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ETHNOBOTANICAL STUDIES OF WEST AFRICAN OKRA [*Abelmoschus caillei* (A. chev) Stevels] FROM SOME TRIBES OF SOUTH WESTERN NIGERIA

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ABSTRACT
West African Okra [*Abelmoschus caillei* (A. Chev) Stevels] is a multipurpose annual, biennal herb sometime perennial woody crop plant common in the humid West African subcontinent. It is produced in traditional agriculture especially when other vegetables are not in season and an important cash crop in the local economy. This study is aimed at generating information and documenting the ethnobotany of *A. caillei* via the indigenous knowledge among tribes of Delta, Edo and Ondo States of Nigeria). Primary information was collected from randomly selected respondents through survey using structured questionnaires and guided walks within 54 sites. A total of 540 persons were surveyed aged between 18-87 years old. Of this number, 259 (48%) were males and 281 (52%) females. Nine ethnic tribes were recorded in the 3 States. The tribes varied in their socio-cultural and economic characteristics and local knowledge about the crop. One-two local names of the crop was recorded with one related "type". Traditional uses of the crop include food (100%) and non-food purposes. The information from non-food uses include medicine (27%), myth/religion (32%), soil fertility indicate (19%), rainy season indicator (8%), dry season/harvest time indicator (100%), fuel (15%) and sponge (11%). These sets of information indicate that the crop plant is of prime importance in the area.

***Keywords*:** Ethnobotany, Indigenous Knowledge, West African Okra, Traditional Uses, Ethnotaxonomy.

INTRODUCTION
Harshberger (1896) was the first person to use the term ethnobotany to denote the study of plants used by primitive aboriginal people. Subsequently, different workers (Robins *et al*., 1916, Jones, 1941; Ford, 1978; Schultes, 1986; Jain, 1989, 1991, Schultes & von Reis, 1995, Wickens, 1998) defined the subject, greatly enlarged the scope and accepted it as an interdisciplinary science for holistic approach to man–plant relationship. Allem (2000), defined ethnobotany as the biological, economic, cultural inter-relationship studies between people and plants in the environment which they exist. More recently, Schultes & Raffauf (2003), broadly defined the subject as human evaluation and manipulation of plant materials, substances and phenomena in societies and Jain (2005), related it as the study of how people make use of plants. According to Pushpangadan & Kumar (2005), it is the entire realm of useful relationship between plant and man. These definitions point out that there is a relationship between people of a given community or society, the environment and the plant diversity in that particular community.

Ethnobotany is an integral part of indigenous/local knowledge of a particular society. Thus, different societies or communities have their own knowledge about plants and their uses. According to Warren & Cashman (1988), the knowledge is the means by which most communities survived for centuries by adapting themselves to their environment, using their intrinsic knowledge of associated resource management.

The importance of indigenous knowledge is overwhelming. Warren & Cashman (1988) valued it as the sum of the experience that forms the basis for decision making for familiar and unfamiliar problems and challenges in a local community. Warren (1992) also emphasized that indigenous knowledge represents an immense valuable database that provides mankind with an insight on how numerous communities have interacted with the changing environment, providing local solutions for local problems and suitable ways for coping with challenges posed by specific conditions.

In Nigeria, Igbokwe (1999) found how local small farmers selectively adopted their local knowledge for increasing rice production in a community in Igbo land. Pressure on land and other attendance problems of agricultural land is on the increase as a result of increasing population and urbanization. Instead of longer fallow periods, cultivation techniques of clearing, gathering in heaps left to decay or thinly spread and buried was adopted. This resulted in continuous cropping without prolonged fallow. This eradicated the incidence of pests and eliminated virulent weeds. Penny (2001) documented indigenous knowledge of local Yoruba women on yams and yam farming which is exclusively different from that of men in the same locality. The study confirmed divergent knowledge among local people of a particular community and emphasized that every group with knowledge should be explored and utilized as part of the community's cultural capital. These divergent perspectives allow for a deeper understanding of yam cultivation, with solutions that can benefit all the people of the community and beyond.

The indigenous knowledge of some farmers in Nigeria on the husk of the kola nut pod shows that the husk is a good material for improving soil structure and fertility (Kolawole, 2002). This was also confirmed at Cocoa Research Institute of Nigeria (CRIN) by researchers and subsequently led to refining the husk as kola nut pod husk fertilizer (KPH fertilizer). This refined KPH fertilizer can be added directly to soil surface with or without additives depending on the crop under cultivation. The use of the fertilizer is reported to be highly sustainable, cost effective, locally manageable and available to local farmers (Kolawole, 2002).

Indigenous knowledge in germplasm classification and sampling has been emphasized (Hammer & Mbewe, 1994; Guarino, 1995). While Hammer & Mbewe (1994) acknowledged that useful traditional information can be included and obtained from the distribution of species in certain areas. This in turn can assist in classifying the flora of that area, Guarino (1995) opined that ignoring local or indigenous knowledge in collecting landraces is wasteful at best and hopeless at worst.

The overall uses of ethnobotanical studies are high, but there are gaps which require to be filled. It may supply information on new approaches that provide better support and improve the management for crops already adopted to fragile ecosystems. Crop improvement systems may also be revealed through studies of the knowledge and innovations among the local indigenes in Nigeria. This, when harnessed, would contribute to sustainable development.

West African okra *Abelmoschus caillei* (A. Chev.) Stevels grows in a wide range of humid ecological zones. It is well adapted to local environmental conditions and pests (Ariyo, 1993). It is naturally distributed in the most densely populated areas where many

people are involved in its production, sales and consumption. It is a multipurpose vegetable used as food, and in orthodox and traditional medicine. This genetic resource together with the indigenous knowledge can be harnessed to improve the livelihood of local communities. This study is aimed at documenting the ethnobotany of the crop plant among ethnic groups in some States of South Western Nigeria.

MATERIALS AND METHODS

Study Area: The study area lies between 5.05^{0}N – 6.15^{0}N and 4.00^{0}E – 6.55^{0}E within the humid and sub humid tropical forest (Fig. 1). It consists of Delta, Edo and Ondo States.

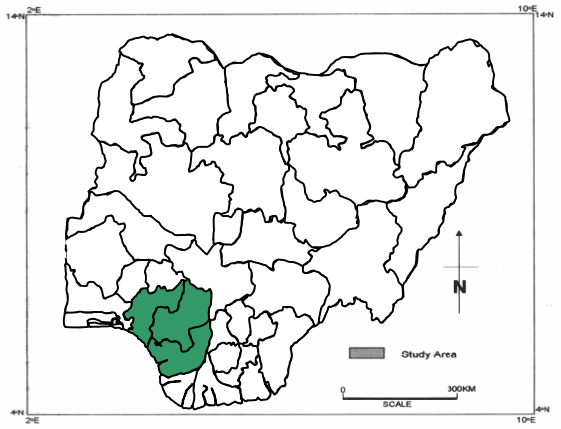

FIG. 1. MAP SHOWING THE STUDY AREA

The area is characterized by lowland relief less than 300 meters above sea level. However, spotted areas of about 500 meters above sea level are found in northern parts of Edo State and western uplands of the country that extend slightly into the northern parts of Ondo State. Most of the area is drained by Rivers Osse, Ossiomo and coastal rivers like Sapele, Forcados, and Warri. These together with river Niger drain water into the Atlantic Ocean.

The area is covered by mangrove swamp and low land rainforest vegetation, but heavy anthropogenic alteration over a long period has replaced the previous vegetation forest with a mosaic of secondary forest (Dania-Ogbe *et al*., 1992). However, derived savanna occurs as a relic area in hills and ridges of Edo State. The area accounts for 20% of 923,800km^2 landmass of Nigeria (Ojo, 1991) and has a population of approximately 8,547,829

The ethnic composition of the area is diversed. All the groups express their specific culture irrespective of the location they lived. Hence, there is a heterogeneous cultural background which has directly influenced their economic activities. The diversity influences plant use and production and sustainable food production, which requires the improvement of agricultural systems and the development of adapted indigenous crops to the agro ecological zones.

Ethnobotanical Survey: Cluster/stratified random sampling method was adopted. In this method, the study area was divided into relatively homogenous sections (State) Fig. 1 and random samples were taken in each section.

There are 25, 18, 18 Local Government Areas in Delta, Edo and Ondo states respectively. Sample areas were therefore selected based on the number of local government areas in each section taking into accounts of the vegetation for selecting sampling sites. For equal sampling in each state, 18 sampling areas were selected. However for Delta state with 25 local government areas, 14 of the Local Government Areas (two each) were merged into seven bringing the sample sites to 18. This merge was base on homogeneity in tribe and proximity of Local Government Areas to each other. On these bases, 18 sampling sites each were selected in Delta, Edo and Ondo State (Table 1).

TABLE 1. SAMPLING SITES AND LOCATION

Sampling site	State	Location
Oghara	Delta	6.00 N 5.41 E
Eku	Delta	5.44 N 5.59 E
Kwale	Delta	5.43 N 6.26 E
Umutu	Delta	5.55 N 6.14 E
Umunede	Delta	6.15 N 6.19 E
Abraka	Delta	5.47 N 6.06 E
Ughelli	Delta	6.30 N 5.58 E
Ogwashi-Uku	Delta	6.09 N 6.32 E
Burutu	Delta	6.30 N 5.31 E
Oleh	Delta	5.28 N 6.12 E
Effuru	Delta	5.33 N 5.47 E
Abbi	Delta	5.40 N 6.13 E
Koko	Delta	6.02 N 5.28 E
Warri	Delta	5.31 N 5.45 E
Agbor	Delta	6.15 N 6.12 E
Asaba	Delta	6.11 N 6.45 E
Bomadi	Delta	5.09 N 5.56 E
Sapele	Delta	5.54 N 5.41 E
Udo	Edo	6.28 N 5.21 E
Ologbo	Edo	6.04 N 5.41 E
Egor	Edo	6.36 N 6.00 E
Ekiadolor	Edo	6.26 N 5.32 E
Useh	Edo	6.20 N 5.30 E
Ugo	Edo	6.28 N 5.21 E
Ivbiaro	Edo	7.02 N 6.08 E
Okhoro	Edo	6.19 N 5.32 E
Ilushi	Edo	6.05 N 6.38 E
Irrua	Edo	6.44 N 6.13 E
Evbohimi	Edo	6.32 N 6.22 E
Ogbona	Edo	7.01 N 6.17 E
Iguadolor	Edo	6.20 N 5.30 E
Ozalla	Edo	6.47 N 6.01 E
Ibillo	Edo	7.26 N 6.04 E
Agenebode	Edo	7.07 N 6.41 E
Auchi	Edo	7.04 N 6.16 E
Abudu	Edo	6.17 N 6.04 E
Okitipupa	Ondo	6.30 N 4.46 E
Kajola	Ondo	6.44 N 4.23 E
Igbara-Oke	Ondo	7.24 N 5.03 E
Idoani	Ondo	7.17 N 5.51 E
Ifon	Ondo	6.55 N 5.46 E
Irun	Ondo	7.35 N 5.40 E
Idanre	Ondo	7.06 N 5.06 E
Ayetoro	Ondo	6.06 N 4.47 E
Iyere	Ondo	7.12 N 5.35 E
Aye	Ondo	6.36 N 4.43 E
Ore	Ondo	6.43 N 4.52 E
Omotosho	Ondo	6.44 N 4.39 E
Ikare	Ondo	11.11 N 8.13 E
Oka	Ondo	7.27 N 5.54 E
Ilara	Ondo	7.20 N 5.07 E
Araromi	Ondo	6.36 N 4.28 E
Ondo	Ondo	7.05 N 4.49 E
Iju	Ondo	7.23 N 5.15 E

Survey of ethnobotanical knowledge of West African okra using methods outlined by Maundu (1995) was carried out. This involved the use of structured open-ended and close-ended questionnaires. The questionnaires were administered on 10 randomly selected key informants at each site to obtain ethnobotanical information

about the crop. The questionnaires were administered randomly on women and men of mixed ages ranging from 18 – 86 years old. Three trips were made to each sample site. First, to randomly select and list the key informants. Secondly, to administer the questionnaire, observe the vegetative growth of the crop on the field and note requirement for germplasm collection. On the third trip, guided walk was taken with key informants to observe the sites and crops in cultivation and possibly seek clarity for some questions outlined in the questionnaire.

Ethnobotanical Data: Responses to stratified structured questionnaires were documented from key informants. Questionnaires were retrieved from randomly selected informants and analyzed quantitatively.

RESULTS

Socio-Demographic Description of Respondents: A total of 540 persons comprising 180 persons each from Delta, Edo and Ondo States respectively responded to the structured questionnaire administered. Of these, 259 (48%) were males and 281 (52%) were females (Table 2). The people engaged mainly in three occupations namely, farming, trading and trado-medical practices, with some of the respondents engaged in two or more occupations.

The age of the respondents ranged from 18 to more than 86 years. However, the largest group was that aged between 40 and 60 years old in all the sampled areas (Fig. 2). In spite of the slight difference in number between sexes, they are important in the study as they equally contribute to the knowledge explore in the survey.

Nine ethnic tribes were encountered during this study. Among these are four dominant tribes; Yorubas (20.2%), Edos (17.4%), Igbos (15.7%) and Urhobos (15.4%), these tribes constitute above 10% among the tribes encountered in the survey.

TABLE 2. GENDER AND OCCUPATION OF RESPONDENTS

States	Respondents	Gender		Occupation						
		M	F	FR	T	TR	FR&T	FR&TR	T&TR	FR&T&TR
Delta	180	80	100	101	42	10	18	5	3	1
Edo	180	83	97	102	37	5	21	7	4	4
Ondo	180	96	84	108	32	7	20	5	5	3
Total	**540**	**259**	**281**	**311**	**111**	**22**	**59**	**17**	**12**	**8**

F = Female, M = Male, TR = Trado-medical practices, T = Trading, FR = Farming

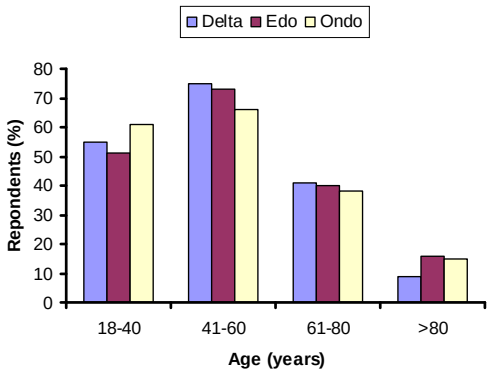

FIG. 2. AGE OF THE RESPONDENTS

The different religions encountered in the study area are presented in Fig 3. Christianity was dominant in all the States, accounting for 81%, 76% and 68% amongst the respondents in Delta, Edo and Ondo States respectively.

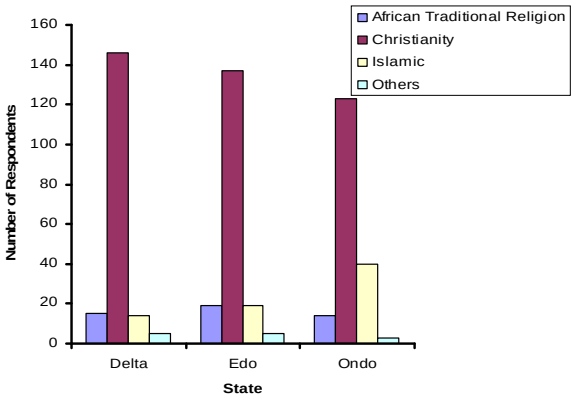

FIG. 3. RELIGION OF RESPONDENTS

Ethnobotanical Status of West African okra in Southwestern Nigeria: The ethnobotanical status of West African okra based on the local/common name, extent of knowledge and cultivation status is presented in Table 3.

TABLE 3. RESPONSES FROM TRIBES SURVEYED

TRIBES	RESPONSES		
	STATES		
	DELTA	EDO	ONDO
Benin	Y,C,CN,T(2)	Y,C,CN LT(2)	Y,C,CN T(2)
Etsako	-	Y,C,CN T(1)	Y,C, CN T(1)
Igbo	Y,C, CN T (1)	Y,C, CN T (1)	Y, C, CN T (1)
Ijaw	Y,C, CN T (1)	Y,C, CN T (1)	-
Ishan	Y,C, CN T (1)	Y,C, CN T (1)	Y,C, CN T (1)
Isoko	Y,C, CN T (1)	-	-
Itsekiri	Y,C, CN T (1)	Y,C, CN T (1)	-
Urhobo	Y,C, CN T (2)	Y,C, CN T (2)	Y,C, CN T (2)
Yoruba	Y,C, CN T (1)	Y,C, CN T (1)	Y,C, CN T (1)

[1]Y = Yes, [2]C = Cultivated [3]CN = it has common/local name
[4]T(n) = number of common/local name(s) ascribed by that tribe.
(1) Extent of knowledge
(2) Cultivated/wild
(3) Local names
(4) number of local/common names

All respondents know only the cultivated plant. No wild type was reported. Seventy-five percent (75%) of the tribes have at least one local name for the crop, "Omonupkogbe, Ohukpo" (in Bini), "Manikpogbo" (in Urhobo and Isoko), "Abukpa" (in Igbo), "Ilagidi" (in Yoruba), "Onanukporu" (in Ishan) and "Ikhiawhor nekhua" (in Etsako). The crop also has two or three local names within tribes.

Traditional Uses of West African okra from Southwestern Nigeria: Two major uses were recorded from the responses. The use for food was 100% among the tribes. Use for non-food purposes is shown in Table 4.

TABLE 4. TRADITIONAL USES OF WEST AFRICAN OKRA BY TRIBES FROM SOUTHWESTERN NIGERIA

No. respondents	Percentage of respondents	Tribe	Plant parts used/indication	Uses
				(i) Seasonal indicator
540	100	All	Bloom of flowers on the crop plant	(a) Beginning of dry season/ harvesting period
43	8	Igbo	Out growth of shoots from the base of the main stem of the crop plant	(b) On set of raining season
102	19	Bini, Ishan, Etsako	Luxuriant growth of crop plant in intense dry season	(c) Fertile soil
130	24	Bini, Igbo, Urhobo, Isoko	Crushed fruit or mucilage extract from any part f the crop plant	**(ii) Medicinal** (a) Child labour/bearing
16	3	Urhobo Itsekiri	Crushed fruit or mucilage extract from any part of the crop plant	(b) As throat clearer and cleaner
80	15	Bini, Igbo, Yoruba	Dead dried whole plant, threshed fruit pods	**(iii) Fuel**
63	12	Bini, Urhobo, Itsekiri, Ijaw, Igbo	Retted matured stem	**(iv) Rope making**
60	11	Igbo	Threshed fruit pods	**(v) Sponge making**
173	32	Bini, Igbo, Urhobo, Isoko	Fruits, old leaves	**(vi) Mythical beliefs**

DISCUSSION

The ethnobotany of West African okra among some ethnic groups of Southwestern Nigeria is documented using approaches that involved local traditional knowledge and socio-cultural practices associated with traditional agricultural systems, biodiversity management and utilization. These practices and knowledge could influence the management, conservation, utilization and help provide "windows" for further scientific understanding about the crop in the wider world. Alonge & Alonge (2006) emphasized that individual men and women in each new generation adapt and add to these knowledge and practices in a constant adjustment to changing circumstances and environmental condition.

Table 2 shows the gender and occupational distribution of the respondents. All the 540 respondents are familiar with the crop irrespective of their sex, occupation, age, cultural background and tribe. Familiarity with plant has been reported as having knowledge of the plant (Rogers & Appan, 1973; Allem, 2000; Sawadogo *et al.,* 2005), especially when associated with local names. Allem (2000) stated that attributing names to plants establishes some sort of relationship between the people and plants and shows that the people are familiar with them to some extent.

Traditional farming dominates the occupation of the people in the study area. Traditional methods of cultivation have existed for millennia. Bressan *et al.,* (2005) reported that the importance of having high proportion of peasant farmers that practiced traditional farming includes providing humanity with several species of economic importance, familiarity, maintaining and amplifying their genetic variability.

Gender describes the social attributes of men, women and their roles. It is an essential variable for analyzing the roles and benefits in all human activities. A ratio of 13:12 female to male is reported in the study. The knowledge of both sexes equally contributes to the survey, but an indepth analysis of the data reveals that major activities such as planting, harvesting and marketing are done by the females. Thus, the women are more abreast with the knowledge of the type, uses and harvesting of the West African okra. It is a vegetable common in traditional agriculture in the study area. Dania-Ogbe *et al.,* (2001) listed it among women crops. Both Cunningham (1994) and Guraino (1995) reported that traditional farmers especially women are greater custodian of knowledge about vegetable crops while Idu (2006) opined that knowledge is firstly accessible to those member of a social group who are charged with specific resource management and production responsibility.

A wide age bracket of 18-89 years was sampled during the present study. It is recognized as an important variable for determining the authenticity of knowledge in a given society (Idu, 2006). Older people have different knowledge from the young ones and vice versa. In this study, a fairly wide range of age has been used that assisted to complement the knowledge of the younger and older people for an in-depth understanding about the crop.

Results from this study shows that farmers are custodian of the diversed plant genetic resources, as demonstrated by the high percentage of traditional farmers among the respondents. The cultivation, uses, processes, importance placed on crops by the local people, adaptability and quality of their crops are known to them as observed in earlier studies (Esqiuvel *et al.,* 1990; Hammer and Mbewe, 1994; Alonge & Alonge, 2006). Markets and trading are important socio-economic institution and occupation. This was confirmed by Idu *et al.,* (2005) who observed up to 7% of the farmers sampled relying mostly on plants and plant products in their vicinity for food, shelter and medicine, an observation also supported by Johnson & Johnson (1976) and Gill *et al.,* (1993). Results also shows that local traders are knowledgeable about uses and availability of the crop plants they sell as their occupation determines the knowledge associated with their responses. While the farmers are knowledgeable about the plant husbandry, the traders are abreast with information on the economy and use of the crops.

The socio-cultural background of the study area is diverse with nine ethnic groups encountered among which the Edo, Igbo, Urhobo and Yoruba were the most prominent. The diverse ethnic composition provides an in-depth understanding of the ethnobotany of the crop plant especially among neighbouring ethnic groups For example, the Benis call West African okra "Omonukpogbe", "Manukpogbe" (Ishans and Urhobos), a similar name by the Urhobo. The local names ascertain the identification of the plants by the different tribes. Various tribes emphasize different knowledge about the crop and this would assist in flora documentation and classification.

There are different local names for the crop in the study area. Documentation of local names has been highly valued (Pax,1910); Rogers, 1963; Rogers & Applan, 1973; Cunningham, 1991, 1994); Hammer & Mbewe, 1994; Allem, 2000; Bressan *et al.,* 2005; Sawadogo *et al.,* 2005). Names and naming are important determinant factors in local societies (Penny, 2001). However, the names given to plants are anecdotal, associated with the economic peculiarity of the plant. For example "Omonukpogbe" in Edo signifies "crop that bears fruit throughout the growing season"; "Ila gidi" in Yoruba means "true okra". These associated names in different tribes refer to the life cycle; yield potentials, cultivar quality etc. These local names act as the local knowledge as they aid detailed revelation about the crop as the name assist to ask more from the community. Among the Benins, two local names were recorded and one among the Yorubas, Ishan and Urhobo respectively. This goes to amplify that local/vernacular names are important in flora determination of a particular area.

No wild type of *A. caillei* was reported among the respondents from the locality. Hawkes (1967) reported that all cultivated crop plants originated from wild and weedy relatives, while Chevalier (1940) specifically mentioned the presence of wild relatives of okra in the West African sub-continent. Several other authors (Ariyo, 1993; Kehinde, 1999; Schippers, 2000; Siemonsma & Hamon, 2002) described the crop as commonly found in traditional agriculture especially around homesteads and along roadsides. Due to its high yields and hardiness, *Abelmoschus caillei* has become a major source of okra pod in West Africa and its cultivation is progressively replacing the conventional okra *A. esculentus*.

The use of *Abelmoschus caillei* for food and other uses has been documented. For example, peasant farmers relate the characteristics of the crop plant in cultivation to the food product. The traders relate the fruit and food quality to market prices. Trado-medical practitioners estimate quantity and quality of the crop plant for medicinal preparation and administration. Earlier workers (Mooney, 1983; Hammer & Mbewe, 1994) reported that the knowledge of any crop plant lies with the local community that has used the plant over the years to produce food. Therefore, such knowledge as type, uses, cropping system, resistance to pests and diseases, drought tolerance, adaptability to various types of soil and tolerance to water logging have been handed down from generation to generation.

The use for non food purposes of *Abelmoschus caillei* includes information on nature, mythical beliefs and medicine. All the tribes studied can recognize dry/wet/harvest seasons. Other knowledge on non-food uses is tribe dependent. This documented indigenous knowledge can be transferred to other communities that cultivate the crop even though the knowledge recorded in this research is tribe dependent.

CONCLUSION

The ethnobotanical survey revealed the importance of the community as managers of the crop genetic resources and in the development of sustainable agriculture. The local knowledge documented is not limited to only the management of useful plants but most likely to a wide array of elements in the agroecosystem that are central to their coping capacity and their well being. Ethnobotany and the local community are important in the conservation and utilization of plant resources.

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