

NOTES ON THE SIMILARITIES AND DIFFERENCES BETWEEN WILD AND DOMESTICATED YAM IN PARTS OF IGBOLAND, EASTERN NIGERIA.

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INTRODUCTION

For thousands of years, man has interacted with plants. This long interaction between people and plants brought about the application of new methods of exploitation and often, the symbiotic relationship, which existed between them gradually, underwent many changes. This long period of interaction includes the earliest use of pounding stones to macerate fibrous stems, roots and tubers, and to crack nuts, the controlled burning of vegetation to enhance the yields of edible plant products (or indirectly of game animals); the elaboration of methods of harvesting and storing seeds, cooking by boiling plant food in pottery and shell, fermentation, the detoxification of bitter and poisonous roots, tubers and seeds by leaching, soaking and of course cultivation (Harris, 1989).

All these technical innovations were applied to wild plants. As time went on and with the increasing application of these techniques and the close relationship between people and the plants, the human control over the reproductive systems of certain plant species became so direct that those plants lost their ability to survive in the wild without human assistance. With this gradual processes, domestication set in and in combination with cultivation, agriculture developed.

The aim of this work, among other things, is to apply the ethnoecological observation made on wild and domesticated species of yam 'ji' Dioscorea Spp. in some parts of Igbo land with the aim of

throwing some light on the beginnings of plant/crop domestication in Africa south of Sahara in general and Igbo land in particular.

Helback (1966) stated that "where there exists in the wild, cousins of a domesticated plant, it is likely that the domestication of that plant took place in that locality". The researcher has observed different 'wild' species of yam 'ji' growing in bushes, forests and sacred groves, especially shrines and oracles, in many parts of Igbo land and has taken pains to collect some of these wild species with a view to studying them and checking whether they have any relationship with the domesticated or cultivated species in our area of study. It has also been the aim of this research to see if the finding/observation can give any credence to Helbaek's hypothesis.

Ethnoecological observation of wild and domesticated yam as applied here means an attempt to the use of the presence of wild yam in parts of Igbo land today and its ecological characteristic to the domesticated ones to infer the beginning of yam domestication in the study area,

This approach has been applied by Joyce (1989) in his research on the "Ethnoecological observations on Wild and Cultivated rice and yams in Northern Thailand". Through this, he was able to establish the beginnings of rice and yam cultivation in Thailand and the Gulf of Mexico (Peru).

The ethnoecological study reported here was seen as another step (taking into consideration the works of Chikwendu and Okezie 1989) towards identifying the local occurrence of wild relatives of eventual domesticates in Igbo land with special reference to yam (*Diosocorea spp.*) This will help trace the beginning of yam domestication in Igbo land by taking into consideration the roles which yam plays in the life of the people from time immemorial. The term 'wild' as used here implies that those crops are not being cultivated or domesticated by man. They grow naturally in the forest uncared for or unattended to in their natural ecotone, but can be sought for and used as food during the periods of scarcity by man. This study grew out of general interest in early plant exploitation, in Igbo land, particularly issues surrounding the emergence of domestication.

Information towards the achievement of this goal came mainly from the ethnographic interview from elderly villagers on wild and domesticated yam, archaeological reconnaissance conducted and observations made in some parts of Igboland like, Nsukka, Abakaliki

and Adani.

Environmental Setting

The Igbo people are one of the main ethnic groups that make up the present day Nigeria. They in addition with the Ibibio, Ijaw and Ekoi people make up the southeast or the eastern states of the forest belt of Nigeria. Today, they belong to the derived savanna environment because it is primarily resulting from continuous cultivation of the original woodland which is a characteristic of Guinea Savanna environment as opposed to the Sudden Savanna. This apparent conversion is mainly witnessed in the northern Igbo Plateau like Nsukka and Abakaliki areas. Rainfall within the eastern region of Nigeria is high ranging from 60-80ins (1524-2032mm) annually with an adequate sunshine all year round. The area belongs to the tropical climate with two main seasons spelt out within this region annually. These are the wet and dry seasons. The wet season or rainy season lasts from April to November, while the dry season sets in from the month of November through April the following year. Two main trade winds blow into the region, viz: the south-east trade wind, which carries rain and the north-east trade wind which brings in a shilly wind or condition known as harmattan.

Due to this conducive climatic changes, the forest people to which the south-eastern states in general and Igboland in particular belong, were able to cultivate root crops like yams 'ji' (*Dioscorea spp.*), cassava (*Akpu Manihot spp.*, Cocoyam (Ede) *Colocasia spp.* and *Xanthosoma spp.* (Udo, 1980).

According to Udo (1980), "the Igbo and Ibibio of the forest belt like the Yoruba and Edo of the west are a settled agricultural people".

The Igbo are found scattered in various village groups on the east and western banks of the river Niger. The existence of the river banks across the Igbo country contributed a lot to the fertility of their soils which enhanced the cultivation of mainly tuberous crops especially yam(ji).

The forested nature of the area which is its vegetative cover has also produced tall trees in which the yam vines can climb, to reach the sunshine for photosynthesis.

As for the relief, the area under study lies geologically within the Nsukka-Okigwe cuesta (Ofomata, 1978) with the river Niger as its main drainage system. As earlier stated, the alluvial deposits within the banks of the Niger have made it possible for many Igbo communities to occupy the banks. These communities include Anam, Umuleri, Nzam, Aguleri,

Odekpe, Atani, Ogurugwu, Igbariam, Ifite Ogwari, Umorum etc. mainly located in Anambra Local Government Area and Onitsha and Ogbaru Local Government Areas of Anambra State, prodigious yam producers.

Wild Yams

Our ethnoecological observations on wild yams within the area under study show that the life cycle of all wild yams are basically similar. Vines develop during the rainy season, using the nourishment available from the previous season, but careful observation on the wild yam found around Elias Avenue in the University of Nigeria Nsukka showed that development of new vines start from the months of February (Fig. 1). Other germinations start from March through the rainy season. Thus, during the rainy season, the previous season's tubers become shrivelled and fibrous, and are not considered edible like those species that may be edible after careful processing and preparation. In the latter part of the rainy season, between September and November, they are fully formed. During the dry season, starting from the months of November through April, the next year, vines die but viable tubers remain underground until the next rainy season when the cycle is repeated.

Some species of wild yams/tubers are edible, but contain toxins which must be leached out or detoxified before the tuber can be eaten. Its consumption requires many processes from peeling, slicing to leaching. For its leaching, several recipes are involved viz, soaking the slices for a period of 3-4 nights in salted water, followed by 2-3 days in fresh water which is changed daily. These slices can be dried and stored for several months (Mrs. Ogbungwa Iyoke; (2/9/98) personal communications). This is another way of storing or preserving food for the period of scarcity.

Wild D. rotundata (white guinea yam) (ji ocha) were seen growing in many forests and grooves in many communities that make up the Old Nsukka division. Within the University of Nigeria environment, Wild D. rotundata, at the time of carrying out this research, was seen growing in its natural vegetation at Elias Avenue (Fig. 1). This depicts the initial vegetative cover of the area prior to the clearing of parts of the area for the construction of roads and erection of buildings as University Staff Quarters. This area is located close to the "Okpe Igala" site excavated by Hartle in 1965, and subsequently used for field studies by several teams of staff and students of Archaeology Department of the University.

The wild yam within the University would have been dug up for an in-depth study, but for the fact that the time of discovery was during the rainy season when it must have been undergoing the reproductive stage.



Fig 1: Wild *Dioscorea rotundata* at Elias Avenue, U.N.N.

The wild *Dioscorea rotundata* for instance are morphologically large and contain numerous thorny roots and thorns all over its vine. It takes at times more than (4) four days to harvest, depending on certain factors like the tool used, the soil and the labour employed. According to Chikwendu and Okezie (1989), "the most difficult aspect of the work (their research) is digging up the wild yams. Apart from tangles of forest roots, the yams themselves radiates roots with long, sharp thorns from head to tail." The work involved for digging up the wild yam and the time consumed and the type of tools used made Chikwendu (1989) to call for the reversion of the assertion that Sangoan tools (picks) were used to grub up yam.

There are many types of wild yam in our area of study apart from the wild D. rotundata earlier mentioned. Among them are, (kpakpari) or (ji ejiri). Wild D. cayenensis. Yellow ya, 'ji oku', ji awuru-wild variety of D. alata water yam 'ji abala' (Fig. 8), 'Iyule ona' -wild variety of D. dumetorum, 'Adu egbe'-wild variety of D. bulbifera (Itanyi, 1990).

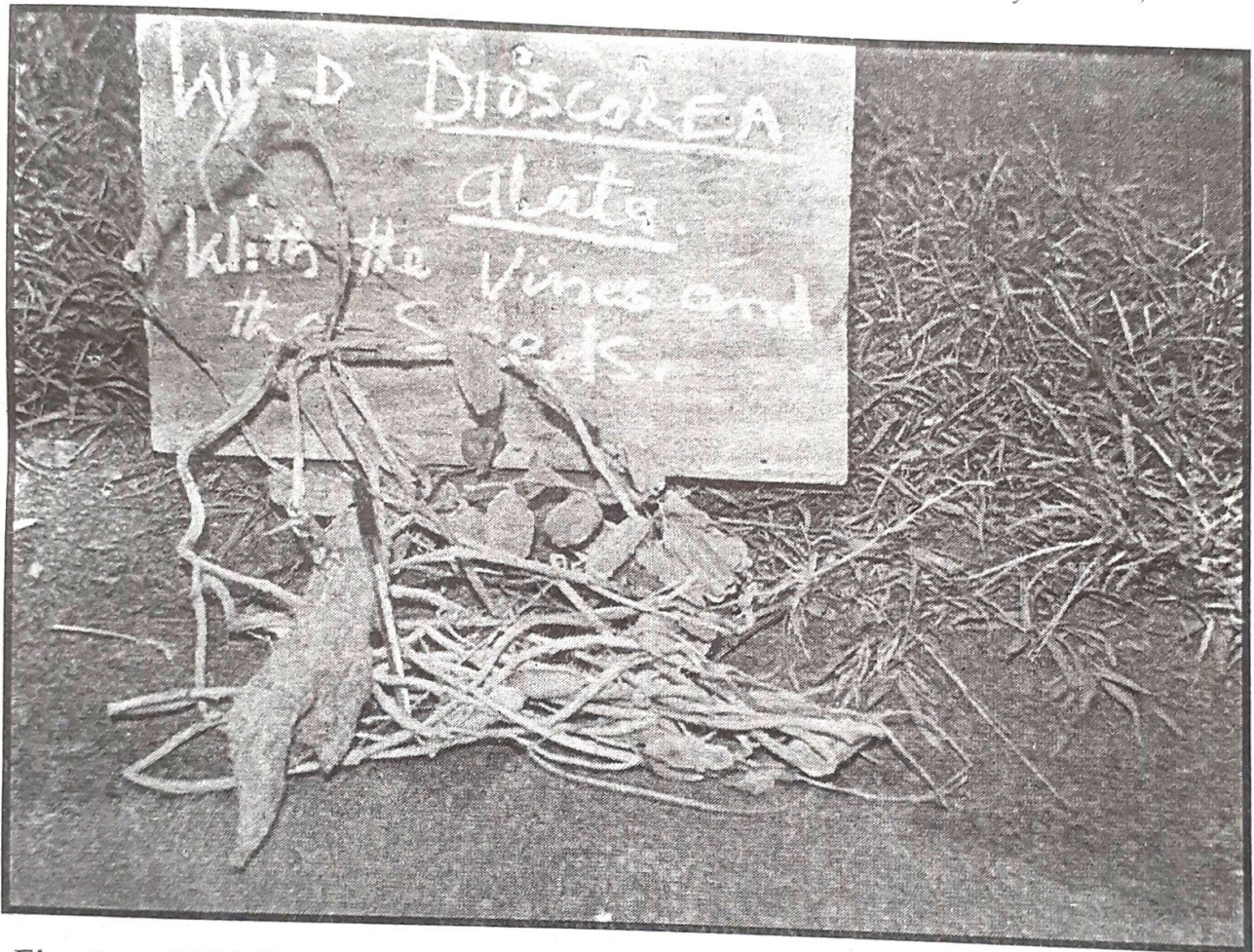


Fig. 8: Wild Dioscorea alata. "Ji Awuru".

As earlier noted, most of these wild species are edible when properly prepared. What makes them mostly different from the domesticated types is their high alkaloid contents which can be removed through boiling and soaking in hot water over night. Example can be given with the preparation of "Iyule Ona" -chips made from wild Dioscorea dumetorum (Ibid, 1990).

The Domesticated Yams

Botanically, yam locally known as 'ji' are plants of natural family Dioscoreacea. The largest genus of this family is Dioscorea containing some six hundred species in all among which are numbered all the important species of edible yams (Alexander and Cursey, 1969). Most

species of yam and all those used as food crops (except *D. bubifera*) developed as underground tuber or group of tubers from which an herbaceous 'vine' is produced annually to die away at the end of the growing season. The yam tuber organographically is derived from the stem. They are natural storage organs, which enable the plant to survive during periods of inclement weather conditions.

In most parts of Igboland, preparation for the cultivation of yam starts from the month of December. This lasts till the month of May depending on the purpose of the cultivation. In the riverine or waterlogged parts of Igboland –like the Anambra Local Government Area, planting of yam starts from January and this set of yam harvested around June and July.

In many parts of Igboland, cultivation after clearing the bushes commences with the first rain. To clear the branches of tree cut down, they were set ablaze. The setting of the area ablaze helps in the addition of manure to the soil. According to Gallagher (1989), "burning kills surface insects and removes dead crop residues, weeds and litter from the previous season. The removal of this litter plays an important role in warming up soil by removing the layer of materials, which block both solar radiation and the evaporation of moisture and hence retard solid warming. Burning also apart from adding charcoal as manure darkens the surface of the fields/ground and increases the ability of the ground surface to absorb solar radiation. Surface temperatures in areas that have been burned may be several degrees higher in unburned areas (Janick et al 1989:170). All these point to the fact that prior to the introduction of artificial fertilizer, the Igbo farmers knows the importance of charcoal and other farm yard manures in manuring their farms. They also know the need to expose their farmlands to sunshine. This is why they cut down all branches of trees around their farm lands to allow sunshine penetrate. For cultivation of yam, many techniques ranging from mound/ heap making to trench and ridge making are adapted.

Yams are later sown in them. The cultivation of yam is followed by weeding, staking and supporting from the months of April through July. After staking and weeding, the farmer then visits his farm intermittently and supervises the farm until maturity and harvesting which starts from November through January the following year.

Some species of yam like 'ji oku' yellow yam *D. cayenensis* (fig. 2) are carefully harvested earlier without harming or damaging the roots and the vines from the month of September. This process is also carried

out in 'ji ocha' or 'ji aga' white guinea yam *D. rotundata* (fig. 3). This process is referred to as the milling of yam.



Fig. 2: Domesticated *Dioscorea rotundata* (White Guinea Yam) 'ji ocha' or 'ji aga'.



Fig. 3: Domesticated *Dioscorea rotundata* (White Guinea Yam) 'ji aga' or 'ji ocha'.

Once the head, the roots and vines are not harmed, the yam will produce more yams, which may be used for re-planting (mainly seed yams).

The second harvests in most cases are smaller in size than the first harvest, but produces clustered seedlings. This may be because of many reasons. Firstly, once cut, the action of photosynthesis on the plant will tend to change. Instead of plants growing straight tubers inside the soil, they will tend to scatter. Secondly, once the first tuber has been cut, the left over tends to loose moisture thereby storing more carbohydrates than the first. Thirdly, the fact that the milking stage occurs when the rain is about stopping, and the fact that the ground becomes drier, there will be less growth down-wards, rather many clustered yams are produced; Okezie- Department of Botany, UNN (personal discussion, 1990).

In discussing the primary cradles of agriculture in Africa, Poteres (1970) divided West African Complex into tropical sector and sub-equatorial sector – each with its own respective sub-sectors and crops associated with them. Within the equatorial sub-sector, he listed different species of yam that can be found. In his words, “this sector has produced many cultivated yams, all of West African ancestry”. Among those species are, *D. cayenensis* Lamk and *D. dumetorum* (fig. 4) Pax. Others include, *D. praehensilis* (fig. 6) Benth, and *D. colocasifolia* (fig. 7) Pax.

With regards to Igboland, our area of study, archaeological reconnaissance and ethnoecological observations made there, showed that most of these mentioned species of yam are cultivated and most of their wild ancestors are being sought for and collected from the bush during the periods of scarcity. In most parts of Igboland, they have different nomenclatures, thus, *D. cayenensis* Lamk (Yellow yam) is generally known as ‘ji oku’, *D. rotundata* Poir (white guinea yam) ‘ji ocha or ‘Ezi ji’, *D. bulbifera* L. (bulbil bearing yam) “Adu”, *D. dumetorum*, Kunt, Pax (three leafed yam Ona or Una”).

Other yams which are claimed to be of South-east Asian origin, but which by the use of Helbaek’s hypothesis have been disproved by the writer and which today have their wild ancestors and cultivated varieties in Igboland are *D. alata* (“Abala or Abana”) (fig. 8) water yam and *D. praehensilis* (forest yam) “Abi”).



Fig. 4: Domesticated *Dioscorea dumetorum* (Three Leaved yam), 'Una or Ona'

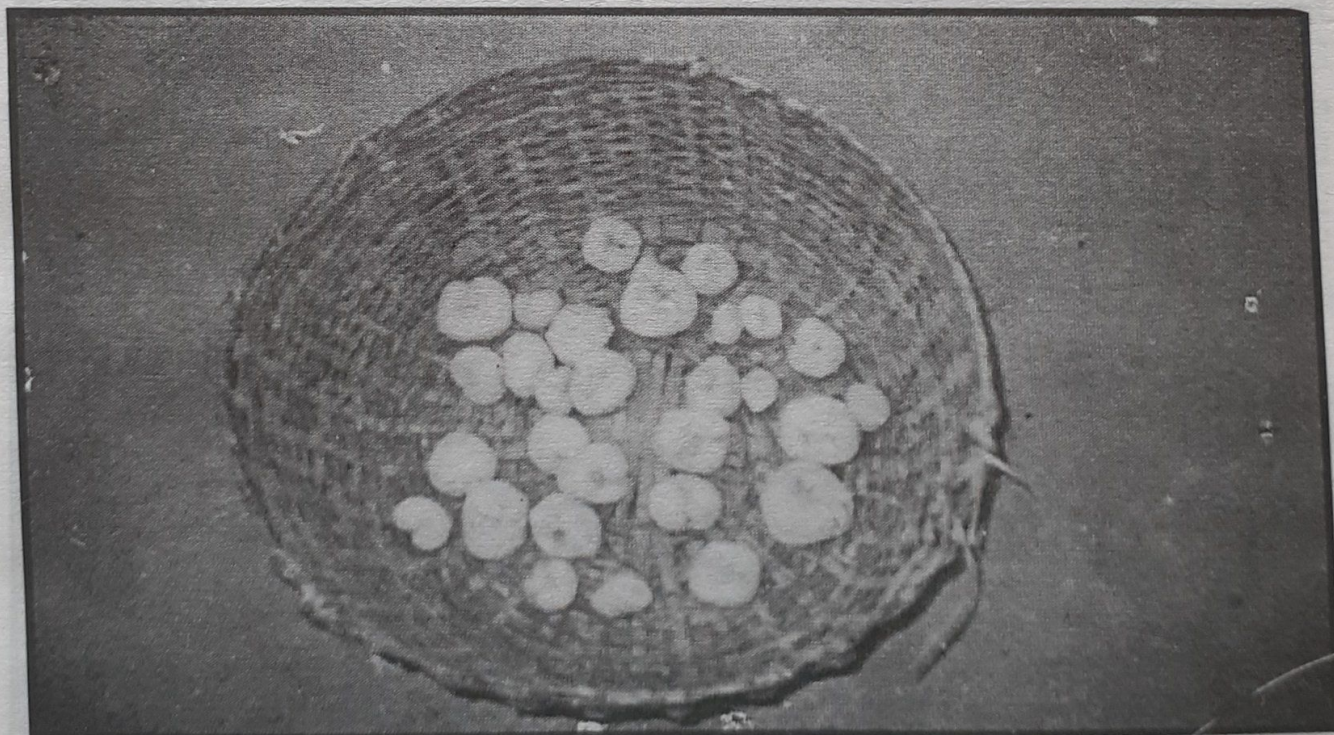


Fig 5: Domesticated *Dioscorea bulbifera* in a basket. Bulbing -bearing yam - Eda or Aa.



Fig. 6: Domesticated *D. Preahensilis* (Forest Yam) "Abi" tied up in a yam ban for preservation and storage.



Fig.7: Domesticated *Dioscorea Colocasi folia* (Coco yam) "Ede".

Comparison between the Wild and Domesticated Species of Yam

Having gone through the brief discussion based on the ethnoecological observation made on wild and domesticated species of yam in Igboland, the researcher deemed it necessary to make a comparison of the two with a view to deducing whether they have certain things in common and moreover, to establish whether one is derived from the other.

Other studies on this deals mainly with the physical properties of the various species studied. Mention has earlier been made on various types of wild and domesticated spp. of yam found in the study area.

As earlier mentioned, the life cycle of both the wild and domesticated spp. are the same. During the dry season, starting from the months of November through April the following year, the vines of the wild yam die, but the viable tubers remain underground until the next rainy season when the cycle is repeated. This mechanism in the wild form is the same with the domesticated form if left in the ground unharvested during the harvesting season. It is also during the months of September through November that most domesticated species of yam are "milked" leaving the upper part with secondary roots attached to the vine. They are re-entered into the soil and seed yams mainly used for replanting are produced (Joyce, 1989).

The stem of both the wild and domesticated species resemble, but the wild species contain larger thorns which are larger, longer, bigger and sharper in the wild form and may be as a result of its long stay in the bush and also for protection against predators. Both their leaves resemble and the leaf arrangement is almost the same-simple serrate type of arrangement. They also have the same number of mid-ribes as contained in the leaves-seven (7) in number. The leaf morphology is of the same shape and size.

Some of their outstanding differences or dissimilarities are that while the domesticated species are edible, the wild ones are poisonous. The alkaloid content in yam is more concentrated in the wild species than in the domesticated. Domestication reduces the alkaloid content in the domesticates while the wild one continues to accumulate more of it. The wild one produces larger fibrous stem than the domesticated ones. The stem and leaf of the wild form is darker in colour than the domesticated type. At times, in some wild species, their leaves and stem may be hairy and also instead of thorny roots, they possess rootlets. In terms of seeds, the wild species flower profusely. The tuber of the wild species contains fibrous materials all over their body.

Entomologically, wild yams are not being attacked by certain insects, but under experimentation towards ennoblement, yam leaves are eaten by several insects, for instance the smelling grasshopper (Zonocerus variagatus) and also garden snails (Limicolera spp.) yam beetles (ebe ji) Heteroliquis meles and Heteroliquis appius attack the tubers of the experimental specimens which have shown marked changes towards ennoblement (Chikwendu and Okezie, 1989). In the same way, this entomological observation may be of great importance to tropical archaeology while dealing with the antiquity of yam in the face of lack of direct archaeological evidence on yam within the region. This is because; some of these insects possess some hard parts like mouth, thoracic cages, legs etc. which can survive in archaeological deposit long after yam tubers have completely decayed. The application of this hypothesis for inferring the presence of yam should be taken with care as the presence of the remains of the species may not be sufficiently indicative to infer past yam cultivation, but if the remains of several yam predating species are found together, their inference is much more secure (Ibid, 1989).

In the same token, abundance of remains of crickets (Abuzi) where they survive in a site may also be an entomological indicative of presence of yam as they occupy areas rich in nitrogenous compounds where yams are farmed or cultivated.

As for the vines of yams, our ethno-ecological research shows that the wild forms possess long vines, which help them to reach sunlight in the forest. The one found at Elias Avenue University of Nigeria, Nsukka quarters are about 140 meters. It contains many cataphylls before the branches and the leaves. Thesame is applicable to the other wild D. rotundata found in most groves and forests in Igbo-Etiti Local Government Area.

Conclusively, attempt has been made in this paper to show that the abundance of wild and domesticated species of yam and their survival in the same ecological zone may prove that they both have certain things in common. It is likely that one (the domesticated spp.) may have been derived from the other (the wild species). The entomological attacks and physical differences on both the domesticated and wild forms of yam may have been brought about as a result of human activities towards domestication. A closer study of them may help an archaeologist looking for evidences for the antiquity of yam in Igboland, in the absence of direct archaeological evidence on the subject matter, yam.

Conclusion

From the ongoing research, one can deduce that, using Helbaek's hypothesis, the beginning of yam domestication can be traced among other places in equatorial sub-sector (Porteres, 1970), to Igboland. This extrapolation was based on the fact that Igboland lies within the equatorial sub-sector which according to Porteres (1970) makes up the yam zone of West Africa.

The use of ethno-botanical and archaeological reconnaissance have revealed the abundance of wild and domesticated species of yam in Igboland and the similarities amongst the two. The dissimilarities based mainly on morphology as a result of cultivation were spelt out.

In the absence of direct archaeological evidences, this work based mainly on indirect evidence has helped us to contribute our quota to the understanding of yam domestication in Igboland. There is the hope that more results would be made as more research on yam "ji" *Dioscorea* spp. and its ennoblement continues in the study area.

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