botanicals for tick management.

The follow-up study in Apac and Pallisa districts of Northern Uganda revealed the presence of potential natural products for tick control in this region (Okello-Onen *et al*., 2004b). This indigenous knowledge of tick control practices, particularly of plant species with anti-tick properties, presents an opportunity to develop alternative measures for tick control. Documenting this knowledge that is largely in the custody of the elderly is especially important given that it could be lost as this group of individuals is lost to attrition. The present study, conducted in Gulu and Amuru districts to document botanicals used for control of ticks is part of efforts to search for alternative cost-effective, environmentally friendly and sustainable control strategies for T and TBDs. It was also aimed at contributing to the knowledge base of plant species available in Uganda with anti-tick properties.

MATERIALS AND METHODS

Purposive sampling was used to obtain data on botanicals for tick control. About 10 sub-counties distributed among Gulu and Amuru districts were surveyed. Within a sub-county, 2 or more sites

Corresponding Author: Robert Opiro, Department of Biology, Gulu University, P.O. Box 166, Gulu, Uganda

(depending on size of sub-county and number of animals) were selected basing on the presence of animal restraining facility (crushes). Cattle keeping households within and nearby the sub county were then required to bring their animals to the site for treatment. From each sub-county, 10 key informants were selected for interviews, totaling 100 interviews. Those chosen were of relatively advanced age (45 years and above) independent of gender. Semi-structured interviews were used to gather information on informant's knowledge of local plants used to manage tick problems on cattle, local names of the plants, mode of administration and preparation and farmers' perception of their efficacy. Samples of the plants were obtained and submitted for identification by botanists of the Makerere University Herbarium.

Any new practice mentioned was recorded and any repeated response was also tallied. Besides, the local names of the already recorded botanicals were recited to each participant to find out whether they knew it and if so, its uses and preparations in relation to tick control. Efforts were made to reduce bias by avoiding the presence of other people during the interviews.

RESULTS AND DISCUSSION

A total of 13 plant species falling into 8 families were documented (Table 1). Total 4 plant species had the greatest consensus amongst the respondents as being used in tick control. These were *Symphostema adedacule* F., *Cassia didymobotrya* Fresen, *Kigelia africana* (Lam.) Benth. and *Euphorbia hirta* L. (Fig. 1). Mode of preparation involved use of different plant parts. Use of fresh aerial leaves is the most frequent followed by the roots and barks (Fig. 2a).

On plant (*Euphorbia hirta*) involves extraction of sap which is then smeared directly on tick infested parts. Family Fabaceae and Asteraceae is the most common (Fig. 2c). Besides most of the plants documented are shrubs with very few herbs and trees (Fig. 2b). For all cases, mode of administration involved spraying directly on tick affected areas. This study has revealed for the first time the presence of anti-tick botanicals in the districts of Gulu and Amuru.

Previous efforts to document medicinal plants traditionally used for treating animals have largely been centred in the pastoral and agropastoral communities in

Table 1: Botanical for mananging ticks on cattle in Gulu and Amuru districts

Scientific names	Local name type of plant	Family	Method of preparation	Method of application
Salanecio mannii (Hook.f) C. Jeffrey	Ooko, shrub	Asteraceae	Leaves crushed, put in water and decanted	Sprayed directly on tick infested areas on the animal body
Symphostema adedacule L.	Anunu, herb	Cucurbitaceae	Fresh plant/vegetative and root tuber is pounded to fine particles in a mortar, mixed with water to make a concentrated solution stirred and filters	It is prayed directly on tick affected areas
Sonchus oleraceus L.	Acwaa, shrub	Asteraceae	Leaves are pounded, put in a volume of water and decanted	It is prayed directly on tick affected areas
Pseudocedrela kotschy (Schweinf.) Harms	Oput, tree	Meliaceae	Leaves are pounded, put in a volume of water and decanted	It is prayed directly on tick affected areas
Ajuga remota Benth	Ongolpil, shrub	Lamiacea	Roots and leaves crushed, mixed with a little water and filtered	It is prayed directly on tick affecte areas
Plectranthus barbatus Andr.	Oyee, shrub	Lamiacea	The plant leaves are pounded, mixed with a little water and decanted	It is prayed directly on tick affecte areas
Euphorbia hirta L.	Acak acak, herb	Euphorbiacea	The sap is extracted directly from the fresh plant	The sap is smeared directly on the affected areas
Cassia didymobotrya F.	Lurogo, shrub	Leguminosae/ Fabaceae	Fresh leaves are removed, crushed, mixed with water and decanted	It is sprayed directly on tick affected areas
Synadenium Hook.f.	Grantii Labuka, shrub	Euphorbiaceae	Fresh leaves are removed, crushed, mixed with water and decanted	It is sprayed directly on tick
Phaseolus lunatus L.	Muranga, herb	Leguminosae/ Fabaceae	Dried bean plants (after pods have been removed) are burt, ashes mixed with water and then filtered	Sprayed on tick affected areas
Erythrina abbyssinca Lam. ex DC	Lucooro, tree	Leguminosae-Papilionoideae	Fresh root and stem bark is pounded to fine particles, mixed in water to make a concentrated solution and filtered	It is sprayed on tick affected areas
Cucurbita maxima Lam	Abanceng, shrub	Cucurbitaceae	Fresh leaves removed and pounded, mixed with a little water and decanted	It is sprayed on tick affected areas
Kigelia africana (Lam.) Benth	Yago, tree	Bignoniaceae	The fresh fruits/bark of the plants is a pounded to a fine powder using a mortar. The pounded product is put in water stirred well and filtered	The product is applied by spraying on affected areas using a pump

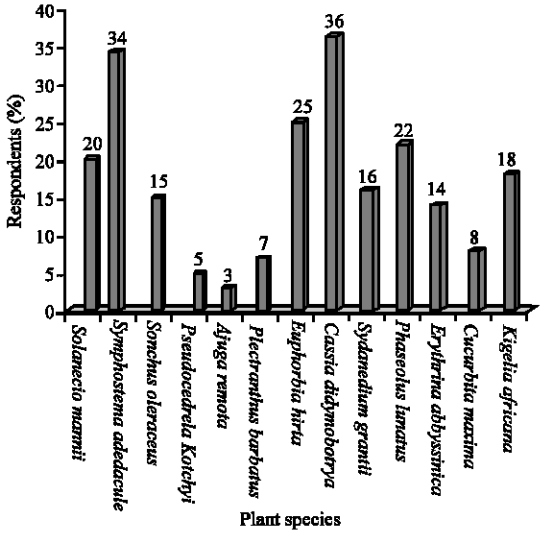

Fig. 1: Consensus amongst respondents on the use of plant species for tick content

the arid and semi-arid areas of East Africa (Ejobi *et al*., 2004). As such this survey was characterized by unwillingness of some individuals to disclose information enquired. This according to Ejobi *et al*. (2007) is probably because in most African countries, individuals with immense knowledge in traditional medicine are highly respected. Consequently, they tightly guard their secrets and only divulge the information to only a few confidants. The families with the largest number of plant species used to treat cattle are Asteraceae, Euphorbaceae, Fabaceae and Lamiacea (Fig. 2c).

These families have the highest diversity of species used to treat cattle diseases probably because they contain relatively more species than other plant families in the area (Tabuti *et al*., 2003). As such, locals tend to try to get the best use of them making discovery of their anti-tick potential more probable.

Many of the plants families and species mentioned in this study have been investigated before with some locally known to have species or genera which have toxic properties which may be responsible for their tick-killing properties. *Mucuna* sp. of the family fabacea contain antinutritional factors such as phenols and tannins and to possess trypsin inhibiting and haemagglutonating activities (Rajaram and Janardhanan, 1991). The Lamiaceae are known to contain alkaloids and proanthocyanidins and the species of reported here, *Ajuga remota* Benth. and *Plectranthus barbatus* Andr. are useful in treating ectoparasites, theileriosis and dietary deficiencies in cattle Central Kenya (Njoroge and Bussmann, 2006). Thus, some of the reported species may have toxic properties and hence may be poisonous to cattle if their use is adopted

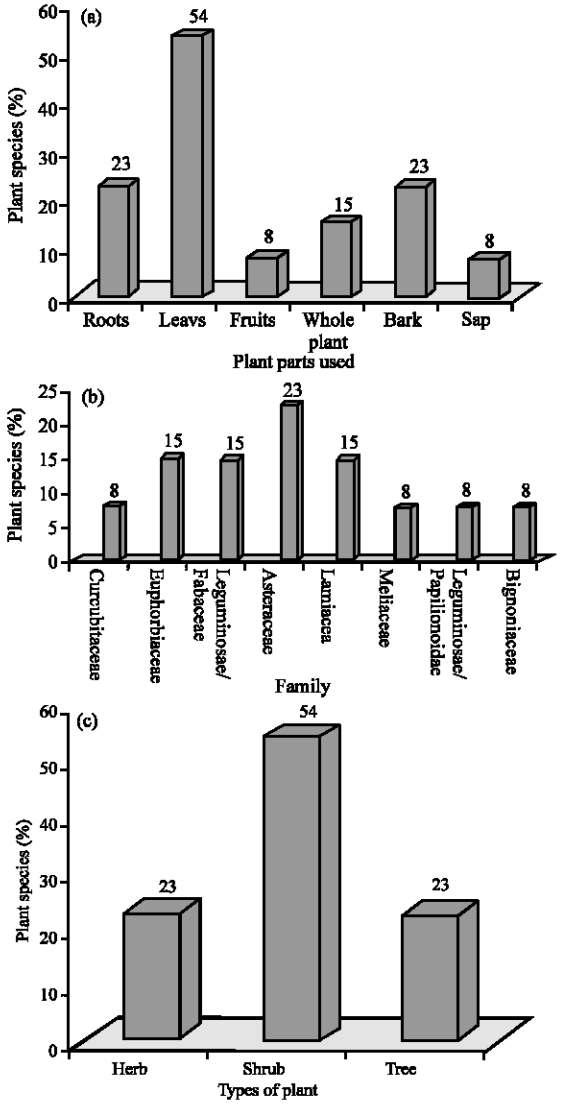

Fig. 2: Characteristics of the plants used for tick control in Gulu and Amuru district (n = 13) plant part used (b) family to which species belong (c) type of plant

without taking precautions. Much as locals believe in their cost effectiveness and efficacy, it must be argued that old sayings like ethnobotanically based practices are safe and can be used over a period of time without side-effects may not be entirely true. Further research needs to be conducted on leaves, stems and seedpods because these could be a hazard in terms of toxicity to farmers working with the crop and to animals consuming the foliage as fodder. Thus, plant species which showed the highest consensus need to be subjected to further studies in terms of efficacy trials and bioassays. It would be interesting to determine whether their traditional uses are supported by actual pharmacological effects or merely

based on folklore (Holetz *et al*., 2002). The survey also led to the discovery that the young people who have stayed for so long in the IDPs camps have absorbed large quantities of western culture but among the older people the remembrance of the past is still alive though gradually eroding now that they do not practice it often. A number of researchers (Wanzala *et al*., 2005; Njoroge and Bussmann, 2006; ICIPE, 2006; Okello-Onen *et al*., 2004a, b) have already expressed the fear that traditional knowledge transmitted orally from generation to generation is always in danger of extinction as older people die and younger generations fail to learn the traditional way of life which inevitably calls for their documentation.

The situation is worsened by rapid socio economic, technological and environmental changes (Tabuti *et al*., 2003).

In terms of conservation, the results show that leaf material is the most useful for tick control and it could be used without any detrimental effect on the plant. However, a mechanism for propagating these botanicals as well as conservation measures particularly for the plant species with high use frequency need to be developed.

CONCLUSION

It is observed that there is a strong possibility that many more plants with anti-tick properties exist in this region since, the research only captured 10 sub-counties. Thus, it is recommended that more research on documentation of anti-tick plants of the northern region of Uganda be done.

ACKNOWLEDGEMENTS

The researchers acknowledge the financial support of Gulu University for the fieldwork. Technical support in identification of plant specimens by Mr. Osinde Cyprian of Makerere University, Botany Department is hereby acknowledged. The appreciation also goes to the Gulu District Veterinary Office for permission to move with their team during the survey. We also thank all those people of Gulu and Amuru districts who shared with us their information during the field work surveys.

REFERENCES

Ejobi, F., D. Olila, S. Arionga and D. Kamoga, 2004. On-Farm Validation of Selected Ethoveterinary Medicinal Plants in the Teso Farming System. Department for International Development, UK.

Ejobi, F., R.D. Mosha, S. Ndege and D. Kamoga, 2007. Ethnoveterinary medicinal plants of the Lake Victoria Basin. J. Anim. Vet. Adv., 6: 257-261.

Holetz, F.B., G.L. Pessini, N. Sanches, D.A. Cortez, C.V. Nakamura and B.P. Filho, 2002. Screening of some plants used in the Brazilian folk medicine for the treatment of infectious diseases. Mem. Inst. Oswaldo Cruz Rio de Janeiro, 97: 1027-1031.

ICIPE, 2006. Evaluation and Application of Anti-Tick Natural Products Used by the Bukusu Community in Livestock Health Management in Bungomadistrict. International Centre for Insect Physiology and Ecology, Nairobi, Kenya.

Mukhebi, A.W., 1992. Economic Importance of Theileriosis and its Control in Africa. In: The Epidemiology of Theileriosis in Africa, Norval, R.A.I., B.D. Perry and A.S. Young (Eds.). Academic Press, London, pp: 379-403.

Njoroge, G.N. and R.W. Bussmann, 2006. Herbal usage and informant consensus in ethnoveterinary management of cattle diseases among the Kikuyus (Central Kenya). J. Ethnopharmacol., 108: 332-339.

Okello-Onen, J., C.M.B. Sekitto, Y.K. Ssentongo and C.A.I. Kudamba, 1992. Tick situation and control strategies in Uganda. Insect Sci. Appli., 13: 657-660.

Okello-Onen, J., E.M. Tukahirwa, G.S.Z. Ssenyonga, B.D. Perry, J.M. Katende, G. Musisi and M.T. Mwayi, 1994. Epidemiology of *Theileria parva* under ranch conditions in Uganda. Kenyan Vet., 18: 362-365.

Okello-Onen, J., T. Rutagwenda, F. Unger, W. Mwayi and S. Erima, 1997. A study on the status of East coast fever, the causes of calf mortality and abortion in ankole cattle in the ankole ranching scheme, Mbarara District, Uganda. Consultancy Report for GTZ-Integrated Pastoral Development Project, Sanga, Mbarara District, pp: 36.

Okello-Onen, J., C.M.B. Ssekitto and W.T. Mwayi, 2004a. Some factors affecting sustainability of tick and tick-borne disease control in Uganda. 1. Malpractice associatedwith acaricide use. J. Agric. Sci., 9: 663-666.

Okello-Onen, J., S. Apio-Kerwegi, D. Olila, C.M. Ssekitto and C. Osinde, 2004b. Participatory evaluation and improvement of ethno-veterinary practices for tick control in Lango and Teso farming systems. Final Technical Report of Project supported by NARO/DFID COARD Project.

Rajaram, N. and K. Janardhanan, 1991. The biochemical composition and nutritional potential of the tribal pulse, *Mucuna gigantea* (Willd) DC. Plant Foods Hum. Nutr., 41: 45-51.

Tabuti, R.S.J., S.S. Dhillion and A.L. Kaare, 2003. Ethnoveterinary medicines for cattle (*Bos indicus*) in Bulamogi County, Uganda: Plant species and mode of use. J. Ethnopharmacol., 88: 279-286.

Wanzala, W., K.H. Zessin, N.M. Kyule, M.P.O. Baumann, E. Mathias and A. Hassanali, 2005. Ethno-veterinary medicine: A critical review of its evolution, perception, understanding and the way forward. Livest. Res. Rural Dev.