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Original Research

Ethnobotany and Germplasm Collection of Two Genera of *Cocoyam* (*Colocasia* [Schott] and *Xanthosoma* [Schott], Araceae) in Edo State Nigeria

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Abstract

Ethnobotany describes the realm between human interactions with plant in their environment. *Colocasia* [Schott] and *Xanthosoma* [Schott] (Araceae) are important staples in Nigeria. This study aims to document the traditional knowledge base of these crops amongst tribes in Edo state. Using random stratified sampling technique, fifty respondents were selected and primary data obtained through semi structured questionnaire. Fifty-four cocoyam (61.11 % *Xanthosoma*and and 38.89 % *Colocasia*) germplasm were collected and documented. Respondents were mostly between 41-50 years (29.63 %) while farming (33.33 %) is the dominant occupation. The dominant ethnic groups encountered were Bini (22.22 %) and Esan (25.93 %). Status of cocoyam collected was 94.44 % and 5.55 % for cultivated and wild respectively. Local names were significant with over twenty recorded. Food use (94.26 %) is higher than non-food use (5.74 %). Use for medicine is the dominant non-food use. Preference is related to uses, adaptation and palatability. More study is recommended to characterize these germplasm.

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INTRODUCTION

Ethnobotany is an evolving subfield of study in plant science. It x-rays and documents the realm of interaction between man and plants in a particular environment. Ethnobotany records the components of a culture and currently ensures that it is sustained (Osawaru and Dania Ogbe, 2010). Early advances in Ethnobotany provided us with utilitarian benefit of plants and on that basis plants were classified. Today, such documentation is essential for the conservation of earth's vast biological resources. Germplasm can be used in reference to plant genetic resources which are simply propagative materials of plant.

The two most cultivated Cocoyam species worldwide are *Colocasia esculenta* (L) Schott and *Xanthosoma sagittifolium* Schott (Purseglove, 1972; Mwenye, 2009) often called red and white cocoyam respectively in Edo State, Southwestern Nigeria. The crops play major role in the lives of many as a food security crop and have rich economic and socio-cultural connotations (Mwenye, 2009). The corms and cormels are consumed after it is boiled, baked, roasted or fried with palm oil, stew, special soup/sauce or beans. The leaves are usually boiled or prepared in various ways mixed with other condiments like spinach (Onwueme, 1999) especially the young leaves which are added to melon soup for its mineral content and taste.

Large morphological variability has been observed in these important staple crops. Enormous traditional knowledge also abounds for these crops because landraces have evolved from original introductions in southern Nigeria. There is need to intensify collection, evaluation, conservation and documentation of traditional knowledge and practices for these plant genetic resources. *Colocasia* may have gotten to Nigeria from Southeast Asia while *Xanthosoma* from early Portuguese visitors. *Colocasia* is one of the world's oldest food crops and among the first to be domesticated in Southeast Asia (Rao *et al*., 2010).

Xanthosoma and *Colocasia* are members of the Araceae(aroid) family and are cultivated in the tropics for their edible corms, cormels and leaves, as well as for its roles in cultural ceremonies. About 25 species are known for the genus *Colocasia* and 50 species for *Xanthosoma*. Their family is large, comprising some hundred genera and more than fifteen-hundred species including terrestrial plants, vines, creepers and epiphytes. They grow mainly in moist and shady habitats. There are two general types of cultivated *Colocasia;* those with large edible main corm with many cormels which grow under variable conditions and has twenty eight chromosomes (i.e. *C. esculenta* var. *esculenta*) while the second type produce small to medium sized inedible corm with variable number of cormels and has forty-two chromosomes and is often found growing close to water or on irrigated lands (i.e. *C. esculenta* var. *antiquorum/globulifera*). The latter are used as soup thickener in southern Nigeria especially among

Ibo speaking tribes. *Xanthosoma* species are popularly termed the American relative of *Colocasia* because they are native to tropical America. They also consist of two types: those with large corm and variable number of cormels which are edible and those without cormel (just a large corm) which are inedible and are used mainly for pounding in parts of Ghana, Nigeria and Cameroon.

The major tuber crops of economic importance in Nigeria are Cocoyam (*Colocasia* and *Xanthosoma*), Sweet potato (*Ipomaea batata*), Potato (*Solanumtu berosum*), Yam (*Dioscorea* species) and Cassava (*Manihot esculentus*). Cassava and Cocoyam are mainly produced in the South while Yam, Potato and Sweet potato are mainly produced in the north. Preference for the tuber crops vary in all the six geopolitical regions of Nigeria. Although Cassava and Yam dominate kitchens in the South and North respectively, Cassava stands out as a major exchange crop. Cocoyam is little known in the North where it is also less consumed when compared with other tuber crops like Sweet potato and Potato. These crops, Cocoyam included, have a greater ability to produce more energy per hectare per day compared to other commodities and produce satisfactory under adverse conditions where other crops may fail (Onwueme, 1978; Malawi Government Report, 1996; Moyo *et al.*, 1999; Sandifolo, 2003).

According to Rao *et al*. (2010) cocoyam genetic resources have remained largely under the control of local farmers and communities because they depend on cocoyam cultivation to meet their daily needs and obligations for millennia that have nurtured and adapted the crop. The initiation of cocoyam research through an initial ethnobotanical survey and collection is paramount especially in parts of Southern Nigeria where the diversity of these crops is most. This forms the basis of the present study as it will contribute in no small measure in guiding research and conservation efforts, breeding programmes and enhance the potentials of the crops. According to Mwenye (2009) this will be successful if optimal existing indigenous knowledge is obtained from farmers to help guide the direction of conservation and establishment of a successful breeding programme. More so, this study aims to assess the morphological diversity of *Colocasia* and *Xanthosoma* genotypes using ethnobotany keys, record farmers' preferences and current economic uses of cocoyam in Edo state and propose a model for the collection of Cocoyam germplasm in state of Southern Nigeria and contribute to the information base on *Colocasia and Xanthosoma*.

MATERIALS AND METHODS

Study Area

The study area is positioned between Longitude 06^0 04^1 E 06^0 43^1 E and Latitude 05^0 44^1 N and 07^0 34^1 N (Figure 1). The state has climatic conditions typical of tropical regions. This is characterized by two distinct conditions of wet and dry seasons. It experiences high rainfall and humidity for most of the year with an annual average rainfall of 150 - 250 cm. The vegetation of Southern Edo State is tropical rainforest while Northern Edo state has characteristics of a derived savanna.

Edo State was created from old Bendel State in August, 1991 and has a total land area of 17, 802 km^2 and population of 3,497,502 (Izoya, 2013). It is bounded by Kogi State in the north, Kogi and Anambra States in the east, south by Delta state and west by Ondo state. It is in the oil rich Niger Delta in the south south geopolitical zone of Nigeria. The eighteen local government areas (LGA) of the state and their capital(in bracket) include: Akoko Edo (Igarra), Egor (Uselu), Esan North East (Uzea/Uromi), Esan Central (Irrua), Esan South East (Ubiaja), Esan West (Ekpoma), Etsako Central (Fugar), Etsako East (Agenebode), Etsako West (Auchi), Igueben (Igueben), IkpobaOkha (Idogbo), Oredo (Benin), Orhionmwon (Abudu), Ovia North East (Okada), Ovia South West (Iguobazuwa), Owan East (Afuze), Owan West (SabongidaOra), Uhunmwonde (Ehor). Benin City is the state capital, most populated and developed area state. The city had one of the earliest cultures in Nigeria and was first to have European visitors as early as 1472 AD as they also sent emissaries to Portugal (Osagie, 2002). Edo state is made up of three major ethnic groups namely Binis (57.54 %), Esan (17.14 %) and Afemai comprising of Etsako (12.19 %). Others are Owans (7.43 %) and AkokoEdos (5.70 %) although Igala speaking communiities exist in Esan South East, Igbira related communities in Akoko and Afemai Areas as well as Urhobos, Izon, Itsekiris and Yoruba communities in Ovia North East and South West LGA especially in the borderlands (Izoya, 2013). According to Izoya (2013) the political pattern and behavior are based on a situation where both monarchy and republican ideas flourished in an integrated manner characterized by peaceful coexistence. Communal activities in the form of traditional festivals (Igue and Ehi Ebo), dressings, arts and crafts play unifying roles. Economic activities include farming pottery making, cloth-weaving, molding of statutes, blacksmithing, basket and mat making from palm fronds.

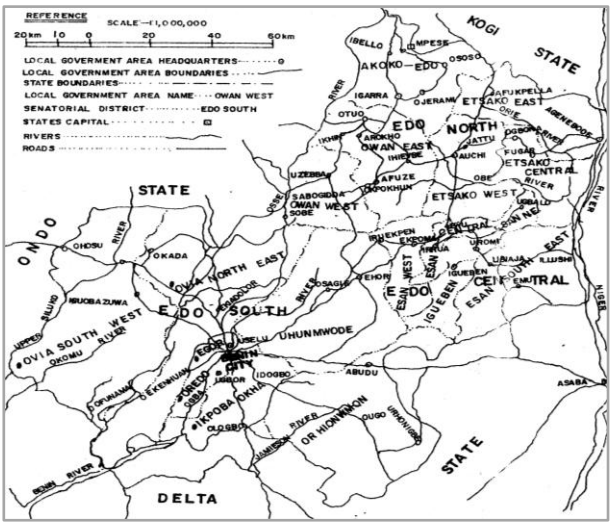

Figure 1: Map Edo state showing the eighteen local government areas (LGA) (Osawaru, 2009)

Collection of Cocoyam Germplasm: Cocoyam germplasm were collected from the eighteen LGA in collaboration with the Department of Plant Biology and Biotechnology, University of Benin, Benin City between January to June 2013. Actual collection was done based on IBPGR (1989) and IPGRI (1999) descriptors for *Xanthosoma* and *Colocasia* using random stratified sampling to select farmers, home/kitchen gardeners and senior citizens. For each accession collected a detailed passport data was recorded. This included: accession code, accession name, sample status, name of farmer, ethnic group, village, local government area, cultural practices, collecting institution, planting date, collection

date, taste, maturity period, target use, period that cultivar has been with the farmer and preferred characteristics of the cultivar. Collected accessions were replicated at the Experimental Garden of the Department of Plant Biology and Biotechnology, University of Benin for conservation.

Gathering of Ethnobotany Data

Semi structured questionnaire was used to interview five hundred and forty persons (thirty per LGA) about their practices and knowledge of the plants. Other information needed was accumulated through conversation during the interview sessions, field observation and preference ranking. Respondents were chosen without distinction of gender and individuals from all age groups were interviewed. The questionnaire was designed to meet all the criteria for an ethnobotanical survey in order to obtain good ethnobotanical scores/rank. Guided tours were animated by the respondents to the field to collect plant materials. Some of the plants encountered were photographed for proper identification at the Department of Plant Biology and Biotechnology, University of Benin, Nigeria.

Data Collection and Evaluation

Data was accumulated during the collection mission from the questionnaires administered to assess respondent knowledge, practices and economic uses of the crops. The questionnaire is divided into six sections addressing social demography of the respondents, knowledge of the crops, occurrence frequency and preference of the crops in relation to other root and tuber crops, cultural practices, economic importance and storage methods. The data obtained were analyzed and expressed as percentage for each areas surveyed. Others were discussed and summarized.

RESULTS AND DISCUSSION

Ethnobotany: Prevalence, Preference and Utilization of Cocoyam Germplasm in Edo State

Results indicate that the two Cocoyam genera are grown in all parts of Edo State although fewer germplasm were observed in Etsako West, Oredo and Ikpoba Okha LGAs. Fifty four accessions were collected three per LGA. It is found in home/kitchen garden and as weeds in urban centers and in kitchen gardens and distant farms in rural centers. Some were collected from the foot of rocks at Igarra. Where ever cocoyam was collected from regardless of the status there is a record of previous cultivation. It is consumed as a food crop in all the areas covered in this study (Table 1) although in variable amounts. It is least consumed and popular in urbanized cities mostly found in the three LGA's given above. Sometimes they distinguish the local germplasm by their area of sources for example Cameroon type, Ghana type and Ibo type. Portuguese been the first set of foreigners to visit is credited for early introductions of *Xanthosoma* while *Colocasia* was suggested to have been brought to their land from the east. Local names do not have specific meanings other than cocoyam. Traits that farmers prefer included taste, high yield in terms of tuber size, palatability, resilience to bad weather, early maturity and good cooking properties.

Germplasm Collection

Collection mission for Cocoyam in Edo state was conducted. Where ever the crop was collected local knowledge and practices relating to the plants were also recorded. Passport data of the accessions collected are presented in Table 1. A total of 54 accessions (61.11 % *Xanthosoma* and 38.89 % *Colocasia*) were accomplished from the specific mission. Local knowledge among the interviewees are presented in Table 3 and also summarized.

Percentage demographic distributions of respondents are presented in Table 2. A reflection of the demographic distribution of respondents showed gender bias of 55.56 % female to 44.44 % male. The dominant age range encountered is between 21-60 with 85.19 %. Most common occupation are Farmers (48.15 %), Artisan (33.33 %) and Civil servant (12.96%). Esan (27.78 %) and Bini (22.22 %) were the dominant ethnic groups.

Respondents' local knowledge of cocoyam in their localities is presented in Table 3. Result suggests that the dominant farming system is lowland not flooded, partial sunlight (72.22 %). Cocoyam is limited in distribution (24.07 %). Three types of the crop are common (33.33 %) and mostly cultivated (94.44 %).

Root and Tuber Crops Available and Preference

The other root and tuber crops available in the state are Cassava (*Manihot* sp), Yam (*Dioscorea* sp), Sweet potato (*Ipomoea batatas*) and to a very small extent Potato (*Solanum tuberosum*). Respondents preferred Cassava, Yam, Sweet Potato, Cocoyam and Potato. Some respondents preferred Cocoyam to Yam and Sweet Potato.

Local/Vernacular Names

In Edo state cocoyam is called different names depending on the dominant ethnic group in the LGA. Some of the names given by the respondents include: Iyokho (General), Akaha (Bini), Ekikio (Ibibio), Odu (Isoko), Coco (Pidgin English), Ucoco, Ilabu, Akara, Iyokhoakaha, Iyoakaha, Akahanofua (white cocoyam), Akahanoba (red cocoyam), Iyokhoebo (Esan), Akasi (Ibo), Ede (Ibo), Cocoindia (Pidgin English), Lambo, Agbakala, Edemmeme, Edebuji, Nwokolodu, Onovia, Ikhoko, Labo (Afuze), Emebo, Ghana cocoyam, Cameroon cocoyam, Iyokhoegbon, Emebonofua, Emebonoghia, Iyokhoeboriwa, Iyokhoewa, Onovia and Ikhoko (Ora), Emutor (Fugar) Ene-pa, Ene-pe and Ibo cocoyam. All of which translate into cocoyam.

Similar Known Crops

Most of the respondents do not know similar crops to cocoyam (*Colocasia* and *Xanthosomona*). The few that claim to know plants similar to cocoyam could not locate them during the collection period. The vernacular names of these crops were given as: Jesus palm, Usoba, Spotted cocoyam, Ododo and Edumuogbanje.

MANAGEMENT TECHNIQUES

a) Origin/Source of Planting Materials and Method of Propagation: All respondents cultivate plant from roots (corms) of mother plant in cultivation. The materials are selected based on morphological characters like yield and maturation periods.

b) Storage of Planting Materials: Planting materials are not stored for long periods. They are harvested close to the planting periods and are immediately planted to prevent detoriation due to dessication and attacks by infectious agents. Corms loose water hence their quality and dry up after two weeks.

Table 1: Passport data of *Colocasia* and *Xanthosomas* accessions indicating exact collecting points, topography, soil type and accession number

No	Collection/ Accession Code	LGA	Exact Location/Site	Collection Source	Genera	Status	Longitude and Latitude	TRIBE
1	ED/NA/ONE001	Ovia North East	Ofunmwengbe	Barkyard garden	*Colocasia*	Cultivar	6.02 N and 5.08 E	Esan
2	ED/NB/ONE003	Ovia North East	Igbogor town	Farmland	*Xanthosoma*	Cultivar	6.31 N and 5.10 E	Bini
3	ED/NC/ONE005	Ovia North East	Ekhiadolor	Farmland	*Xanthosoma*	Cultivar	6.66 N and 5.56 E	Bini
4	ED/OA/OSW001	Ovia South West	Ikoha village	Roadside	*Xanthosoma*	Weedy	6.23 N and 5.20 E	Yoruba
5	ED/OB/OSW003	Ovia South West	Ugbogui-Evbonogbon	Farmland	*Colocasia*	Primitive cultivar	6.15 N and 5.12 E	Isoko
6	ED/OC/OSW005	Ovia South West	Okokpon/Obaretin	Backyard garden	*Colocasia*	Cultivar	6.09 N and 5.20 E	Yoruba
7	ED/BA/EGR001	Egor	Upper Siluko	Backyard garden	*Xanthosoma*	Cultivar	6.38 N and 5.43 E	Bini
8	ED/BB/EGR003	Egor	OwodeSiluko	Backyard garden	*Xanthosoma*	Cultivar	6.35 N and 5.64 E	Ogbo
9	ED/BC/EGR005	Egor	AkpataEgor	Backyard garden	*Xanthosoma*	Cultivar	6.33 N and 5.65 E	Esan
10	ED/LA/ORD001	Oredo	Ogbe road	Backyard garden	*Xanthosoma*	Cultivar	6.36 N and 5.71 E	Bini
11	ED/LB/ORD003	Oredo	3rd Ogbewaise	Backyard garden	*Colocasia*	Cultivar	6.45 N and 5.76 E	Bini
12	ED/LC/ORD005	Oredo	Okpenede	Backyard garden	*Colocasia*	Cultivar	6.35 N and 5.83 E	Bini
13	ED/KA/IKB001	IkpobaOkha	Ikpoba hill	Backyard garden	*Colocasia*	Cultivar	6.26 N and 5.71 E	Bini
14	ED/KB/IKB003	IkpobaOkha	Idogbo	Backyard garden	*Colocasia*	Cultivar	6.26 N and 5.67 E	Bini
15	ED/KC/IKB005	IkpobaOkha	Aduwawa	Backyard garden	*Xanthosoma*	Cultivar	6.29 N and 5.64 E	Esan
16	ED/RA/UHW001	Uhunmwode	Eyaen village	Shifting cultivation	*Xanthosoma*	Wild	6.45 N and 5.82 E	Bini
17	ED/RB/UHW003	Uhunmwode	Urhokuosa	Farmland	*Xanthosoma*	Breeder Line	6.41 N and 5.78 E	Bini
18	ED/RC/UHW005	Uhunmwode	Ehor	Farmland	*Xanthosoma*	Breeder Line	6.46 N and 6.08 E	Bini
19	ED/MA/ORH001	Orhionmwon	Abudu	Shifting cultivation	*Xanthosoma*	Wild	6.30 N and 5.80 E	Bini
20	ED/MB/ORH003	Orhionmwon	Uvbe	Backyard garden	*Xanthosoma*	Cultivar	6.29 N and 5.91 E	Agbor
21	ED/MC/ORH005	Orhionmwon	Ugbomoson	Backyard garden	*Xanthosoma*	Cultivar	6.27 N and 6.02 E	Ibo
22	ED/EA/ESE001	Esan South East	Ubiaja-Ariah	Farmland	*Colocasia*	Cultivar	6.64 N and 6.35	Ibo
23	ED/EB/ESE003	Esan South East	Ubiaja-Udakpa	Farmland	*Xanthosoma*	Cultivar	6.67 N and 6.38 E	ibo
24	ED/EC/ESE005	Esan South East	Ubiaja-Ukhualen	Farmland	*Colocasia*	Cultivar	6.68 N and 6.35 E	Ibo
25	ED/DA/ENE001	Esan North East	Uromi-Ogbidi	Backyard garden	*Colocasia*	Cultivar	6.71 N and 6.31 E	Esan
26	ED/DB/ENE003	Esan North East	Uromi-Agbor road	Backyard garden	*Colocasia*	Cultivar	6.71 N and 6.33 E	Esan
27	ED/DC/ENE005	Esan North East	Uromi-Ogbidi	Backyard garden	*Xanthosoma*	Cultivar	6.71 N and 6.33 E	Esan
28	ED/CA/ECT001	Esan Central	Irrua	Backyard garden	*Colocasia*	Cultivar	6.69 N and 6.24 E	Etsako
29	ED/CB/ECT003	Esan Central	Irrua	Backyard garden	*Xanthosoma*	Cultivar	6.74 N and 6.29 E	Esan
30	ED/CC/ECT005	Esan Central	Irrua-Akho	Backyard garden	*Xanthosoma*	Cultivar	6.72 N and 6.24 E	Esan
31	ED/FA/EWE001	Esan West	Iruekpen	Backyard garden	*Xanthosoma*	Cultivar	6.51 N and 5.95 E	Esan
32	ED/FB/EWE003	Esan West	Ekpoma	Roadside	*Colocasia*	Weedy	6.47 N and 5.92 E	Esan
33	ED/FC/EWE005	Esan West	Opoji	Shifting cultivation	*Colocasia*	Wild	6.65 N and 6.15 E	Esan
34	ED/JA/IGB001	Igueben	Iduomon	Farmland	*Colocasia*	Cultivar	6.49 N and 6.18 E	Esan
35	ED/JB/IGB003	Igueben	Eguare	Farmland	*Xanthosoma*	Cultivar	6.48 N and 6.21 E	Esan
36	ED/JC/IGB005	Igueben	Idumogo	Farmland	*Colocasia*	Cultivar	6.47 N and 6.17 E	Esan
37	ED/AA/AKD001	Akokoedo	Igarra-Itua	Roadside	*Xanthosoma*	Weedy	7.25 N and 6.13 E	Okpe
38	ED/AB/AKD003	Akoko Edo	Igarra-Bokessimi	Farmland	*Colocasia*	Cultivar	7.26 N and 6.16 E	Okpe
39	ED/AC/AKD005	Akoko Edo	Igarra-Bokessimi	Backyard garden	*Colocasia*	Cultivar	7.24 N and 6.10 E	Esan
40	ED/IA/ETW001	Etsako West	Aviele-Ubiane	Secondary forest	*Xanthosoma*	Wild	7.03 N and 6.27 E	Etsako
41	ED/IB/ETW003	Etsako West	Aviele-Ubiane	Secondary forest	*Xanthosoma*	Wild	7.07 N and 6.27 E	Etsako
42	ED/IC/ETW005	Etsako West	Aviele-Ubiane	Secondary forest	*Xanthosoma*	Wild	7.00 N and 6.29 E	Etsako
43	ED/GA/ETC001	Etsako Central	Fugar-Ogbona	Backyard garden	*Xanthosoma*	Weedy	7.15 N and 6.19 E	fugar
44	ED/GB/ETC003	Etsako Central	Fugar-Iviavia	Farmland	*Xanthosoma*	Cultivar	7.19 N and 6.16 E	Fugar
45	ED/GC/ETC005	Etsako Central	Avianwu	Backyard garden	*Xanthosoma*	Cultivar	7.10 N and 6.21 E	Fugar
46	ED/HA/ETE001	Etsako East	Upland Agenebode	Farmland	*Colocasia*	Primitive cultivar	7.17 N and 6.51 E	Agene bode
47	ED/HB/ETE003	Etsako East	IviogheAgenebode	Farmland	*Xanthosoma*	Primitive cultivar	7.11 N and 6.43	Agene bode
48	ED/HC/ETE005	Etsako East	IgiodeAgenebode	Farmland	*Xanthosoma*	Primitive cultivar	7.14 N and 6.49 E	Agene bode
49	ED/PA/OWE001	Owan East	Afuze-hospital road	Farmland	*Xanthosoma*	Primitive cultivar	7.16 N and 6.02 E	
50	ED/PB/OWE003	Owan East	Afuze-Locust road	Farmland	*Colocasia*	Weedy	7.14 N and 6.12 E	Afuze Otuo
51	ED/PC/OWE005	Owan East	Izobo quarters, Avehi road	Roadside	*Xanthosoma*	Wild	7.19 N and 6.09 E	Afuze Otuo
52	ED/QA/OWW001	Owan West	Ovbiare	Backyard garden	*Xanthosoma*	Cultivar	6.98 N and 6.11 E	Urhobo
53	ED/QB/OWW003	Owan West	SabongidaOra	Roadside	*Xanthosoma*	Wild	6.95 N and 6.13 E	Ora
54	ED/QC/OWW005	Owan West	Ovbiokhumrin	Backyard garden	*Xanthosoma*	Cultivar	6.93 N and 6.10 E	Ora

c) Storage of Harvested Materials and Shelf Live

Cocoyam can be harvested from nine months to three years after planting. Freshly harvested Cocoyam is usually kept for a period less than a month. This practice is important because it usually signifies the end of a growing season. In few cases they are transported to the market and must be sold within the same period. The following are the ways respondent suggested to store harvested Cocoyam:

1 Lay on bare cold floor
2 Lay on concrete floor after applying ashes
3 On high ground away from creeping insects
4 Inside dug ground and bury it
5 Lay on bare ground away from the sun and rain

6 Store on the ground near the mother plant
7 On wood above the ground
8 Inside baskets with leaves laid underneath
9 In a cool dry place
10 Store under shade preferably under banana (*Musa paradisiaca*)
11 On a barn (tied to the barn rope)
12 Apply charcoal and store in a basket. The charcoal prevents insect attack.
13 Lay on plantain (*Musa sapientum*) leaves and sprinkle a little ash.

Table 2: Demographic characteristics of respondents

Characteristics	Frequency	%
Gender		
Male	24	44.44
Female	30	55.56
Age Range		
≤ 20	1	1.85
21-30	8	14.82
31-40	12	22.22
41-50	16	29.63
51-60	10	18.52
≥ 60	7	12.96
Religion		
Christian	49	90.74
Muslim	1	1.85
Others	4	7.41
Occupation		
Artisans	18	33.33
Farmers	26	48.15
Civil Servant	5	12.96
Student	3	5..56
Ethnic Groups		
Bini	12	22.22
Esan	14	27.78
Yoruba	2	3.70
Isoko	1	1.85
Igbo	4	7.41
Agbor	1	1.85
Owan	3	5.55
Urhobo	1	1.85
Etsako	4	7.41
AfuzeOtuo	3	5.56
Agenebode	3	5.56
Fugar	3	5.56
Okpe	2	3.70
Iruekpen	1	1.85

d) Who Does the Planting and When

All the respondents all claim to do the planting themselves with no special requirement for any other person who wants to plant it. It essence the cocoyam can be planted by anybody. The planting period is usually during the rainy season or just before the rains appear that is between February and May. This is because the crop requires water more than any other plant growth requirements. As unavailability of water can affect growth or inhibit it entirely. Under irrigation, the plant can also be cultivated anytime of the year. Some respondents also cultivate cocoyam two to three times a year. Size planted determined the size of the cormels when they mature.

e) Evidence of Maturity and Time

Respondents gave varying response regarding evidence on maturity based on the premise that cocoyam mature variably. The evidence of maturity and time by respondents include:

1 After six months to three years after planting
2 Absence of green leaves and presence of yellow leaves
3 Redness and appearance of seed
4 After twelve months characterized by changes in leave coloration
5 Decrease in leave number and leaf death
6 During the dry season (that is towards the end of the year between October and December)
7 When leaves become weak, dry up and fall off
8 The above ground parts dry up.
9 When corms break out of the ground
10 Withering of leaves
11 Just before the rainy season.

Table 3: Degree of ethnobotanical response on cocoyam in the study area

Variable	Frequency	%
Farming System		
Lowland not flooded, partial sunlight	39	72.22
Lowland not flooded, full sunlight	6	11.11
Upland not flooded, partial sunlight	6	11.11
Upland not flooded, full sunlight	3	5.55
Occurrence of Cocoyam		
Rare	10	18.52
Limited	13	24.07
Widely distributed	31	57.41
Extensive stands	0	0.00
Types Known		
1	10	18.52
2	18	33.33
3	22	40.74
4	2	3.70
5	1	1.85
6	1	1.85
Status of Collection		
Cultivated	46	85.19
Wild	8	14.82
Frequency of Crop in the Locality		
High	20	37.04
Medium	17	31.48
Low	12	22.22
Very low	5	9.26
Extent of Cultivation		
High	22	40.74
Medium	8	14.82
Low	18	33.33
Very low	6	11.11
Land Preparation during Propagation		
Ridges	13	24.07
Mould	22	40.74
Untilled land	3	5.56
Dug ground	16	29.63
Importance in the Locality		
Subsistence	35	64.82
Cash	7	12.96
Both subsistence and cash	12	22.22
Others	0	0.00
Utility (Locally)		
Food use	36	66.67
Non food use	2	3.70
Food and non food use	16	29.63
Part(S) Used		
Corms	4	7.41
Cormels	33	61.11
Corms and cormels	12	22.22
Leaves and stalk	1	1.85
Leaves	4	7.41

f) Method of Harvesting

All respondents use local methods to harvest cocoyam corms and cormels for use. This mostly involves the use of hoes or shovels to dig around the plant and applying force to uproot it. After which corms are sought for in the ground and picked up. Others used parts like the young leaves are harvested by using Knife to cut them from the plant.

g) Methods of Preservation for Use

No spoilage issues. Red ones are more nutritious, sweeter and medicinal than the white ones. In traditional medicine it can be used to curse ones enemy that they should be shaking like the leaves of cocoyam when it rains. Cures diabetes and blood pressure when roasted and eaten sole. Petiole used for treating inner pile. Cut burnt and mixed with palm kernel oil. Cocoyam is grown on the boundaries of farms to demarcate them. Insects, pigs, rats and rabbit attacks are the most common threats to cocoyam farms. It is acclaimed that the use of fertilizer hastens corm spoilage while it does well on dung hill/dump. Leaves are also medicinal and used as remedy for malaria, fever, waist pain and dysentery. More so, dried corms are grinded and the powder gotten thereof used for amala like dish. Furthermore, only the leaves of the red type can be used in soup. They are used in melon soup i.e the fresh new leaves.

CONCLUSIONS

This study has shown that there exists a great amount of cocoyam diversity in Edo state, Nigeria. Studies investigating the use and other interactions of the plant with humans in the study area reveal the different roles of the crops. They are important in many aspects of daily lives including as food and to a lesser extent as feed for livestock, industrial purpose, ornamental plant and as a medicinal plant. At most collection point the plants were accorded different names and regarded necessary. Most of the Cocoyam germplasm collected belonged to the *Xanthosoma* species compared to *Colocasia* species collected. The key to distinguish the two most common edible Araceae members, namely *Colocasia* and *Xanthosoma*, is based on the predominant leaf base shape (Purseglove, 1972). *Colocasia* species has peltate leaves while *Xanthosoma* species has sagittate or hastate leaves with pointed top tips (not rounded). Respondent's preferences regarding cocoyam germplasm include uses of plant parts, areas of adaptation and eating quality. Preferences and uses tend to shape the way germplasm are disseminated from farmer to farmer and promoting the diversity. No record of severe attack from pest or diseases in the past and present. Most respondents especially the elderly demonstrated intricate knowledge of the crop especially about local classification and safe use of these crops. The crops are not as popular as Cassava (*Manihot* sp.) and Yam (*Dioscorea* sp.) It is recommended that a thorough collection be done in all Southern States in Nigeria to record, evaluate and conserve existing Cocoyam germplasm as it is a heritage of the nation yielding foreign exchange which can be improved upon. This willalso help determine the extent of *Colocasia* and *Xanthosoma* diversity in Nigeria after proper characterization. Researchers need to incorporate indigenous knowledge if they are to disseminate new and improved *Colocasia* and *Xanthosoma* varieties.

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