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Tuareg ethnoveterinary treatments of camel diseases in Agadez area (Niger)

Traitements ethnovétérinaires des maladies du chameau par les patres Tuareg dans la region d'Agadez (Niger)

Tratamientos etnoveterinarios tuareg de las enfermedades de los camellos en el area de agadez (Niger)

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Abstract

For generations, nomadic herders have been learning to manage herd health, particularly in dromedaries because of their great value. Owing to the unavailability of veterinary services, camel herders in remote areas have been developing their own pharmacopoeia and veterinary techniques. The bleeding of sick animals is a common treatment, as Tuareg herders believe that 'tainted blood' (*izni*) is the cause of many conditions. Several surgical techniques are also used, such as excision of calcified sublingual cord. The remedies mentioned in this survey are derived from *Maerua crassifolia*, *Boscia senegalensis*, *Acacia raddiana*, *Cucumis prophetarum*, *Calotropis procera*, *Ricinus communis*, *Citrullus colocynthis*, green tea, millet, tobacco and onions. Artificial elements are also used for treatment of animals: Powders collected from batteries, various haircare or skincare creams, crushed glass, insecticides or motor oil belong to their pharmacopoeia. This broadmindedness allows the introduction of modern veterinary medicine. Factors such as the lack of real production objectives constitute limits to this progress, however.

Résumé

Pendant des générations, les patres nomades ont appris à prendre en charge la santé des troupeaux, en particulier ceux de dromadaires en raison de leur valeur considérable. Etant donné le manque de disponibilité de services vétérinaires, les patres de chameaux des zones distantes ont développé leurs propres techniques vétérinaires et celles des techniques adaptées à la pharmacopée. La saignée des animaux malades est un traitement courant, compte tenu du fait que les patres Tuareg estiment que du "sang vicié" (*izni*) est la cause de nombreuses conditions. Plusieurs techniques chirurgicales sont néanmoins utilisées, telles que l'excision du cordage sublingual calcifié. Les remèdes mentionnés dans cette enquêtes sont dérivés de *Maerua crassifolia*, *Boscia senegalensis*, *Acacia raddiana*, *Cucumis prophetarum*, *Calotropis procera*, *Ricinus communis*, *Citrullus colocynthis*, du thé vert, du millet, du tabac et des oignons. Des éléments artificiels sont également utilisés pour le traitement des animaux. Les poudres recueillies de batteries, de diverses crèmes de soins des cheveux ou de la peau, du verre granule, des insecticides ou de l'huile pour moteur appartiennent à leur pharmacopée. Cette ouverture d'esprit autorise l'introduction de médicaments vétérinaires modernes. Différents facteurs, tels que le manque d'objectifs de production réels, représentent toutefois des limitations au progrès.

Resumen

A través de las generaciones los pastores nómadas han ido aprendiendo a maneiar la salud del rebaño, en particular en el caso de los dromedarios debido a su gran valor. Al no disponer de servicios veterinarios, los pastores de camellos en áreas remotas han ido desarrollando su propia farmacopea y técnicas veterinarias. El sangrado de animales enfermos es un tratamiento habitual, ya que los pastores Tuareg creen que la "sangre contaminada" (*izni*) es la causa de muchas enfermedades. Además se utiIizan varias técnicas quirúrgicas, como la escisión del cordón sublingual calcificado. Los remedios que se mencionan en este estudio son derivados de

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Maerua crassifolia, *Boscia senegalensis*, *Acacia raddiana*, *Cucumis prophetarum*, *Calotropis procera*, *Ricinus communis*, *Citrullus colocynthis*, té verde, mijo, tabaco y cebollas. También se utilizan elementos artificiales para el tratamiento de los animales. Polvos recogidos de baterfás, varias cremas para el cuidado del cabello o de la piel, vidrios machacados, insecticidas, o aceites de motores pertenecen todos el los a su farmacopea. Esta amplia mentalidad permite portanto la introducción de la moderna medicina veterinaria. No obstante, diferentes factores como la falta de objetivos reales de producción, limitan este progreso.

Keywords : Camel ; ethnoveterinary ; tuareg; pharmacopoeia ; niger

INTRODUCTION

In Niger, where the climate is of the Sahelian type in the major part of the country one-humped camel breeding populations are mainly Tuaregs, Tubus and Arabs. They are primarily used for dairy production for family consumption, although meat consumption is not negligible in town populations. In pastoral populations, the dromedary because of its high commercial value, represents true capital, which it is advisable to preserve. Camels are thus sold for slaughter only when important cash income is needed. For generations herders have been learning how to manage their herds and the poor natural resources they have at their disposal. They thus have developed great expertise on camel diseases, their diagnosis, their consequences, their prevention and their treatments using a traditional pharmacopoeia.

Within the framework of projects for breeding development in remote areas, this ethnoveterinary knowledge and its evaluation are of the greatest importance. It is essential that traditional knowledge is taken into consideration by professional veterinary services for mutual understanding and possible integration into disease control.

The present paper describes the Tuareg pharmacopoeia used for the treatment of diseased camels.

MATERIAL AND METHODS

Survey

The survey was carried out from November 2003 to January 2004, corresponding to the beginning of the cold dry season. It was implemented through discussions with herders taking part in the milk collection circuit organized for the dairy plant Azla Saveur, with its manager playing the role of interlocutor. These meetings were repeated several times during the study period, thus making it possible to increase confidence and to clarify any Doubts. Herders of other zones, passing through Agadez, were also questioned.

The questions asked related to the camel diseases that were considered most important, whether because of their frequency or their gravity. The covered symptoms and their evolution, possible seasonality, affected age groups, traditional treatments, the effectiveness of those, and the herders' personal interpretations of the causes of these diseases. Less important disorders were also indexed when cited by those questioned, thus providing a more comprehensive overview of the subject.

Herders

Twenty-five Tuareg herders participated to the survey. Those taking part in milk collection lived within a 40 km radius around Agadez, the closest being located 7 km west of the city, in the camp of Ekirkiwi. The other camps were Urey (9 km west of Agadez), Kurbubu (25 km west), Tiffayan Inyal (38 km southeast) and Tassakh n Talamt (8 km east). They practised 'micro-nomadism', their movement during the year being within a 5-10 km radius. The herders of the camp Tiffayan Inyal, however, were likely to practise greater movement, going up to 50 km south during the dry hot season (from June to the end of July). Other herders originated from more distant zones such as Timia (2 herders), an oasis located 220 km north-east of Agadez, or Arlit (Tamesna zone), a mining city located approximately 230 km north-north-west of Agadez.

Among these people there was no traditional animal health specialist; each herder had good practical knowledge and practised ethnoveterinary medicine himself. However, certain herders were recognized as particularly skilled in some 'surgical' interventions.

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RESULTS AND DISCUSSION

Conditions for which Tuareg herders described treatments are cited in English. Tuareg names of the diseases/syndromes are mentioned in italic type.

General disorders

Chronic helminthosis (*izni*)

The Tuareg word '*izni*', which means 'blood', refers to a chronic weight loss syndrome. Bleeding is the most frequent treatment, as herders believe the cause to be an 'excess of tainted blood'.

Bleeding is practised by jugular vein puncture on the distal third of the neck. A tourniquet is not used. Herders describe the swollenjugular vein as the 'dromedary's waterskin'. Ag Arya (1998) reports that some herders recommended drenching of the bled animals as well as a 'differential bleeding', the most seriously affected camels being bled to a more significant degree. In the present study, the herders explained that a lesser bleeding is recommended in seriously ill camels because the loss of a too great volume of blood could be fatal to them. The metatarsal vein is then chosen for bleeding in order to adjust the quantity of blood released.

Other treatments are also used. Tobacco is used in various ways. Chewed tobacco can be given just as it is. Herders also use it mixed with crushed leaves of *Boscia senegalensis* and salt. Another plant, *Cucumis prophetarum*, is recommended either mixed with green tea and garlic and cooked overnight, or mixed with *Boscia senegalensis* and then boiled. Ag Arya (1998) reports another use of *Boscia senegalensis*: it is crushed and put to soak in ewe urine for 24 h; the liquid is then filtered and given orally or intranasally during 3 days.

Acute exhaustion syndromes (*acute helminthosis*, *pasteurellosis*, *anthrax*) (*izni*, *tataryat*, *tandar*)

In the cases diagnosed as *izni*, the most used treatment is bleeding as above. In cases identified as *tataryat* or *tandar*, the evolution of the disease isso rapid and lethal that no treatment is reported.

Chronic trypanosomosis (*menshash*)

Bleeding is also reported in the treatment of *menshash*. Tuaregs draw attention to the fact that differential bleeding is of major importance in those cases because sick camels are often weaker than in the case of *izni*. Various other treatments were described. Jackal meat is cooked overnight in a broth with grasses named *ararouf* (the scientific name of which could not be found) and drenched. This treatment is reported as very effective by herders. It should be noted that Somali herders use this type of meat broth against respiratory infections (Köhler-Rollefson *et al.*, 2001).

Another preparation consists of cow's milk in which salt block pieces are soaked overnight. Boiled green tea or the previously described mixture of crushed *Boscia senegalensis* and salt can also be diluted in the feeding trough.

Cutaneous disorders and external parasitism

Tick infestations (*igardan*)

Two plants are used for tick infestations. *Boscia senegalensis* can be crushed and mixed with salt, to be finally diluted in the feeding trough. The other plant is *Maerua crassifolia*. In the same way as *Boscia senegalensis*, it is crushed and administered *per os*. Millet can be added as an energy supplement for these weakened animals.

Some treatments using insecticidal powders are undertaken.

Lastly, a particularly expeditious method was reported: the infested animal is covered with straw, which is then burned. This kind of treatment is exceptional, however, and 'experimental'.

A traditional treatment, reported as effective by Köhler-Rollefson and co-workers (2001), consists of washing the infested animal with a broth of tobacco leaves mixed with soapy water. As this is readily available for Tuaregs, it could be proposed to them as an easy alternative for treatment against ticks in the absence of veterinary services.

Mange (*ajoud*)

The most reported treatment consists of the application of motor oil to affected parts. This treatment is a variant of a traditional treatment based on plant tar or oil (Curasson, 1947). It is an example of nomads' attempts to integrate elements of modern life and shows that ethnoveterinary knowledge is evolving, progressing by trial and error. Its use by Bedouins is reported by Al-Ani (2004).

Crushed *Boscia senegalensis* leaves mixed with salt, as cited for tick treatment, is also applied in mange.

Castor-bean oil and dried gourd (*Citrullus colocynthis*) are also used for topical application. In the case of gourd, it is first cooked and then crushed.

Ag Arya (1998) reports the local application of *Balanites aegyptiaca* fruit tar. It is obtained by cooking fruits mixed with crushed bones or with barks of *Balanites aegyptiaca* and gum of *Acacia seyel* or *Acacia ehrenbergiana. Tribulus terrestris* can also be mixed with barks of *Calotropis procera* and *Boscia senegalensis*. This last recipe is called *alkabri*. Treatments containing crushed bone, *Balanites aegyptiaca*, seeds of *Citrullus colocynthis* and seeds of *Ricinus communis* are also cited by Köhler-Rollefson and co-workers (2001).

Camel pox (*erk eshik*)

Branding is a widespread treatment in various conditions (Dioli *et al.*, 1992). For camel pox it is applied behind the ears and on the breast. Washing the affected zones with hot water, followed by the application of haircare cream, was reported as effective.

Köhler-Rollefson and co-workers (2001) reported the use by various ethnic groups of application to the affected zones of a tar obtained by crushi ng and cooking *Citrullus colocynthis* seeds, as well as the application of urine, camel milk and sheep or goat fat.

Dermatophytosis (*tafore*)

The treatments are cow's milk butter, reported as being very effective, or haircare cream as in the case of camel pox.

Contagious skin necrosis (*dermatophilosis*, *corynebacteriosis*, *staphylococcosis*) (*worsadas*)

For abscesses, a *Boscia senegalensis* decoction is applied. A more specific treatment is application to the wound of latex from *Calotropis procera*, which is commonly used by nomadic herders in Africa (Faye, 1985). Human faeces are also used this way. These treatments are reported as being very effective.

Respiratory disorders

Cough (*toza*) *and nasal discharge* (*elishlash*)

Many herders did not know of any treatment against '*toza*' (bronchopneumonia). However, some of them described three possible treatments. The first consists of pouring groundnut oil in the nostrils. For the second treatment, the animal is made to run fast against the wind direction. This aims to cause such a strong cough ('till lips touch the ground') that it is supposed to drain the disease out of the animal. Similar treatments have been reported in the literature (Mahaman, 1979; Ag Arya, 1998; Köhler-Rollefson *et al.*, 2001). The last treatment consists of washing the animal at the end of the seventh day of the disease. This wash aims at avoiding contagion.

For the treatment of nasal discharge, hot water poured in the nostrils is commonly used. When there is a solid discharge obstructing the nostrils, oil is used to soften it and finally it is withdrawn with a spoon.

Other Tuareg treatments cited in the literature are nostril vein bleeding and application of pepper or milk in the nostril. Sick animals may be isolated and fires are lighted at night around healthy animals as a preventive procedure (Köhler-Rollefson *et al.*, 2001).

Turkanas tribes (Horn of Africa) are reported to use *Calotropis procera* root infusions (Köhler-Rollefson *et al.*, 2001). This plant is very abundant around Agadez, so this treatment might also be taught to Tuaregs if its

efficacy is proven.

Sinusitis (*anafad*)

The treatments described consist of branding the head or appl ication of tobacco in the nostrils. Ag Arya (1998) also described a longitudinal scarification beginning between the ears, passing between the eyes and stopping at the level of 'the sinus area' with other transversal incisions of the face, followed by application of butter.

Digestive disorders

Diarrhoea (*efay*)

Since diarrhoea is an important constraint for camel rearing, herders have used many treatments. *Maerua crassifolia* leaves are crushed and mixed with millet and water. Bark from *Acacia raddiana* mixed with water is another remedy. Boiled green tea, mixed millet bran, water and charcoal and kneaded clay or even clear water are also used as treatments.

Oral administration of dried and crushed kid abomasum is also reported. Another treatment consists of administration of Camifloc (which is a rennet specially developed for camel milk). This derived and unforeseen use is actually well known to specialists, who took advantage of this to popularize cheese manufacture and valorization of dairy surpluses.

Ag Arya (1998) presented the following treatments: a drench of soapy water given every morning, leaves of *Acacia raddiana* and *Boscia senegalensis* mixed with clay, diluted in water and filtered, the filtrate being used *per os*. The same principle but with a mixture of bark of *Cordia sinensis* and clay is also cited. Fresh cow's or ewe's milk is also given as a treatment. Finally, crushed leaves of *Acacia raddiana* are prepared in the form of a ball and given to the camel calf for chewing. For camel calf diarrhoea, Köhler-Rollefson and co-workers (2001) also cited the use by Gabra tribes (Horn of Africa) of *Maerua crassifolia* bark infusions. This plant was also cited in the present study.

Colic (*tadanan*)

Treatments are the administration of curdled milk or of chewed tobacco. These treatments aim at purging the animal.

Locomotor and nervous disorders

Rear limb paresis and paralysis (*lajuad*, *taras*)

Branding of thighs is often used in these cases.

A 'surgical' operation was described against *lajuad* (rear limb paraparesis occurring in old animals). This consists of an opening applied to the sacral level. According to one herder, blood and a watery liquid escaped from this opening and a temporary healing was observed, but the animal relapsed thereafter. Another herder reported that an unidentified thing (tissue?, foreign body?) had to be removed from the opening. He described this operation as effective but very dangerous for the animal.

Neck stiffness (*irziman*)

Brandings or small scarifications on the whole length of the neck are used. This is the usual treatment applied in tribes from the Horn of Africa (Dioli and Stimmelmayr, 1993; Kölher-Rollefson *et al.*, 2001).

Local lesions

Lymphadenitis (*tafasas, zlitey*)

Branding of the affected region is the usual treatment. When an abscess is ruptured, the treatment is then the usual one for wounds and abscesses, which consists of an application of cow's milk butter or of a decoction of *Boscia senegalensis*.

Sublingual fibrous cord hyperplasia (*amanos*) (*calcifying fibromatous process*)

The usual treatment is surgical. It consists in cutting of the sublingual cord with a razor blade, followed by rubbing of the wound with salt. There is no described recurrence.

At the level of the sternal pad, where an infected crack is said to accompany the tongue lesion, the abscess is washed and filled with fat. Branding of the sternal pad is also used.

Ag Arya (1998), who reported this same disease under another name, cited a treatment by scarification between the ears, between the shoulders, at the base of the tail, on the sternal pad and at the base of the neck (on both sides). These scarifications were then cauterized.

Kerato-conjunctivitis (*tadenak*)

As in the case of *amanos*, the treatment can be surgical. It consists in cutting with a razor blade of the 'nail' observed within the spacing of the eyelids. Only some herders, whose dexterity is recognized by others, are able to perform this operation. The 'nail' described could be the nictitating membrane, but its removal would cause new episodes of kerato-conjunctivitis and other complications that were not reported by herders. Small incisions around the eye were also mentioned. The exact sites of these incisions were not given but they could be either in the eyelids or in the oedematous conjunctivae.

'Medical' treatments also exist. The eye can be washed with salted water tinted with indigo (used for dyeing clothes) or with boiled water only. Another washing solution is the liquid resulting from pressing in a piece of woven fabric the chewed leaves of *Maerua crassifolia*.

Köhler-Rollefson and co-workers (2001) reported the application of chewed tobacco juice by Tuareg herders, in the case of ocular affections. These authors also cite the use of tobacco by Turkana and Somali tribes (Horn of Africa) but in the form of a suspension of crushed dried leaves.

Saddle wounds (*tafadi*)

For Tuaregs, saddle wounds are evidence of incorrect camel management. Because of the great importance of camels for riding, this difficult-to-cure condition is highly disabling.

All treatments are intended for local application. Leaves of *Maerua crassifolia* are crushed and poured on the wound. The usual treatments for abscesses and wounds, namely the application of cow's milk butter or of a decoction of *Boscia senegalensis*, are also used here.

Herders also pour onto the wound the powder collected by breaking worn batteries or finely crushed glass or cement powder. These are other examples of the use of modern elements as in the case of mange and ticks.

Ag Arya (1998) specified that the leaves of *Maerua crassifolia* can be cooked in butter or animal fat for local application and that a rag can be attached to the hump hairs in order to frighten birds and keep them away.

Jugal papilla hypertrophy (*tasrawin*)

The treatment consists of the excision of the hypertrophied papilla. Recurrences are possible. A treatment by branding of the cheek is also described, which aims at causing its retraction.

Abortion and uterine prolapse

Uterine prolapse is corrected manually after washing the organ. Herders specify that the animal generally recovers very well if the treatment is carried out quickly. When cases occur far from the camp and are treated too late, the affected animal generally dies.

Bleeding is often practised following abortions. It is intended to hasten the return to oestrus.

Concerning other obstetric practices, it is worth mentioning that vulval lesions following difficult parturitions are treated by application of boiled cow dung.

Embryotomy, carried out with a knife, is also practised in cases of irreducible dystocia.

Intoxications

Salt intoxication

The possible treatments are drenching with sweetened milk or bovine excrement.

Plant intoxications

The usual treatment is fermented milk (aiming to purge the animal). Groundnut oil is also used in cases of bloat caused by *Cleome africana* (*tedak*), this plant being reported by herders as the most important toxic plant. In the case of serious bloat, some herders practise trocharization (with an instrument normally used to bore millet bags, of which the hollow structure allows evacuation of ruminal gases). Ewe blood is also sometimes given to animals intoxicated by *Ipomoea asarifolia* (*tanalla*), another frequent and lethal source of intoxication.

GENERAL DISCUSSION

Owing to the lack of veterinary services, camel herders in remote areas have been developing their own medicine. The bleeding of sick animals is frequent; as Tuareg herders believe that 'tainted blood' (*izni*) is the cause of many conditions. On the other hand, treatment by branding, even if reported, does not seem to be as important for Tuaregs as in certain ethnic groups from East Africa, where herders find an aesthetic interest in this practice (Dioli and Stimmelmayr, 1992). Other surgical techniques are practised, such as excision of sublingual cord. The remedies mentioned in this survey are often derived from local plants (especially *Maerua crassifolia* and *Boscia senegalensis*). Traditional elements of nomadic life such as salt, green tea and tobacco are also frequently used in treatments. Some remedies are derived from animal products, such as fermented milk or even meat or excrement.

Products from modern industry are also used, illustrating the evolution of ethnoveterinary treatments and the need to benefit from all available elements, whether natural or artificial. This broadmindedness allows use of modern drugs. However, some factors limit the introduction of veterinary medicine, such as cost and accessibility of products and veterinary services, relative absence of economic objectives in herd management, and underestimation of the traditional knowledge by veterinary services. Improper use of antibiotics (especially tetracycline) by herders in the absence of veterinary advice moreover constitutes a real problem.

It is thus imperative for health care agents to have a good knowledge of ethnoveterinary medicine so that mutual consideration and effective collaboration can be achieved.

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