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CONTRIBUTION TO THE IDENTIFICATION OF LORANTHACEAE COMMERCIALIZED IN THE MARKETS BY BETE AND NIABOUA OF DALOA, COTE D'IVOIRE

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ABSTRACT

Loranthaceae are hemiparasite plants used in traditional medicine to treat diseases and are commercialized by Bété and Niaboua, two ethnic groups of Daloa city, Côte d'Ivoire. The object of the study was to identify and know the therapeutic virtues of Loranthaceae species. Semi-structured research conducted from march to august 2018, in french and in local languages, were realized among sixty-two (62) herbalists in five (5) markets of Daloa on the Loranthaceae. The ethnobotany inquiry identified three (3) species of hemiparasites divided into 3 genera commercialized. Three parts of Loranthaceae: leaves, leafy twigs and stem barks. Several methods of preparation: decoction, infusion, maceration, pounding and kneading were identified. Several diseases treated are mentioned and Malaria is the most cited. The study shows the therapeutic importance of Loranthaceae and their use in traditional medicine by Bété and Niaboua ethnic groups are ways to deepen to discover new active ingredients to cure diseases.

KEYWORDS: Loranthaceae, commercialized, traditional medicine, diseases, Bété and Niaboua, Daloa.

INTRODUCTION

Plant resources occupy a large place in the life of man. In Africa, despite advances in modern medicine, African populations, in large numbers, are turning to medicinal plants from which they have developed health care systems (N'Guesssan *et al*., 2011). According to the WHO (2002), nearly 80 % of the population relies on traditional medicine for their primary health care. Medicinal plants play an important role in the health and treatment of various pathologies (Adjanohoun and Aké-Assi, 1979). The vascular plants of the family Loranthaceae are among these medicinal plants variously used to treat diseases or symptoms (Traoré, 1983). Various studies conducted in Africa have indicated that plant drugs from Loranthaceae species are used to treat multiple diseases (Dibong *et al*., 2009, Jiofack *et al*., 2010, Rainatou, 2012). Their therapeutic uses are experiencing renewed interest in many African civilizations (Kouyaté, 2005). However, in Côte d'Ivoire, studies for a better understanding of the therapeutic virtues of these plants remain to be conducted to deepen traditional knowledge, in order to provide valuable information for their uses in conventional medicine. In addition, no study on the use of Loranthaceae in relation to the Bété and Niaboua people of the city of Daloa (Côte d'Ivoire) has been carried out. This study is therefore a contribution to research knowledge of species Loranthaceae and their therapeutic virtues held by some initiated.

METHODOLOGY

The surveys were conducted from march to august 2018 in 5 markets as geographic coordinate: Orly (06°52,201'N and 006°27,228'W), large market (06°52,825'N and 006°52,638'W), Lobia (06°53,918 'and 006°27,102'W), market of Tazibouo (06°53,576'N and 006°26,293'W) and market of Slaughterhouse (06°51.601' N and 006°26, 029'W) of the city of Daloa with sixty two (62) herbalists consisting of 25 men and 37 women aged 35 to 70 years. The markets were selected on the basis of the number of sellers of medicinal plants and their availability. The semi-structured interviews conducted in French and local languages using questionnaires required the assistance of interpreters. The interviews required the assistance of

credible interpreters from the surveyed community regarding the Loranthaceae species sold and their therapeutic virtues. The interviews are sometimes accompanied by the purchase of Loranthaceae boots commercialized. The samples of these plants obtained were identified using the herbarium of the National Center of Floristic (CNF) in Abidjan. The data collected were grouped by type and nature of knowledge acquisition to determine the response rate (f) of the interviewees.

$$f = \frac{S}{N} \times 100$$

The calculation of the respondents' response rate was made according to the following formula:

(f - Response rate of respondents, S - Number of people who answered a given question, N - total number of people interviewed).

RESULTS

Characteristics of the respondents

Sixty-two (62) herbalists aged 35 to 70 years were interviewed in the five (5) markets in the city of Daloa about the therapeutic use of commercialized Loranthaceae species. About three-thirds of the interviewees are women, or 77, 42 %, and more than half (96, 77 %) of them are illiterate (Table 1). The majority is between 41 and 50 years old, with an average age of 43, 55 % (Table 2). 73 % of them claim to have received their knowledge of Loranthaceae from their ancestors (Table 3).

Loranthaceae species sold

Three (3) commercialized species of Loranthaceae were identified in five (5) markets in Daloa city and used in traditional medicine by local populations (Figure 2 A and B). They are *Globimetula braunii*, *Phragmanthera capitata* and *Tapinanthus bangwensis*. The species identified are divided into three genera.

Knowledge about Loranthaceae

All respondents know the Loranthaceae in the photos presented before the questionnaires (95 % of responses) know the species of Loranthaceae commercialized. They even make a difference between epiphytes and Loranthaceae in local languages to avoid confusion. But, the species of Loranthaceae are designated under one single word: "*zougroudjèlèba*" in Bété, "*soukoucalama*" in Niaboua, "*adjre or wakassou aidjré*" in Baoulé, "*n'dagnaman*" in Agni and "*gniriladon*" in Senoufo.

Uses of Loranthaceae and therapeutic indications

The three (3) species were cited in drug recipes. The respondents indicate that Loranthaceae species are marketed to treat several diseases or symptoms. The parts of the species marketed and used are the leaves, the bark of stems and the leafy twigs.

Table 1: Distribution of respondents according to their level.

Gender	Intellectual level		Number of respondents	Rate (%)
	Illiterate	Primary		
Man	13	1	14	22,58 %
female	47	1	48	77,42 %
Total	60	2	62	100 %

Table 2: Distribution of respondents by age classes.

Age classes	Effective	Rate (%)
≤ 35 years	18	29,03
> 35 à ≤ 50 years	27	43,55
> 50 à ≤ 60 years	6	9,68
> 60 years	11	17,74
Total	62	100 %

Figure 2: A and B: Loranthaceae leafy twig boots commercialized at markets in Daloa

Table 3: Listed Loranthaceae species and therapeutic indications.

Species of Loranthaceae	Vernacular names	Diseases, symptoms	Used parts	Modes of preparation	Modes of administration
G. braunii	*Adjire* (baoulé), *Zougroudjèlèba* (bété)	Malaria	Fe	Decoc	Ablt, drink
		Cdtre	RaFe	Decoc	Oral bath
		Rheumatism	Fe	Ptge + lemon	Friction
		Asthma	RaFe	Inf	Drink
		Headache	Fe	Piling + water	Nasal instillation
		Fontanelle	Fe	Ptge	Light friction
P.capitata	*Adjire* (baoulé) *Zougroudjèlèba* (bété),*soukoucalama* (niaboua), *N'dagnaman* (agni)	Headache	Fe	Plge + water	Nasal instillation
		Shingles	RaFe	Pdr + garlic + cola	Ointment, friction
		Anemia	EcT, Fe	Maceration	Drink
		Diarrhea	Fe	Plge + hot pepper	Purge
		Ulcer	Fe	Plge + garlic, inf	Purge, Drink
		Malaria	Fe	Decoc	Ablt, drink
		Fontanelle	Fe	Ptge	Light friction
		Fear of heights	RaFe	Inf	Drink
		Hyp arte	RaFe	Inf + citon	Drink
		Weak sex	EcT	Decoc + Pcola	Drink
		Sterility	EcT	Pdr + Pcola	Purge
		Rules of Procedure	EcT	Pdr + lemon	Drink
		Diabetes	RaFe	Decoc	Drink
		Hemorrhoid	Fe	Plge + garlic	Purge
		Abscess	EcT	Pdr + lemon	Friction
T. bangwensis	*Adjire* (baoulé), *Zougroudjèlèba* (bété), *soukoucalama* (niaboua), *N'dagnaman* (agni), *Gniriladon* (senoufo)	Anemia	EcT, Fe	Maceration	Drink
		Ulcer	Fe	Plge + garlic	Purge
		Fear of heights	RaFe	Inf	Drink
		Palp card	Fe	Inf + lemon	Drink
		Typhoid fever	EcT	Decoc, Pdr + garlic	Drink, Purge
		Sterility	EcT	Pdr + Pcola	Purge
		Cdtre	RaFe	Decoc	Oral bath
		FGle	RaFe	Maceration	Bath
		Angina	Fe	Inf + lemon	Drink
		Asthma	RaFe	Inf	Drink
		Cough,	Fe	Inf + honey	Drink
		Diarrhea	Fe	Plge + hot pepper	Purge
		InflaP	Fe	Ptge + Pcola	Friction
		Diabetes	RaFe	Decoc	Drink
		Varicella	Fe	Pdr + KTK	Badig, Friction
		Rules	EcT	Pdr + lemon	Drink
		Hyp arte	RaFe	Inf + citon	Drink
		Malaria	Fe	Decoc	Ablt, drink

Explanation of abbreviations: *Badig - Brushing; EcT - Bark of stem; Fe - Leaf; Infusion; Insti- Instillations; KTK - Kutoukou; Decoction - Decoction; Ptge: Kneading; RaFe: Leafy twig; Pdr - Powder; Plge - Pill, InfaP: Inflammation of the feet; Hyp art - Hypertension; Règl dlses - Painful Rules; Ablt - Ablution; Pcola - Small cola - Cdtre - Dental caries; FGle - General fatigue; Weak sex - Low sexual*

In total, twenty four (24) diseases were cited by the herbalists interrogated (Table 4). These are especially malaria, typhoid fever, anemia, diabetes, asthma, tooth decay, headache, high blood pressure, heart palpitation, asthma, diarrhea, stomach sores or ulcers, and inflammation of the feet after the woman's delivery. Digestive diseases are the most cited therapeutic indications (56, 40 % response). Five (5) modes of preparation are mentioned: maceration (15 % of responses), decoction (53 %), infusion (51 %), pounding (35 %) and herbal tea (25 %). The recipes are administered in the form of steam bath (28 % of responses), drink (80 %), purge (69 %), friction (37 %), inhaling (12 %). The drink (80 % of responses) is the most cited mode of administration. Loranthaceae are often used alone or in association with other plants or drugs.

DISCUSSION

The collected data identified three (3) species of Loranthaceae belonging to 3 genera commercialized in the markets of Daloa and used for the treatment of various diseases. Other studies conducted in Northern Benin (Ahamide *et al*., 2017) and in Sud-Comoé, Côte d'Ivoire (Amon *et al*., 2017) on the uses of plants in the family of Loranthaceae have identified respectively four (4) and seven (7) species. This difference in number could be explained by the extent of the study area. This study was led only in the city of Daloa, Côte d'Ivoire.

Listed species are recognized and designated under a single name. The local attribution of name to Loranthaceae by the respondents, testifies their knowledge of plants (Adjanohoun, 2001). This confirms the remarks made by Aké Assi (1984) that local people do not name the plant species they use.

Taking into account the criteria acquisition of knowledge of respondents, the majority among them (73 % of response) claims to have received the knowledge of these plants from their ancestors. This could be explained by the fact that the field of traditional medicine is a relatively closed field where knowledge about medicinal plants is inherited from father to son.

Three (3) parts of the Loranthaceae species (leaves, leafy twigs and stem bark) are sold and are used in medicinal preparations for the treatment of various diseases. The leaves are the vegetative organs most cited. The importance of leaves used in medicinal recipes can be justified by their ease of sampling by local populations (Adjanohoun and Aké-Assi, 1979).

A total of twenty-three (23) diseases or symptoms were identified during our surveys of Bété and Niaboua ethnic groups in Daloa and are treated from Loranthaceae. The data show that these plants have various antibacterial, antiseptic, antirheumatic, antihelminthic, antidiarrheal and analgesic activities and are useful in the treatment of several diseases or symptoms mentioned by the respondents: shingles, gastrointestinal infections (diarrhea, ulcer), angina, migraine painful periods, tooth decay, rheumatism and inflammation of the feet after delivery. The comparison of the present study with a Loranthaceae survey carried out in the city of Logbessou in Douala, Cameroon (Dibong *et al*., 2009) and in Benin (Ahamide *et al*., 2017) for these same plants mentioned in both cities shows several conformities regarding the treated diseases, cited by the herbalists interviewed.

Similarly, Swanson-Flatt *et al*. (1989) have also reported antispalmodic and antiasthmatic activity at *Viscum album* L. subsp. album a species of (Loranthaceae) used in cases of asthma. This number is proof that the Bété and Niaboua ethnic groups have a good knowledge of the therapeutic virtues of Loranthaceae.

The collected data show that Loranthaceae taken from mango: *Mangifera indica* is used to treat diseases of mystical origin, to protect against evil spirits: geniuses. This is consistent with the information collected by Amon *et al*. (2017).

CONCLUSION

This study constitutes an important database for the valorization of the plants of the family Loranthaceae medicinal in traditional medicine. The results of the evaluation of ethnobotanical knowledge of Loranthaceae by Bété and Niaboua ethnic groups have shown that they are plants with undeniable therapeutic properties. Their uses could lead to further studies on extraction of active ingredients and more efficient use in conventional medicine for the care of certain diseases.

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