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Utilization of the West African manatee(*Trichechus senegalensis*) in the traditional medicine in Niger

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Abstract

River Niger constitutes the core backbone which supports the livelihoods of the local communities living along its banks. This study focuses on the utilization of the West African manatee (*Trichechus senegalensis)* in the traditional medicine in Niger. It aims to assess the local medicinal knowledge and the various diseases cured using manatees' parts. The study which was conducted in fifty (50) villages along the River Niger from Koutougou (Department of Ayorou) to Dole (Department of Gaya) enabled to characterize the different usages of the manatees' parts in the treatment of diseases. The methods consisted of socio-economic surveys, personal interviews and visits to villages' markets for data collection. The study revealed that the West African manatee plays an important role in the treatment of diseases. It is also a source of income and a dietary supplement for the local communities. This study showed that all manatees' parts are being used intensively but the most commonly used are the bones, the male sex organ and the fat oil. The flesh and the skin are usually eaten or sold. The existence of tough laws which confer to the manatee fully protection in Niger is a great step taken for its conservation. This situation hinders data collection by scientists and therefore promoting its conservation. Sustainable conservation of manatee in Niger can only be achieved if the local communities who are the guardians of the natural resources are fully associated in mapping out wildlife laws which should be flexible enough in order to take into account the traditional beliefs and customs of these communities.

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Introduction

4,200 km long, the river Niger is the third longest river in Africa after the river Nile (6,700 km) and the river Congo (4,374 km). Its active basin drains a total area of about 2,000,000 sq km and spread over ten countries. The river cross Niger republic over 550 km and its local basin spreads out in the regions of Tillabéry and Niamey (9,007,200 ha), Dosso (3,100,000 ha) and Tahoua (10,667 700ha). The active basin which covers around 430,000 sq km, is composed of the main river and its tributaries (Ahmed et Rouscoua, 2001). The manatees are herbivorous aquatic mammals that belong to the Sirenia order. Despite their similarities in body shape, adaptations and habitat, manatees have no evolutionary relationship with other major groups of living marine or freshwater mammals, which are included in the order Cetacea (Reynolds and Odell, 1991). Nowadays only three species of manatee remain in the world, all from the same family, Trichechudae, and one species of dugong (*Dogung dugong*). The three existing manatees are the Amazonian manatee (*Trichechus inungiuis*), the West Indian manatee (*Trichechus manatus*) and the West African manatee (*Trichechus senegalensis*) (Akoi, 2004). The West African manatees are facing many pressures like illegal hunting, habitat destruction due to human activities and climate change in its distribution area (Wetlands, 2011).

In Niger, consecutive droughts, habitats fragmentation, silting up of wetlands, invasive plants species, drying up the wetlands and poaching constitute the major threats facing wildlife conservation (CNEDD, 2014). The wetlands which constitute the main manatees' habitat are converted into rice fields or modified by dams for hydroelectricity production. These threats are over emphasized by increasing human pressure on natural resources and the utilization of wildlife's parts in traditional medicine. The high level poverty in the rural areas forces the local communities to relay mostly on natural resources for their daily proteins requirements and for income generation. The aim of this study is to assess the utilization of the manatee in the traditional medicine in Niger.

Materials and methods

Study area

The study was conducted on the Nigerien portion of the River Niger, the largest river in West Africa. It originates in the Fouta Djallon mounts in Guinea and crosses successively Mali, Niger, Benin and Nigeria. It traverses the Niger territory on about 550 km from Koutougou (region of Tillabéry) to Dolé (Region of Dosso) (Fig. 1). The population of the area is estimated at 5,977,951 inhabitants in 2014 with a population density ranging from 13.6 persons/km² in Ouallam to 35.6 persons/km² in Kollo (INS, 2014). The main activities are agriculture and fishing while animal husbandry is conducted at small scale.

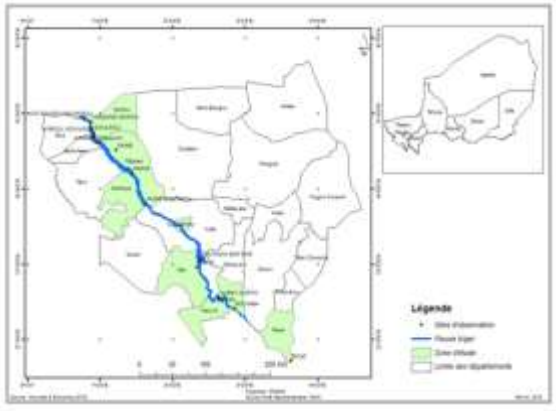

Fig. 1. Map of the study area (Boureima & Mourtala, 2016).

Materials

This study necessitated the elaboration a data collection sheet to conduct a socio-economic survey and personal interviews in relation with the role played by manatee in the traditional medicine. Interviews focused mainly on (i) manatees' parts used, (ii) diseases treated, (iii) medicinal values of manatee and (iv) the challenges facing its conservation, etc. Field investigations required a motorized canoe equipped with a 45 hp motor, a Garmin 60 GPS and a digital camera. Desk review provided an overview of the researches conducted on the manatee. In the course of this research work, various difficulties were encountered, including an enormous difficulty in accessing the areas inhabited by fishermen, as well as the reluctance of some respondents to provide answers to some of the questionnaires.

Methods

Sampling is based on the data gathered during a preliminary field investigation. All the 50 villages and fishing camps found along the river were surveyed. In each village, three (3) groups of actors were interviewed: the fishermen, the traditional healers, and the water masters (Sorkhos). In each group, 5 subjects were interviewed; hence 750 people were surveyed.

Data analysis

Data was collected and Excel spread sheet was used for data processing and graphs drawings, while ArcGIS 10.1 was used for map production.

Results

Human activities in the study zone

The daily life of the local communities in the study area is governed by the floods and tides of the river. Mainly rural, Agriculture and fishing are the activities that occupy these populations as shown in fig. n°2. Fishing is practiced by about 58% of the population.

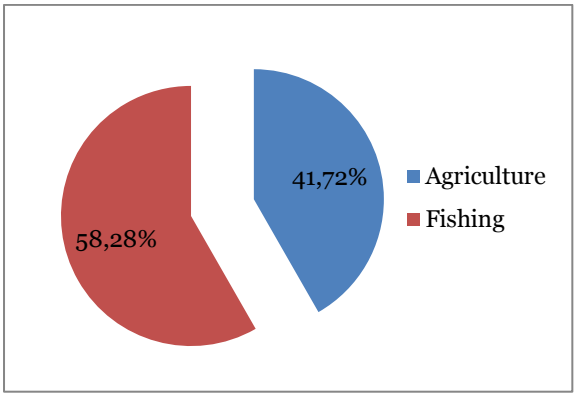

Fig. 2. Human activities.

Manatee capture

Manatee capture is a great event in the daily lives of the local fishermen. The Fig. 3 shows that about 22% of the respondents revealed that they had captured at least one manatee in their lifetime, while the rest of the respondents either denied the capture of manatee or refused to provide answers.

Manatees' parts

The manatee is a very discrete animal which is difficult to see. This situation makes its monitoring very difficult. Monitoring manatees' dynamics is essentially based on indirect method which relay on the use of indirect signs. These indirect signs include feeding indices and manatees' parts (bones, skin, oil, etc.). This indirect method of manatee remains the most privileged tool to confirm its presence and abundance. The Fig. 4 shows that about 19% of respondents stated that they possess some manatees' parts while the remaining were either reluctant to provide answers or claimed not to have any manatees' parts.

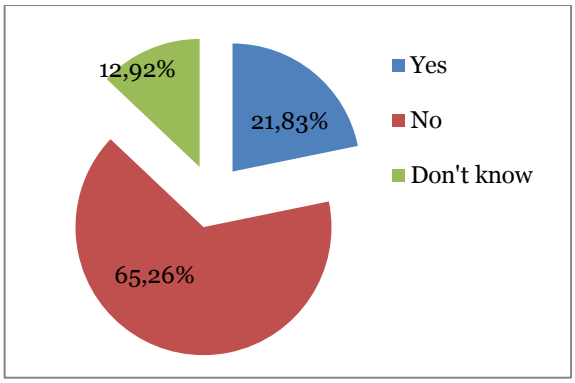

Fig. 3. Manatee capture.

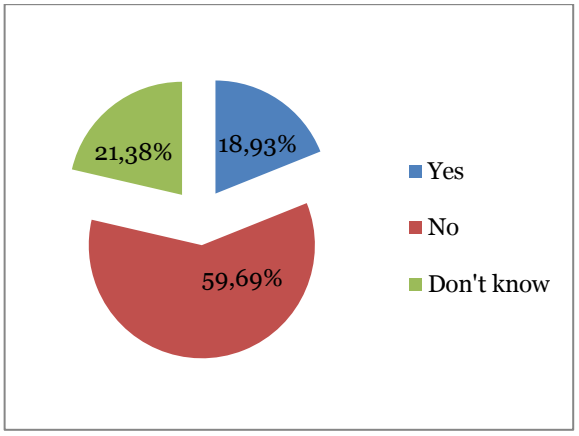

Fig. 4. Obtainting manatee's parts.

Different usages of manatees' parts

In rural areas where poverty level is very high, people depend heavily on natural resources in general and wildlife in particular to meet their food, health and income needs. The manatee plays a major role in meeting these needs as stated by about 48% of the respondents who said that they used manatees' parts for feeding while about 47% used its parts in the treatment of diseases (Fig. 5).

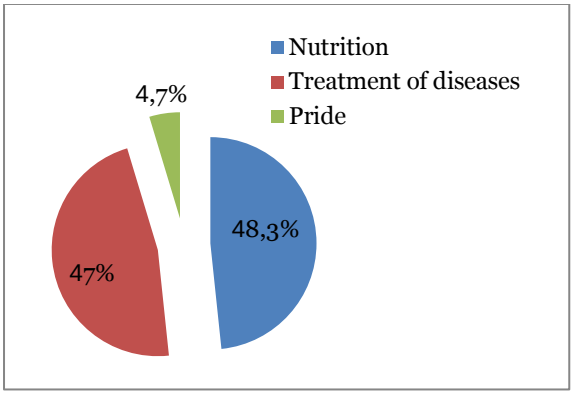

Fig. 5. Different usages of manatee in Niger.

Most used manatees's parts in the treatement of diseases

Manatee is one of the most widely used aquatic wildlife species in the treatment of diseases in local communities. All its parts are useful, however about 45% of the respondents claimed that the bones are the most used parts (Fig. 6) while 24% of the respondents stated that the male sex organ is highly appreciated for its aphrodisiac values. The table 2 shows some parts of the manatee used to cure a variety of diseases.

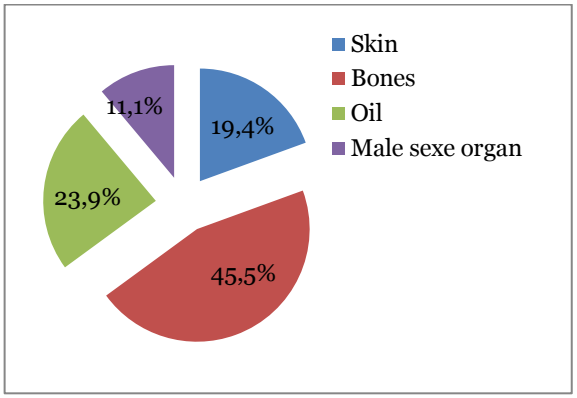

Fig. 6. The most used parts of the manatee in traditional medicine.

Table 1. Different diseases cured using manatees' parts in Niger.

Parts used	Diseases treated	Observations
Oil fat	Anemia and ear infections	Used as lightening oil and as cooking oil
Bones	Rheumatisms and epilepsy	Burn the bone and add in massage cream
Male sexual organs	Infertility and sterility	Grill and mix with tree barks extracts
Skin	Wounds healing	Dry and grind and mix with shear butter to apply on the wound
Ribs	Treatment of back aches	Dry and grind and mix with shear butter to apply during massage
Inner ear parts	Ear aches	Burn and mix with trees' barks and apply behind the ears
Mammal (breast)	Breast cancer	Dry and grind and mix with shear butter to apply on the wound
sperm	Male Impotency	Dry and grind and mix with tree barks extracts and drink as infusion
Extracts from female seminal liquid	Increase sexual appetite Retain a wife in her marital house if she doesn't love her husband	Dry and mix with tree barks extracts and drink as infusion

Discussions

History and folks on manatee

Manatees are large animals, with a cylindrical body, small head and small eyes with a muzzle terminated by two nostrils. They measure about 3m and weigh up to 450Kg. Legends about the manatee exist throughout Africa (Wetlands, 2008). According to the local fishermen a popular legend says that manatee would be a little Fulani bride. She was taken her bath naked on the river bank when she saw her father-in-law approaching. Fearing that he discovers her nakedness, she ploughed into the river and shouted "Ayu" and hided her nakedness in the water with a van. This van turned into a tail and the bride became a manatee. That is why the Fulani people never eat the manatee's meat, but they use its bone to increase the reproduction of their livestock.

Main human activities in the study zone

The River Niger plays a major role in the survival of the local communities living on its banks. The daily life of the populations is punctuated by the floods and tide of the river. Agriculture and fishing are the main activities which occupy the local communities. The river serves as the backbone of the life in the villages and fishing camps which are spread along its banks.

The main inhabitants of these camps are fishermen while larger villages are inhabited by farmers, hunters and traders. The fishing camps are most often attached to the villages. The camps are run by a traditional authority or a camp leader. Another authority that only rules the fishermen's organizations is the chief of the waters (a mystical authority known as the "Sorkho"). The canoes which are the most preferred means of transport on the river are vessels measuring between 6 and 8 meters generally imported from the Federal Republic of Nigeria. Active fishing mainly concerns the use of harpoons, driftnets and hawk net. Others tools used include hook gears, gill nets and traps. Group fishing techniques use purse seines, sometimes dams and shoots of grouped hawks. Individual or solitary fishing involves a single person with his equipment. The respondents reported that fishing is the main cause of their settlement in the camps but the decline in fish capture led them to diversify their production systems through the practice of agriculture and animal husbandry. As far as livestock is concerned, animals are mainly feed with the agricultural by-products and the bourgou (*Echinochloa stagnina*) which the populations collect directly in the river (UNESCO, 2007). Fig. 2 shows that about 58% of the respondents practice fishing as a primary occupation while about 42% practice agriculture.

Manatee capture

Manatee capture is a great event in the daily lives of the local fishermen. This capture is not an easy task because according to respondents, all animals have protective djinns which watch over them. Before killing any animal, the spirit of these djinns must be appeased by making some sacrifices otherwise even if the animals are in abundance; they cannot neither be seen nor killed. In order to approach and kill a manatee, one must be properly prepared using fetishes and ointments made with trees' bark. All human odors must be removed since the protective djinns of the manatee cannot bear human odor. The respondents stated that in a normal time it is more difficult to kill a manatee than to kill a hippopotamus, and this is explained by the fact that the manatee's parts are more important, so its protective djinns does not make its killing easy. According to the respondents, the difficulty in capturing manatee lies in the fact that the manatee is considered as "a human being whom God has put in the water", so he is aware of everything a man could do. Indeed, if a fisherman approaches a manatee without being properly prepared, he may die or go mad. According to the interviewees, Islam has greatly disrupted certain practices which, nevertheless, remain very present in the lifestyle of the Sorkhos. The Fig. 3 shows that about 22% of the respondents stated that they had captured at least one manatee in their lifetime, while the rest of the respondents either gave negative answer or refrained from giving any answer to the questions. This is due to the fact that respondents are afraid that the Wildlife services' informants could report them to the administration and the tough legislation associated with the wildlife protection in general and the manatee in particular. These informants are locally recruited staffs who help the wildlife administration in gathering information on the illegal activities of the local communities on wildlife. Cooking manatee's meat requires some rituals for the fear that it consumption does harm people. Before sharing the meat, a part is reserved for the village's head, the person who initiated the fisherman and the fisherman who killed the animal. Then the rest is shared among all the villagers.

Obtaining manatees' parts

In Niger, the Law 62-28 of august 4th 1962 conferred total protection for aquatic wildlife species including the manatee. This protection had increased with the ratification of several wildlife protection Conventions like the Convention on Biological Diversity, the Ramsar Convention, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), etc. The Law 98-07 of 29th April 1998 on hunting clearly stated the importance of the manatee by raising its level of protection from annex I (partially protected species) to annex II (fully protected species). This annex II reinforces the manatee's protection and increases the fines and penalties incurred by offenders.

Thus, manatee illegal hunting is considered as a punishable offense fined by severe penalties including imprisonment ranging from 2 months to 6 years and/or a fine ranging from 40,000 FCFA (US$ 80) to 4,000,000 FCFA (US$ 8,000). Nowadays the manatee enjoys total protection in Niger and only a few exceptional catch permits are issued, in connection with local cultures and scientific purposes. The strengthening of the legislation which protects the manatee had become the main obstacle in data collection by the researchers and the administration in charge of wildlife protection. In Africa, at National level, the manatee has been classified as a fully protected species from the time when legislative steps were first taken by colonial authorities to protect wild fauna in Francophone, Anglophone and Lusophone Africa. Thus, from then on, it became illegal to hunt or capture the manatee across its range. This absolute protection status was maintained everywhere after the independence, but enforcement of legislative codes relating to wildlife, forest, river, lake or coastal ecosystems has been poor due to lack of governmental capacity and resources (Wetlands, 2008). The African Convention on the Conservation of Nature and Natural Resources (Algiers' Convention) included the West African manatee in Class A (totally protected species) in September,1968.

At international level, since July 1975, it has been listed in CITES Appendix II and it was classified as "Vulnerable" on the IUCN Red List of threatened species in 1978. The 16th Conference of Parties of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), also known as the Washington Convention, held in 2013 in Bangkok, the manatee's status was revised. During this COP, the Sirenia Specialist Group of the IUCN Species Survival Commission designated a subgroup of specialists for the West African manatee to assess the status of the manatee and to serve as a resource for experts and managers of the species. Following the recommendations from this sub group, the manatee's level of protection was risen from Annex II (partially protected) to annex I (fully protected). The Convention on the Conservation of Migratory Species of Wild Animals (CMS), in partnership with UNEP, developed a Memorandum of Understanding and an Action Plan on the conservation of manatees for CMS Parties in West Africa. As noted in the Conservation Strategy for the West African Manatee, "Due to the threatened status of the West African manatee, increasing threats and an overall population decline, it is clear that conservation efforts are essential to safeguard the survival of the species across its range. Various national and local conservation efforts have taken place, and some important regional assessments compiled but this is the first time that a wide range of stakeholders from across the manatee's range have been actively engaged in conservation planning for the manatee". The purpose of the Conservation Strategy is to "improve policies and protective legislation, determine research priorities, reduce existing pressures on the manatee and enhance awareness of the culture and value of the species" (Wetlands International, 2008). All the respondents recognized that despite this tough legislation on manatee, the fishermen continue to kill the animal and to hide the remains of the killed animal. This situation is depicted in fig. n°4, which shows that about 60% of the respondents stated they do not hold any parts of manatees while about 21% of the interviewees claimed to they have some manatees' parts. More in-depth interviews revealed that the respondents were reluctant to provide information because of the repressive attitude of the Wildlife Administration. Only the village notables, some old fishermen and the Wildlife services' informants could state to have consumed manatee's meat or to possess some manatees' parts. This is due to the fact that they do not fear any sanctions or fines from the wildlife service's mainly for their age, social status and privileges as informant.

Different usages of manatees' parts

Animals have been methodically tested by pharmaceutical companies as sources of drugs to the modern medical science (Launet, 1993). Chemicals from nature have been a part of human civilization ever since our early ancestors began exploiting natural compounds to improve and enrich their own lives (Agosta, 1996).

Most of these chemicals are obtained from animals. According to Costa-Neto and Marques (2000), animals are therapeutic arsenals that have been playing significant roles in the healing processes, magic rituals, and religious practices of peoples from the five continents. The healing of human ailments by using therapeutics that are obtained from animals or ultimately are derived from them is known as zoo therapy. Animal-based medicines have been elaborated from parts of the animal body, from products of its metabolism (corporal secretions and excrements), or from non-animal materials (nests and cocoons). The traditional medical knowledge of indigenous peoples throughout the world has played an important role in identifying biological resources worthy of commercial exploitation. Indeed, the search for new pharmaceuticals from naturally occurring biological material has been guided by ethnobiological data (Blakeney 1999). Through the ages, people have exploited manatees for their meat, oil, and hides and for their ivory like bones. Every part of a dead manatee can be used (Reynolds and Odell, 1991).

According to Akoi (1994), the thick skin of the manatee is often crafted into quality leather goods, including walking sticks, horsewhips, shoes, and the heavy leather whips once used on slave plantations. Lacking marrow, the dense rib bones were used as weapons or ivory for ornamental carvings. Even the manatee's body fat and clear oil were used for lubrication, and as lantern fuel to generate light. El-Kamali (2000) reported that the tusks of hippo (Hippopotamus amphibious [Linnaeus, 1758]) are used for aphrodisiacs and ornamentals. Other custom includes the use of fat extracted from a manatee (*Trichechus senegalensis* Link, 1795) to cure rheumatism, boils, and backache. In rural areas where poverty level is very high, people depend heavily on natural resources in general and wildlife in particular to meet their food, health and income needs. The manatee plays a major role in meeting these needs as stated by about 48% of respondents who said that they use manatee for feeding while about 47% use it in the cure of diseases.

About 5% of the respondents said that they killed manatees just for pride and to satisfy their own ego (Fig. 5). In the fishing communities, killing a manatee used to be a great event in the villages. According to the respondents, in ancient time, a young man could only prove his courage and virility by killing a manatee and by offering its flesh to the parents of his beloved future wife.

Manatees' most used parts in the treatement of diseases

Animal parts are widely used in the treatment of various illnesses in the world. For example, Alexiades recorded that in the Ese Eja community in Peru, the blood of the black caiman (*Melanosuchus niger* [Spix 1825]) is used to treat epilepsy and stroke; ants of the genus *Pseudomyrmex* are smashed and used in the treatment of toothache, or are left to bite painful joints of sick people. In the area of Sierra Madre (California, USA) people used to say "The more poisonous the animal, the more potent its anti poison" (Werner 1970). This author points out that various anatomical parts of the rattlesnake (*Crotalus* sp.) are used for infirmities ranging from boils to bronchitis. The manatee continues to occupy a prominent place in the treatment of diseases in local communities. It is among the most widely used aquatic wildlife species in the treatment of diseases in fishermen's communities. As examples of traditional usage, people have worn manatee ear bones as charms in the hope of improving human hearing, and they have applied or ingested other manatee body parts as medicinal cures. The Spanish believed that the manatee's inner ear bones had special curative power (Reynolds and Odell, 1991).

They burned and pulverized the bones, called stones, into a powder and then took a small amount of the powder on an empty stomach in the morning with a swig of white wine. The magic manatee stones were supposed to cure just about everything from aches, colic, and dysentery to kidney problems (Reynolds and Odell, 1991). The table 1 gives an overview some diseases cured using manatees' parts according to the respondents.

Virtually all its parts are useful, however about 45% of the respondents claimed that the bones are the most used parts (Fig. 6). According to about 24%, the male sex organ remains one of the most preferred part for its aphrodisiac values. The male sex is dried, pounded with herbs to produce a powder called dakan masa "the pounding man" used against impotency and to increase sexual virility. As for the bones, in addition of being used against joint pains and rheumatism, they are burned and mixed with herbs to accelerate the reproduction of domestic animals by increasing fertility and milk production.

Conclusion

This study carried out in fifty (50) villages and fishing camps along the River Niger provided information on the multiple usages of manatee in traditional medicine. The methods consisted in socio-economic surveys, personal interviews and visits to villages' markets. The outcomes of the study revealed that the local communities due to low income and lack of health centers relay mostly on traditional healers to cure their diseases. The findings show that the bones, the male sex organ and the fat oil were the most used manatees' parts in traditional medicine. The harsh laws and their associated fines are great challenges facing the customs and traditions of the local communities which depend on natural resources to perpetuate their lifestyle. To ensure the long-term success of manatee's conservation, it is essential that communities living along the river are integrated into the design and implementation of conservation programs and to give them a sense of responsibility and ecological values in natural resources management.

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