COLLECTION AND DOCUMENTATION OF MELON GERMLASM IN NIGERIA

Aishatu Adamu GADO1, Muhammad Liman MUHAMMAD1*, Olamide Ahmed FALUSI1, Matthew Omoniyi ADEBOLA1, Oladipupo Abdulazeez Yusuf DAUDU1, Mohammed Chata DANGANA1, Sadiq Abdulrahman YAHAYA1,2

1 Federal University of Technology, Department of Plant Biology, Minna – Nigeria
2 Nigerian Institute for Oil palm Research, Jigawa State – Nigeria
* Corresponding author. E-mail: ml.muhd@futminna.edu.ng

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 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...
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 [MAHMT, 2012]. It provides potential diversity-base in genetic resources of cultivated plants [MAHMT, 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 undertaken 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 ADOJUTEREGAN & 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.

Muhammad Liman MUHAMMAD – is Plant geneticist and breeder with special interest in mutation breeding. He holds a PhD in applied plant genetics and breeding.

Olamide Ahmed FALUSI – is a professor of plant cytogenetics and breeding with special interest in inheritance studies of plants.

Matthew Omoniyi ADEBOLA – is an associate professor of mycology.

Oladipupo Abdulazeez Yusuf DAUDU – is a Plant biologist with special interest in germplasm studies. He holds a PhD in applied plant genetics and breeding. He focuses on

Mohammed Chata DANGANA –is a PhD student with special interest in germplasm studies.

Sadiq Abdulrahman YAHAYA – is a PhD student with special interest in genetics of palms

Acknowledgements

We express our gratitude to staff of Agricultural development projects (ADP) of the various states visited for all the assistance rendered in collection of germplasm and in serving as interpreters in some cases.
Figure 1. Seeds of the different species of melon encountered

Colocynthis citrullus

Cucumis melo

Cucurbita moschata

Lagenaria sphaerica

Lagenaria siceraria

Cucumeropsis mannii

Cucurbita maxima
| 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      | *Colocynthis citrullus* | Gita/Paiko          | Niger | NC          | Brown           | Black         | 1.7           | Smooth/glabrous | Oval       |
| 2.   | NGR-NG-02     | Bologi     | *Colocynthis citrullus* | Lenfa/Lapai         | Niger | NC          | Brown           | White         | 1.7           | Smooth/glabrous | Oval       |
| 3.   | NGR-NG-03     | Eashi      | *Colocynthis citrullus* | Gidan Mangoro       | Niger | NC          | Brown           | Rimless       | 1.2           | Smooth/glabrous | Oval       |
| 4.   | NGR-NG-04     | Eashi      | *Colocynthis citrullus* | Agaie               | Niger | NC          | Brown           | Black         | 1.5           | Smooth/glabrous | Oval       |
| 5.   | NGR-NG-05     | Eashi      | *Colocynthis citrullus* | Paiko               | Niger | NC          | Brown           | Rimless       | 1.1           | Smooth/glabrous | Oval       |
| 6.   | NGR-NG-06     | Eashi      | *Colocynthis citrullus* | Gidan Mangoro       | Niger | NC          | Brown           | White         | 1.5           | Smooth/glabrous | Oval       |
| 7.   | NGR-NG-07     | Eashi      | *Colocynthis citrullus* | Mashegu             | Niger | NC          | Brown           | Rimless       | 1.5           | Smooth/glabrous | Oval       |
| 8.   | NGR-NG-08     | Agushi     | *Colocynthis citrullus* | Gidan Mangoro       | Niger | NC          | Brown           | Black         | 1.6           | Smooth/glabrous | Oval       |
| 9.   | NGR-KG-09     | Abaro      | *Cucumeropsis mani*   | Dekina              | Kogi  | NC          | White           | Rimless       | 2.5           | Smooth/glabrous | Spherical elongated |
| 10.  | NGR-KG-10     | Epi        | *Colocynthis citrullus* | Ankpa               | Kogi  | NC          | Brown           | Black         | 1.8           | Smooth/glabrous | Oval       |
| 11.  | NGR-KG-11     | Epi Igala  | *Colocynthis citrullus* | Idah                | Kogi  | NC          | Brown           | Rimless       | 1.4           | Smooth/glabrous | Oval       |
| 12.  | NGR-KG-12     | Ito        | *Cucumeropsis mani*   | Lokoja              | Kogi  | NC          | White           | Rimless       | 2.6           | Smooth/glabrous | Spherical elongated |
| 13.  | NGR-KG-13     | Epapara    | *Colocynthis citrullus* | Adavi               | Kogi  | NC          | Brown           | Black         | 1.7           | Smooth/glabrous | Oval       |
| 14.  | NGR-FCT-14    | Babba Paper | *Colocynthis citrullus* | Kwali               | Fct   | NC          | Brown           | Rimless       | 1.5           | Smooth/glabrous | Oval       |
| 15.  | NGR-FCT-15    | Lala Eguain Colocynthis citrullus | Gwagwalada | Fct | NC | Brown | Black | 1.6 | Smooth/glabrous | Oval |
| 16.  | NGR-FCT-16    | Kanana     | *Colocynthis citrullus* | Gosa                | Fct   | NC          | Brown           | Rimless       | 1.2           | Smooth/glabrous | Oval       |
| 17.  | NGR-FCT-17    | Gunayi     | *Colocynthis citrullus* | Garki               | Fct   | NC          | Brown           | Rimless       | 1.1           | Smooth/glabrous | Oval       |
| 18.  | NGR-NS-18     | Eashi egi  | *Colocynthis citrullus* | Kufan Gwari         | Nasarawa | NC | Brown | Black | 1.9 | Smooth/glabrous | Oval |
| 19.  | NGR-NS-19     | Letele    | *Colocynthis citrullus* | Kufan Gwari         | Nasarawa | NC | Brown | Rimless | 1.5 | Smooth/glabrous | Oval |
| No. | Code       | Location          | Status | Desire | Color       | Size | Shape       | Shell | Color      |
|-----|------------|-------------------|--------|--------|-------------|------|-------------|-------|------------|
| 20. | NGR-NS-20  | Tetele            | Colocynthis citrullus | Wakama | Nasarawa | NC   | Brown       | Rimless | 1.7        | Smooth/glabrous | Oval         |
| 21. | NGR-NS-21  | Kagala            | Colocynthis citrullus | Guduma | Nasarawa | NC   | Brown       | Black  | 1.6        | Smooth/glabrous | Oval         |
| 22. | NGR-NS-22  | Tetele            | Colocynthis citrullus | Jitata | Nasarawa | NC   | Brown       | White  | 1.6        | Smooth/glabrous | Oval         |
| 23. | NGR-KN-23  | Kabewa            | Cucurbita maxima      | Rano   | Kano     | NW   | Cream       | Cream  | 1.7        | Smooth/glabrous | Spherical   |
| 24. | NGR-KD-24  | Dan Keffi Babba   | Colocynthis citrullus | Kaduna | Kaduna   | NW   | Brown       | Rimless | 1.5        | Smooth/glabrous | Oval         |
| 25. | NGR-KD-25  | Agushi            | Colocynthis citrullus | Doka   | Kaduna   | NW   | Brown       | White  | 1.8        | Smooth/glabrous | Oval         |
| 26. | NGR-KD-26  | Agushi mai bakin kai | Colocynthis citrullus | Kaduna | Kaduna   | NW   | Brown       | Black  | 1.8        | Smooth/glabrous | Oval         |
| 27. | NGR-OY-27  | Ntoh              | Cucumeropsis mannii   | Saki/Ibadan | Oyo   | SW   | White       | Rimless | 2.5        | Spherical/elongated |
| 28. | NGR-OY-28  | Papa              | Colocynthis citrullus | Saki/Ibadan | Oyo   | SW   | Brown       | Black  | 1.4        | Smooth/glabrous | Oval         |
| 29. | NGR-OY-29  | Bojuri            | Lagenaria sphaerica   | Ibadan | Oyo     | SW   | Brown       | Cream  | 2.1        | Spherical/elongated |
| 30. | NGR-OY-30  | Igba              | Lagenaria siceraria    | Saki/Ibadan | Oyo   | SW   | Dark brown | Rimless | 2.2        | Smooth/glabrous | Triangular   |
| 31. | NGR-OS-31  | Igba              | Lagenaria siceraria    | Egbebori | Osun   | SW   | Dark brown | Rimless | 2.3        | Smooth/glabrous | Triangular   |
| 32. | NGR-OS-32  | Ntoh              | Cucumeropsis mannii   | Egbebori | Osun   | SW   | White       | Rimless | 2.0        | Spherical/elongated |
| 33. | NGR-OS-33  | Papa              | Colocynthis citrullus | Oshogbo | Osun    | SW   | Brown       | Black  | 1.7        | Smooth/glabrous | Oval         |
| 34. | NGR-OS-34  | Egusi             | Colocynthis citrullus | Egbebori | Osun   | SW   | Brown       | Rimless | 1.7        | Smooth/glabrous | Oval         |
| 35. | NGR-OD-35  | Atogbo            | Cucumeropsis mannii   | Ilodaada | Ondo   | SW   | White       | Rimless | 2.1        | Spherical/elongated |
| 36. | NGR-OD-36  | Atan              | Lagenaria sphaerica   | Ilodaada | Ondo   | SW   | Brown       | Cream  | 2.0        | Spherical/elongated |
| 37. | NGR-OD-37  | Epapara           | Colocynthis citrullus | Agogoro | Ondo    | SW   | Brown       | Rimless | 1.5        | Smooth/glabrous | Oval         |
| 38. | NGR-OD-38  | Egusi             | Colocynthis citrullus | Ifon   | Ondo    | SW   | Brown       | Rimless | 1.8        | Smooth/glabrous | Oval         |
| 39. | NGR-OG-39  | Wewe              | Colocynthis citrullus | Hunguru | Ogun    | SW   | Brown       | Rimless | 1.5        | Smooth/glabrous | Oval         |
| 40. | NGR-OG-40  | Serewe            | Colocynthis citrullus | Ijebu   | Ogun    | SW   | Brown       | Rimless | 1.4        | Smooth/glabrous | Oval         |
| No. | Location | Species | Town/Area | State | Color | Shell | Width | Shape | Description |
|-----|----------|---------|-----------|-------|-------|-------|-------|-------|-------------|
| 41. | NGR-OG-41 | Papa | Colocynthis citrullus | Ilara | Ogun | SW | Brown | Black | 1.3 | Smooth/glabrous | Oval |
| 42. | NGR-KW-42 | Papa | Colocynthis citrullus | Illorin | Kwara | NC | Brown | Black | 1.7 | Smooth/glabrous | Oval |
| 43. | NGR-KW-43 | Papa | Colocynthis citrullus | Oke Oyi | Kwara | NC | Brown | Black | 1.3 | Smooth/glabrous | Oval |
| 44. | NGR-BE-44 | Cheghar | Colocynthis citrullus | Makurdi | Benue | NC | Brown | Black | 1.7 | Smooth/glabrous | Oval |
| 45. | NGR-BE-45 | Cheghar | Colocynthis citrullus | Makurdi | Benue | NC | Brown | Rimless | 1.3 | Smooth/glabrous | Oval |
| 46. | NGR-RV-46 | Papa | Colocynthis citrullus | Abua/Odual | Rivers | SS | Brown | White | 1.6 | Smooth/glabrous | Oval |
| 47. | NGR-RV-47 | Papa | Colocynthis citrullus | Andoni | Rivers | SS | Brown | Black | 1.8 | Smooth/glabrous | Oval |
| 48. | NGR-RV-48 | Papa | Colocynthis citrullus | Abua/Odual | Rivers | SS | Brown | Rimless | 1.5 | Smooth/glabrous | Oval |
| 49. | NGR-ED-49 | Irere | Cucumis melo | Etsako West | Edo | SS | Cream | Rimless | 0.7 | Smooth/glabrous | Elliptical |
| 50. | NGR-ED-50 | Eivo | Colocynthis citrullus | Etsako West | Edo | SS | Brown | Rimless | 1.5 | Smooth/glabrous | Oval |
| 51. | NGR-ED-51 | Eivo | Colocynthis citrullus | Etsako East Auchi | Edo | SS | Brown | Rimless | 1.4 | Smooth/glabrous | Oval |
| 52. | NGR-EN-52 | Ugboro | Cucurbita moschata | Emene/Enugueast | Enugu | SE | Brown | Rimless | 1.3 | Hairy | Oval |
| 53. | NGR-EN-53 | Enine | Colocynthis citrullus | Igboekiti | Enugu | SE | Brown | Rimless | 1.5 | Smooth/glabrous | Oval |
| 54. | NGR-EN-54 | Anyu | Cucurbita maxima | Nkanu | Enugu | SE | Tan | Cream | 2.3 | Smooth/glabrous | Spherical |
| 55. | NGR-AB-55 | Egwusi | Colocynthis citrullus | Ugbo/Arochukwu | Abia | SE | Brown | Rimless | 1.4 | Smooth/glabrous | Oval |
| 56. | NGR-AB-56 | Ugboyoro | Cucurbita moschata | Ugbo/Arochukwu | Abia | SE | Brown | Rimless | 1.3 | Hairy | Oval |
| 57. | NGR-AN-57 | Egwusi | Colocynthis citrullus | Orumba | Anambra | SE | Brown | Rimless | 1.4 | Smooth/glabrous | Oval |
| 58. | NGR-IM-58 | Anyu | Cucurbita maxima | Akuwanta | Imo | SE | Tan | Cream | 2.3 | Smooth/glabrous | Spherical |
| 59. | NGR-IM-59 | Egwusi | Colocynthis citrullus | Akuwanta | Imo | SE | Brown | Rimless | 1.4 | Smooth/glabrous | Oval |
| 60. | NGR-IM-60 | Ugboyoro | Cucurbita moschata | 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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**How to cite this article:**

GADO A. A., MUHAMMAD M. L., FALUSI O. A., ADEBOLA M. O., DAUDU O. A. Y., DANGANA M. C. & YAHAYA S. A. 2019. Collection and documentation of melon germplasm in Nigeria. *26*: 59-66. https://doi.org/10.33628/jpd.2019.26.1.59