Ambivalent character of the ornamental plants inventoried in the city of Abidjan.

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Abstract—In the countries in the process of becoming developing, plants are means important of things to solve the public health probleme of third world countries. Ornamental plants are generally introduced into our environment make into a city for esthetics, fragrance and ecological benefits reason. However, this characteristic of ornamental plants often has another face, a "toxic" character. Thisstudy in Abidjan town, aims to show a certain ambivalence ornamental plants which embellish our close environment.The first phase that study method consisted to make an inventory of all the ornamental plants present in the study area. Then the second phase, the way to approach is an ethnobotanical investigation doing among the populations in the study area. The way is a direct interview, which consisted of inquest the populations surveyed. Their answers are reported on an adapted sheet, designed for this purpose. Thus, we visited the horticulturists, florists and the populations on the corridor of the city of Abidjan. In this study, the quiz was at the center of the toxic effects of certain ornamental plants. To make this study possible the inventory of 286 ornamental species belonging to 85 families and divided up in 219 kind. According to our surveys, among the ornamental plants surveyed, we have catalogued 34 toxic ornamental species, or almost 12% of listed species. Also, 6 ornamental plants with toxic constituents, listed, are responsible for many poisoning cases: Asclepias curassavica L. (Asclepiadaceae), Datura metel L. (Solanaceae), Dieffenbachia picta Schott (Araceae), Lantana camara L. (Verbenaceae), Nerium oleander L. (Apocynaceae) and Thevetia peruviana (Pers.) K. Schum. (Apocynaceae). The esthetic and "toxic" dimension contributes to the ambivalence of these ornamental plants.

Index Terms—Ornamental plants, Ambivalent, Toxic, Ethnobotany investigation.

1 INTRODUCTION

The origin of the spoillage come generally from the agriculture, population growth and climatic factors (1); (2); (3). Before this bad spectacle, everyone want to recreate, at home, the universe where he will be at ease daily only (4). Thereby, beyond any utilitarian notion, many peoples have loved plants for their beauty alone (5): They are ornamental plants.

An ornamental plant can be defined as a plant used to decorate, decorate, embellish inside (apartments, offices, hospitals, schools, nursing homes ...) or outside (private or public gardens, parks ...). It is appreciated and cultivated for the beauty of his leafage, his fruits, her flowers, for his fragrance or for his esthetics rather than for utilitarian purposes. Despite his comfort sign, associating green space and ornamental plants with dwelling place, has become, today, a custom no matter of social status. We find horticulturists everywhere: around great cities, along highways, at crossroads, etc. The proliferation of this activity sector is with out doubt related to his economic profitability. Ornamental charm plants the living environment (6); they are solicited in several ceremonies: births, marriages, deaths, birthdays, etc. (4). Their importance has become incontestable decoration. However, ornamental plants can have differents character. In extra to being beautiful, some of them can cause serious poisoning in humans. A toxic plant, or poisonous plant, is a kind of plant which contains in some or all of his parts, substances which are mainlytoxic to humans or animals. The principles toxic contained in the plants are generally organic compounds, more rarely minerals. Poisoning is most often done by the ingestion of certain plant parts, but, it can also happen with a simple contact of certain species, causes toxic effects to children, over games (7; 8).

The prevalence of poisoning by plants is unfamiliar in tropical and intertropical zones, where there are not always poison control centers.

(9) classifies intoxication by tropical plants according to the main clinical effects they cause. For this author, the toxicity of tropical plants is complex, before the great diversity of plants. It depends both of the type of contact between the plant and humans and on the sort of the toxics. The purpose of this work is not to give all the of toxic plants, but to show the ambivalent nature of certain ornamental plants present in the city of Abidjan. Specifically, about to make some ethnobotany survey in the horticultural sector in Abidjan town to put in order the list toxic species list among the cultivated ornamental plants, then characterizing the chemical compounds responsible of the listed the toxicity plants listed and describe the toxic effects through a bibliographic study.

2- MATERIAL AND METHOD

2-1.Study material

- **Presentation of the study area**

Located in the South-East of the côte d'ivoire (Figure1), Abidjan region is limited to the North, by the subprefecture of Azaguié; to the east by the Adjin and Potou lagoons; to the south by the Atlantic Ocean and to the west by the river ofBandama. His geographic coordinates are 5 ° 12 'to 5 ° 24' north latitude and 3 ° 39 'to 4 ° 45' west longitude. The climate of the South of Côte d'Ivoire is characterized by the presence of 2 rainy seasons separated by a short dry season. The long dry season take on average 3 to 5 months (10ELDIN, 1971).

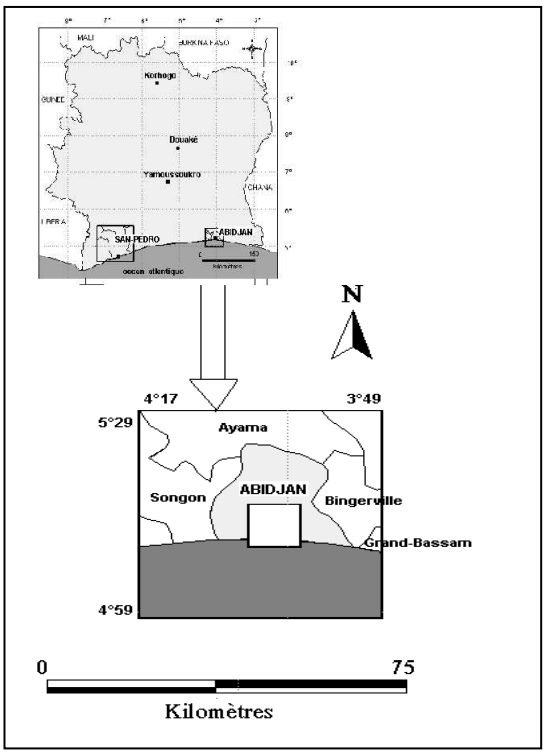

Figure 1 - Location map of the study area

- **Technical material**

The technical material used to fulfil this study consists of a previously developed interview guide, a dictaphone to record the interviews, herbarium sheets for collecting plant, a network for online bibliographic research.

2.2. Method

2-2-1. Survey of people nearby the actor and inventory of ornamental species

The survey method used is a direct interview based on an interview guide which has two main parts. The first part concerns questions relating to an inventory of ornamental plants. It provides information on the vernacular or commercial name of the plant, the organs used in decoration and the spaces to be decorated. The second part of the interview guide deals with the toxic aspect of ornamental plants. It identifies toxic species, toxic organs, modes of intoxication and the morbidity associated with toxicity. During the survey, an exhaustive floristic census was carried out in all the horticultural farms and shops in the city of Abidjan and, in rare cases, in the homes of certain individuals.

The interview is carried out with people experienced in the practice of growing and selling ornamental plants or people equipped in the creation of landscaped gardens. These people, in direct contact with ornamental plants and benefiting from a long experience in the realm, are likely to provide correct and original information on ornamental plants. Field visits were also carried out with the actors on their respective sites. and an inventory of ornamental species was carried out there, whatever the surface of the site.

2-2-2. Bibliographic research

A bibliographic synthesis in relation to the chemical compounds responsible for toxicity in toxic indexed species within the horticultural flora of Abidjan town was realize.

2-2-3. Statistical analysis

The results obtained were analyzed using computer software (SPSS Statistics 3.2 and Excel 2010) in order to identify groups of plants.

3. RESULTS

3-1- Inventories of listed ornamental plants

3-1-1-Wealth and floristic composition

The inventory carried out in the city of Abidjan identified 286 ornamental species. These species are distributed among 219 genus grouped into 85 families. Their distribution into taxonomic groups is shown in Table I.

Table I: Taxonomic distribution of species harvested in abidjan.

Taxonomic groups	Number of taxa		
	Families	Genera	species
Prephanerogames	1	2	3
Dicotyledons	62	153	209
Monocotyledons	16	58	68
Gymnosperms	3	3	3
Pteridophytes	3	3	3
Total	85	219	286

Regarding the chorology of the species of horticultural flora of the city of Abidjan listed, those from America are the most abundant and represent 33% of all the listed species (Figure 1). They are followed by species originating in Asia (28%) and those from Africa (23%). As for the species from Europe and Oceania, they represent 8% and 6% respectively

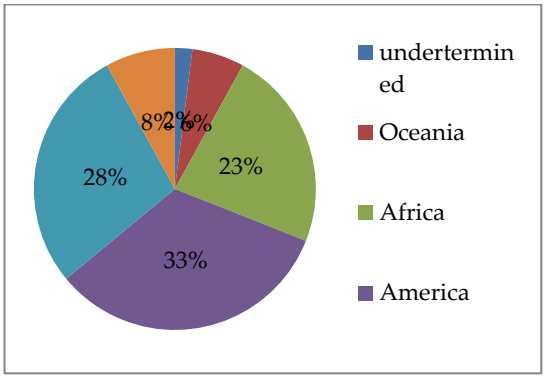

Figure 1: Originate from the horticultural plants of Abidjan

3-2 Toxicity of ornamental plants

3-2-1. Ornamental plants identified as toxic

3-2-1-1. Wealth and composition

To total of 32 ornamental species belonging to 18 families have been qualified as poisonous plants by both the plant vendors and by our bibliographic study. The most representative families in number of species are those of Apocynaceae, Araceae and Euphorbiaceae. They each count four species (Figure 2).

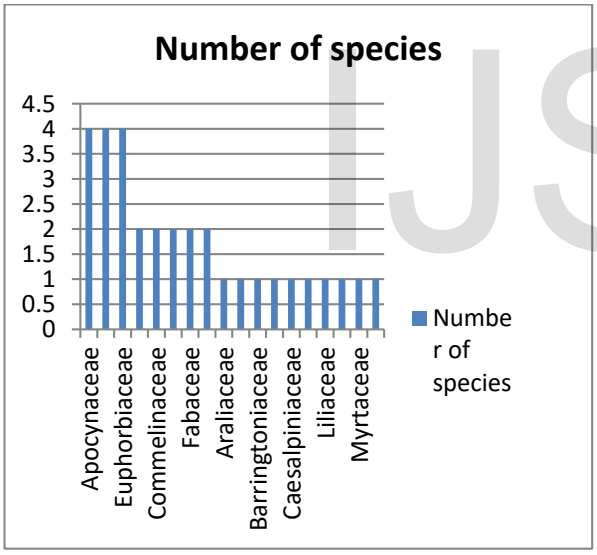

Figure 2: Diagram of families of toxic ornamental plants inventoried

In general, the toxic ornamental species listed are represented by 4 morphological types which are Trees, shrubs, litle trees and grasses (Figure 3). Ornamental and toxic herbs are the most represented with 35%. Next in descending order are shrubs (24%), litle trees (22%) and trees (19%).

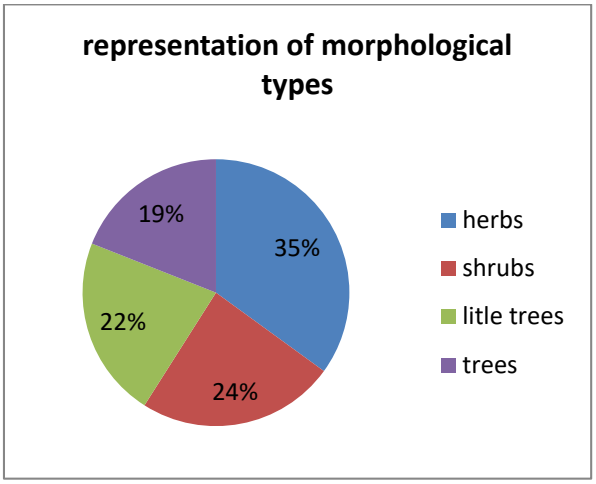

Figure 3: Spectrum of morphological types of toxic ornamental species listed in Abidjan

3-2-1-2. Distribution of species according to the organs concerned

Analysis of the ornamental and toxic species listed in Abidjan city reveals about the species in which all the poisoning plant organs are the most abundant with 43% (Figure 4). Rare is the Ornamental species of whomthere is only the leaves and fruits presenting a risk of poisoning their percentage are (5%).

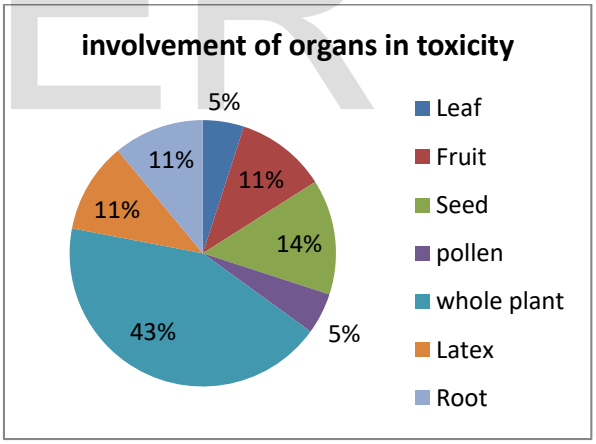

Figure 4: Spectrum of the organs accused of intoxication

3-2-1-3 Toxic ornamental plants frequently listed

Among the 32 ornamental species that we considered toxic, we will be exclusively interested on the ornamental plants which were most frequently responsible for many cases of poisoning listed by the respondents and reported by the populations (Table II). These are *Asclepias curassavica* L. (Asclepiadaceae), *Datura metel* L. (Solanaceae), *Dieffenbachia picta* Schott (Araceae), *Lantana camara* L. (Verbenaceae), *Nerium oleander* L. (Apocynaceae) and *Thevetia peruviana* (Pers.) K. Schum. (Apocynaceae). The table II classifies these species according the

place where they leave, the organs of the infection, the main constituents, the types of infections and the way of poisoning.

Table II: Characterizations of frequently cited toxic ornamental plants

Scientific names of taxa	place of life	Main constituents	Symptoms poisoning	organ incriminated	voice of intoxication
Asclepias curassavica	outdoor plant	cardiotonic heterosides	Colic Cardiac arrest	Whole plant	oral
Datura metel	outdoor plant	Alkaloids (hyoscyamin, atropin, scopolamin)	• delirium • hallucination • death	Whole plant	oral
Dieffenbachia picta	house plant or shady place plant	calcium oxalate crystals	• Swelling of the mouth • Burning sensations • Erythema • Blisters, • Local inflammation of the eye	Leaves, stem, plant juice	Dermal, oral
Lantana camara	outdoor plant	Toxic terpenoids (lantanin)	• Irritations	Flowers, leaves	oral
Nerium oleander	outdoor plant		• Nausea • Vomiting	flowers, whole plant	oral
Thevetia peruviana	outdoor plant	Toxic heterosides	• Seizures • Gastrointestinal upset • Asphyxiation	seeds, whole plant	oral

3-2-1-4. Mode of poisoning of the toxic ornamental plants frequently listed

According to our investigation, responsible of many cases of poisoning aresix of these ornamental plants with toxic constituents . These are *Asclepias curassavica* L. (Asclepiadaceae), *Datura metel* L. (Solanaceae), *Dieffenbachia picta* Schott (Araceae), *Lantana camara* L. (Verbenaceae), *Nerium oleander* L. (Apocynaceae) and *Thevetia peruviana* (Pers.) K. Schum. (Apocynaceae). The way that these plants used to poisoned differs from one species to another.

- ***Asclepias curassavica* L. (Asclepiadaceae):**

Common name:Blood -flower

It is a herbaceous plant of around 1 m, with a little ramified stem (Figure 5). Very often the plant spontaneously multiplies by seeds. It is cultuvat in the gardens along the paths.

Figure 5 - *Asclepias curassavica* L. (Asclepiadaceae)

The whole plant is toxic. According to the respondents, at high doses. Drinking more than a spoonful of decoction causes colic and heart attack

- *Datura metel* L. (Solanaceae):

Common names: Metel thorn apple trumpet of judgment Datura

Datura, a ruderal plant. Given its beautiful flowers (Figure 6), it is cultivated as an ornamental plant. His propagation is done by sowing seeds. The whole plant and especially the seeds have hallucinogenic properties. All parts are toxic by the oral route. There have been numerous reports of poisoning by ingestion of seeds mixed with food, causing hallucinatory delirium and sometimes death.

Figure 6 – *Datura metel* L. (Solanaceae)

-*Dieffenbachia picta* Schott (Araceae)

Common name:Dumb cane

Dumb cane is mainly grown in pots, as a houseplant (Figure 7); also used to garnish the shaded flowerbeds. Dieffenbachia is propagated by cuttings. The whole plant is toxic. The poisoning can be fatal if not leave serious consequences. By chewing, swelling of the mouth, burning sensations and a temporary inability to speak can be observed, which can lead to death if the edema obstructs the respiratory tract. According to the results of the investigation, skin contact also causes irritation, erythema and phlyctenes. If the plant's juice is accidentally thrown into the eye, it causes local inflammation.

Figure 7 - *Dieffenbachia picta* schott (Araceae)

- *Lantana camara* L. (Verbenaceae)

Common name: Lantana

The *Lantana* has become invasive, and considered to be a plague (Figure 8). The leaves are fragrant and are used in the production of beds and also as hedges. Propagation is done by sowing seeds or by cuttings. The flowers and especially the leaves are toxic to consumption.

Figure 8- *Lantana camara* L. (Verbenaceae)

- *Nerium oleander* L. (Apocynaceae) :

Common name: Oleander.

For its particular shape and its beautiful flowers, the plant is cultivated isolated in the gardens (Figure 9). Its multiplication is done by cuttings. This plant has great toxicity; numerous poisonings have been reported. According to the respondents, falling asleep in the shade of an oleander can cause discomfort. Poisoning is often fatal, especially for children who have chewed the flowers or leaves. Poisoning of domestic animals is rare; these spontaneously avoiding the plant. Honey and even smoke from an oleander fire are very toxic.

Figure 9 - *Nerium oleander* L. (Apocynaceae)

- *Thevetia peruviana* (Pers.) K. Schum. (Apocynaceae) :

Common name:Yellow oleander

This plant is decorative by inflorescences, consisting of flowers, yellow, funnel-shaped (Figure 10). Bois-lait in live hedges or isolated, to enhance its harmonious silhouette. It is also used as an alignment shrub. Propagation is by sowing seeds. The whole plant and especially the seeds contain are toxic. Ingestion of 4 seeds causes seizures, gastrointestinal disturbances and asphyxiation.

Figure 10 - *Thevetia peruviana* (Pers.) K. Schum. (Apocynaceae)

3-2-1-4- ingestion related disorder of extract toxic plant

According to the information collected, following the absorption of a toxic plant, the subject presents, more or less, common digestive disorders, in particular nausea and vomiting associated with violent diarrhea aimed at eliminating the toxic agent in question. There is also abdominal pain or colic associated with the acceleration of intestinal transit.

These disorders are sometimes more serious with the presence of blood in the stool or vomiting. In the absence of adequate care, these disorders can progress to significant dehydration. After this impact on the digestive point, other more specific manifestations can come with a level cardiac, renal, respiratory, neurological, liver and bodily disorders.

4 - DISCUSSION

The ornamental flora of the city of Abidjan is made up of 286 species, 77% of which are exotic. The high presence of exotic plants observed in the ornamental flora is not specific to the city of Abidjan. Indeed, in most African countries, ornamental horticulture is oriented towards exotic taxon as mentioned in the work of (11)and (12) respectively in Togo and Dakar. In addition, 32 ornamental species have been classified as toxic plants. The dominance of ornamental and toxic herbs (35%) is due to the fact that they are characterized by easy reproduction and are the subject of a strong and important presence in the immediate environment of populations. In addition, the diversity of the parts of the ornamental plants implicated in poisoning ikn accordance with the work of (13) which also noticed that the roots, leaves, flowers, fruits and seeds are the incriminated plant organs in poisoning in the Tlemcen region in Algeria. However, the abundance of ornamental species of which all the organs are concerned in intoxication, estimated at 43%, which is observed in this study, change the results of (13). For these authors, a plant is rarely toxic in all his part. The respondent consider that *Asclepias curassavica*, *Datura metel*, *Dieffenbachia picta*, *Lantana camara*, *Nerium oleander* and Thevetia peruviana are the ornamental species responsible for many cases of poisoning. The toxic nature of these six ornamental species is frequently mentioned in other studies (9); (14). It is the same for the divers symptoms presented by people intoxicated by these species aforementioned.

the ornamental plants, beyond their appealing particularly,esthetic characteristics, also reveal a toxic character. This dimension, both esthetic and toxic, have an effect in the ambivalent character of these ornamental plants. Indeed, this ambivalence is manifested in certain plants including *Asclepias curassavica* L, because of the presence of cardiotonic heterosides in the whole plant, would cause poisoning of cattle (15). In addition, at a high dose, more than one spoonful of decoction causes colic, blood stained excretion and direct action on the heart (16). Ambivalence is also described in *Datura metel* L. (Solanaceae), whose presence of alkaloids derived from tropane including hyoscyamine, atropine and scopolamine which has hallucinogenic properties, would cause by ingestion many cases of intoxication seeds mixed with food (17). The plant with parasympatholytic properties is a powerful hallucinogen and a narcotic (16). In general, (18)put the importance on the chemical composition of toxic ornamental plants. They identified 10 mains constituents which are the alkaloids, coumarins, flavonoids, cardiotonic heterosides, cyanogenetic heterosides, lectins, phenols, saponosides, sterols and terpenes responsible for the toxicity of ornamental plants more or less a low dose.

before the impacts and nuisances caused, this ambivalence "beauty and danger" of certain ornamental plants must be under a particular attention, exploited and to make the population more aware about it.

5 CONCLUSION

The census of the horticultural flora carried out in Abidjan's city,made it possible to inventory 286 ornamental species belonging to 85 families and 219 sort of plant. In the decoration domain the role of plants is no longer to be demonstrated. Many of them are used in this domain a simplified classification has proved necessary taking into account the decorative elements and places of use.However, their ambivalent character deserves to be pointed out for a better use of these plants. Especially more than their decorative role, several of them, used in pharmacopoeia or medicine, become toxic at certain doses; The introduction of new species into the horticultural flora must be done with great attention, at the risk of seeing them become real blight on society.

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