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Traditional plant-based remedies to control gastrointestinal disorders in livestock in the regions of Kamina and Kaniama (Katanga province, Democratic Republic of Congo)

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ABSTRACT

Ethnopharmacological relevance: Gastrointestinal parasitic diseases present one of the main constraints hindering the productivity of the livestock sector (goat and cattle). Due to the limited availability and affordability of deworming drugs, traditional herbal remedies are still frequently used. The study aims at collecting traditional knowledge on local plants and remedies used to treat gastrointestinal parasitoses in livestock in two adjacent territories (Haut-Lomami district).

Material and methods: A field survey was carried out in a part of the Haut-Lomami district (province of Katanga). A semi-structured questionnaire was used to interview 44 people including farmers, traditional healers and livestock specialists (veterinarians and agronomist), identified as using or practicing traditional medicine. To prepare botanically identified herbarium specimens, cited plants were collected with the participation of interviewed people.

Results: Although interviewed people cannot precisely identify the etiology of gastrointestinal disorders/parasitoses in domestic animals, they treat the condition with herbals collected in their near environment. Nineteen different traditional remedies were collected and described; 9 plant species were identified as commonly used to treat gastrointestinal parasitic infections. From these, *Vitex thomasii* De Wild (Verbenaceae) appears as the plant most often used.

Conclusion: This survey contributed to the establishment of an inventory of plants used in livestock parasitic treatment in this region of the Democratic Republic of Congo. Future studies are needed to confirm the efficacy and safety of these traditional remedies.

1. Introduction

Livestock raising occupies an important place in the economy of the rural zone of Haut-Lomami district (Katanga province, Democratic Republic of Congo), especially for populations who have virtually no other sources of revenue than agriculture. This activity provides food security and guarantees an essential income. Unfortunately, as in most tropical areas, the performance of livestock raising is usually low, due to the small investment of farmers and poor sanitary conditions (Graber and Perrotin, 1983). Parasitic infections by gastrointestinal helminthes remain among the principal causes of a loss in productivity (Kasonia et al., 1991; Burke et al., 2009). An efficient control of parasites is generally achieved with husbandry management associated with a strategic anthelmintic prevention and therapy (Gnoula et al., 2007); the resistance of helminthes is however becoming a generalized phenomenon (Chiejina et al., 2010), although only scant data are available so far for sub-Saharan Africa.

In the investigated region of Katanga, conventional drugs of guaranteed quality are expensive and often unaffordable to resource-limited farmers. In addition many of the drenches available on the local market are counterfeits. Traditional plant-based remedies thus remain the primary solution to treat domestic

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animals by rural communities (Githiori et al., 2006; McGaw and Eloff, 2008; Jaeschke et al., 2011). Unfortunately, until now, very few publications have identified traditional remedies used for livestock in this part of Central Africa (Okombe et al., in press).

The present survey aims at collecting information on herbal remedies used by traditional healers and animal owners for the treatment of gastrointestinal disorders in cattle and goats, including their modes of diagnostic and of remedy preparation and administration.

2. Material and methods

2.1. Regional context and study area

A survey was carried out among natural healers, breeders and users of medicinal plants for their animals in the territories of Kaniama and Kamina, in the Haut-Lomami district of the province of Katanga, 600 km northwest from the capital city of province, Lubumbashi.

The livestock keeping in this rural area is characterized by (i) a family breeding with quite small herds of goats; and (ii) the presence of a large ranch, the "*Compagnie pastorale*", which raises thousands of Bonsmara cattle.

The geographical coordinates of the seven specific locations where surveys were conducted are as follows: Kamina (latitude 8°44′642S, longitude 24°0′507E), Kelambwe (latitude 8°35′335S, longitude 24°414′422E), Kankundwe (latitude 8°45 106′636S, longitude 24°50′491E), Kiabukwa (latitude 8°44′270S, longitude 24°54′253E), Makanza (latitude 8°52′640S, longitude 24°19′725E), Kindele (latitude 8°39′520S, longitude 24°11′098E) and Tshongwe (latitude 7°38′131S, longitude 24°29′192E).

2.2. Methodology

Forty-four interviewees were selected by the *Compagnie* for their working knowledge of ethnobotanical veterinary practice and as representative of the population working in livestock raising. The survey was conducted in two stages, in February–March 2008 and March–April 2010, by the same investigator, and targeted all people using herbal remedies to treat animals (herders, traditional healers,…); semi-structured interviews, with both closed and open questions, were conducted in people's home. The interviews required the establishment of a relationship built on mutual trust based on introducing the objectives of the survey. None of the approached individuals refused to participate in the interview. The interviews and discussions took place mainly in Swahili and/or in French, languages mastered by the investigator, and, if necessary in Kiluba, with the aid of an interpreter.

Initially the study was targeted at anthelminthic diseases; however, given that most of the interviewees identify signs that are not necessarily pathognomonic, the questionnaire was broadened to encompass "gastrointestinal disorders". The questionnaires aimed at collecting data relative to the individuals interviewed (sex, age, ethnic group, literacy, acquisition of knowledge, and acquisition of plants), the gastrointestinal disorders (identification, causes, periods of occurrence, animals affected, and care of the sick animals), and the traditional treatments used. For the seven locations, samples of leaves, stalk stems, seeds and roots of the nine plants listed in the survey were collected in the presence of the traditional users. The plants were identified with the help of Professor Jean Lejoly (Université Libre de Bruxelles) and voucher samples were deposited in the Kipopo herbarium (Botanic Laboratory of the University of Lubumbashi; specimen numbers are indicated in Table 4).

The relationships between recipes and herbs were graphed as an interaction network using the software Cytoscape 2.8.0 (http://cytoscape.org), with the layout organic (Shannon et al., 2003; Mukazayire et al., 2011).

3. Results

3.1. Users of veterinary phytotherapy

Forty-four people were interviewed (6 women and 38 men) aged between 27 and 71 years (Table 1). Nineteen of them were literate. The knowledge related to plants was always acquired, either by inheritance (86.4%) or by learning from other users (13.6%). All the interviewees gather the plants by themselves in their direct environment.

3.2. Gastrointestinal disorders/parasitoses in livestock (cattle and goats)

Keepers, livestock specialists (veterinarians and agronomist), and traditional healers interviewed during this survey identify gastrointestinal parasitoses through different signs (Table 2). As regard of the origin(s) of the disease, two major sources are commonly mentioned: drinking water and pastures soiled by stools deposited by affected animals (Table 2). Gastrointestinal signs of parasitoses are more common during rainy season (from September to April) and concern both cattle and goats. All the interviewees treat their infected animals by themselves.

Table 1
Information about interviewed persons ($n=44$).

Interviewee category	Men	Women	Age range (years)	% of Interviewees in that category
Livestock raiser	28[a]	6	27–71	77.3
Veterinarian	6	0	32–41	13.6
Traditional healer	3	0	42–61	6.8
Agronomist	1	0	56	2.2
Total	38	6		

[a] One of the raisers has a nurse formation.

Table 2
Indicative signs of gastrointestinal parasitoses and suspected main origins of parasites, as identified by interviewees.

Symptoms and causes of gastrointestinal parasitosis		Frequency (% of informants) ($n=44$)
Symptoms	Loss of weight	64
	Loss of appetite	64
	Rough hair coat	89
	Distended abdomen	73
	Presence of worms in stools	73
	Diarrhea	43
Causes	Drinking water	100
	Pasture	84
	Night kraals[a]	5
	"Moisture"	7

[a] Enclosure generally surrounded by a wooden fence, used to confine animals during the night (and during periods when it is necessary to protect crops).