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## COLLECTION AND DOCUMENTATION OF MELON GERMPLASM IN NIGERIA

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**Abstract:** Members of family Cucurbitaceae are collectively called melon; they are mainly found in the warmer parts of all continents. A germplasm collection was undertaken in Nigeria between April and August, 2015 which corresponded to the periods of harvesting of the crop across major growing regions of the country. Eighteen states including Federal Capital Territory, which are the major growing areas of the crop, were visited. The collections were done in collaboration with Agricultural Development Projects (ADP) extension officers. Fifty five farmers were interviewed and a total of 60 accessions were collected. The accessions collected were identified to species level. All the 60 accessions fall into 5 genera and 7 species; *Colocynthis citrullus* (45), *Cucurbita moschata* (3), *Cucurbita maxima* (3), *Lagenaria siceraria* (2), *Lagenaria sphaerica* (2), *Cucumeropsis mannii* (4) and *Cucumis melo* (1). All the farmers interviewed preferred cultivation of *Colocynthis citrullus* due its high oil content, demand and more acceptance by consumers all over the regions. Niger state had highest number (8) of Egusi melon (*Colocynthis citrullus*) while Nasarawa and Kogi had same number (5) each. The high number of egusi melon encountered might be due to fact that it is the most cultivated member of Cucurbitaceae in the country. This collection had boasted the baseline information of diversity of family Cucurbitaceae. Also it has generated source of genetic variability for members like *Colocynthis citrullus* which can be aid in improvement of the crop.

**Key words:** Cucurbitaceae, *Colocynthis*, Egusi, *Lagenaria*, melon.

### Introduction

Melon is the common name of members of family Cucurbitaceae. It is found mainly in the warmer parts of all continents. It consists of 119 genera with altogether 825 species [SCHIPPERS, 2002]. Fruits of Cucurbitaceae have a considerable economic values. One of the main uses of the cucurbits apart from their fruits, leaves, flowers and occasionally their root is that of its seeds. The seed kernels of the Cucurbitaceae family found in markets throughout West Africa are important source of edible oil. Those oil-rich seeds are found in a range of genera of which the most important are *Colocynthis* (Egusi melon), *Citrullus* (Watermelon), *Cucurbita* (Pumpkin), *Lagenaria* (Bottle gourd), *Cucumis* (Melon), *Telfairia* (Fluted pumpkin) and *Luffa* (Sponge gourd) [SCHIPPERS, 2002]. According to [OGBONNA, 2013], *Colocynthis citrullus* (Egusi melon), which is one of the most cultivated species of family Cucurbitaceae, has been wrongly referred to by different scientific names by different authors such as; *Citrullus vulgaris*, *Citrullus lanatus*, and *Citrullus colocynthis*.

It is not out of point to belief that these genera of the family Cucurbitaceae could have the same Centre of Origin or Centre of Diversity. Since it is believed by numerous authors that many members of this family are found in warmer parts of all continents; it is pertinent to collect the germplasm of these crops in Nigeria. This will enhance the study of

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genetic diversity among the various members of the family Cucurbitaceae in the country.

Germplasm is a term used to describe living genetic resources such as seeds or tissues, maintained for the purpose of breeding, preservation, and other research uses [MAHMUT, 2012]. It provides potential diversity-base in genetic resources of cultivated plants [MAHMUT, 2012]. Germplasm collections can range from collections of wild species to elite, domesticated breeding lines that have undergone extensive human selection.

According to MAHESH & RONNIE (2017) insufficient germplasm is a global problem and no single country can boast of self-adequacy in germplasm to meet its food obligation. Many African countries including Nigeria depend greatly on non-native crops and imported germplasm for food and agricultural development. Thus this research aimed at evaluating existing genetic diversity of melons, through its germplasm collection, in Nigeria.

### **Materials and methods**

A germplasm collection was under taken from April to August 2015, in collaboration with Agricultural Development projects (ADP) extension officers to major growing areas of the crop across Nigeria. Five geopolitical zones (north central, North West, south east, south west and south south) formed the major growing areas. The states visited, were Niger, Kogi, Nassarawa, Kwara, Ondo, Osun, Benue, Plateau, Kaduna, Abia, Anambra, Rivers, Oyo, Ogun, Edo, Enugu, Imo and Federal Capital Territory (FCT). The exercise involved visits to farming villages in the states to collect available accessions of Cucurbitaceae. Each accessions collected were well-packed in an envelope and assigned an entry number and local name. The length of the seeds were taken using veneer callipers. Fifteen seeds were randomly selected, measured and the mean for each accession was taken.

### **Results and discussion**

A total sixty accessions were collected which fall in to five genera and seven species; *Colocynthis*, *Cucurbita*, *Lagenaria*, *Cucumeropsis*, *Cucumis*. The genus *Colocynthis* had highest number (43) of accessions, followed by *Cucurbita* (6), *Lagenaria* (4), *Cucumeropsis* (4), *Cucumis* (1) (Table 1, Figure 1). The *Colocynthis* (egusi melon) recorded highest occurrence in almost all parts of the country while *Lagenaria* and *Cucumeropsis* were more in the south-western part of the country (Table 1). This implied that there was non-uniform distribution of the genera across the country.

The uneven distribution and confinement of some species to one particular area or region of the country might be due variation in availability of rainfall and or edaphic factors. This can corroborated by the report of ADOJUTELEGAN & al. (2015) who identified rainfall and soil factor among others that limit production of watermelon.

The occurrence of species like *Colocynthis citrullus* across the regions might not be unconnected with germplasm flow in and out of the regions. Such flows are probably facilitated by Agricultural Development Projects (ADPs). Similar suggestion was made by MAHESH & RONNIE (2017). They reported that one of the routes through which germplasms could get in to a region is donor-assisted projects involved in agricultural development. The number of accessions of 'Egusi' melon collected is higher than those from earlier reports of IDEHEN & al. (2007); this could be due to smaller number of areas / regions visited in their research. In addition, they wrongly addressed egusi melon (*Colocynthis citrullus*) as *Citrullus lanatus*. The high number of egusi melon accessions which were collected from Niger (8), Nassarawa (5) and Kogi (5), is an indication that these states have the greatest diversity of the crop genetic resources in Nigeria. It also showed that these

regions might be the secondary centre of origin of the crop. This can be buttressed by opinion of SCHIPPERS (2000), SCHAEFER & RENNER (2011), KOUAME & al. (2014), RAGHAMI & al. (2014). They all opined that the family Cucurbitaceae has its centre of origin in West Africa.

### **Conclusion and recommendations**

Nigeria harbour appreciable diversity of members of family Cucurbitaceae especially egusi melon (*C. citrullus*) which is the most important in Nigerian economy. These collections which are now organised can provide baseline information of diversity of melon as well as raw materials for improvement of the crops. Evaluation of these germplasm for desirable traits is therefore recommended.

#### **Notes on contributors**

Aishatu Adamu GADO – is a plant biologist with a special in plant genetics and germplasm studies. She holds a PhD in applied plant genetics and breeding.

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*Colocynthis citrullus*



*Cucumis melo*



*Cucurbita moschata*



*Lagenaria sphaerica*



*Lagenaria siceraria*



*Cucumeropsis mannii*



*Cucurbita maxima*

**Figure 1.** Seeds of the different species of melon encountered

**Table 1.** Sources and description of Melon Germplasm in Nigeria

S/ No	Accession no.	Local name	Scientific Name	Place of collection	State	Zone/ region	Seed Coat colour	Rim/eye colour	Seed size (mm)	Seed texture	Seed shape
1.	NGR-NG-01	Eashi	<i>Colocynthis citrullus</i>	Gita/Paiko	Niger	NC	Brown	Black	1.7	Smooth/glabrous	Oval
2.	NGR-NG-02	Bologi	<i>Colocynthis citrullus</i>	Lenfa/Lapai	Niger	NC	Brown	White	1.7	Smooth/glabrous	Oval
3.	NGR-NG-03	Eashi	<i>Colocynthis citrullus</i>	Gidan Mangoro	Niger	NC	Brown	Rimless	1.2	Smooth/glabrous	Oval
4.	NGR-NG-04	Eashi	<i>Colocynthis citrullus</i>	Agaie	Niger	NC	Brown	Black	1.5	Smooth/glabrous	Oval
5.	NGR-NG-05	Eashi	<i>Colocynthis citrullus</i>	Paiko	Niger	NC	Brown	Rimless	1.1	Smooth/glabrous	Oval
6.	NGR-NG-06	Eashi	<i>Colocynthis citrullus</i>	Gidan Mangoro	Niger	NC	Brown	White	1.5	Smooth/glabrous	Oval
7.	NGR-NG-07	Eashi	<i>Colocynthis citrullus</i>	Bosso	Niger	NC	Brown	Rimless	1.5	Smooth/glabrous	Oval
8.	NGR-NG-08	Agushi	<i>Colocynthis citrullus</i>	Mashegu	Niger	NC	Brown	Black	1.6	Smooth/glabrous	Oval
9.	NGR-KG-09	Abaro	<i>Cucumeropsis mannii</i>	Dekina	Kogi	NC	White	Rimless	2.5	Smooth/glabrous	Spherical elongated
10.	NGR-KG-10	Epi	<i>Colocynthis citrullus</i>	Ankpa	Kogi	NC	Brown	Black	1.8	Smooth/glabrous	Oval
11.	NGR-KG-11	Epi Igala	<i>Colocynthis citrullus</i>	Idah	Kogi	NC	Brown	Rimless	1.4	Smooth/glabrous	Oval
12.	NGR-KG-12	Ito	<i>Cucumeropsis mannii</i>	Lokoja	Kogi	NC	White	Rimless	2.6	Smooth/glabrous	Spherical elongated
13.	NGR-KG-13	Epapara	<i>Colocynthis citrullus</i>	Adavi	Kogi	NC	Brown	Black	1.7	Smooth/glabrous	Oval
14.	NGR-FCT-14	Paper Babba	<i>Colocynthis citrullus</i>	Kwali	Fct	NC	Brown	Rimless	1.5	Smooth/glabrous	Oval
15.	NGR-FCT-15	Eshi Lala Eguain	<i>Colocynthis citrullus</i>	Gwagwalada	Fct	NC	Brown	Black	1.6	Smooth/glabrous	Oval
16.	NGR-FCT-16	Paper kanana	<i>Colocynthis citrullus</i>	Gosa	Fct	NC	Brown	Rimless	1.2	Smooth/glabrous	Oval
17.	NGR-FCT-17	Gunayi	<i>Colocynthis citrullus</i>	Garki	Fct	NC	Brown	Rimless	1.1	Smooth/glabrous	Oval
18.	NGR-NS-18	Eashi egi	<i>Colocynthis citrullus</i>	Kufan Gwari	Nasarawa	NC	Brown	Black	1.9	Smooth/glabrous	Oval
19.	NGR-NS-19	Eashi Letelete	<i>Colocynthis citrullus</i>	Kufan Gwari	Nasarawa	NC	Brown	Rimless	1.5	Smooth/glabrous	Oval

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20.	NGR-NS-20	Tetele	<i>Colocynthis citrullus</i>	Wakama	Nasarawa	NC	Brown	Rimless	1.7	Smooth/glabrous	Oval
21.	NGR-NS-21	Kagala	<i>Colocynthis citrullus</i>	Guduma	Nasarawa	NC	Brown	Black	1.6	Smooth/glabrous	Oval
22.	NGR-NS-22	Tetele	<i>Colocynthis citrullus</i>	Jitata	Nasarawa	NC	Brown	White	1.6	Smooth/glabrous	Oval
23.	NGR-KN-23	Kabewa	<i>Cucurbita maxima</i>	Rano	Kano	NW	Cream	Cream	1.7	Smooth/glabrous	Spherical
24.	NGR-KD-24	Dan Keffi Babba	<i>Colocynthis citrullus</i>	Kaduna	Kaduna	NW	Brown	Rimless	1.5	Smooth/glabrous	Oval
25.	NGR-KD-25	Agushi	<i>Colocynthis citrullus</i>	Doka	Kaduna	NW	Brown	White	1.8	Smooth/glabrous	Oval
26.	NGR-KD-26	Agushi mai bakin kai	<i>Colocynthis citrullus</i>	Kaduna	Kaduna	NW	Brown	Black	1.8	Smooth/glabrous	Oval
27.	NGR-OY-27	Ntoh	<i>Cucumeropsis mannii</i>	Saki/Ibadan	Oyo	SW	White	Rimless	2.5	Smooth/glabrous	Spherical elongated
28.	NGR-OY-28	Papa	<i>Colocynthis citrullus</i>	Saki/Ibadan	Oyo	SW	Brown	Black	1.4	Smooth/glabrous	Oval
29.	NGR-OY-29	Bojuri	<i>Lagenaria sphaerica</i>	Ibadan	Oyo	SW	Brown	Cream	2.1	Smooth/glabrous	Spherical elongated
30.	NGR-OY-30	Igba	<i>Lagenaria siceraria</i>	Saki/Ibadan	Oyo	SW	Dark brown	Rimless	2.2	Smooth/glabrous	Triangular
31.	NGR-OS-31	Igba	<i>Lagenaria siceraria</i>	Egbeore	Osun	SW	Dark brown	Rimless	2.3	Smooth/glabrous	Triangular
32.	NGR-OS-32	Ntoh	<i>Cucumeropsis mannii</i>	Egbeore	Osun	SW	White	Rimless	2.0	Smooth/glabrous	Spherical elongated
33.	NGR-OS-33	Papa	<i>Colocynthis citrullus</i>	Oshogbo	Osun	SW	Brown	Black	1.7	Smooth/glabrous	Oval
34.	NGR-OS-34	Egusi	<i>Colocynthis citrullus</i>	Egbeore	Osun	SW	Brown	Rimless	1.7	Smooth/glabrous	Oval
35.	NGR-OD-35	Atogbo	<i>Cucumeropsis mannii</i>	Ilodaada	Ondo	SW	White	Rimless	2.1	Smooth/glabrous	Spherical elongated
36.	NGR-OD-36	Atan	<i>Lagenaria sphaerica</i>	Ilodaada	Ondo	SW	Brown	Cream	2.0	Smooth/glabrous	Spherical elongated
37.	NGR-OD-37	Epapara	<i>Colocynthis citrullus</i>	Agogoro	Ondo	SW	Brown	Rimless	1.5	Smooth/glabrous	Oval
38.	NGR-OD-38	Egusi	<i>Colocynthis citrullus</i>	Ifon	Ondo	SW	Brown	Rimless	1.8	Smooth/glabrous	Oval
39.	NGR-OG-39	Wewe	<i>Colocynthis citrullus</i>	Hunguru	Ogun	SW	Brown	Rimless	1.5	Smooth/glabrous	Oval
40.	NGR-OG-40	Serewe	<i>Colocynthis citrullus</i>	Ijebu	Ogun	SW	Brown	Rimless	1.4	Smooth/glabrous	Oval

41.	NGR-OG-41	Papa	<i>Colocynthis citrullus</i>	Ilara	Ogun	SW	Brown	Black	1.3	Smooth/glabrous	Oval
42.	NGR-KW-42	Egusi	<i>Colocynthis citrullus</i>	Illorin	Kwara	NC	Brown	Black	1.7	Smooth/glabrous	Oval
43.	NGR-KW-43	Papa	<i>Colocynthis citrullus</i>	Oke Oyi	Kwara	NC	Brown	Black	1.3	Smooth/glabrous	Oval
44.	NGR-BE-44	Cheghar	<i>Colocynthis citrullus</i>	Makurdi	Benue	NC	Brown	Black	1.7	Smooth/glabrous	Oval
45.	NGR-BE-45	Cheghar	<i>Colocynthis citrullus</i>	Makurdi	Benue	NC	Brown	Rimless	1.3	Smooth/glabrous	Oval
46.	NGR-RV-46	Ardogha	<i>Colocynthis citrullus</i>	Abua/Odual	Rivers	SS	Brown	White	1.6	Smooth/glabrous	Oval
47.	NGR-RV-47	Ardogha	<i>Colocynthis citrullus</i>	Andoni	Rivers	SS	Brown	Black	1.8	Smooth/glabrous	Oval
48.	NGR-RV-48	Ardogha	<i>Colocynthis citrullus</i>	Abua/Odual	Rivers	SS	Brown	Rimless	1.5	Smooth/glabrous	Oval
49.	NGR-ED-49	Irele	<i>Cucumis melo</i>	Etsako West	Edo	SS	Cream	Rimless	0.7	Smooth/glabrous	Elliptical
50.	NGR-ED-50	Eivo	<i>Colocynthis citrullus</i>	Etsako West	Edo	SS	Brown	Rimless	1.5	Smooth/glabrous	Oval
51.	NGR-ED-51	Eivo	<i>Colocynthis citrullus</i>	Etsako East Auchu	Edo	SS	Brown	Rimless	1.4	Smooth/glabrous	Oval
52.	NGR-EN-52	Ugboro	<i>Cucurbita moschata</i>	Emene/Enugueast	Enugu	SE	Brown	Rimless	1.3	Hairy	Oval
53.	NGR-EN-53	Enine	<i>Colocynthis citrullus</i>	Igboekiti	Enugu	SE	Brown	Rimless	1.5	Smooth/glabrous	Oval
54.	NGR-EN-54	Anyu	<i>Cucurbita maxima</i>	Nkanu	Enugu	SE	Tan	Cream	2.3	Smooth/glabrous	Spherical
55.	NGR-AB-55	Egwusi	<i>Colocynthis citrullus</i>	Ugbo/Arochukwu	Abia	SE	Brown	Rimless	1.4	Smooth/glabrous	Oval
56.	NGR-AB-56	Ugboyoro	<i>Cucurbita moschata</i>	Ugbo/Arochukwu	Abia	SE	Brown	Rimless	1.3	Hairy	Oval
57.	NGR-AN-57	Egwusi	<i>Colocynthis citrullus</i>	Orumba	Anambra	SE	Brown	Rimless	1.4	Smooth/glabrous	Oval
58.	NGR-IM-58	Anyu	<i>Cucurbita maxima</i>	Akuwanta	Imo	SE	Tan	Cream	2.3	Smooth/glabrous	Spherical
59.	NGR-IM-59	Egwusi	<i>Colocynthis citrullus</i>	Akuwanta	Imo	SE	Brown	Rimless	1.4	Smooth/glabrous	Oval
60.	NGR-IM-60	Ugboyoro	<i>Cucurbita moschata</i>	Akuwanta	Imo	SE	Brown	Rimless	1.3	Hairy	Oval

NC = North Central, NW = North West, SW = South West, SS = South South, SE = South East



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