Wageningen University dissertation no. 2992

Title: Creole remedies: case studies of ethnoveterinary medicine in Trinidad and Tobago
Author: Cheryl Lans

Abstract

Context

The popular pharmacopoeia of Trinidad and Tobago is the result of a Creole pan-Caribbean culture, closely linked to history, and the result of a South American Indian, African, European and Asian heritage. Ethnoveterinary medicine in this thesis is the local, mainly plant-based medicines used for animals. Low cost inputs are necessary and important to the future of livestock production in Trinidad and Tobago. Investments in commercial drugs are not sound in situations where farmers report that high numbers of animals are lost or stolen (Table 1).

Table 1. Summary of stolen, lost or dead animals in the 4 months prior to the November-December 1988, Tobago livestock census.

	Sheep	Goats	Cows
No. animals lost or stolen	118	37	21
No. farmers reporting lost / stolen animals	37	19	3
No. dead animals	625	149	48
No. farmers reporting deaths	167	84	31

Source: Osuji *et al.*, 1988.

Objective

Research in ethnoveterinary knowledge was conducted as one possible solution to the existing constraints in animal health care in Trinidad and Tobago. The origins of the folk knowledge in Trinidad and Tobago were traced since socio-cultural rather than scientific logic provides the basis for some of the folk remedies. Knowledge of these cultural practices is necessary in the verification process, so that research effort is not wasted in chemical analysis of plants that are used for culturally specific reasons.

Methods

The methods used were inter-disciplinary and paid equal attention and respect to local and western-scientific perspectives. The first phase of the research involved data collection carried out for five months in 1995. This data collection can be divided into four parts: the school essay method; the group and individual interviews; the focus group workshops and the secondary literature review. The school essay method used in the first step of the data collection is a Rapid Rural Appraisal (RRA) tool. The group interviews and the workshops used in the second and third steps of the data collection fall under the category of Participatory Rural Appraisal (PRA).

In the second phase of the research, the researcher worked through previously known individuals and from previously existing social networks in building a snowball sample. Known people helped in the creation of some networks by suggesting people who could be interviewed. Snowball sampling led to community members who were well recognised as knowing more than the average person knows. A purposive sample of ethnoveterinary key respondents was obtained, which minimised negative outcomes. This networking approach

was necessary because there was no sampling frame of persons involved in traditional healing. From 1997 - 1999, the researcher also conducted research with one group of seven hunters based in south Trinidad. This research included participant observation which involved taking part in five hunts over the three years (going into the forest, observing the chase and capture, sharing a meal and sharing of take home game). Participant observation and in-depth interviewing of key respondents are traditional anthropological approaches.

Western science has often been used as the standard by which other knowledges should be evaluated. Western science has become the main means of establishing whether a technology works and how. The non-experimental validation of the ethnoveterinary medicines was undertaken in recognition of that fact.
The purpose of this non-empirical validation is to provide a guide to laboratory researchers as to which of these plants merit further investigation. The first step of the methodology involved a review of the published historical, social science and ethnomedicinal literature to gain an understanding of Caribbean, Asian, African and Latin American concepts of health and illness. This step served to separate the plants used for cultural reasons from those with specific medicinal properties. The second step involved searching the published literature for information on the plants' known chemical constituents and pharmacological effects. The third step built on the first two and was an evaluation of whether there is a plausible biological mechanism by which the plant chemicals and known or possible physiological effects could achieve the results described by the respondents. Conclusions are based on these evaluations.

Results

The dominant form of transmission seemed to be from the 'older heads' to the young. The most commonly mentioned 'older heads' were mothers, grannies and old aunts. The results were divided into nine case studies, pigs, commercial poultry and gamecocks, ruminants and reproductive health, pet dogs and hunting dogs, horses and [human] ethnomedicine. Three of the tables and one of the matrices are reproduced in this abstract.

Eight plants are used for health problems and husbandry in pig farming. *Erythrina pallida*, *E. micropteryx*, *Cecropia peltata*, *Bambusa vulgaris*, C*arica papaya*, *Citrus aurantium*, *Centropogon cornutus* and *Coffee arabica / robusta*.

The ethnoveterinary usage of locally available plants for commercial poultry in Trinidad are summarised in Table 2. Poultry keepers use seventeen medicinal plants for medicinal purposes.

Table 2. Medicinal plants used by poultry farmers and poultry keepers

Scientific name	Family	Common name	Plant part used	Use
Allium sativum	Liliaceae	Garlic	Bulb	Reduced appetite
Kalanchoe pinnata	Crassulaceae	Wonder of the world	Leaves	Reduced appetite
Momordica charantia	Cucurbitaceae	Caraaili	Vine	Reduced appetite
Neurolaena lobata	Asteraceae	Z'herbe á pique	Leaves	Reduced appetite
Chrysobalanus icaco	Chrysobalanaceae	Ipecak		Pox
Citrus aurantifolia	Rutaceae	Lime	Juice, pulp	Yaws
Citrus species	Rutaceae	Citrus species	Juice, peel	Respiratory conditions, heat stress
Coffee arabica / robusta	Rutaceae	Coffee	Grounds	Respiratory conditions
Eryngium foetidum	Apiaceae	Chadron bénée	Leaves	Respiratory conditions
Momordica charantia	Cucurbitaceae	Caraaili	Vine	Respiratory
Pimenta racemosa var. *racemosa*	Myrtaceae	West Indian Bay	Leaves	Respiratory
Ricinus communis	Euphorbiaceae	Carapate	Leaves	Respiratory
Aloe vera	Liliaceae	Aloe	Gel	Enhance liveability
Kalanchoe pinnata	Crassulaceae	Wonder of the world	Leaves	Enhance liveability
Ocimum sanctum	Lamiaceae	Tulsi	Leaves	Enhance liveability
Azadirachta indica	Meliaceae	Neem	Leaves	Ectoparasites
Cedrela odorata	Meliaceae	Cedar	Leaves	Ectoparasites
Cordia curassavica	Boraginaceae	Black sage	Leaves	Ectoparasites
Momordica charantia	Cucurbitaceae	Caraaili	Vine	Ectoparasites
Petiveria alliacea	Phytolaccaceae	Kojo root	Leaves	Ectoparasites
Renealmia alpinia	Zingiberaceae	Mardi gras	Leaves	Ectoparasites
Eryngium foetidum	Apiaceae	Chadron bénée	Leaves	Meat quality

Nine plants are used for medicinal purposes by owner/trainers for game cocks in Trinidad. One of these plants (gru gru boeuf) was tentatively identified from the literature but eyebright has not yet been identified. The plants used were *Citrus aurantium*, *Acrocomia ierensis* (gru gru boeuf), *Chenopodium ambrosioides*, *Gossypium* sp. *Aloe vera*, *Plantago major*, Eyebright and *Citrus limonia*.

The ethnoveterinary usages of locally available plants for ruminants in Trinidad and Tobago are summarised in Table 3. Twenty-one plants are used. Medicinal plant dosages for ruminants tended to be case and context specific. Phases of the moon were taken into consideration in farmers' decision making.

Table 3. Medicinal plants used for ruminants

Scientific name	Family	Common name	Plant part used	Use
Bambusa vulgaris	Poaceae	Bamboo	Leafy branches	Retained placenta
Curcuma longa	Zingiberaceae	Turmeric	Rhizome	R/ placenta
Oryza sativa	Poaceae	Rice paddy	Grain	R/ placenta
Senna occidentalis	Caesalpiniaceae	Wild coffee	Leaves, roots	R/placenta
Spondias mombin	Anacardiaceae	Hogplum	Leafy branches	Retained placenta
Achryanthes indica	Amaranthaceae	Man better man	Leaves, roots	Oestrus induction
Aloe vera	Liliaceae	Aloes	Leaves	O/ induction
Mimosa pudica	Fabaceae	Ti marie	Roots	O/ induction
Petiveria alliacea	Phytolaccaceae	Gullyroot	Roots	O/ induction
Ruellia tuberosa	Acanthaceae	Minny root	Roots	O/ induction
Senna occidentalis	Caesalpiniaceae	Wild coffee	Leaves, roots	Oestrus induction
Laportea aestuans	Urticaceae	Stinging nettle	Leaves	Urinary problems
Anacardium occidentale	Anacardiaceae	Cashew	Bark	Diarrhoea
Psidium guajava	Myrtaceae	Guava	Buds	Diarrhoea
Aloe vera	Liliaceae	Aloes	Leaves	Poultice
Asclepias curassavica	Asclepiadaceae	Red head	Flower	Poultice
Curcuma longa	Zingiberaceae	Turmeric	Rhizome	Poultice
Kalanchoe pinnata	Crassulaceae	Wonder of the world	Leaf	Poultice
Musa species	Musaceae	Banana	Stem	Poultice
Nopalea cochenillifera	Cactaceae	Rachette	Joint	Poultice
Theobroma cacao	Sterculiaceae	Cocoa	Pods	Poultice
Aloe vera	Liliaceae	Aloes	Leaf	Wounds
Curcuma longa	Zingiberaceae	Turmeric	Rhizome	Wounds
Azadirachta indica	Meliaceae	Neem	Leaves	Anthelmintic
Petiveria alliacea	Phytolaccaceae	Gullyroot	Roots	Anthelmintic
Ruellia tuberosa	Acanthaceae	Minny root	Roots	Anthelmintic
Stachytarpheta jamaicensis	Verbenaceae	Vervine	Leaves	Anthelmintic, Milk production
Cordia curassavica	Boraginaceae	Black sage	Leaves	Ectoparasites

A methodology for the non-experimental validation of herbal medicines was used to evaluate nine (9) plants used for reproductive health in both ethnomedicine and ethnoveterinary medicine. These nine plants were *Spondias mombin*, *Senna occidentalis*, *Petiveria alliacea*, *Ruellia tuberosa*, *Curcuma longa*, *Abelmochus esculentus*, *Bambusa vulgaris*, *Oryza sativa* and *Stachytarpheta jamaicensis*. The purpose of the non-experimental validation was to provide a guide to laboratory researchers as to which of these plants merit further investigation. The link between medicinal plants used for both human and animal health was most clearly seen in the plants that are used for retained placenta, or to remove what the respondents called the “clot blood” associated with birth (the blood clots and haematomas). This connection is demonstrated.

The plants, three of which are used for retained placenta, can be evaluated according to the terms "irritating" and "warming". Chemical constituents that correspond to the term "warming" are perhaps those that cause *in vivo* or *in vitro* uterine contractions. Uterine stimulants are ergometrine, oxytocin, serotonin (5-hydroxytryptamine), acetylcholine and prostaglandins (PGE_2 and $PGF_{2\alpha}$). Irritating chemical constituents are 1,8-cineole, alpha-pinene, borneol, eugenol, oleic acid and vanillin. Chemicals with spasmogenic activity are 1,8-cineole, serotonin (5-hydroxytryptamine), alpha-pinene and beta-pinene. The non-experimental validation of these nine plants suggested that these plants are used for rational reasons (in Western scientific terms) and are used similarly elsewhere. The role that culture and religion play in farmer decision making may explain the similarity between the ethnoveterinary practices found in Trinidad and Tobago and ethnomedicines used by women in the Caribbean, India, Africa and South America.

Twenty medicinal plants used for dogs in Trinidad and Tobago are presented in Table 4.

Table 4. Medicinal plants used for pet dogs

Scientific name	Family	Common name	Plant part used	Use
Anacardium occidentale	Anacardiaceae	Cashew	Bark	Diarrhoea
Psidium guajava	Myrtaceae	Guava	Buds, leaves	Diarrhoea
S. jamaicensis	Verbenaceae	Vervine	Leaves	Milk let down
Bambusa vulgaris	Poaceae	Bamboo	Leaves	Grooming
Cordia curassavica	Boraginaceae	Black sage	Leaves	Grooming
Scoparia dulcis	Scrophulariaceae	Sweet broom	Plant tops	Grooming
Bixa orellana	Bixaceae	Roukou	Inside pods	Mange
Crescentia cujete	Bignoniaceae	Calabash	Pulp	Mange
Eclipta prostrata	Asteraceae	Congo lala	Plant tops	Mange, Fungal skin infections
Musa species	Musaceae	Moko, Banana	Stem	Mange
Manilkara zapota	Sapotaceae	Sapodilla	Seeds	Myiasis
Cajanus cajan	Fabaceae	Pigeon pea	Leaves	Ectoparasite
Cordia curassavica	Boraginaceae	Black sage	Leaves	Ectoparasite
Mammea americana	Guttiferae	Mammee apple	Seeds	Ectoparasite
Nicotiana tabacum	Solanaceae	Tobacco	Leaves	Ectoparasite
Pouteria sapota	Sapotaceae	Mamey sapote	Seeds	Ectoparasite
Areca catechu	Arecaceae	Betel nut	Fruit/nut	Anthelmintic
A. indica	Meliaceae	Neem	Leaves	Anthelmintic
Cajanus cajan	Fabaceae	Pigeon pea	Leaves	Anthelmintic
Carica papaya	Caricaceae	Papaya	Seeds	Anthelmintic
Cassia alata	Caesalpiniaceae	Senna	Leaves	Anthelmintic
C. ambrosioides	Chenopodiaceae	Worm grass	Leaves	Anthelmintic
Cocos nucifera	Arecaceae	Coconut	Jelly	Anthelmintic
Gossypium species	Malvaceae	Cotton bush	Leaves	Anthelmintic

Hunters use ethnoveterinary medicines for themselves and their hunting dogs. Plant use for hunting dogs is based on smell and plant morphological characteristics. These plant uses

are embedded in a complex cultural context based on indigenous Amerindian beliefs. Plants are used for snakebites, scorpion stings, for injuries and mange of dogs and to facilitate hunting success. The plants used are: *Piper hispidum*, *Pithecelobium unguis-cati*, *Bauhinia excisa*, *Bauhinia cumanensis*, *Cecropia peltata*, *Aframomum melegueta*, *Aristolochia rugosa*, *Aristolochia trilobata*, *Jatroph*a *curcas*, *Jatropha gossypifolia*, *Nicotiana tabacum*, *Vernonia scorpioides*, *Petiveria alliacea*, *Renealmia alpinia*, *Justicia secunda*, *Phyllanthus urinaria*, *Phyllanthus niruri*, *Momordica charantia*, *Xiphidium caeruleum*, *Ottonia ovata*, *Lepianthes peltata*, *Capsicum frutescens*, *Dendropanax arboreus*, *Siparuma guianensis*, *Syngonium podophyllum*, *Monstera dubia*, *Solanum* species, *Costus scaber*, *Eclipta prostrata* and *Spiranthes acaulis*, *Barleria lupulina*, *Cola nitida* and *Acrocomia ierensis*.

Seventeen plants are used in equine ethnoveterinary medicine, several of which are used similarly in ethnomedicine. Exclusive to the horse case study were the use of *Nasturtium officinale* to increase blood counts, the use of *Pueraria phaseoloides* and *Stachytarpheta jamaicensis* as high protein feeds and the use of *Mucuna pruriens* as an irritant to enhance performance.

The ethnomedicinal plants used in Trinidad and Tobago that did not seem to have ethnoveterinary parallels are summarised in Tables 17a – g in the thesis. The majority of the ethnoveterinary and ethnomedicinal plants show the lowest level of validity. This means that the plants (or a closely related species of the same genus) are used in geographically similar or different places for the treatment of similar illnesses. In order to achieve the highest level of validity the ethnobotanical, phytochemical and pharmacological literature has to support the ethnomedicinal use of the plant.

There is evidence that some of the ethnomedicinal plant uses have been transferred from the original countries of Trinidad's first migrants. This finding is matched by those of other researchers who found that the plant pharmacopoeia in South America is Creolized. The plants used are cultivated, exotic and opportunistic and are found in home gardens, roadsides and secondary forest rather than being indigenous species from the primary forests. Those plants with very few ethnomedicinal references are perhaps the true 'indigenous [to Trinidad] knowledge'. This is a tentative conclusion since it is possible that the relevant ethnomedicinal references for these plants were not found or are still unpublished (in the scientific literature). These 'indigenous' ethnomedicinal plant uses are those that involve *Antigonon leptopus*, *Justicia secunda*, *Microtea debilis*, *Eupatorium macrophyllum*, *Centropogon cornutus*, *Bontia daphnoides*, *Parinari campestris*, *Brownea latifolia*, *Eupatorium triplinerve*, *Richeria grandis*, *Eupatorium triplinerve*, *Begonia humilis* and *Sansevieria guineensis*. Some of the local claims of medicinal properties of the ethnomedicinal plants have been supported by scientific studies.

Chapter 12 looks at the actor networks involved in science and folk medicine, pointing out some of the processes by which knowledge is accepted into or excluded from science. There are some local extension agents, animal health assistants, agricultural chemical agents, scientists and veterinarians who undervalue ethnoveterinary knowledge in favour of the scientific principles in which they were trained. There are others who are actively promoting the use of this knowledge. The reasons for both attitudes towards ethnoveterinary knowledge are examined using the constructivist perspective that all knowledge is socially constructed, with both strengths and weaknesses.

Matrix 1. The Trinidad and Tobago scientific and societal actor network

Terms and Definition	Scientist/public response	Consequence
A stabilised network is only stable for those members who form/use/maintain it. Network users who are non-members of the community of practice suffer. Scientist- communities of practice, have conventions of use.	Scientists often take sabbaticals to do research in other countries so they can publish. Scientific texts are networks for the in-crowd. Social management of trust moves from herbalist to professionals.	Trinidad and Tobago scientists sign on to the standardised technologies in order to gain from already established external scientific networks. This is a network with established norms.
The Gatekeeper standpoint the strategies by which an actor-network becomes indispensable and maintains itself. Eminent scientists become gatekeepers. Gatekeeping influences topic selection and research funding for most scientists.	Folk medicine is not 'modern', or 'progressive'. Research is done on 'poisonous' plants, and 'weed' control.	Peer review and publishing in the 'right' journals excludes folk medicine from animal health science.
An intermediary is anything passing between actors, which defines the relationship between them. Intermediaries describe their networks; they compose them by giving them order and form. Knowledge and funding, scientific articles, drugs, instruments and software are intermediaries.	'Foreign' science is more profitable career-wise. Agro-chemical shops and Pharmacies sell drugs to farmers without prescriptions leading to abuse of drugs. There is no monitoring of drug residues at the abattoir.	'Uncertain' folk medicine discarded in favour of 'certain' imported drugs. Discarding of local knowledge as folklore. Foreign technology becomes embedded in local social networks. Institutionalisation.
Every enrolment entails both a failure to enrol and a partial destruction of the world of the non-enrolled.	Rejection of folk medicine as an actor since some involved in the conventional drug industry are afraid of loss of sales if farmers use their own plant-based solutions.	The joint creation / nullification of knowledge: Farmers and herbalists want to gain some autonomy and prestige for their own knowledge, but are actively discouraged.
Partial signings-on and commitments, no intermediaries, no standardised package, all lead to a Weakly convergent network.	Under-funded actors in the Ministry of Agriculture find their status is constantly in question and it is difficult to mobilise other parts of the network.	Veterinarians do not get sufficient resources from Government. Without money vets have less power so farmers use their own strategies.

Chapter 13 briefly outlined the existing research approach taken to document medicinal plants, an alternative approach promoted by TRAMIL (Traditional Medicine in the Islands), the current bioprospecting environment, the major players and stakes involved and a vision for future research into ethno [veterinary] medicine. This chapter like Chapter 12 documents an attempt to create a shared vision of an approach to medicinal plant research and use that is sustainable and equitable to all the stakeholders.

Conclusion

In this research farmer's knowledge is taken and validated scientifically and in the future there are plans to return this validated knowledge to farmers. This approach can be justified in engaged anthropology, one of whose aims is to identify indigenous institutions or processes that could be strengthened and to support processes that could lead to culturally appropriate or effective corrective programs.

The content of Caribbean and other folk pharmacopoeia shows that plant use is based on empiricism: informal clinical trials, observations and experiments. One researcher has claimed based on a decade of chemical investigations of medicinal plants, that “all plants that are claimed to be antiinfectious, antiviral, antitumoural, or antiparasiticidal are good candidates for potential immunostimulating activities and deserve further investigation.” Clinical trials will establish in scientific terms whether the Creole legacy of folk medicine is of positive value for human and animal health.