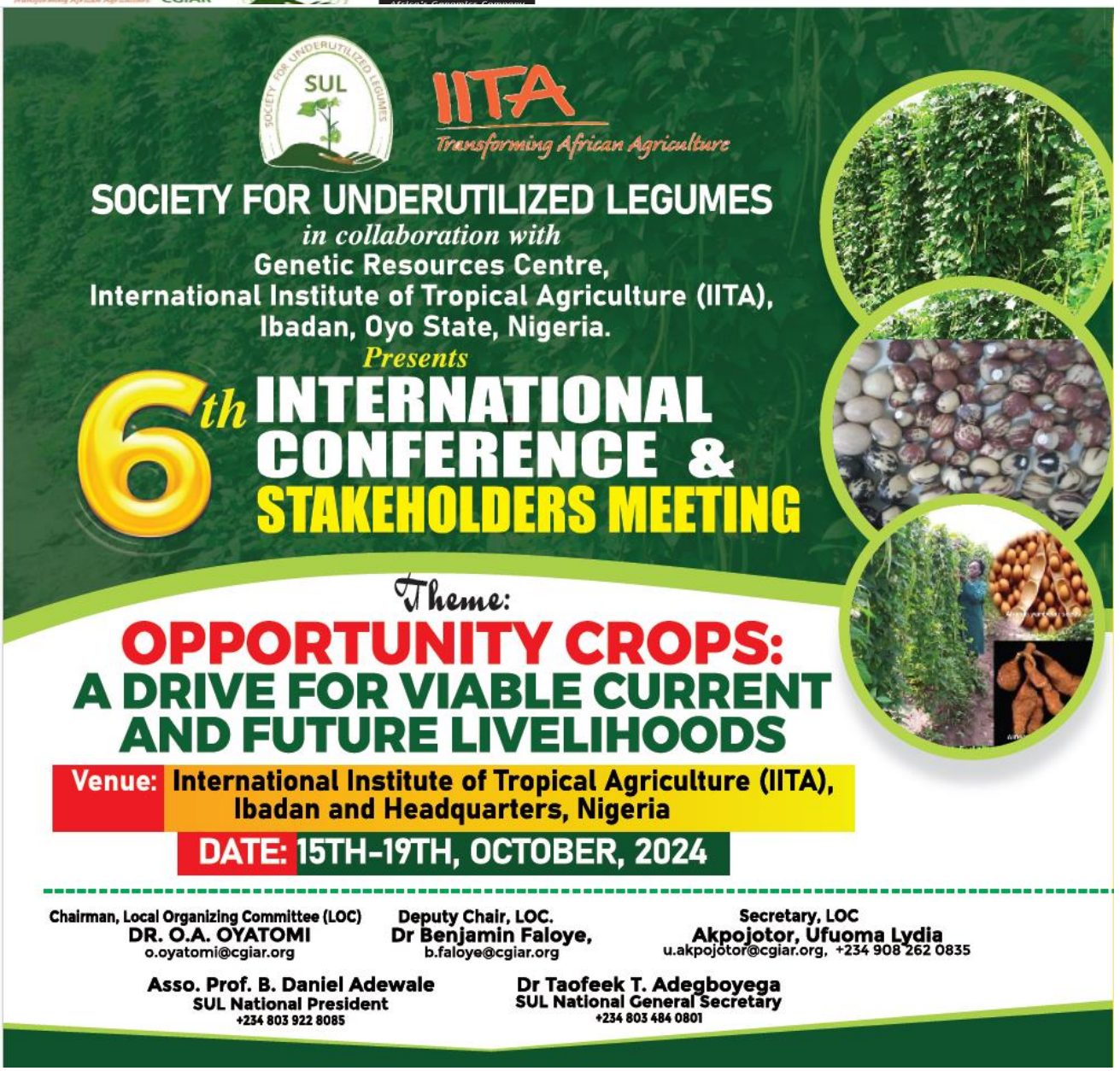

SUL
IITA
Transforming African Agriculture
SOCIETY FOR UNDERUTILIZED LEGUMES
in collaboration with
Genetic Resources Centre,
International Institute of Tropical Agriculture (IITA),
Ibadan, Oyo State, Nigeria.
Presents
6th INTERNATIONAL CONFERENCE & STAKEHOLDERS MEETING
Theme:
OPPORTUNITY CROPS:
A DRIVE FOR VIABLE CURRENT AND FUTURE LIVELIHOODS
Venue: International Institute of Tropical Agriculture (IITA), Ibadan and Headquarters, Nigeria
DATE: 15TH-19TH, OCTOBER, 2024
Chairman, Local Organizing Committee (LOC)
DR. O.A. OYATOMI
o.oyatomi@cgiar.org
Deputy Chair, LOC.
Dr Benjamin Faloye,
b.faloye@cgiar.org
Secretary, LOC
Akpojotor, Ufuoma Lydia
u.akpojotor@cgiar.org, +234 908 262 0835
Asso. Prof. B. Daniel Adewale
SUL National President
+234 803 922 8085
Dr Taofeek T. Adegboyega
SUL National General Secretary
+234 803 484 0801

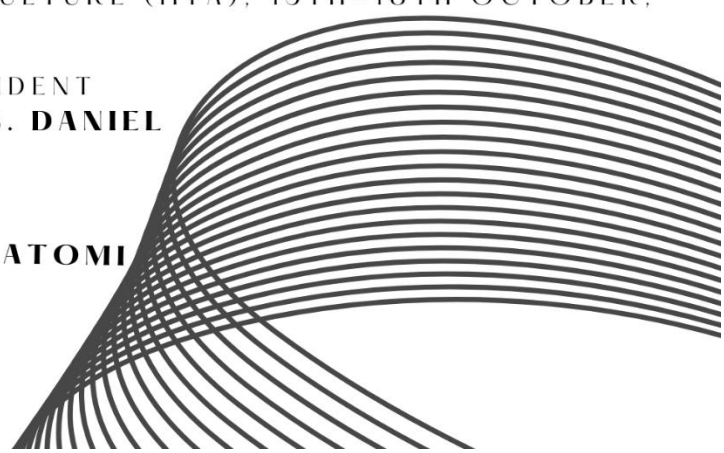
6th National Conference and Stakeholders' Forum of the Society for Underutilized Legumes held in conjunction with the Genetic Resources Centre, International Institute of Tropical Agriculture (IITA), 15th-18th October, 2024.

Book of Abstracts

6TH NATIONAL CONFERENCE AND STAKEHOLDERS' FORUM OF THE SOCIETY FOR UNDERUTILIZED LEGUMES HELD IN CONJUNCTION WITH THE GENETIC RESOURCES CENTRE, INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE (IITA), 15TH–18TH OCTOBER, 2024

NATIONAL PRESDIDENT
DR. ADEWALE, B. DANIEL

LOC CHAIR
DR. OLANIYI OYATOMI



C/O Genetic Resources Centre,
International Institute of Tropical Agriculture
Oyo Road, PMB 5320, Ibadan, Nigeria.
Telephone +2348039228085; +2348034840801; +2348064640018; +2348033784501

Citation:
SUL (Society for Underutilized Legumes). 2024.

Compiled by Adewale B. Daniel; Beckley Ikhajiagbe; Adegboyega, T. Taofeek; Odesola Kafila; Adesokan O. John

Book of Abstract of 6th International Conference Of the Society for Underutilized Legumes, 15 – 19 October, 2024.

Held at International Institute of Tropical Agriculture (IITA), Ibadan and Headquarters, Nigeria.

ISBN: 978-978-131-351-6

Disclaimer

The views expressed in this publication are those of the authors and do not necessarily represent the position or policy of IITA. This publication was printed outside IITA's Communication Office.

TABLE OF CONTENTS

Contents

TABLE OF CONTENTS iv

LOCAL ORGANIZING COMMITTEE vii

SUL EXCOS x

PROGRAMME OF EVENTS 10

Day 1: Tuesday 15th October, 2024 10

Day 2: Wednesday, 16th October, 2024 10

Day 3: Thursday, 17th October, 2024 12

Day 4: Friday, 18th October, 2024 15

BOOK OF ABSTRACT 36

The SOCIETY FOR UNDERUTILIZED LEGUMES (SUL) 118

MISSION: 118

OBJECTIVES: 118

ANNEX III 119

NOTES ON CHAIRMAN AND KEYNOTE SPEAKER, PLENARY CHAIR 119

REVIEWERS LIST 121

SPONSORS 122

Dr Simeon Ehui

IITA Director General and CGIAR Regional Director for Continental Africa

Prof. Michael Abberton

Director, R4D, Western African Hub & Head, Genetic Resources Centre, IITA

LOCAL ORGANIZING COMMITTEE

Dr Olaniyi A. Oyatomi
Chair, LOC, SUL-IITA 2024

Dr Benjamin Faloye
Deputy Chair, LOC, SUL-IITA 2024

Ms Ufuoma Akpojotor
Secretary, LOC SUL- IITA 2024

LOCAL ORGANIZING COMMITTEE

Scientific/Editorial

1.	Prof Beckley Ikhajiagbe (UNIBEN)	Chair
2.	Dr Badmos Amina (FUNAAB)	Secretary
3.	Ass Prof BD Adewale	Member
4.	Prof Soetan Kehinde	Member
5.	Ass Prof Omena Bernard	Member
6.	Ass Prof Gbenro Popoola	Member
7.	Dr Adegboyega Taofeek Tope	Member
8.	Dr Osundare Tunde	Member
9.	Dr Odesola Kafilat	Member
10.	Dr Rajneesh Paliwal	Member
11.	Dr Olaide Ogunsanya	Member
12.	Dr Kareem Titilope	Member

Communications/Publicity

1.	Dr Adegboyega Taofeek Tope	Chair
2.	Mr Adesokan John	Secretary

LOCAL ORGANIZING COMMITTEE

Programme Planning/Logistics/Welfare

1.	Dr Ben Faloye	Chair
2.	Mrs Emily Iwu	Secretary
3.	Mr Adebowale Oladepo	Member
4.	Mr Ihenacho Jeffrey	Member
5.	IGH	Member
6.	I House	Member
7.	Mrs Yemi Fajire	Member

Finance/Sponsorship

1.	Prof Yemisi Jeff Agboola	Chair
2.	Dr Olaniyi Oyatomi	Member
3.	Dr Shoge Mansurat	Member
4.	Prof Catherine Nnamani	Member
5.	Prof Soetan Kehinde	Member
6.	Ass Prof BD Adewale	Member

SUL EXCOS

Ass Prof B. D. Adewale
National President SUL

Dr Adegboyega Taofeek Tope
National Gen Secretary SUL

Prof Nnamani Catherine Vera
National Treasurer SUL

Ass Prof Popoola Jacob Olagbenro
National Linkage Coordinating Officer

Dr Oyatomi Olaniyi A.
National Linkage Officer
(Research Institute)

Prof Jeff-Agboola Yemisi Adefunke
National Linkage Officer
(International Linkages)

PRESIDENT'S WELCOME ADDRESS

This is the eighth year of the birth of a renewed view for the value of the neglected and underutilized crops in Nigeria; It was back in the year 2016 that we converged for a symposium on African Yam Bean here in this same hall. I appreciate God for all of us who were both here then and living to see today. The birth of the research community; Society for Underutilized crops (SUL) had a long incubation period, during which many individuals from different disciplines worked and reported on different underutilized crops and legumes. All those were "kicks in the womb" – we are glad that SUL was born and is now eight years old. Interestingly, this year's conference coincides with the celebration of the birthday of the convener of the first African Yam Bean symposium meeting; a great and passionate man, our first Fellow in SUL, a father for us all - Prof. Michael Abberton.

We are scholars and scientists with dear passion for underutilized crops - especially legumes - with a purpose to rescue their value from depletion and erosion. "Why legumes?", you may want to ask. The answer is "Legumes because the global need for human and livestock protein is majorly (≥60%) sourced from plants (legumes)." Protein content from plants have continued to dominate because: they are relatively more accessible and affordable with promising health benefits compared to animal-based protein (Tilman and Clark, 2014). Sustainable future protein supply for humans cannot afford to be dependent on increasing production of few sources since protein from different sources are not the same; they differ in profile, digestibility, bioavailability, consumers' acceptability etc. (Henchion *et al.*, 2017). Therefore, as a society, we are in the business of rescuing and promoting all forms of opportunity crops for sustainable present and future livelihood.

SUL began as AYBCUAN in 2017. That happened at Ebonyi State University, Abakaliki, Nigeria. However, the society has since moved forward with the renewed name of "SUL" (Society for Underutilised Legumes) which incorporate other underutilized legumes. SUL, now a registered academic society has become visible on the net, now floating a peer reviewed journal (Journal for Underutilized legumes (JUL)) which is currently in the 7th volume. JUL will be hosting the iconic presentations from this conference as published articles in a special edition. We are the registered group which wars against the displacement of the relevance and promise of lesser-known pulses. This year's theme was purposely made broad, as we are aware that legumes are not the only neglected and underutilized crop. In this conference, about 18% of the presentations will be on non-leguminous crops. Please be informed that the consideration of other neglected crops for incorporation into our mainstream is brooding. Our goal remains intact; however, we are open to collaborations, synergy and shared opportunities.

Meanwhile, we still mourn the Bambara groundnut ambassador; an ardent scholar, a renowned researcher, a mentor with very excellent versatility, a man with a rare CV, so valued that he couldn't just retire without a valedictory service, a household and global name in root and tuber breeding research, a man whose profile is seemingly too big for me to describe, our special guest of honour at the 5th SUL Conference (FUOYE 2023) - Prof. Malachy Oghenevo Akoroda. We miss him, may his soul rest in peace.

You are in for the momentous and thrilling experience characteristic of listening, learning and exchange of ideas in an academic domain. This conference will equally usher in new National Executives and newly inducted SUL members. While this meeting will be hosting lots of attractions, we are here to see great works and results on underutilized crops.

Therefore, let us all inquisitively give our unalloyed attention to gain the best through attentiveness and interaction. Make sure you build healthy relationships and collaboration before the end of this program

You are welcome to IITA, 2024. Enjoy your stay and make every moment meaningful for yourself.

Thanks.

Dr. Adewale, B. Daniel
President, Society for Underutilized Legumes

WELCOME ADDRESS BY CHAIR, LOCAL ORGANISING COMMITTEE

On behalf of IITA and the local organizing committee of the 6th International conference of the Society for Underutilized Legumes, I welcome all delegates to IITA for this conference.

This conference marks the first of its kind to be hosted by IITA after the African Yambean symposium we had in 2016. This is very significant as it marks the beginning of a new paradigm shift in the history of our dear society as we transform into a full-blown international society especially now that the global interest in Neglected Underutilized Legumes (NUS) is increasing in the phase of climate change. I am indeed delighted to be accorded the opportunity to lead the local organizing committee for the planning and execution of this conference, the success of which couldn't have been possible without the selfless commitment of the committee members, and the members of the NEC of the society, most importantly I must greatly appreciate the support of IITA Genetic Resources Center under the able leadership of Prof. Michael Abberton. On behalf of SUL NEC, we really appreciate your support we are not taking it for granted. At this juncture I would like to welcome all the delegates from different parts of the country and those joining virtually from the diaspora. Let us take this unique opportunity to explore IITA beautiful campus and our diverse cultural society. I will not conclude without informing the delegates about IITA culture of maintaining a clean environment, let us endeavour to keep IITA free of litters, we operate a bully free society with zero tolerance for any form of harassment.

Once again you are all welcome, enjoy your stay.

Thanks

Olaniyi Oyatomi PhD.
Genetic Resources Center, Chairman Local Organizing Committee.

PROGRAMME OF EVENTS

Tuesday 15th – Friday 18th October., 2024
International Conference Centre, International Institute of Tropical Agriculture (IITA) HQ, Ibadan, Nigeria
Theme: "Opportunity Crops: A drive for viable current and future livelihoods"

Day 1: Tuesday 15th October, 2024

Arrival, Check-in and Accommodation of Delegates.
Registration and Collection of Souvenirs……Conference Centre: 14:00-17:00pm

Day 2: Wednesday, 16th October, 2024

	FACILITATORS	Venue	DURATION
EVENTS		Conference Centre	
Arrival/Registration	LOC-Registration & Protocol		07:00-09:00 am
Introduction of Special Guests	Master of Ceremony		09.00-09:05 am
Opening Remark of the LOC Chairperson	Dr Oyatomi Olaniyi		09:05-09:10 am
Welcome Address, President SUL	Ass. Prof. Adewale, B. Daniel		09:10-09:15 am
Welcome address, Head, GRC, IITA	Prof Michael Abberton		09:15-09:20 am
Good will messages	Former Director/CEO NACGRAB, DG NIHORT, DG IAR &T, MD ICARE, DG NABG, Other guests		09:20-09:30 am
Speech of Guest of Honour	Dr Adebowale Akande (Rep. Governor, Oyo State, Nigeria)		09:30-09:35 am
Address of the Chief Host (DG IITA)	Dr Simeon Ehui		09:35-09:40 am

Keynote Speech: Opportunity Crops: A drive for viable current and future livelihoods	**Prof Enoch G. Achigan-Dako,** Genetics, Biotechnology and Seed Science Unit (GBioS), University of Abomey-Calavi, Republic of Benin. **Rapporteurs:** *Dr Wale Olatidoye, Nwogwugwu Precious Amarachi*		9:40 -10:15am
Inqaba Biotec West Africa	Mr Lukman Aroworamimo (Olanrewaju Olufowobi)	**Conference Centre**	10:15-10:25am
Bioflow (IITA Biometrics)	Mr. Kayode Fowobaje		10:25-10:35am
Group Photographs	All Participants		10:35-10:45am
Healthy Tea Break	**All participants**		10:45-11:00am
Plenary Session **Chairman:** Prof. B. Ikhajiagbe (EiC, JUL) **Rapporteurs:** *Quadri Zainab Toyin, Akinyoola Omolara Ifeoluwa*			
Plenary Speaker 1: Exploration and Utilization of Indigenous Plant Genetic Resources	**Prof. Happiness Oselebe** Director, Centre for Crop Improvement, Nutrition and Climate Change (CCINCC), Ebonyi State University, Nigeria.	Conference Centre	11:00-11:25am
Plenary Speaker 2: Artificial Intelligence for Opportunity Crops' Promotion	**Prof. Abiodun Musa Aibinu** Vice-Chancellor, Summit University, Offa, Kwara State. Nigeria.		11:25-11:50am
Plenary Speaker 3: Genetic Improvement, Biotechnology and Crop Modelling of opportunity	**Prof. Sola Ajayi** Vice-Chancellor, First Technical University, Ibadan, Oyo State, Nigeria.		11:50-12:15pm
Q & A	Panel of Speakers/All Participants		12:15-13:00pm
Announcements	Master of Ceremony		13:00-13:05pm
Lunch	All participants	IITA i-House	13:05-14:00pm

Parallel Technical Sessions			
1st Parallel Technical Session: Oral/Poster presentation on **Thematic Area 1: Exploration and Utilization of Indigenous Plant Genetic Resources**	**Plenary Chairman: Prof. Sylvester Uhunoma Ewansiha** **Rapporteurs:** *Olamide Afolarin,, Priscilla Aiyedun*	Conference Centre (Venue 1)	14:00-15:30pm
2nd Parallel Technical Session **Thematic Area 2: Genetic Improvement, Biotechnology and Crop Modelling**	**Plenary Chairman: Ass. Prof. Jacob Popoola** **Rapporteurs:** *Olamide Afolarin, Priscilla Aiyedun*		15:30-17:00pm
3rd Parallel Technical Session **Thematic Area 3: Crop Production and Health**	**Plenary Chairman: Dr Lava Kumar** **Rapporteurs:** *Adenike Oluwaseun Dada, Alayo Faizah Olawunmi*	GRC Hall (Venue 2)	14:00-15:30pm
4th Parallel Technical Session **Thematic Area 4: Healthy Nations through Opportunity Crops**	**Plenary Chairman: Dr Kareem Titilope** **Rapporteurs:** *Adenike Oluwaseun Dada, Alayo Faizah Olawunmi*		15:30-17:00pm
Photography, Welcome Cocktail	LOC-Welfare/iHouse	IITA I-House	17:00-19:00pm

Day 3: Thursday, 17th October, 2024

EVENT	FACILITATOR	Venue	TIME
Opening Formalities	LOC-Registration & Protocol	Conference Centre	07:30-8:10am
Recap of Day 1	Dr Adegboyega Taofeek Tope		08-10:08:25am
Introducing Genetic Resources Centre, IITA	Dr Oyatomi Olaniyi		08.25-08:40am
IITA Bioscience Centre	Mrs Yemi Fajire		08.40-08:55am
Plenary Session 02 **Chairman:** Prof. Charity Aremu **Rapporteurs:** *Quadri Zainab Toyin, Akinyoola Omolara Ifeoluwa*			

Plenary Speaker 4: Natural Resources Management and Climate Change	**Prof. Olubukola Oluranti Babalola,** Vice President, TWAS & OWSD. Research Director, North-West University, South Africa. Provost Visiting Professor, Imperial College London.	Conference Centre	09:00-09:25am
Bristol Scientific, Lagos, Nigeria	**Adanna Ikeora**		09:25-09:30am
Q & A	Chairman Plenary		9.30 – 9.40 am
Group Photograph	All Participants		09:40-09:45am
Healthy Tea break	All participants		09:45-10:00am
Parallel Technical Session 02			
5th Technical Session: Thematic Area 5: **Natural Resources Management and Climate Change**	**Plenary Chairman: Asso. Prof Omena Ojuederie** **Rapporteurs:** *Azeez Moriam Iyabode, Ogungbola Suzan*	GRC Hall	10:00-13:00pm
6th Parallel Technical Session: **Thematic Area 6: Nutrition, Food Processing and Value Addition**	**Plenary Chairman: Prof Kehinde Soetan** **Rapporteurs:** *Farinola Adetutu, Gbaruko Gift Chinonye*		
7th Technical Session: **Socio-economics and Agribusiness in Opportunity Crops**	**Plenary Chairman: Prof Marshall A. Azeke** **Rapporteurs:** *Atijosan Oluwabukola Eunice, Bhadmus Ayomide Ajoke.*	Conference Centre	10:00-13:00pm

8th Technical Session: **Gender-Responsive Innovations for Food Security and Policy**	**Plenary Chairman: Prof Catherine V. Nnamani** **Rapporteurs:** *Akeem Oluwasegun Nofiu, Mary Edhemuino*	Conference Centre	
9th Technical Session: **Artificial Intelligence for Opportunity Crops Promotion**	**Plenary Chairman: Dr Rajneesh Paliwal** **Rapporteurs:** *Ogunkanmi Mubarak Akorede, Towobola Funmilayo Mary*		
Lunch	**All Participants**	iHouse	13:00-14:00pm
Reports from the Conference	**Rapporteurs**	Conference Centre	14:00-14:30pm
AGM **Induction of Newly registered members**	**Chairman, Ass. Prof BD Adewale**		14:30-15:30 pm
Election of new National Executive/Handing Over	**Electoral Committee**		15:30-16:30 pm
Communique	Communique Drafting Committee		16:30-16:45pm
Appreciation/Announcements	Chairperson, LOC Dr Oyatomi Olaniyi		16:45-16:50
Closing Remarks	Prof Michael Abberton		16:50-16:55
Group Photos	All Participants		16:55-17:00

Day 4: Friday, 18th October, 2024

EVENT	FACILITATOR (Optional and on request)		TIME
Genetic Resources Center, IITA	Dr Oyatomi Olaniyi	Conference Centre	08:00-11:00am
Bioscience Center, IITA	Yemi Fajire		08:00-11:00am
Departure	All participants		Departure

ORAL PRESENTATIONS 16th October 2024

1. **Exploration and Utilization of Indigenous Plant Genetic Resources** **(1-18)**
   Prof. Ayodeji Salami
   Rappoteurs: *Olamide Afolarin, Priscilla Aiyedun*

2. **Genetic Improvement, Biotechnology and Crop Modelling** **(19-34)**
   Plenary Chairman: Ass. Prof. Jacob Popoola
   Rappoteurs: *Olamide Afolarin, Priscilla Aiyedun*

3. **Crop Production and Health** **(35-52)**
   Plenary Chairman: Dr Lava Kumar
   Rappoteurs: *Adenike Oluwaseun Dada, Alayo Faizah Olawunmi*

4. **Nations through Opportunity Crops** **(53-62)**
   Plenary Chairman: Dr Kareem Titilope
   Rappoteurs: *Adenike Oluwaseun Dada, Alayo Faizah Olawunmi*

ORAL PRESENTATIONS 17th October 2024

5. **Natural Resources Management and Climate Change** **(63-68)**
   Plenary Chairman: Asso. Prof Omena Ojuederie
   Rappoteurs: *Azeez Moriam Iyabode, Ogungbola Suzan*

6. **Nutrition, Food Processing and Value Addition** **(69-73)**
   Plenary Chairman: Prof Aremu Charity
   Rappoteurs: *Farinola Adetutu, Gbaruko Gift Chinonye*

7. **Socioeconomics and Agribusiness in Opportunity Crops** **(74-81)**
   Plenary Chairman: Prof Morufat Balogun
   Rappoteurs: *Atijosan Oluwabukola, Bhadmus Ayomide Ajoke.*

BOOK OF ABSTRACT

Underutilized Legume Genetic Resources of Gembu Beans on the Mambilla Plateau of Taraba State, North-East Nigeria

Aliyu, B., Jangong, E.A. and M.S. Zamzam
Department of Agronomy, Faculty of Agriculture, Taraba State University, Jalingo, Nigeria
(Corresponding Author: Bakarialiyu005@gmail.com +234(80)3 343 1447

ABSTRACT (1)

The Genetic resources available in traditional varieties of crops are an essential component of agricultural biodiversity which need to be collected, evaluated, characterized and conserved. This resource could, in addition to its use as food in its own right could also be used to breed new crop varieties for the present and future use. The Gembu Beans, known as Waken Gembu in the Hausa language is an underutilized traditional legume crop consisting of a collection of different genotypes of the common bean, *Phaseolus vulgaris* grown on the Mambilla Plateau of Taraba state, North-East Nigeria. Despite the many benefits and advantages of the crop, little research has been done on the landraces in Nigeria leaving the few farmers of the crop completely at the mercy of environmental and climatic fluctuations while the country also misses out on this important genetic resource. The objective of this article is to draw the attention of researchers and policy makers to the availability of the genetic resource of Gembu Beans on the Mambilla Plateau with a view to making further research that can lead to the crop's improvement as well as its germplasm collection, evaluation, conservation and wider use. Preliminary survey of the Mambilla Plateau has led to the identification of nine (9) genotypes of the crop on the Plateau which are, hereby, presented to researchers and policy makers.

Keyword: Gembu Beans, *Phaseolus vulgaris,* Genetic erosion, Germplasm collection, Conservation

Divergence in African Yam Bean Accessions, Promote Utilization

Nwosu D. J; Afolayan G; Adetunji D. A., Hanafi S. S., Fashola O. O., Amao J. O., Oladimeji B. K., Abbas S., Muhammad A. A
dicksonnwosu@gmail.com

ABSTRACT (2)

African yam bean (*Sphenostylis stenocarpa*) is a valuable underutilized legume crop with numerous nutritional advantages that could increase food and nutritional security in Nigeria. However, limited information on available germplasm and their diverse characteristics has hindered the full use of this crop. In this study, 10 accessions of African yam bean were evaluated using morphological descriptors Quantitative characters such as length and width of terminal leaf, peduncle length, petiole length, number of leaves, pod length, and pod weight, were significantly different among the accessions. Cluster analysis based on Ward dendrogram delineated the accessions into three groups. Each group mostly distinguished by their number of days flowering and number of days to maturity, petiole length (cm), terminal leaf width and pod length (cm). these traits are major contributors to variability accounted for in PC 1. The genetic correlation analysis revealed that the 15 measured traits were significantly correlated with one another, an indication that selection for one trait implies indirection selection for others in African yam bean improvement program. This study reveals valuable information on the genetic diversity in the crop gene pool for further utilization in genetic improvement and breeding of African yam bean, to maximize its potential to support food and nutrition security in sub-Saharan Africa.

Keywords: Quantitative characters, African yam bean, Flowering, Cluster analysis; groups

Diversity study of some common beans collection (phaseolus vulgaris) from varied environments

Adedotun Daniel Adewumi, Qudrah Olaitan Oloyede-Kamiyo*, Mayowa Segun Oladipo, Kehinde Titilope Kareem, Olubusola Fehintola Oduwaye, Rachael Bolanle Olayinka, Paul Chiedozie Ukachukwu

Institute of Agricultural Research and Training (IAR&T), PMB 5029, Moor Plantation, Ibadan, Nigeria. qudratkamiyo@gmail.com. 08060993930

ABSTRACT (3)

Common bean (Phaseolus vulgaris), popularly known as green bean, is still underutilized in Nigeria going by its poor documentation in the literatures, limited germplasms, with no known improved variety. A total of 54 accessions were sourced from CIAT, Uganda; IITA(Nigeria), and open markets in Jos, Abuja and Abeokuta, Nigeria, and evaluated to assess their level of diversity and adaptation to the southwest zone. The study was conducted at Ilora out-station of the Institute of Agricultural Research and Training (IAR&T) in 2022 using a a Randomized Complete Block Design (RCBD) in with two replications. Data were collected on disease and pests damage, agronomic traits and yield components. Principal component analysis (PCA) and cluster analysis were performed to assess genetic diversity. Some accessions showed promising adaptability. Eight PCs with Eigen values >1 accounted for 99.86 % of the variations observed. PC1 alone accounted for 66.5 % of the variation with days to 50 % flowering and podding being most important. PC 2 and 3 accounted for 24.5 % and 6.75 % respectively, with pod weight/plot and 100 seed weight as the most significant traits,. At 1/3 distance of the dendogram, five major groups were formed. Group 3 had the largest number of accessions with several subgroups. While accession 28 sourced from Uganda and placed in group 1, stood out with the highest pod and seed yield per plot. The result revealed a broad genetic base in this collection, providing valuable material for selection and further improvement studies.

Keywords: Adaptability, cluster analysis, crop improvement, principal component analysis, under-utilized legumes

Pre-treatment methods for breaking seed coat dormancy of *Prosopsis Africana*

O.A Obembe
Plant Science and Biotechnology Department, Adekunle Ajasin University, Akungba Akoko, Ondo State, Nigeria. olutayobembe@gmail.com.08080177119.08058019336

ABSTRACT (4)

Prosopsis africana (Guill. and Perr.) Taubert tree belongs to the natural plant order fabales, family fabaceae synonym Leguminosae and sub family Mimosoideae. This tree is a grossly underutilized legume plant that can be vastly exploited as food condiment, seasoning or spice and for other multifarious uses. The objective of the research was to overcome seed coat usually associated with its seeds. Viable seeds determined by floatation method were subjected to pre-treatments including nitric acid, boiled/hot water (wet heat), physical abrasion using rough sandpaper for varying time durations of 30,60 and 90 seconds along with control experiments. A total of 1,200 randomly hand-picked seeds were sown in 48 perforated, white plastic buckets filled with loose and well drained river sand at sowing depth of 4centimetres based on its seed size. Each bucket diameter was 22cm with a depth of 24cm from base to the brim, the 48 buckets were arranged in a complete randomized design (CRD). For each pretreatment and the control experiments four replications of the 100 randomly handpicked seeds were used with 25 seeds per bucket. The study period was 90days (3 months). Data obtained were subjected to statistical analysis. Results show that 30 to 90seconds physical abrasion treatments (62 to 79%) with mean germination times of 8.72 to 13.85days was most efficient, followed by wet heat treatments (53 to 59%) with mean germination times of 11.12 to 21days.Acid treatments (9 to 11%)and control experiments (5 to 7%) with mean germination times of 10.58 to 38.78days and 13.66 to 29.71days respectively gave very low germination percentages.Thus,30 to 90% physical abrasion treatments using rough sand paper is recommended for massive propagation of this economically viable *P. africana* tree.

Keywords: *Prosopsis africana*, pre sowing treatments, control experiments, germination percentage, mean germination time.

Evaluation of hybrids between male sterile (Gero type) pearl millet (*Pennisetum* Farmers' participatory selection for promising African yam bean accessions

Rukayat Jegede, Morufat Balogun, and Michael Abberton, Olaniyi Oyatomi
m.abberton@cgiar.org

ABSTRACT (5)

Pearl millet (Pennisetum glaucum (L.)R. Br), has shown promise as a forage crop in the wet humid zone of southwest Nigeria. Three pearl millet types are cultivated in the northern guinea savanna. These are 'gero' which is day neutral and early maturing, dauro' which is late maturing and 'maiwa' which is late maturing and short-day photoperiod sensitive. The present study was conducted to evaluate hybrids of gero A and maiwa 25-2 an inbred line as well as gero A and open pollinated dauro. Seeds of the hybrids along with seeds of gero A, maiwa 25-2 and dauro were sown by drilling at the rate of 10kg/ha. Plots were 1.5m single rows spaced 90cm apart Plots were laid out in a randomized complete block design with three replicates. Plants were harvested at 50% boot stage for forage yield determination. The forage dry matter yield of gero A x maiwa, gero A x dauro, gero A, maiwa 25-2 and dauro were 3.0t/ha, 2.73t/ha, 1.99t/ha, 4.20t/ha and 4.79t/ha respectively. Crude protein content ranged from 13.51% for dauro to 19.53% for gero A. Dry-matter mid-parent heterosis values -2.9% and -23% for gero A x maiwa and gero A x dauro, respectively. This lack of heterosis in the hybrids may be due to the use of male sterile gero line which didn't have good combining ability with the maiwa 25-2 inbred and dauro. Further tests would need to be carried out to identify maiwa and dauro genotypes that would produce heterotic hybrid combinations with gero A.

Keywords: Pearl millet, forage, yield, heterosis

Farmers' participatory selection for promising African yam bean accessions

Rukayat Jegede, Morufat Balogun, and Michael Abberton, Olaniyi Oyatomi

m.abberton@cgiar.org

ABSTRACT (6)

African yam bean (AYB) (*Sphenostylis stenocarpa*) is an indigenous, resilient, dual-benefit crop with the potential to broaden the food base for human consumption. However, the majority of farmers still do not grow it, as the crop's varietal development has yet to be tailored towards local farmers' needs. This study sought to identify farmers' most preferred traits in deciding which accessions to grow as well as identify promising AYB accessions for parts of derived and Sudan savanna ecological zones using the farmer participatory approach. Farm level data on days to 50% flowering, seed yield, tuber yield and general visual appraisal were collected for three cropping season on 40 accessions. AYB farmers and research groups were organised and separated into two groups based on gender to provide their assessments of the accessions. The Importance Performance Analysis (IPA) was used to compare performance; yields were evaluated using the Finlay-Wilkinson test and GGE biplot was used to determine the most stable lines to be recommended for large scale farming. The results showed that TSs-301, TSs-86, TSs-157, TSs-84, TSs-96, TSs-68 and TSs-427 had the highest acceptability scores based on farmers' preferences. Finlay-Wilkinson and GGE biplot revealed that TSs-86, TSs-301, TSs-427 and TSs-157 exhibited high potential yield and stability across test environments, which indicated that the four accessions are well adapted and highly productive in different environments.

Keywords: GGE biplot, preferred traits, participatory selection, resilience, yield performance

Comparative Assessment of Seed Longevity in Cowpea [*Vigna unguiculata* (L.) Walp.], Soybean (*Glycine max* L.), and Common Bean (*Phaseolus vulgaris* L.) Accessions in Storage Under Accelerated Aging Condition

Afolarin O. G [1,2], Abe. A [1], Hay, F. R[3], Oyatomi O.A [2] and Abberton M.T[2]

[1] International Institute of Tropical Agriculture, Oyo Road, P.M.B 5320, Ibadan, Nigeria. [2] Department of Crop and Horticultural Science, University of Ibadan, Nigeria. [3]Department of Agroecology, Aarhus University, Denmark. o.oyatomi@cgiar.org

ABSTRACT (7)

Legumes play a crucial role in nutritional security due to their high protein content, but their preservation in gene banks is often hindered by poor seed longevity. This study aimed to assess the viability of selected legumes under accelerated aging conditions and predict their longevity for long-term storage. Seeds of eight accessions of three legume species (cowpea (IT07K-318-33, TVu-3629), soybean (TGm-2048, TGm-392, TGm-1137), and common bean (TPv-791, TPv-765, and TPv-780) were randomly selected from the Genetic Resources Center of the International Institute of Tropical Agriculture (IITA), Ibadan. The initial moisture content of the seeds was determined using an auto moisture analyzer and rehydrated to targeted moisture content (cowpea: 11.1%, soybean: 9.0%, and common bean: 10.0%) to minimize the change in seed moisture content during aging. The seeds were subjected to accelerated aging at 45°C and 60% relative humidity and tested for germination to assess their viability. The P_{50} (time taken for seed viability to decline by 50%) and σ (time taken for seed viability to drop by 1 Probit (days) were estimated. P_{50} values ranged from 25.61 to 89.29 days in soybean, 55.74 to 73.73 days in cowpea, and 49.34 to 92.25 days in common bean. The highest longevity was observed in common bean (142.45 days), while soybean (TGm-392) had the lowest (16.10 days). This study identified accessions with high seed longevity, which is an advantage for effective and economical conservation of legumes. Early prediction and monitoring of seed longevity are crucial for reducing regeneration frequency and preserving genetic diversity in gene banks. Implementing these strategies can optimize resource use and ensure the long-term viability of conserved accessions.

Keywords: legumes, gene bank, seed longevity, seed viability, accelerated aging.

Comparative Analysis of Photoperiod Influence on Growth and Yield of four *Sphenostylis stenocarpa* (Hochst. Ex A. Rich.) Harms Accessions Across Different Planting Seasons in Ibadan, Nigeria.

Akeem Nofiu, Morufat Balogun, Micheal Abberton, Adeniyi Togun, Olaniyi Oyatomi
+234 8029071468, a.nofiu@cgiar.org

ABSTRACT (8)

Sphenostylis stenocarpa, commonly called African yam bean (AYB) is a highly nutritious underutilized crop with great potential for food security. Though photoperiod-sensitive, optimizing its planting schedules could enhance food security and reduce hunger in sub-Saharan Africa. This study compares the effects of photoperiods on the growth and yield of four AYB accessions planted in different months. In 2022, seeds of four AYB accessions (TSs-152, TSs-157, TSs-107, and TSs-96) were sown at 1 m x 1 m in a Randomized Complete Block Design (RCBD) with three replicates across four planting times (January, April, July and October) at IITA, Ibadan, Nigeria. AYB plants cultivated in July reached 50% flowering significantly earlier, taking 109 days, compared to those planted in October, April, and January, which took 145, 169, and 232 days, respectively. The reproductive phase of AYB plants occurred between September and March, within an average daylength range of 12.17 to 11.70 hours. Among the genotypes, TSs-96 yielded the highest grain at 214.30 kg/ha, while TSs-157 had the lowest yield at 102.61 kg/ha. Planting season strongly affects African yam bean flowering and yield, with July showing the fastest flowering and April the highest yield. Optimizing planting schedules during the key reproductive phase from September to March is vital for productivity.

Keywords: African yam bean, Food security, Photoperiod sensitivity, Planting season optimization, Crop improvement.

Agro-Morphological Characterization of Bambara groundnuts (*Vigna subterranea* (L.) Verdc.) accessions in Nigeria's savannah region

[1]Zakari Abdulrahaman Yau, M.S Mohammed, Mansurat O. Shoge, [2,3,4]Taofeek Tope Adegboyega

[1]Biology Unit, Faculty of Science, Air Force Institute of Technology, Kaduna State, Nigeria. [2]Department of Plant Science, Institute for Agricultural Research Samaru, Ahmadu Bello University Zaria. Kaduna State, Nigeria [2]Biology Unit, Faculty of Science, Air Force Institute of Technology, PMB 2014, Nigerian Air Force Base, Kaduna. Kaduna State, Nigeria.[3]Food Security and Safety Niche, Faculty of Natural and Agricultural Science, North-West University, Mmabatho, 2735. South Africa. [4]Department of Microbiology & Parasitology, University of Rwanda. amzy00000@gmail.com

ABSTRACT (9)

Bambara groundnut (*Vigna subterranea* [L.] Verdc.) is an orphan leguminous plant with numerous benefits. This study was conducted to assess the diversity of Bambara groundnut accessions through agro-morphological characterization, and to determine the relationship between seed yield and agronomic traits. One hundred accessions obtained from the Genetic Resources Center of the International Institute of Tropical Agriculture Ibadan, Nigeria were evaluated for two years using 10 by 10 alpha lattice design at Institute for Agricultural Research Samaru, Nigeria. Data collected were subjected to analyses of variance using R- software. The result revealed a significant variation ($p \leq 0.05$) for some agro-morphological traits evaluated indicating that selection can be made for these traits. Principal Component Analysis (PCA) revealed five out of nineteen Principal components (PCs) explained 61.19% of the total variation among the accessions with PC1 and PC2 accounting for 19.53 and 15.43% of the total variability, respectively. A significant negative correlation (r) was observed between petiole length (-0.14), plant height (-0.20) with yield indicating a repulsive linkage which implies that improvement of these traits cannot be done simultaneously. A positive correlation was observed between presence or absence of two seeds per pod (0.09), seed width (0.08), leaf length (0.11), seed dry weight (0.89), pod dry weight (0.79) with yield which indicate a coupling linkage which implies that traits can be improve simultaneously. The Bambara groundnut accessions evaluated in this study exhibited significant variations in some agronomic traits, suggesting the likelihood of future genetic enhancement.

Keywords: Bambara groundnut, Coupling linkage, Repulsion linkage, PCA, seed yield.

Assessment of Broad Adaptability and Yield Improvement among Common bean germplasm using Agromorphological Characters

Adebowale Samuel Oladepo, Emmanuel Idehen, Olusegun Oduwaye, Olaniyi Oyatomi, Michael Abberton
o.oyatomi@cgiar.org

ABSTRACT (10)

Common bean (*Phaseolus vulgaris*) is an herbaceous annual plant grown worldwide for its edible dry seeds or immature pods. It is a source of dietary minerals that potentially provide essential minerals and daily protein requirements for humans. Despite its potential for breeding resilient and high-yielding varieties, the information on the genetic diversity of the crop is limited; This study evaluated the genetic diversity and the grain yield stability among 30 accessions of common bean using agromorphological characters. The experiment was carried out in three agro-ecological zones in Nigeria —Ibadan, Ikenne, and Mokwa using a Randomized Complete Block Design (RCBD) with three replications. Data were collected on five representative plants of each accession focusing on traits such as days to flowering, plant height, grain yield per plant, and 100-seed weight. Data collected were subjected to statistical analysis using the Statistical Analysis System (SAS) software package and GenStat software package. The genetic diversity was assessed using clustering analysis, GGE biplot, and AMMI analysis to assess the performance and stability of the accessions studied. The 30 accessions clustered into seven (7) groups showing a high genetic diversity. Among them, TPv-830 and TPv-930 had significant yield potential and broad adaptability. The study identifies these two accessions stable across different environments, while observed genetic diversity could be explored for a breeding programme aimed at improving common bean varieties.

Keywords: Diversity, Broad Adaptability, Grain yield, Common bean.

Orthologous Gene Evolution and Genome Architecture in Four Legume Species

Ojuederie O.B.[1,2] Akpojator U.L[3]., Ojuederie T.C,[3] Adeniji A.A[4]. Popoola JO[5], Babalola O.O[2]

[1]Department of Biological Sciences, Biotechnology unit, Faculty of Science, Kings University, Nigeria [2]Food Security and Safety Focus Area, Faculty of Natural and Agricultural Sciences, North- West University, South Africa [3]Genetic Resources Center, International Institute of Tropical Agriculture, PMB 5230, Idi-Ose, Oyo Road, Ibadan, Nigeria. [4]Centre for Epidemic Response and Innovation (CERI), School of Data Science & Computational Thinking, Stellenbosch University, Cape Town 7505, South Africa. [5]Pure and Applied Biology Programme, College of Agriculture, Engineering and Science, Bowen University, Iwo, Osun, Nigeria

ABSTRACT (11)

Legumes are an essential part of the global food system and provide vital nutrients and health benefits. However, underutilized legumes which are opportunity crops, are neglected in research, leaving their potential unexploited. This study conducted comparative genomic analyses of cowpea, mung bean, African yam bean, and winged bean to clarify their genomic architecture and evolutionary relationship. Protein fast sequences were extracted from the GenBank database of the National Center for Biotechnology Information and analyzed using OrthoVenn3 software to identify orthologous genes. Using MEGA 11, multiple sequence alignment and amino acid composition analysis were carried out. Genetic sequencing analysis revealed significant differences in the size, number of chromosomes, and protein content of the genome between species. The range of genome sizes was 463.1 Mb for Mung beans and 709.8 Mb for Winged beans. with Winged bean having a different number of chromosomes from the other legumes. With 24,535 shared gene clusters, we found a similar genetic thread despite these differences. The underutilized legumes had higher percentage of essential amino acids compared to cowpea. GO enrichment revealed the contributions to adaptations in the different species which highlights their potential as climate resilient crops. Essential bioactive compounds polyketides, terpenes, saccharides and alkaloids were identified. Our research uncovered unexpected relationships between the legumes: African yam bean and winged bean shared a unique bond because of their tuberous nature, while cowpea and mung bean demonstrated closer evolutionary relationship. This study sets the path for understanding the genetic diversity of underutilized legumes and paves the way for future crop improvements.

Keywords: Comparative genomics, Food security, Genetic diversity, Legumes, Nutritional Security, Opportunity crops

Performance of Bambara groundnut (*Vigna subterranean* (L.) Verdc.) under varied rates of NPK fertilizer in a forest agroecology

Amali, E. P.[1] and Salami, A. E.[2]
Department of Crop Production, University of Jos [2]Department Crop, Horticulture and Landscape Design, Ekiti State University, Ado-Ekiti.
ayodeji.salami@eksu.edu.ng

ABSTRACT (12)

The beneficial effect of early application of fertilizer has been established for some legumes. This study was conducted to determine the appropriate rate of NPK fertilizer on the growth and yield of Bambara groundnut in Ado-Ekiti, a forest agroecology in Nigeria, during the early cropping session of 2024. The study was a 3 x 4 factorial experiment consisting of three NPK (15:15:15) fertilizer rates: 0, 75 and 150Kg ha^{-1} and four varieties: TVSu 222, TVSu 410, TVSu 415 and TVSu 1398. This was laid out in a randomized complete block design and replicated three times. Data was obtained on number of petioles $plant^{-1}$, number of leaves $plant^{-1}$, days to 50% flowering, weights of pods $plant^{-1}$ and number of pods $plant^{-1}$. Results indicated an increase in number of petioles and number of leaves $plant^{-1}$with increased rates of NPK fertilizer. The application of 150kg ha^{-1} NPK fertilizer produced the highest number of petioles (71.7) and number of leaves (212.3) at 6 weeks after planting, which was significantly higher than other rates, similarly 50% flowering, fresh pod weight, number of pods $plant^{-1}$ and dry pod weight $plant^{-1}$ where highest at 150kg ha^{-1} rates. TVSu 222 consistently had better vegetative growth performance than other varieties, but TVSu 415 had better fresh pod weight and number of pods $plot^{-1}$ compared with other three varieties across the three fertilizer rates. However, TVSu 410 recorded significantly higher dry pod weight then the other varieties. The results of this study are suggestive that early application of NPK fertilizer at the rate of 150 kg ha-1 is helpful in enhancing the performance of Bambara groundnut before nitrogen fixing activities commences.

Keywords: Bambara groundnut, NPK fertilizer, rates, growth, yield

Influence of different soil types and sulphur fertilizer rates on performance of Green Pea (*Pisum sativum* L.)

A.R. Adebayo-Ishola, M. Moitse, E.T. Sebetha
adebayoruth101@gmail.com, +27848464876

ABSTRACT (13)

Sulphur has been known as a neglected plant nutrient. However, recently the sulphur nutrient has called the attention of soil scientists and plant nutritionists due to its significant role in crop production. A green-house experiment was carried out at North-West University Research Farm to investigate the effect of soil types and sulphur fertilizer rates on the performance of green pea. The experiment design was 4×2 factorial fitted in a randomised complete block design with four replications. The treatment factors consisted of two soil types (Sandy soil and Sandy loam) and four sulphur fertilizer rates (0,30,60 and kgS/ha). The parameters measured were plant height, numbers of leaves, numbers of branches, numbers of flowers, number of pods/plant, pod length, pod mass and seed mass. The data collected was subjected to GenStat for analysis of variance (ANOVA). The taller plant height (13.82 and 20.7 cm) was obtained from pea planted on sandy soil at 56 and 70 Days After Planting (DAP). The pea supplied with 60kgS/ha had highest number of leaves (25.10 and 42.20) at 56 and 70 DAP. Pea fertilized with 90kgS/ha had highest number of pod/plant (4.04) and seed mass (0.82g). The sulphur fertilizer rates showed positive and non-significant association with growth and yield parameters of pea. In conclusion, the result indicated that sandy loam soil supports the performance of green pea. The sulphur rate at 60 kg S/ha enhanced the growth of pea while the application of 90 kg S/ha improved yield production of green pea.

Keywords: Sulphur fertilizer rates, soil types, seed mass, pod length, pea.

Ecotaxonomic assessment of plant species associated with *Gliricidia sepium* in a tertiary institution in Nigeria

Beckley Ikhajiagbe[1], Esther Omone Akhigbe[2], Izegbuwa Anthonia Erumwenbibi[3], Esther Osemudiamen Otoibhi[1]

[1]Dept. of Plant Biology and Biotechnology, University, Benin City [2]Dept of Biology, Federal University, Otuoke, Bayelsa State [3]Dept of Physiology, Nigeria Institute for Oil palm Research, Benin City.

beckley.ikhajiagbe@uniben.edu

ABSTRACT (14)

This research was conducted with the aim of carrying out an Eco-taxonomic study of weed species associated with *Gliricidia sepium* in the University of Benin. Conservation sites and fields were visited around the institution, which includes the Department of Plant Biology and Biotechnology botanic garden, Bursary field, Life science complex field. *Gliricidia sepium* tree is known for its importance in agroforestry due to its contributions in the biodiversity of the ecosystem and its allelopathic effects to plants growing around its canopy. A thorough assessment of weed species found growing under *Gliricidia sepium* tree in shaded (Undisturbed) and unshaded (disturbed) environment were documented and analysed. Furthermore, an assessment of weeds species found growing in an open environment around the institution were documented and analysed to compare the species found growing under *Gliricidia sepium* canopy to that growing around the institution. The many plant species were divided into groups based on particular habits and life cycles. For grids used in the botanic garden, each plant species was correctly identified, numbered, and recorded. This study further suggests the need for more intensive research, to study the influence of *Gliricidia sepium* towards biodiversity and bioremediation.

Keywords: *Gliricidia sepium*, ecotaxonomic survey, botanic garden, shaded plants, biodiversity

Consumption pattern and contribution of Bambara groundnut (*Vigna subterranea*) to recommended nutrient intakes of women in rural north central Nigeria

Farinola-Udofia, F.A.[1, 2], Adepoju, O.T [2], Oyatomi, O.A[1], Abberton, M.T.[1]
[1]International Institute of Tropical Agriculture (IITA), Idi-Ose, Oyo Road, Oyo State, Nigeria.
[2]Department of Human Nutrition, College of Medicine, University of Ibadan, Ibadan, Nigeria.
a.farinola@cgiar.org

ABSTRACT (15)

Bambara groundnut (BGN) is an underutilized legume with a high nutrient profile that has been proven to enhance household dietary diversity and improve food and nutrition security. However, there is limited information on its actual consumption pattern and contribution to nutrient intake. This study assessed the consumption pattern and contribution of BGN to the mean daily nutrient intake of women of reproductive age (19-49 years). This study was a descriptive cross-sectional study involving 420 women selected through systematic random sampling from twelve rural areas in Niger State of Nigeria. Data on Socio-demographics and dietary information were collected using a food frequency questionnaire, while nutrient intake was assessed via 24-hour dietary recall. Factor analysis was used to identify consumption patterns of BGN, and regression analysis was used to analyze the association between BGN consumption patterns and the socio-demographics of the respondents. The mean age of the respondents was 33.7±8.3 years. The majority (75.9%) of the respondents had consumed BGN in the past two years. However, 45.7% of the respondents often consumed BGN twice a week, and its Consumption was associated with ethnicity. The most preferred form of BGN for Consumption was boiled, and its Consumption was attributed to its taste and satiety. The contribution of BGN to the nutrient intake of its consumers was 19.9-89.5% protein, 10.8-55.9% carbohydrate, 30.8%-63.7% iron, 56.9-78.9 calcium, and 21.0-98.3% zinc. Bambara groundnut contributed significantly to the nutrient intake of women in Niger State, and it has the potential to contribute to their overall dietary quality.

Keywords: Bambara groundnut, Consumption pattern, Nutrient Intake, women of reproductive age

Cowpea consumption in Oyo town and nutritional quality of two commonly consumed local and improved varieties

[1]Oyinwola, V. T., [1]Ariyo O., [2]Adesokan M., and [3]Adeniji P. O.

[1]Department of Human Nutrition and Dietetics, University of Ibadan, Ibadan, Nigeria. [2]Food and Nutrition Laboratory, International Institute of Tropical Agriculture, Ibadan, Nigeria. [3]Department of Hospitality and Tourism Management, Reedemer's University, Ede, Nigeria.

ABSTRACT (16)

Cowpea (*Vigna ungiculata L. Walp.*), is an affordable source of protein and essential nutrients in Nigeria, yet its full potential remains underutilized. This study was designed to investigate cowpea consumption patterns in Oyo town and compared the nutritional quality and antinutrient levels of two commonly consumed local cowpea varieties (Oloyin, Sokoto white) with two improved varieties (IT99K-573-1-1, IT07K-318-33). A mixed-method approach was used, combining focus group discussions with cowpea sellers and consumers using a structured interview guide, and laboratory analysis of the cowpea varieties. Proximate analysis was conducted using standard AOAC methods, minerals content using Jenway digital flame photometer and atomic absorption spectrophotometer, and the antinutritional analysis using titration method and absorbance. Quantitative data were analysed using descriptive statistics and thematic analysis was adopted or the qualitative data. Fat (g/100g), metabolizable energy (g/100g), zinc (mg/100g) and iron (mg/100g) were higher in IT99K-573-1-1 (1.73±0.06; 445.64±1.55; 0.89 ± 0.01; 3.182±0.01) and IT07K-318-33 (1.61±0.10; 436.45±0.52; 0.73±0.01; 2.791±0.01) compared *to Sokoto white (1.14;* 426.6; 0.73±0.01; 2.091±0.01*)* and *Oloyin* (1.3; 431.7; 0.65±0.01; 2.400±0.01), respectively. Moisture content and Tannin (g/100g) were lower in IT99K-573-1-1 (9.21±0.11; 2.54±0.11) and IT07K-318-33 (9.25±0.10; 2.90±0.10) compared to *Sokoto white (*10.60±0.10; 4.10±0.25) and Oloyin (10.60±0.40; 4.90±0.10). Findings revealed a preference for the local Oloyin and Sokoto white varieties, driven by taste, cooking time, price, and limited awareness of improved varieties. The improved beans varieties possess superior nutritional quality characterized by lower tannin content, and higher mineral and energy values, however, underutilization persists following limited awareness, affordability, and other culinary characteristics.

Keywords: *Vigna ungiculata L. Walp, consumption pattern, nutritional quality, improved varieties*

Iron Analysis of Bambara groundnut ((*Vigna subterranea* (L) Verdc) accessions

[1]Zakari Abdulrahaman Yau, M.S Mohammed, Mansurat O. SHOGE, [2,3,4]Taofeek Tope Adegboyega

[1]Biology Unit, Faculty of Science, Air Force Institute of Technology, Kaduna State, Nigeria. [2]Department of Plant Science, Institute for Agricultural Research Samaru, Ahmadu Bello University Zaria. Kaduna State, Nigeria [2]Biology Unit, Faculty of Science, Air Force Institute of Technology, PMB 2014, Nigerian Air Force Base, Kaduna. Kaduna State, Nigeria.[3]Food Security and Safety Niche, Faculty of Natural and Agricultural Science, North-West University, Mmabatho, 2735. South Africa. [4]Department of Microbiology & Parasitology, University of Rwanda.

amzy00000@gmail.com

ABSTRACT (17)

Bambara groundnut (*Vigna subterranea* [L.] Verdc.) is an opportunity crop with numerous unexplored benefits. This study was conducted to analyze the constituents of Iron and Zinc of 100 accessions of Bambara groundnut sourced from Genetic Resources Centre, International Institute of Tropical Agriculture Ibadan Ibadan, Nigeria. The analyses were carried out using the method described by the association of analytical chemist (AOAC) in the multi-user laboratory, Chemistry Department, Ahmadu Bello University, Zaria. The results were subjected to analysis of variance using SAS software (Version 9.3) and revealed a significant variation ($p \leq 0.05$) among the Bambara groundnut accessions in their mineral constituents. The observed variations for the iron and zinc contents among the accessions may be due to their source of origin, genetic makeup, growing condition and storage condition of the seeds. The concentration and bio-accessibility of calcium, magnesium, iron and zinc in the Bambara groundnut seeds were influence by factors such as storage condition, processing method and location of minerals in the seeds (testa or cotyledon), and the degree and strength of mineral chelation. Accessions TVSu-987, TVSu-1727, TVSu-674, and TVSu-82 had the highest mean based on rank summation index 10, 10, 13, and 14, respectively while accession TVSu-1628, TVSu-1951, TVSu-542, and TVSu-1621 were found to be the least with the rank summation index of 152, 148, 146, and 143 respectively. Accessions TVSu-987 and TVSu-1727 having recorded higher Zinc and Iron could be used by breeders for the development of Bambara groundnut genotypes with increased mineral contents.

Keywords: Accessions, Zinc, Iron, Testa, Cotyledon, TVSu-987.

World Orphan Legumes Biodiversity: their Application in Food, Animal Feed, Pharmaceutical and Biodiesel industries

Victoria Olufunmi Adeyemo-Eleyode[1]*, Oluwaseun Iyadunni Oluwasogo[2], Peace Abiodun Olajide[3], Ajibola Olaide Olawumi[456], Babatunde Oluwafemi Adetuyi[3], Felix Oladele Okunlola[3], Charles Chinazaekpele Chidume[3], Oluwatosin Adefunke Adetuyi[7], Peter Gbenga Oni[8], Ayobami Ifeoluwa Awe[9], Gaber; El-Saber Batiha[10], Kehinde Imisiagbaraolorun Temitope Eniola[1]

[1]Department of Biological Sciences, College of Agriculture and Natural Sciences, Joseph Ayo Babalola University, Ikeji-Arakeji (JABU), P.M.B 5006 Ilesha, Osun State, Nigeria. [2]Soil Science Laboratory, School of Applied Biosciences, Kyungpook National University, Daegu, 41566, Republic of Korea. [3]Department of Natural Sciences, Faculty of Pure and Applied Sciences, Precious Cornerstone University, Ibadan, Oyo State, Nigeria. [4]Department of Biochemistry, Memorial University of Newfoundland, St Johns, NLAIC 5S7, Canada. [5]Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, Kota Samarahan, 94300, Malaysia. [6]Institute of Biodiversity and Environmental Conservation, Universiti Malaysia Sarawak, Kota Samarahan, 94300, Malaysia. [7]Department of Chemistry and Biochemistry, Texas Tech University, Lubbock, USA. [8]Department of Chemistry and Biochemistry, Worcester Polytechnic Institute, Massachusetts, USA [9]Department of Biology, The Catholic University of America, Washington DC, USA.[10]Department of Pharmacology and Therapeutics, Faculty of Veterinary Medicines, Damanhour University, Damanhour 22511, Egypt. victoriaeleyode@gmail.com

ABSTRACT (18)

The increasing global population necessitates enhanced food production in the face of numerous challenges, including climate change, biodiversity loss, land degradation, limited access to resources (fertilizers and many more), drought and poor market linkages. Overreliance on a few major crops for food security can be mitigated by leveraging orphan legumes, an area of focus for institutions such as International Institute of Tropical Agriculture (IITA-CGIAR). While some orphan plant species remain unidentified, many are underutilized in both developing and developed countries, primarily serving ornamental and conservation purposes despite their potential to contribute to Sustainable Development Goals (SDGs). Orphan legumes demonstrate resilience to climate change, drought, and extreme soil conditions, with rhizospheric microbes playing a crucial role in soil improvement and plant health. However, limited cultivation, low economic significance, and lack of information have led to their neglect by industries, farmers, researchers, and consumers, overlooking their potential as sources of income, therapeutic agents, supplements for human, biodiesel production, animal nutrition. This comprehensive review categorizes published orphan legumes based on their family relatedness, focusing on Fabaceae, Malvaceae, and Euphorbiaceae. A literature search was conducted using Google Scholar, Science Direct, Academia.edu, PubMed, Web of Science and ResearchGate, cross-referencing findings with the International Union for Conservation of Nature (IUCN) database. The review highlights the potential of these underutilized/ forgotten/ neglected/ orphan legumes as promising constituents for drug discovery, targeting both communicable and non-communicable diseases for prevention and treatment. This review indicated that orphan legumes possess hidden and wasting nutritional, energy source and pharmacological properties thus a need to explore these plant parts (seeds, flowers, leaves, barks among others).

Keywords: Climate change; Orphan legumes; Food security; SDGs; Global population; Rhizospheric microbes; Drug discovery; Biodiesel; IITA-CGIAR.

Inheritance Studies of Pod Shattering and other studied Agronomic Traits in African Yam Bean (*SphenostylisStenocarpa* (Hochst ex. A. Rich) Harms) using Generation Mean Analysis.

[1*]Agbowuro G. O. and [2]Salami A. E.

[1]Dept. of Biosciences and Biotech., University of Medical Sciences, Ondo City Nigeria. [2]Dept. of Crop, Horticulture and Landscape Design, Ekiti State University, Ado-Ekiti Nigeria

ABSTRACT(19)

African yam bean (AYB) is a tropical underutilized legume that serves as food and feed. Despite its nutritional, agricultural, and economic importance, pod shattering limits its production. Overcoming pod-shattering through a breeding programme entails adequate information on the inheritance pattern of the traits responsible for the factor. However, this information is scanty in the publications. A field experiment was carried out to study inheritance patterns of pod-shattering in AYB. Two AYB accessions with divergent pod-shattering potential were used to generate six generations and evaluated in three agroecological zones. Data collected on pod-shattering using the oven-dried (PSODC) and open field method (PSOFC), pod length (PL), number of pods per peduncle ($PodPed^{-1}$), pods per plant ($PodPl^{-1}$) and Pod weight (Pw) were analysed. Generation mean analysis (GMA) and scaling tests were estimated. At least two of the scaling tests for each studied trait were significant. Dominance gene effects were high for $PodPed^{-1}$, $PodPl^{-1}$ and Pw while other traits were high for additive gene effects. Duplicative epistasis was recorded in traits studied except for PSOFC. Environmental variances were lower in the traits studied compared with genotypic variances except for PSOFC. Broad sense heritability values were high in all the traits studied and low for narrow sense heritability. This shows that both additive and non-additive gene actions are important in the inheritance of these traits. Hence, reciprocal recurrent selection is the most suitable breeding procedure to improve pod-shattering in AYB.

Keywords: African yam bean; Epistasis; Gene effects; Legumes Pod shattering

Drying temperature, stage of seed maturation and the subsequent seed longevity of soya bean (*Glycine max*) seed.

O.F. Salvador[1, 2], R.H. Ellis[1] and F.R. Hay[3], M.T. Abberton[2], O.A. Oyatomi[2]

[1]School of Agriculture, Policy and Development, University of Reading, Earley Gate, P.O. Box 237, Reading RG6 6EU, UK, [2]Genetic Resources Center, International Institute of Tropical Agriculture, Oyo Road, Ibadan, 200001, Nigeria and [3]Department of Agroecology, Aarhus University, Forsøgsvej 1, 4200, Slagelse, Denmark o.oyatomi@cgiar.org

ABSTRACT (20)

Seed survival is prolonged at lower moisture contents, and so by post-harvest drying, in air-dry storage. Previous research has shown benefit from drying soybean seeds initially at 40°C, a temperature greater than the recommended genebank drying procedure of a drying room (DR) at 5-20°C. This study examined if warmer temperature drying benefits soybean seed longevity for genebank storage, explored whether any benefit is influenced by fumigation before or after initial seed drying prior to DR drying, and if harvesting at different times (during seed maturation or at harvest maturity) affected the above. Seeds of twenty-three soybean genotypes harvested before and at harvest maturity between 7-13% moisture contents were dried at either 30°C or 40°C with 15% RH for 4 days before drying to equilibrium in a DR (17°C/15% RH) or in a DR throughout. Significantly greater longevity was obtained following fumigation after initial drying at 30°C or 40°C compared to DR throughout in all accessions, whilst fumigation before drying at 30°C or 40°C resulted in an improvement in seed longevity in few of the accessions. Accessions benefiting most from warm-temperature drying were those harvested earlier at higher moisture content. Genebank standards for drying soyabean seed should be reconsidered.

Key words: Soybean genotypes, Genebank, Seed maturation, Seed longevity

Studies on character expression for yield components in soybean

Osekita, O.S., Ajayi, A.T., Atimokhale, D. and Adeniyi, B.C.
atimokhaledaniel@gmail.com

ABSTRACT (21)

Soybean (*Glycine max* (L.) Merrill) is a legume native to East Asia perhaps in North and Central China. It is grown for edible bean, oil, and protein around the world. Investigating character expression for yield and its components in soybean is crucial for addressing agricultural challenges, ensuring food security, fostering economic growth, and advancing scientific knowledge in the field of crop science. This study was conducted to assess the variability in character expression related to soybean yield and to analyze the interactions between genetic and environmental factors affecting yield components. Seeds of five soybean varieties were collected at the National Center for Genetic Resources and Biotechnology (NACGRAB), Ibadan, Oyo state, Nigeria. The seed of each accession was sown in a plot laid out in randomized complete block design with three replications. Data were collected on 12 agronomic characters and analyzed. Traits such as number of pod per plant (81.78, 98.80) seed yield per plant (76.14, 87.83) and 100-seed weight (69.73, 63.45) had high heritability with high GAM respectively. This indicates additive gene effect, high level of transmission and amenability of these traits to improvement. Plant height was highly positively correlated with number of leaves, number of branches and also positively correlated with number of pods per plant. By implication, taller plants will produce more leaves, more branches and also more pods. Traits having high variability and positive correlation should be selected for further breeding programmes in soybean improvement.

Keywords: Accessions, Genetic advance, Heritability, Variability

Morphometric traits and proximate analysis of ten accessions of mung bean (*Vigna radiata* [L.] Wilczek)

Emmanuel Akajagbon and Opeyemi T. Osundare
Department of Crop Science and Horticulture, Federal University Oye-Ekiti, Ekiti State, Nigeria.
opeyemi.osundare@fuoye.edu.ng

ABSTRACT (22)

African heritage diets include beans of all kinds, but few of the kinds of foods have been commercialized. This is due to limited information available on the nutritional composition and variation in morphometric traits to guide consumers in choosing their preferences among underutilized legumes. This study evaluated morphometric and proximate composition of 10 accessions of Mung bean. The dried powdered sample of the accessions of Mung bean were homogenized and stored in deep freezer (-18^{o}C) and used for proximate analysis. Moisture, crude protein, crude fat, crude fiber and ash were determined according to the standard methods of Association of Official Agricultural Chemist (AOAC,1990). PROC GLM procedure in SAS was used for the determination of variability among the Mung bean accessions and their means were separated using Tukey HSD. Seven of the ten studied morphometric traits showed significant ($p \leq 0.01$ and 0.05) variation among the accessions. Mean performance among the 10 accessions showed significant ($p \leq 0.01$ and 0.05) differences for: seed weight, petiole length, number of seed per pod, 100-seed weight, leaflet width, chaff weight and pod girth. Proximate composition also showed significant variation, and protein content ranges between 18-25% with the highest (24.74) from Tvr-43. This study confirmed that variability exist among the 10 Mung bean accessions for morphometric and proximate composition: thus, unveiling possibilities for genetic improvement of the crop.

Keywords: Accessions, variability, traits, mung bean, and proximate composition

Parental Selection of Bambara groundnut (Vigna subterranea L. Verdc) genotypes based on genetic diversity

***Odumuyiwa, O. E[1]., Adeniyan O. D[2]., Iduh, M. O.[2], Adaraloye M. A.[1] and Efiunwole O. P.[3], Olabamiji D. O.[1], and Kehinde, T. O[1].**

[1]Department of Plant Breeding and Seed Technology, Federal University of Agriculture, Abeokuta, P. M. B. 2240, Nigeria, [2]Department of Crop Protection and Environmental Biology, University of Ibadan, Nigeria. [3]Institute of Agricultural Research and Training, Obafemi Awolowo University, Ibadan, Nigeria. oludareodumuyiwa@gmail.com; 08130601583

ABSTRACT (23)

Assessing genetic diversity in the available germplasm of Bambara groundnut to identify and select superior genotypes is essential to optimising the crop's potential. This study observed eleven quantitative characters on 30 Bambara genotypes collected from the gene bank of IITA and evaluated at the Teaching and Research Farm of the Federal University of Agriculture, Abeokuta, Nigeria, using the Randomized Complete Block Design with three replicates. Analysis of Variance (ANOVA), Principal Component Analysis (PCA) and Single Linkage Cluster Analysis (SLCA) were employed to determine genetic divergence and identify superior genotypes for improvement. ANOVA revealed a significant level of variation among the genotypes based on days to emergence, emergency %, number of seeds germinated, plant height, and number of seeds with 2 or more seeds. The first three principal component axes (with eigenvalues ≥1) accounted for 79.03% of the total variation observed. The genotypes were grouped into 3 distinct clusters by SLCA at about 65% similarity level, with TVSu-887 and TVSu-1622 revealed to be distinct from the other genotypes. TVSu-887 (distinct phenotype) and TVSu-1922 (number of seeds germinated and number of pods with two or more seeds) were revealed to be superior and could therefore be used as suitable parents for the improvement of Bambara groundnuts with high heterotic value and better yield.

Keywords: Genetic diversity, selection, improvement, superior genotype

Genetic diversity analysis and nutritional profiling of black fonio millet (*Digitaria iburua* stapf) revealed genotypes with high nutritional value

Nwogiji, Cletus O.[1,2,3], Uba Charles U.[4], Majiok Koak Nyoac[5], Nkpuma Kenneth[3,6], Nnamani Catherine V.[1,3], Afiukwa C. *A[3,7], Abdul, S. D[8], Uyoh E. A[9], Opaluwa, H. I.[10], Enoch G. Achigan-Dako[11] and Oselebe Happiness O[3,6]*

[1]Department of Applied Biology, Ebonyi State University, Abakaliki, Nigeria., [2]Department of Biology/Biotechnology, David Umahi Federal University of Health Sciences, Uburu, Nigeria.[3]Centre of Excellence for Crop Improvement, Nutrition and Climate Change (CCINCC), Ebonyi State University, Abakaliki, Nigeria. [4]Department of Biological Sciences, Godfrey Okoye University, Enugu State, Nigeria.[5]University of Gondar, Ethiopia. [6]Department of Crop Production and Landscape Management, Ebonyi State University, Abakaliki, Nigeria. [7]Department of Biotechnology, Alex Ekwueme Federal university, Ndufu-Alike Ikwo. [8]Department of Biological Sciences, Abubakar Tafawa Balewa University, Bauchi. [9]Department of Genetics & Biotechnology, University of Calabar, Nigeria.[10]Department of Agricultural Economics, Prince Abubakar University, Ayingba, Kogi State, Nigeria.[11]Laboratory of Genetics, Biotechnology and Seed Sciences, University of Abomey-Calavi, Republic of Benin.nwogijicletus201@gmail.com

ABSTRACT (24)

Black fonio millet (*Digitaria iburua),* an underutilized African crop, plays a crucial role in food security in West Africa. Despite its benefits, the potential for improvement remains largely untapped, and there is a paucity of knowledge about its genetic diversity and nutritional properties. This study assessed variability in *D. iburua* using nutritional traits and molecular markers. Forty-one (41) accessions were obtained from farmers in Northern Nigeria (Nasarawa, Kaduna, Abuja, and Plateau), where the crop is mainly grown. The results of the descriptive statistics revealed a wide range of variation for the studied nutritional traits and were supported by the analysis of variance showing highly significant differences ($p < 0.01$). Among the sources of collection, Nasarawa State accessions had the highest crude protein content, while the least is Plateau accessions. Similarly, Plateau accessions had the highest carbohydrate and crude lipid content. Also, the result reveals that sulfur, phosphorus, and potassium are the most abundant mineral contents found in *D. iburua.* However, the result of molecular marker analysis showed that the genetic distance between pairs of sources of collection varied from 0.61 to 0.79 with higher similarity between Nasarawa and Kaduna accession. Furthermore, the analysis of molecular variance showed 11% variation among the population and 89% within the population. Also, the admixture model identified four major sub-clusters, and this was supported with discriminant analysis of principal components (DAPC) analysis. These findings have provided insight into the genetic diversity of *D. iburua* and the opportunity for genetic improvement for improved nutritional value. Accessions from Nasarawa State, with the highest crude protein content, are recommended for future breeding programmes to boost food and nutrition security in Africa.

Keywords: *Digitaria iburua,* Genetic diversity, Molecular analysis, Nutritional profiling, Nigeria, Underutilized crop.

Morphological characterization and nutritional evaluation of some African yam bean [*Sphenostylis stenocarpa* (Hochst ex A. Rich.) Harm] collection

Ebiti, E. K., Olasanmi, B. Abberton, M. T, Oyatomi, O. A.
Genetic Resources Center, International Institute of Tropical Agriculture (IITA) m.abberton@cgiar.org

ABSTRACT (25)

African yam bean (AYB) is an underutilized legume and one of the opportunity crops in Africa. It is a dual-purpose crop with enormous potentials capable of alleviating hunger and malnutrition in sub-Sahara Africa if its genetic variability is carefully explored. This study was conducted to assess the variability among accessions of AYB using yield and nutritional traits. Thirty accessions of AYB were characterized using Randomized Complete Block design in a field experiment. Data were collected on yield traits using the AYB descriptors, while fourteen of the AYB accessions were evaluated for nutritional compositions using the Association of Official Analytical Chemists (A.O.A.C) method. Yield and nutritional data were analyzed using R package and SAS where ANOVA, PCA, Correlation were computed. A wide range of variability was observed among the accessions based on morphological and nutritional traits evaluated. The first two PCs accounted for 65.2% of the total variation observed. The Broad sense heritability (H^2) ranged from 3.76% (seed thickness) to 56.04 % (days to flowering). Protein content ranged from 9.63-24.64%, Crude fiber (3.34-13.48%), Fat (0.09-2.98%), Carbohydrate (47.44-72.53%), Ash (2.94-3.99%). Trypsin inhibitor was relatively high in the seeds of TSs-636 and TSs-642 (38.31 mg/g and 35.87 mg/g) respectively, while tannin content ranged from 0.40-2.58 mg/g, phytate content (0.84-9.11 mg/g) and oxalate (12.85-14.04 mg/g). The mineral contents in the seeds and tubers of AYB varied from 50.34-77.58 ppm for Iron, Selenium (0.39-2.58 ppm), while Zinc ranged from 18.04-31.69 ppm, Calcium (0.39-0.43%) and Magnesium (0.07-0.16%). The variation observed among the AYB accessions could serve as basis for selection for AYB improvement.

Keywords: African yam bean, Anti-nutrients, Morphology, Mineral content, Proximate.

Morphological diversity and ploidy evaluation of some green gram (Vigna radiata L. Wilczek) accessions

Agbolade J.O., Oluwajobi A.O., Olajide J.S., Adekoya M.A., Oduoye O.T., Ogunsakin D.O & Ogedengbe A.C
olajideseunfunmi@gmail.com

ABSTRACT (26)

Green gram, an annual legume crop, possesses enormous nutritional potential enough to rival the major staple crops. Despite this, it is still an underutilized legume due to the limited research and commercialization effort dedicated to it. This study examined the genetic variation of green gram accessions based on their vegetative characters and ploidy analysis. Twenty-five (25) accessions of green gram seeds collected from the International Institute of Tropical Agriculture (IITA), Nigeria were evaluated using RCBD for 18 morphological traits. For ploidy evaluation, three samples for each accession were harvested and taken to the laboratory for sample preparation and flow cytometry analyses. ANOVA test revealed significant differences among the accessions for all the studied traits, indicating the presence of sufficient genetic variability. Pearson's correlation coefficients demonstrated a strong positive relationship between the vegetative characters, with no negative correlations detected. PCA analysis generated 12 principal component axes, but only PC1 and PC2 were statistically significant accounting for 73.56% of the total variation, with values greater than 2.0. The result of this study showed that the vegetative attributes of green gram can effectively discriminate between the genotypes of the legume crop. Flow cytometry analysis revealed that all accessions studied were diploid(2n) organisms with a chromosome number of 2n=22 except for the accession Tvr-83, with notably three sets of chromosomes(3n=33); this is a novelty and calls for further investigations. Data obtained in this study can serve as a reference point in any other relevant study.

Keywords: Variability, PCA, ANOVA, flow cytometry, chromosome number

Assessment of winged bean (*Psophocarpus tetragonobolus* (L.) DC.) seedlings for drought tolerance

Ufuoma, Lydia Akpojotor, Jelili Opabode, Michael Abberton and Oyatomi Olaniyi
m.abberton@cgiar.org

ABSTRACT (27)

Winged bean is a potential food security crop as all parts of the crop are edible and nutritious, however, the impact of climate change such as drought can hinder its production. Therefore, there is a need to screen winged bean for drought to identify tolerant accessions. Hence, the objective of this study was to evaluate winged bean accessions for drought tolerance at the seedling stage using the wooden box screening technique. Fifty accessions of winged bean laid out in a Completely Randomized Design (CRD) in three replicates were planted in wooden boxes. Five plant stands for five accessions, were planted into a wooden box filled with topsoil (75%) and loamy soil (25%). They were subjected to drought stress by stopping the supply of water for six weeks, six weeks after planting. Data on chlorophyll content (CHL), wilting score (WLT), plant height (PHT), number of leaves (NOL), stem width (SWT), and the recovery rate was collected and subjected to analysis of Variance, Duncan multiple range test and Pearson correlation. Moisture content, temperature, humidity, and dew point ranged from 3.7-19.5%, 18-50^{o}C, 11.5-95%, and 6.5-28.4^{o}C respectively. Data was taken 30, 44, 58, and 72 days after the implementation of drought. Analysis of variance (ANOVA) revealed significant differences at 0.05 level of probability among accessions and days for CHL, NOL, and WLT. There was highly significant correlation ($p<0.001$) between WLT and NOL (0.32), and SWD, and CHL (0.39). None of the accessions were able to recover after the six weeks of imposing drought. However, based on mean separation for the wilting score, Tpt-11-A and Tpt-4-A were significantly different from all other accessions. These might be drought-tolerant accessions. In addition, the wooden box technique was successful in evaluating winged bean for drought tolerance.

Keywords: Winged bean, seedling drought, moisture content, wooden box.

Wild Vigna: A New Gene Pool for Developing Resilient Cowpea to Enhance Food Security

Mary Edhemuino, Abe Ayodeji Olaniyi Oyatomi, M. Abberton
o.oyatomi@cgiar.org

ABSTRACT (28)

Cowpea (*Vigna unguiculata*) is a widely cultivated legume in the Fabaceae family, valued for its nutritional benefits and global importance, particularly in tropical regions. However, various biotic and abiotic stresses often constrain its production throughout its growth stages. With increasing population demands and the exacerbating impacts of climate change, there is an urgent need for a new gene pool to support the development of more resilient cowpea varieties. Wild *Vigna* species, particularly *Vigna vexillata*, could be a promising gene source for addressing these production challenges. Known for its edible root tuber and protein-rich seeds, *V. vexillata* offers valuable genetic traits that could be harnessed to enhance cowpea's stress tolerance, yield, and nutritional quality. Despite its potential, tuber cowpea's genetic resources and production technologies remain underexplored, especially in Africa. Thus, the review's objective is to highlight the critical need to incorporate modern breeding tools and techniques to unlock the genetic potential of wild *Vigna (V. vexillata)* for advancing cowpea improvement programs, thereby contributing to global food security.

Keywords*: Vigna vexillata*, Cowpea, Food security, and Genetics Resources

Dynamics of intraspecies variations in chlorophyll fluorescence parameters of mung bean (*Vigna radiata* L.) accessions in response to phosphorus application rate and planting method in the derived Savanna of Nigeria

[1,2]Adesokan, O. J., [1]Aderibigbe, S. G., [1]Soremi, P. A. S., [1]Oni, O. E., [1]Sakariyawo, O. S., [2*]Abberton, M. and [2]Oyatomi, O. A.

[1]Department of Plant Physiology and Crop Production, Federal University of Agriculture, Abeokuta (FUNAAB), Ogun State, Nigeria. [2]International Institute of Tropical Agriculture (IITA), Ibadan, Oyo State, Nigeria. m.abberton@cgiar.org

ABSTRACT (29)

Sustainable food and nutrition security involves optimization of inputs to enhance productivity. It is unclear how mung bean accessions and varied phosphorus availability affect photosynthetic efficiency under different planting strategies. A (2×4×5) experiment arranged in RCBD was conducted at IITA to address this. The study included two sowing methods (row spacing and broadcast), four P_2O_5 rates (0, 30, 60, 90 kg/ha) and five mung bean accessions (TVr-1211, TVr-1200, TVr-1212, TVr-1215, and TVr-1202). Photosynthetic parameters, such as leaf thickness, PAR, and photosystem II quantum yield (Fv/Fm and ΦPSII), were measured biweekly from 4 to 12 weeks after planting (WAP). Row planted mung bean significantly increased the Fv/Fm compared to broadcasting at 6 WAP, 90kg/ha P_2O_5 and TVr-1200 showing the highest Fv/Fm. Sowing method, P_2O_5 rate, and accession did not impact leaf angle, PhiNPQ, thickness or qP. PAR was highest in plots with 30 kg/ha P_2O_5, while the control plot had the least at 8 WAP. Increased ΦPSII in mung bean seeded in rows may be due to higher Fv/Fm, leaf angle, and lower leaf temperature compared to broadcasting. TVr 1211 intercepted less PAR than TVr-1202, which contributed to its higher leaf angle and low leaf temperature, enhancing quantum yield and light interception. Hence, decreasing maintenance respiration and increasing carbon gain.

Keywords: Sustainable food and nutrition security, Mung bean accessions, Phosphorus availability, Photosynthetic efficiency and Planting strategies.

Assessment of genetic diversity of serependipity berry (*Dioscoreophyllum cumminsii*) using start codon targeted (SCoT) polymorphism

Onwe Victor C., Ogah, Fidelis and Oselebe, Happiness O.
onwevc@dufuhs.edu.ng & victorkezie@gmail.com

ABSTRACT (30)

Nigeria is home to many rare, endangered, and underutilized crops. *Dioscoreophyllum cumminsii* (Serendipity berry), is an indigenous African fruit. Despite its enormous nutritional and medicinal potential, especially for diabetics, minimal research attention and funding has been given to this plant which is fast going extinct. Conservation, domestication, and genetic improvement efforts are urgently needed. The study examined the genetic diversity and population structure of *D. cumminsii* accessions in Ebonyi State using Start codon targeted (SCoT) polymorphism markers. Twenty-three accessions were analyzed using 7 SCoT markers. DNA were extracted from seed tissues using CTAB protocols and PCR amplification was performed. Amplicons were separated on 1.5% agarose gel electrophoresis for scoring and data collection. Results showed a mean gene diversity of 0.762 across populations, with SCoT 33 showing the highest gene diversity (0.938) and lowest value (0.423) recorded for SCoT 16 marker. The Polymorphic Information Content (PIC) ranged from 0.934 to 0.334 with a mean of 0.729 in SCoT 33 and SCoT 16, respectively. The AMOVA indicated that 5% genetic variation existed among populations, 5% among individuals, and 90% within individuals. UPGMA and Neighbor-Joining Tree analysis divided accessions into three clusters. The SCoT marker-based study showed a high level of genetic diversity within *D. cumminsii* population and lower diversity among the population and individuals. This implies that serendipity berry is genetically diverse. Management and conservation strategies should be developed and deployed to maintain the existing genetic resources within each population for sustainable utilization of this crop.

Keywords: Serendipity berry, underutilized crops, genetic diversity.

Morphological characterization of ten accessions of cowpea (*Vigna unguiculata* [L.] Walp)

Opeyemi T. Osundare*and Oluwapelumi Adeola Omoniyi
Department of Crop Science and Horticulture, Federal University Oye-Ekiti, Ekiti State, Nigeria.
opeyemi.osundare@fuoye.edu.ng

ABSTRACT (31)

Cowpea (*Vigna unguiculata*) is a major source of dietary protein that nutritionally complements staple low-protein cereal and tuber crops and is a valuable commodity that generate income for farmers, yet the full yield potential of this crop is yet to be attained. This study aimed at establishing variations in the traits of ten accessions of cowpea obtained from the Genetic Resource Centre, International Institute of Tropical Agriculture (IITA), Ibadan. A Randomized complete block design (RCBD) with three replications was used for the evaluation. Observations were made on quantitative and qualitative traits. The accessions showed significant differences ($P < 0.01$ and $P < 0.05$) in days to 50% flowering, days to first mature pods, calyx lobe length, pod wall thickness (mm), pod length (mm), pod width (mm), seed length (mm), seed width (mm), peduncle length (cm), terminal leaflet width (cm) and number of seed per pod. Mean performance for analysis of variance were moderate to high for terminal leaflet length, terminal leaflet width, plant height (cm), peduncle length, pod width and pod length for accession TVu-9916. Seed length and seed width were low for accession TVu-984 and TVu-98. Accession TVu-8950, TVu-8986 and TVu-9967 had the highest plant height. Plant height was highest for three accessions (TVu-8950, TVu-8986 and TVu-9967). Stem pigmentation, flower colour, mature pod colour, seed colour, seed shape, pod curvature also differs. Selection for these traits was effective to establish variability among the accessions of cowpea and such variation is a good tool for improvement of the crop.

Keywords: Qualitative traits, quantitative traits, accessions, *Vigna unguiculata* and variability

Evaluation of seed morphological characteristics of Bambara groundnut (*Vigna subterranea* L.) on seedling quality

M. A. Adebisi[1], M. H. Bolajoko[2*], O. K. Babalola[3], O. E. Adebayo[2], C. O. Alake[1], M. M. Shittu[1], A-S. Abdullah[1]

[1]Department of Plant Breeding and Seed Technology, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria [2]Department of Crop Production, Federal University of Technology, Minna, Niger State, Nigeria [3]National Horticultural Research Institute, Idi-Ishin, Jericho GRA, Ibadan, Oyo State. muhammed.bolajoko@futminna.edu.ng +2347067676267

ABSTRACT (32)

Bambara groundnut is an underutilized grain legume grown mainly for its *subterranean* pods in Sub-Saharan Africa by subsistent farmers. Successful production of Bambara groundnut is dependent on availability of good seed. Seed quality refers to all aspects of seed performance and early crop establishment. It is important to evaluate seed morphological characteristics on seed quality before planting. Quality of seed is the capacity to express vital functions characterized by germination, vigour, viability longevity, parameters that interfere in the performance of the seed under field and storage conditions. Vigour is a quality of the seed responsible for rapid uniform germination, increased storability, good field emergence and ability to perform over a wide range of field conditions. Poor seed quality; viability and vigour, will result in uneven or erratic emergence. This study was carried out to evaluate the effect of morphological characteristics of Bambara groundnut seed on the seedling quality. The experiment was laid out in a completely randomized design replicated three times. Data collected were subjected to analysis of variance. The result obtained shows that there was significant difference in seedling length among the accessions evaluated with TVsu1611 performing best with the longest seedling length of 16.96. Seedling length is therefore recommended for consideration in improvement program of Bambara groundnut.

Keywords: Morphological, Seed, Seedling quality and Bambara groundnut

Evaluation of some breeding lines of African yam bean for genetic estimate and inheritance of their grain yield components

***Olatunji, Q. Kehinde and Adewale, B. Daniel**

Department of Crop Science and Horticulture, Federal University Oye-Ekiti, Ikole-Ekiti Campus, Nigeria. homokehinde1999@gmail.com

ABSTRACT (33)

African yam bean (*Sphenostylis stenocarpa* Hochst Ex, A, Rich) Harms is an underutilized legume with significant potential capable of improving food and nutrition security in sub-Saharan Africa. This study evaluated the performance of twenty-four breeding lines of African yam bean AYB, assessed their genetic estimates and inheritance for some grain yield components. The 24 breeding lines which comprises F1, reciprocal F1 and some parents were evaluated on the field in a randomized complete block design of three replicates. Data were collected on flowering, number of pods and seed traits. Analysis of variance (ANOVA) and mean separation was done; furthermore, genetic estimates and cytoplasmic inheritance for some traits between some F1 and reciprocal F1 were estimated using paired t-test statistics. ANOVA revealed highly significant ($p<0.001$) differences among the 24 AYB lines for all studied traits, indicating available and substantial genetic variability in the population. The proportion of the coefficient of variation for genotypic to the phenotypic was generally high for major traits with broad-sense heritability ranging from 0.27 to 0.92, suggesting variations in the genetic control of the different traits. Cytoplasmic inheritance was identified in the control of number of seeds per pod (DW11 x DW117a and DW11 x DW1123) and 100-seed weight for DW117a x DW123. Findings in the present study unveiled diversity and reliable responses of traits to genetic and environmental influences. The generated information therefore presents a platform for efficient and promising possibilities in AYB improvement.

Keywords: African yam bean, cytoplasmic inheritance, gene action, genetic estimates, improvement

Aboveground Biomass Allometric Model Development for Tamarind tree (*Tamarindus indica*) in Soudano-sahelian region of Cameroon

Sylvain Meinrad Donkeng Voumo [1*] Narendra Kumar Maurya[2] Remi Dadigolo[3]

*[1]Research Scholar, Department of Environmental Sciences, Gokul Global University, Sidhpur (Patan), India. [2]Assistant professor, Department of Civil engineering (Environmental Engineering), Gokul Global University, Sidhpur (Patan), India. [3]Research scholar, Faculty of Agronomy and Agricultural Sciences, Department of Forest and Agroforestry, University of Dschang, Cameroon.*sylvainmeinrad@yahoo.com*

ABSTRACT (34)

In the Soudano-Sahelian zone of Cameroon, the Tamarind tree plays a crucial ecological and socio-economic role for rural populations. However, the absence of region-specific allometric models for *Tamarindus indica* hinders accurate biomass and carbon stock assessments. This study aimed to develop and validate a localized allometric model for Tamarind trees. Fifty-four trees, categorized into seven diameter classes (5≤D≤75 cm), were destructively sampled to measure their biomass. Using Excel, R, and E-views software, simple and multiple regression analyses were conducted, correlating aboveground biomass (AGB) with dendrometric parameters like diameter at breast height (Dbh), total height (H), crown width (Cd), and wood density (ρ). Twelve models were evaluated based on adjusted R^2, residual standard error (RSE), and Akaike Information Criterion (AIC). Model two (M_2), which used crown diameter to predict dry biomass, was the most accurate, with the equation Ln (AGB) = -4.38 + 3.66 ln (Cd) (AdjR^2 = 0.92; RSE = 0.511; AIC = 1.130). Paired t-tests revealed significant differences between the M_2 model and widely used forest and savannah models (p=3.52967E-09 and P= 0.003435). However, the closest similarity was found with a Madagascar equation using crown diameter (P=0.212). This study highlights the necessity of region-specific allometric models for precise biomass assessment, offering a valuable tool for evaluating carbon stocks of Tamarind trees in similar ecosystems, particularly for carbon reduction (REDD+) initiatives, activities to benefit the local communities from carbon trade in Cameroon.

Keywords: Above ground Biomass**;** Allometric Model; Soudano-Sahelian; *Tamarindus indica*

Soil enrichment with dry leaf materials of *Moringa oleifera* (lam.) to evaluate the biomass production and chlorophyll conent of bambara groundnut (*vigna subterranea* (l.) verdc.)

Esther Omone Akhigbe[1*] and Emuejevoke Dennis Vwioko[2]
[1]Department of Biology, Faculty of Science, Federal University, Otuoke, Bayelsa State, Nigeria.
[,2]Department of Plant Biology and Biotechnology, University of Benin, Benin City, Nigeria.
akhigbeeo@fuotuoke.edu.ng. Tel: +234 (0) 805 334 3383

ABSTRACT (35)

A potted field experiment was conducted at the Botanic Garden, Department of Plant Biology and Biotechnology, University of Benin, Nigeria, from May to September, 2018 to assess the biomass production of seven accessions of bambara groundnut (*Vigna subterranea* (L.) Verdc., in soils enriched with different amount of ground dry leaves of *Moringa oleifera* (Lam.). The study comprised of 4 treatments viz; control, 10 g, 20 g and 35 g were added to 4 kg of soil in a completely randomized block design with 3 replicates. Parameters obtained include plant height, number of leaves, stem girth, number of branches and leaf chlorophyll content. Results showed that application of *Moringa* leaves as soil amendment significantly ($p < 0.05$) increased the growth parameters and leaf chlorophyll content of bambara groundnut at 28 DAP (days after planting). Significant higher values were recorded for vine length, number of leaves in the treatment with 20 g and 35 g of soil augmented with *Moringa oleifera* at 28 DAP. The effect of soil enrichment with 10 g and 35 g amounts of *Moringa oleifera* on the stem girth of Bambara groundnut showed significant difference among treatments at 28 DAP in accessions (TVSU-466), (TVSU-75) and (TVSU-562). No significant difference was recorded for number of branches in all accessions when compared with the control. Higher total chlorophyll content were obtained in accessions (TVSU-1155), (TVSU-303) and (TVSU-1496) in soils treated with *Moringa oleifera* at 28 DAP. It was therefore concluded that soil enrichment with dry ground leaves of *Moringa oleifera* with higher concentration of 20g and 35g amount can be used as an alternative nutrient source to enhance biomass production and hence facilitate the yield of bambara groundnut and other agronomic crops.

Key words; *Moringa oleifera; Vigna subterranea*; soil enrichment, biomass; leaf chlorophyll.

Interactions among *Macrophomina phaseolina*, *Fusarium oxysporum* and *Meloidogyne incognita* with Bambara groundnut and their influence on yield

Beulah P. Ayeni*, Abiodun O. Claudius-Cole, Alejandro Ortega-Beltran, Olaniyi Oyatomi, Michael Abberton, Danny Coyne
International Institute of Tropical Agriculture (IITA), b.ayeni@cgiar.org, ayenibeulah@gmail.com

ABSTRACT (36)

Fungi such as *Fusarium oxysporum* and *Macrophomina phaseolina* and the root-knot nematode *Meloidogyne incognita* are serious pathogens that co-infect Bambara groundnut in West Africa. However, there is limited research on the impact of the interaction of these pathogens on the yield of Bambara groundnut and the pathogens' damage. The current study aims to elucidate the influence of the three-way interaction on the growth and yield of two Bambara groundnut accessions, TVSu-1628 and TVSu-1698. The evaluations were conducted in a controlled pot experiment in a screenhouse, on a total of 168 plants. The treatments include single and combined inoculations at 24 hours before planting, and 2 or 3 weeks after planting. Data on growth, root weight, yield, and disease severity were collected and analysed using ANOVA and means were separated using the least significant difference. There were significant differences between the accessions and the interaction between accessions and treatments. Differences between accessions were in root weight and disease severity. Accession TVSu-1698 had a higher root weight than TVSu-1628 and TVSu-1628 was more susceptible to the inoculated pathogens than TVSu-1698 at 10 WAP. Plants inoculated with *M. phaseolina* and *F. oxysporum* had more pods per plant than plants inoculated with *M. incognita* alone and in combination with the fungi but a similar number to the control. This indicated that infection with the root-knot nematode is the key pathogen in this multiple-pathogen interaction affecting Bambara groundnut yield reduction.

Keywords: Orphan crop, multi-pathogen interaction, root-knot nematode, damage, susceptible.

Phytosanitary management of IITA's African yam bean genetic resources for safe conservation and international distribution

***P. Lava Kumar*, O. Olayemi, O. Oguntade, D. Ajamu, S. Alaohuo, P. Ogunsanya, J.* Ihenacho, A. Oladepo, O. Olaniyi, and M. Abberton.** L.Kumar@cgiar.org

ABSTRACT (37)

African yam bean (AYB) (*Sphenostylis stenocarpa*) is an underutilized legume native to Africa. The IITA has conserved 514 accessions of AYB, several of which are known to be susceptible to several pathogens, which pose a challenge to AYB genetic resources conservation and distribution. The limited knowledge on pathogens affecting AYB in the farmer's fields is a constraint to design comprehensive diagnostics tests for AYB seed health monitoring. Since 2017, IITA's Germplasm Health Unit, jointly with the Genetic Resources Unit, has been collecting data on the incidence and diversity of pathogens affecting AYB during the seed regeneration programs in Nigeria. The involves testing for some of the common endemic legume infecting viruses, such as bean common mosaic virus (BCMV), cowpea aphid-borne mosaic virus (CABMV), cowpea mild mottle virus, cowpea mottle virus, southern bean mosaic virus, and cucumber mosaic virus. Of the 1148 samples of 20 batches evaluated, seedborne viruses were detected in 15% samples and the most frequently detected viruses are BCMV and CABMV. In the plating method for seedborne fungal or bacterial infections, *Macrophomina phaseolina*, *Fusarium oxysporum*, *Bacillus cereus*, *Penicillium oxalicum*, and *Aspergillus niger* were frequently detected. The field-grown plants are frequently infected by *Colletotrichum* spp., *Macrophomina* sp., and *Phoma* sp. Plants affected with *Colletotrichum* spp., often showed necrotic blotches on the leaves and pods. IITA ensures systematic testing for harvesting seed from healthy plants for conservation and international distribution while harnessing the data on pathogens of economic significance to AYB production to develop disease control strategies.

Keywords: African yam bean, germplasm health, phytosanitary**.**

Polyphasic analyses identify a diverse group of *Colletotrichum* spp. causing leaf, pod, and flower diseases on the orphan legume African yam bean

Olaide Mary Ogunsanya[1,2,3,4], Moruf Ayodele Adebisi[1], Akinola Rasheed Popoola[1], Clement Gboyega Afolabi[1], Olaniyi Oyatomi[2], Richard Colgan[4], Andrew Armitage[4], Elinor Thompson[3], Michael Abberton[2], Alejandro Ortega-Beltran[2,*]

[1]Federal University of Agriculture, Abeokuta, Nigeria; [2] International Institute of Tropical Agriculture, Ibadan, Nigeria; [3] Faculty of Engineering and Science, University of Greenwich, United Kingdom; [4] Natural Resources Institute, University of Greenwich, United Kingdom

ogunsanyaolaide@rocketmail.com

ABSTRACT (38)

African yam bean (AYB; *Sphenostylis stenocarpa*) is an underutilized legume indigenous to Africa. The crop has great potential as it can enhance food security and offers nutritional and medicinal opportunities. However, low grain yield caused by fungal diseases, including pod blight and leaf tip dieback, deters farmers from large-scale cultivation. To determine the prevalence of fungal diseases affecting leaves, pods, and flowers of AYB, a survey was conducted in 2018 and 2019 in major AYB-growing areas in Nigeria. Leaf tip dieback, flower bud rot, and pod blight were the most common symptoms. Morphological and molecular assays were conducted to identify the causal agents of the observed diseases. Fungi from eight genera were isolated from diseased leaves, pods and buds, but Koch's postulates were only fulfilled for *Colletotrichum* species. Fungi from the other seven genera did not produce disease symptoms in healthy AYB tissues. Several *Colletotrichum* isolates were characterized by sequencing the ITS, glyceraldehyde-3-phosphate dehydrogenase, calmodulin, and ApMAT loci. A combined phylogenetic analysis revealed four *Colletotrichum* species: *C. siamense*, *C. theobromicola,* and *C. fructicola*, which were recovered from diseased leaves, and *C. truncatum*, recovered from diseased pods and buds. Our results are useful to gear efforts to develop integrated management strategies to control diseases affecting AYB in Nigeria and elsewhere. Availability of such strategies may stimulate greater AYB cultivation to contribute to diet diversification, which has been repeatedly advocated by a range of stakeholders to increase food security and prosperity of smallholder farmers.

Keywords: African yam bean, multi-locus sequencing, *Colletotrichum* spp, pod blight, leaf tip dieback.

Evaluation of some plant parasitic nematode associated with lima bean (*Phaseolus lunatus*)

[1+]Elufisan, T. S., and [1] Adebayo, A. K.
[1]Institute of Agricultural Research and Training, Obafemi Awolowo University, Nigeria.
tobielufisan@gmail.com

ABSTRACT (39)

Plant parasitic nematodes have been recognized as a significant disease impacting the performance of Lima beans (*Phaseolus lunatus*). To evaluate, identify and assess the impact of plant parasitic nematodes associated with Lima bean performance, a field experiment was conducted at the Institute of Agricultural Research and Training experimental site in Ibadan, (latitude at 07^0 22"N, 3^0 50"E) in the derived savannah/transition agro-ecology of South West Nigeria, in 2022 and 2023 respectively. Fifteen lima bean accessions obtained during survey from four Nigerian states (Osun, Ondo, Ekiti, and Oyo) were grown in a naturally nematode infested field. The beans were planted at a spacing of 1m x1m, with two seeds per hole. Insect control was achieved using Lambda cyhalothrin, applied during flowering and podding. Manual weeding was performed throughout the study. Data on growth and yield components, such as plant heights, Days to 50% flowering, pod lengths, number of seeds/pods, and dry matter (shoot and root weight) as well as nematode parameters nematode populations and gall numbers, were collected. Data collected was subjected to analysis of variance and Pearson's correlation test using Statistical Tool for Agricultural Research (STAR) © 2013. Significant means were separated by the Duncan Multiple Range Test (DMRT). The experiment revealed that *Meloidogyne* spp. (root-knot nematodes) were the most prevalent, causing significant damage, while *Pratylenchus* spp. and *Helicotylenchus* spp. contributed to yield reductions. The study underscores the need for effective nematode management strategies, such as nematicide application, and development of resistant lima bean cultivars to enhance productivity.

Keywords: Lima bean, Plant parasitic nematodes, *Meloidogyne*, *Pratylenchus*, *Helicotylenchus*, Nematode management

Identification of fungi pathogen associated with selected accessions of African yam bean (*Sphenostylis stenocarpa* (Hochst ex. A. Rich) Harms)

Ihenacho, J.U.; Kehinde, I. A; Abberton, M. T; Ayo-John E.I.; Bankole P.O.; P. Lava Kumar; Oguntade O.; Adegboyega T.T. and Oyatomi, O. A.
j.ihenacho@cgiar.org, 0803 076 9009

ABSTRACT (40)

African Yam Bean (AYB) (*Sphenostylis stenocarpa*) is a food crop with nutritional, medicinal, and economic value. Susceptibility to fungi diseases is one of the limiting factors in the cultivation of AYB. This study was conducted to identify fungi associated with diseased leaves and pod of African yam bean. Twenty four (24) accessions of AYB were planted using a Randomized Complete Block Design on the experimental field at the International Institute of Tropical Agriculture (IITA) Ibadan. Two seeds were planted per hole on 5 m ridges, spaced 1 m apart, each accession was planted on two rows of 1 m intra-row spacing. Diseased leaves and pod were collected using detached leaf and pod technique. The diseased plant leaves were taken to the laboratory for culture, isolation, and identification of pathogens using standard procedure. Fungal diseases were identified using morphological and microscopic tools. Twelve fungal species: *Aspergillus niger, Colletotrichum dermatium, Colletotrichum truncatum, Macrophomina* sp, *Fusarium verticillioides, Cladosporium* sp, *Colletotrichum gloeosprioides, Fusarium oxysporum, Phoma* sp, *Phomopsis* sp, *Alternaria solani* and *Curvularia lunata*) were identified on pod and leaf samples of the AYB accessions. *Colletotrichum dematium* is the most frequent fungi associated with AYB pod disease, followed by *Fusarium oxysporum*. *Phoma* sp. has the highest relative frequency of occurrence on infected AYB leaves followed by *Fusarium oxysporum*. The study revealed that several fungal species are associated with the pod and leaf samples of AYB and can result in varying disease symptoms. Effective management and control of these fungal species in AYB on the field will help enhance the yield and reduce harvest losses.

Keywords: African yam bean, Disease diagnosis, Pathogen, Pod and Leaf.

Phytochemical, antibacterial and antifungal evaluation of Laurus nobilis (Bay Leaf) against some selected pathogens

***[1]Saheed S.O and [1]Agbonwaneten O.B**
Department of Microbiology Faculty of Life Sciences University of Benin
sabatini.oshodin@uniben.edu

ABSTRACT (41)
Laurus nobilis known as "Bay leaf" is widely used in food. It contains compound which have potential use for food safety because of the antimicrobial properties. Dried *laurus nobilis* were purchased from the markets in Benin city, identified in the herbarium unit, University of benin. This study was carried out to determine the phytochemical constituents, antibacterial and antifungal activities of aqueous, methanolic and ethanolic extract of *Laurus nobilis* against bacterial isolates (*Staphylococcus aureus*, *Bacillus subtilis, Pseudomonas aeruginosa, Klebsiella Pneumoniae, Escherichia coli, Proteus* sp. And *Salmonella typhi.*) using paper disc-disk diffusion method. The effect of solvent extracts on mycelial growth of test fungi (*Fusarium solani, Aspergillus niger, Aspergillus flavus, and Penicillium chrysogenum*) was determined using poisoned food technique. The phytochemical screening of the leaves was done using standard method. The phytochemical screening of the leaf showed the percentage composition of saponin, alkaloid, tannin, flavonoid and total polyphenol were 4.40%,4.00%13.50%,11.00% and 0.10% respectively. The methanolic extract showed antibacterial activity of the leaf on *Bacillus subtilis* (23.00+0.00) mm at 400mg/ml which was resistant to most standard antibiotics used. *Fusarium solani* had the highest radial growth of 44.00mm and 31.50mm obtained from ethanol and methanol at 300mg/ml and 400mg/ml respectively. This study has shown that *Laurus nobilis* has antibacterial and antifungal effect on some Pathogens.

Keywords; Anti-bacterial, *Laurus nobilis*, phytochemical, antibiotics.

Antimicrobial activity of *Cymbopogon citratus* leaf extract on isolates from spoilt *Malus domestica* (Apple)

***[1]Saheed S.O. and [1]Adigida F.I.**
Department of Microbiology, Faculty of Life Sciences, University of Benin, P.M.B. 1154, Benin City, Edo State, Nigeria. sabatinioshodin@gmail.com

ABSTRACT (42)

Malus domestica (apple) is an edible fruit cultivated for its attractiveness and nutritional value, *Cymbopogon citratus*, popularly known as citronella grass belongs to the genus Cymbopogon whose antagonistic activity towards different pathogenic bacteria, protozoa and fungi has been reported. This study was carried out to determine the effect of *Cymbopogon citratus* leaf extract on fungal and multi-drug resistant bacterial isolates of spoilt *Malus domestica* (apple). The anti-bacterial and antifungal activity was done using agar well diffusion and poisoned food technique respectively while broth dilution method was used for the minimum inhibitory concentration for both the ethanolic and aqueous extract. All bacterial isolates showed no sensitivity to the extracts, except *Shigella* sp. which showed inhibitory effect to aqueous extract and minimum inhibitory concentration at 100.00%. *Mucor* sp. had higher percentage inhibition of the mycelial at 100.00% concentration for the aqueous extract. At 1000.00mg/ml of ethanol extract, the mycelial diameter for *Penicillium* sp was 78.00mm. Results for fungi showed ethanolic extract showed more effective inhibitory activity than the aqueous extract. Since,lemongrass extract was almost 100.00% effective on fungi organisms as seen in the results, information from this research can be used as guideline for the lemongrass extract as antifungal agent towards preservation of packaged fruits(apples).

Keywords: Lemon grass, antimicrobial activity, apple

Phytochemical evaluation and In vitro antimicrobial activity of root extract of Vigna subterranea (L.) Verdc.

***[1]Aliyu Aminu Sarki, Mansurat O. Shoge,[1]Anas Ali Tamasi, [2]Eucharia Ngozi Ozioko, [1]Aliyu Muti'u O and [2,3]Taofeek Tope Adegboyega.**

[1]Department of Chemistry, Faculty of Science, Air Force Institute of Technology, Kaduna State, Nigeria. [2]Biology Unit, Faculty of Science, Air Force Institute of Technology, PMB 2014, Nigerian Air Force Base, Kaduna. Kaduna State, Nigeria.[3]Food Security and Safety Niche, Faculty of Natural and Agricultural Science, North-West University, Mmabatho, 2735. South Africa.

aliyuaminu340821@gmail.com

ABSTRACT (43)

The aim of the current study is to conduct phytochemical analyses and in vitro antimicrobial activity of the ethanolic root extract of *vigna subterranea.* Samples were obtained from established field at the institute of agricultural research (IAR), which is located in Ahmadu Bello University (ABU) Zaria. The samples were dried in the shade, pulverized and subjected to extraction through maceration utilizing ethanol at a concentration of 100% as the solvent. The resultant liquid extract underwent evaporation in water bath at 50 0 C to achieve dryness. The dried extract was subjected to qualitative phytochemical analyses using standard procedures. The antimicrobial susceptibility test was performed by using standard procedures against clinical bacterial isolates *(E. coli, S. aureus and P.aeruginosa) and a fungus (C.albicans) using different concentrations (0.5, 1.0 and 1.5 mg/ml)* to access the susceptibility, with ciprofloxacin and fluconazole employed as positive controls for the antibacterial and antifungal examination respectively. Qualitative phytochemical analyses showed the abundance presence of saponins, tannins and flavonoids, while steroids and alkaloids are less abundant with anthraquinone notably absent. The antimicrobial studies revealed that the efficacy of the extract is reliant on concentration, with the most substantial zone of inhibition recorded at 1.5 mg/ml in p.aeruginosa. Consequently, the findings obtained from this investigation indicated that in addition to the substantial nutritional properties of Bambara groundnut, the root may also be utilized in traditional medicinal practices for the treatment of various ailments

Keywords: vigna subterranea, phytochemical analyses, antimicrobial activity, maceration

Keywords: Antimicrobial activity, Bambara groundnut, Phytochemical analysis, Opportunity Crop

Evaluation of the Effect of Storage Conditions and Packaging Materials on Aflatoxins in Retailed Dry-Roasted Groundnuts (*Arachis Hypogea L.*)

[1]Oluwasola E.I., [1]Oluwafemi G.I. and [1]Olaseeni M.K.
Food Technology Department, The Federal Polytechnic Ado Ekiti, Ekiti State Nigeria.
oluwafemi_gi@fedpolyado.edu.ng

ABSTRACT (44)

The presence of aflatoxins in retailed roasted groundnut for human consumption is of great concern, especially aflatoxin B1(AFB1), the most potent naturally occurring known hepatocarcinogen among the aflatoxin stains. Hence, evaluating the effect of storage conditions and packaging materials on aflatoxin contamination levels in stored retailed roasted groundnuts (RRG) (*Arachis hypogea L.*) is of significant interest to the food industry, researchers, and consumers in general. Fresh retailed roasted groundnut samples (in duplicates) were packaged in glass bottles (amber and transparent) and plastic bottles (amber and transparent). It was subsequently kept under both refrigerating (4° C) and ambient (32° C) conditions. The roasted groundnut's pH, moisture content, and aflatoxin value were determined after twelve (12) weeks of storage period. Aflatoxin level was evaluated using high-performance liquid chromatography (HPLC). Aflatoxin B1 (AFB1) was detected in the stored roasted groundnut packaged in both amber and transparent plastic bottles irrespective of the storage conditions, with values ranging from 43.9 - 60.9 ppb. However, none of the aflatoxin strains was detected in all the samples packaged in glass bottles which incidentally have a lower moisture content. It is, therefore, established that glass containers as packaging material for retail roasted groundnut (RRG) are preferable to plastic containers to safeguard it from aflatoxin propagation.

Keywords: Aflatoxins, Packaging, Storage-conditions, Roasted-groundnut

Unveiling the potency of *Ocimum gratissimum* oil on storage bruchid of Cowpea *(Vigna unguiculata* (L. Walp.)

Odetoye*, A. A. Ubong, I.Q and Adewale, B. D.
Department of Crop Science and Horticulture, Federal University Oye-Ekiti, Ikole-Ekiti Campus, Nigeria .adefunke.odetoye@fuoye.edu.ng

ABSTRACT (45)

Cowpea (*Vigna unguiculata* L. Walp.*),* is an essential legume known for its economic, nutritional and industrial importance. However, storage bruchid (*Callosobruchus maculatus)* has been its major constraint. Scent leave (*Ocimum gratissimum*) is a valuable spice in most Nigerian gardens. However, less is known about the insecticidal property of the oil in the leaves, hence the present investigation. This experiment was carried out at Crop Science and Horticulture laboratory, Federal University Oye-Ekiti (FUOYE), Nigeria to investigate the efficacy of different concentrations of *O. gratissimum* oil extracted with ethanol on postharvest qualities of five cowpea genotypes. Four cowpea genotypes from Grain Legume Improvement Programme (GLIP), International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria and Ife brown from Agricultural Development Programme (ADP), Ikole-Ekiti, Nigeria were used. Tested concentrations of *O. gratissimum* oil were 0, 0.5, 0.75 and 1 ml. Levels of the two factors were arranged into completely randomized design with three replications. Post-harvest data included: mortality at 24, 48, 72 and 96 hours, number of egg laid, adult emergence, seed damaged and percentage weight loss. Lowest number of eggs, seed weight loss, adult emergence and seed damagedwas observed at 1.0 ml concentration. The trend of efficacy of concentration was positively linear. Mortality of bruchidincreased with hours of exposure to *O. gratissimum*. The five cowpea genotypes had significant variation in their response to *C. maculatus* attack. IT13K-1425-1 had lowest number of eggs, seed damaged and percentage weight loss. This research identified the 1.0 ml/20g efficacy of oil of *O. gratissimum* for *C. maculatus* in cowpea.

Keywords: Cowpea, concentration, *Ocimum gratissimum*, extracts, *C. maculatus*

Underutilized Legumes as Functional Foods and Nutraceuticals: Understanding their Potential Roles in Diseases Prevention and Management

Adeniyi A. Adebayo*, Leye J. Babatola, Daniel A. Olarewaju
Department of Biochemistry, Joseph Ayo Babalola University, P.M.B. 5006, Ikeji Arakeji, Nigeria
adeniyiabiodun2@gmail.com; +2348037288629

ABSTRACT (46)

Legume seeds accumulate large amounts of storage proteins that could undergo proteolysis to yield short peptides and free amino acids that are physiologically important in human health and wellness. In addition, they also contain some minor proteins such as protease, lipoxygenase, and lectins which are related to the nutritional and functional quality of the seed. Furthermore, many bioactive peptides isolated from these legume seeds have been reported to possess various biological activities ranging from antioxidant, antihypertensive, anticancer and immunomodulatory among others. However, despite health-promoting properties of these legumes, some are still underutilized, example of such include winged bean, sword bean, bambara groundnut, velvet bean, jack bean, and scarlet bean, which are rich in antioxidants and polyphenols that are capable of promoting health status in humans. Thus, this study aimed at elucidating the bioactive components of these underutilized legumes vis-à-vis their roles in diseases prevention and management, delve into some of the myths responsible for their underutilization, and provide possible ways of incorporating them into our daily meal as functional foods and nutraceutical in diseases management. Finally, strategies pointing towards maximizing the use of these legumes must be properly addressed as these legumes appear to be a formidable resource in achieving good health and wellness.

Keywords: Underutilized legumes; human health, antioxidant, antihypertensive property.

Variability in responses of African yam bean breeding lines to nematode management on the field

Ayangbade*, D. Olufunmilayo, Agbenin, N. Ogechi, Itodo, E. Echeofun and Adewale, B. Daniel

Department of Crop Science and Horticulture, Federal University Oye-Ekiti, Ikole-Ekiti Campus, Nigeria. oluwafunmilayoayangbade@gmail.com

ABSTRACT (47)

Long time remark was that low or no input is needed for African yam bean production. However, there had been reports of nematode attacks with attending low grain yield in Southwestern Nigeria. The present study attempted to quantify variation among different African yam bean (AYB) breeding lines under managed and unmanaged field conditions. The experiment with four replicates had two levels of nematicides (Furadan) in the main plot and three AYB lines were in the sub-plot at the Teaching and Research farm, Federal University Oye-Ekiti, Ikole-Ekiti campus, Nigeria. Data were collected on grain yield characters and subjected to analysis of variance and mean separation using Tukey honestly significant differences. The three genotypes differed significantly ($p \leq 0.05$) for all traits, while with or without nematicide application significantly ($p \leq 0.05$) affected all the measured variables except pod length. In all cases (except pod length), Furadan application significantly ($p \leq 0.05$) improved grain yield determining traits in the three AYB lines. Performances of the three AYB lines was not consistent under the two treatment conditions for the measured traits. DW5 had the most superior means for pods/plant (43), pod weight/plant (212.7 g.), number of seeds/plant (16) and seed weight/plant (139.8 g). DW2 had the best seed weight/pod (4.33 g), but DW6 was the genotype with the longest (25.1 cm) pod length. This study noted that genotypes' response to treatments differ, identified nematode as significant pest of AYB and disproved the assertion that low or no input is necessary to enhance AYB grain yield.

Keywords: African yam bean, Furadan, grain yield, nematicides, root knot nematodes.

Growth and yield response of Bambara groundnut (*Vigna subterranea* L. Verdc) to spraying stages of brassinolide in Calabar – Nigeria

Effa, Emmanuel B.[1], Ekpenyong, Ekpenyong I.[1], Iyanda, Olumayowa J.[2*] and Shiyam, John O.[1]

[1]Department of Crop Science, University of Calabar, Calabar [2] Department of Agricultural Sciences, Afe Babalola University Ado-Ekiti, Ekiti State, Nigeria. iyandamayojo@abuad.edu.ng

ABSTRACT (48)

The potential of early-stage brassinolide application in enhancing the growth and yield of Bambara Groundnut, a neglected crop with significant opportunities for improving food security. A study evaluating the effectiveness of brassinolide sprayed at different growth stages on the performance of Bambara groundnut (*Vigna subterranea* L. Verdc) under field conditions was carried out at the Crop Science Teaching Farm, University of Calabar. Four treatments: zero sprays (control), spraying at seedling (3 weeks), vegetative, (6 weeks) and flowering (9 weeks) stages were applied, using a randomized complete block design with three replications. Data on crop growth and yield parameters were analyzed using GenStat 10.3 DE edition (2011), and post-hoc test on significant treatment means utilized Fisher's Least Significant Difference (F-LSD) ($P \leq 0.05$). Results indicated significant ($P \leq 0.05$) effects of brassinolide on height, canopy spread, leaf area index, days to 50% flowering, seed weight per plant, and seed yield per hectare. Spraying brassinolide at the seedling stage resulted in significantly ($P \leq 0.05$) taller plants with more branches and the highest canopy spread and leaf area index, followed by spraying at vegetative and flowering stages, with the least performance arising from the control. Plants sprayed at the seedling stage also produced the highest seed weight per plant, and seed yield per hectare in the study. The highest seed yield was obtained in plants sprayed early at the seedling stage (1.80 t/ha), followed by the vegetative stage (1.43 t/ha), and flowering stage (1.02 t/ha) corresponding to 56.67%, 45.46% and 23.53 % respectively compared to the control. Therefore, early spraying of brassinolide is most advantageous for higher yields in Bambara groundnut.

Keywords: Brassinolide, yield increase, neglected crops, opportunity, food security, Bambara groundnut, growth stages, agronomic practices.

Fusarium verticillioides **causing wilt disease in** ***Parkia biglobosa*** **seedlings in Nigeria**

Oyedeji, E.O [1*], Adebayo, A. G [1], Kareem K. T [2]., Olaleye, O [1]., Olabode, I. A [1]., Amosu, S. A[1]., Adeoluwa, O.O [1]., Akintoye, H. A [1]., Adebisi- Adelani. O [1]., Oladoja, S.A[1]

[1]National Horticultural Research Institute, P.M.B 5432, Ibadan, Oyo State, Nigeria. [2]Institute of Agricultural Research and Training, PMB 5029, More plantation, Ibadan. ennyhorlar@yahoo.com

ABSTRACT (49)

The study was conducted to isolate and identify the pathogen responsible for the wilting of *Parkia biglobosa* seedlings. Leaves showing wilt symptoms and soil samples were collected from *P. biglobosa* seedlings and the rhizosphere, respectively. The leaf samples were surface-sterilized and cultured on Potato Dextrose Agar (PDA) while soil samples were serially diluted and cultured on PDA. Pure culture was obtained and the pathogen identified morphologically. Pathogenicity test was carried out to fulfill Koch's postulate by re-inoculating the identified pathogen into healthy seedlings. Further identification was carried out using molecular technique. Cultural appearance revealed a growth pattern showing white aerial mycelium with pink to orange lower surface typical of *Fusarium verticilloides*. The morphology showed single-celled, oval to club-shaped microconidia while few macroconidia present appeared sickled oral most straight. Pathogenicity test further revealed that *F. verticilloides* was responsible for the wilting observed in *P. biglobosa* seedlings inoculated with the conidial suspension of the fungus while the un-inoculated control seedling remain healthy. Molecular analysis of the isolate further confirmed the pathogen to be *F. verticilloides*. The organism has about 99.01-99.81% match with *F. verticilloides* genes in the GenBank. The study concludes that proper identification is a prerequisite to disease management as this determine the type of management approach to adopt.

Keywords: *Fusarium* wilt, disease, isolation, parkia, pathogenicity

The Role of Underutilized Legumes in Food Security and Public Health

Aleke, C. N, Omoniyi, E. O.
International Institute of Tropical Agriculture (IITA) Ibadan, Oyo State, Nigeria.
chidinma.aleke.236655@unn.edu.ng +234-810-811-0131

ABSTRACT (50)

Legumes are crucial in global diets and health due to their dense nutritional profiles and functional properties. Although primary grain legumes have received some attention, less attention has been paid to neglected and underutilized legumes (NULs), even though they provide an opportunity to address the problems of malnutrition and food security in Africa. These food stuffs include but are not limited to Bambara groundnut (*Vigna subterranea*) and African yam bean (*Sphenostylis stenocarpa*) which have good quality nutritious value, and these include dietary fibers, essential amino acids, polyunsaturated fatty acids, and bioactive compounds. The use of neglected and underutilized legumes (NULs) remains limited, with relatively few studies or applications extending beyond their current known uses. This work surveyed two African NULs and described their nutritional and functional characteristics and potential for enhancing food security. It also draws attention to several advantages of using NULs, especially Nitrogen fixing, which is important in improving soil fertility and making sustainable agriculture. Furthermore, the factors that limit their absorption into national and international supply chains were also considered with recommendations on how to increase production and demand of these crops. These challenges cannot be underestimated and must be tackled to enable NULs to perform the intended roles of spearheading sustainable agriculture and a resilient food security system as well as enhancing public health.

Keywords: Sustainable agriculture, Food security, Neglected and underutilized legumes (NULs), Nutritional profiles, and public health

Consumers' evaluation, proximate composition and antioxidant activity of "Okpehe" – a fermented *Prosopis africana* seeds with *Zingiber officinale* and *Thymus vulgaris*

***Clement Olusola Ogidi, Oluwatoyin Ajoke Oladeji and Adeyanmola Oluwaseyi Faturoti**
Department of Food Science and Technology, Olusegun Agagu University of Science and Technology, Okitipupa, Nigeria. clementogidi@yahoo.com, co.ogidi@oaustech.edu.ng

ABSTRACT (51)

Fermented condiments are cheap source of plant protein usually added to food to impart specific flavour, taste etc. "Okpehe" is fermented condiment derived from *Prosopis africana* seeds, it's use is not wide in most parts of Nigeria. Odour from it and colour often limit its acceptance. The present study was designed to produce "Okpehe" with spices in order to improve its attraction among consumers and enhance its nutritional qualities. "Okpehe" without spices (OSS), "Okpehe"with *Zingiber officinale* (OZF), "Okpehe" with *Thymus vulgaris* (OTH), Okpehe with *Zingiber officinale* and *Thymus vulgaris* (OZT) were the treatments. The proximate composition, amino acids and antioxidant activity of "Okpehe" were determined using standard methods. The overall acceptability of OZT, OTH and OZF by consumer (6.80) was significant (p=0.05) to OSS with 5.00. "Okpehe" with *Zingiber officinale* and *Thymus vulgaris* (OZT) had the highest protein, crude fibre, and ash contents of 38.40%, 9.30% and 0.93%, respectively. Likewise, OZT had the highest glutamic acid and aspartic acid of 11.02 mg/100g and 7.80 mg/100g respectively. Extracts from OZF, OTH and OZT significantly (p=0.05) scavenged the activity of 1, 1-diphenyl-2-picryhydrazyl (DPPH) with respective values of 64.60%, 67.7% and 75.80% compared to 55.30% in OSS. From this study, supplementation of "Okpehe" with spices improved nutritional qualities, its acceptability and appeal to consumers.

Keywords: fermentation, fortification, protein, spices.

In vitro **bioactive components and antioxidant activities of seeds of different accessions of Bambara groundnut and Lima beans**

Soetan, Kehinde Olugboyega[1]*, Olaiya, Charles Ojo[2], Karigidi, Kayode Olayele[3]
[1]Department of Veterinary Physiology and Biochemistry, University of Ibadan, Oyo State 100002, Nigeria. [2]Department of Biochemistry, College of Medicine, University of Ibadan, Oyo State 100002, Nigeria. [3]Department of Chemical Sciences (Biochemistry Programme), Olusegun Agagu University of Science and Technology, Okitipupa, Ondo State, Nigeria. kehinde.soetan@gmail.com

ABSTRACT (52)

Bambara groundnut (BG) and Lima beans (LB) are among the prominent underutilized legumes with numerous nutritional and health benefits. In this present study, the bioactive components and antioxidant activities were sought in three accessions of BG (TVSU-688, TVSU-870, TVSU-879) and six accessions of LB (2006-001, 2006-003A, 2006-004, 2006-009, 2006-011, 2006-015) seeds. The bioactive component determined were total phenolic (TPC) and total flavonoid (TFC) contents while antioxidant ability was by 2, 2-diphenyl-1- picrylhydrazyl (DPPH) scavenging effect, reducing power (RP) and total antioxidant capacity (TAC) using standard methods. The results showed appreciable content of TPC and TFC. The TPC ranged from (0.70 - 0.74 mg GAE/g Bambara groundnut; 0.75 - 0.90 mg GAE/g Lima beans) while the TFC ranged from (0.18 -0.32 mg QUE/g Bambara groundnut; 0.10 - 0.44 mg QUE/g Lima beans) respectively. They exhibited antioxidant properties; TAC (0.62-0.86 mg AAE/g Bambara groundnut; 0.52-1.00 mg AAE/g Lima bean), DPPH (48.69-53.84 % inhibition Bambara groundnut; 22.92-74.26 % inhibition Lima bean) and Reducing power (0.16-0.21 mg AAE/g Bambara groundnut; 0.17-0.23 mg AAE/g Lima beans). Seeds of accessions of Lima bean showed significant ($p < 0.05$) higher antioxidant activity above Bambara groundnut. With the results obtained in this study, Lima bean and Bambara groundnut could be used in management of oxidative-related diseases in human being.

Keywords: Accessions; Bambara groundnut; Bioactive components; Lima bean

Characterisation of Iron Acquisition Metabolising Microbes in Cowpea Rhizosphere using Shotgun High-throughput Sequencing

Kehinde Abraham Odelade, Adijat Abosede Onaolapo, Seun Seidu , Abdulmuiz Oyewale Olabooye. onaolapoaa@federalpolyayede.edu.ng. 08032520810

ABSTRACT (53)

Nutrient acquisitions are very crucial in the development and growth of cowpea plants. Unfortunately, the nutrients are not readily available in the soil. Hence, the applications of artificial synthetic chemicals to promote plant productivity. However, these chemicals are commonly accompanied by adverse and long-term effects on both primary and secondary consumers. Thus, there is a need for better alternatives to enhancing plant growth. This study investigated microbes from cowpea plants at different seasons, possessing genes expressing protein products that can metabolize inorganic forms of phosphorus and iron to make them available to plants using culture-independent approach (shotgun high-throughput sequencing) and in-silico analysis. Functional characterisations from this study revealed several genes and ORF genes coding for various putative protein products involved in several molecular functions and biological processes in iron acquisition metabolisms. Iron acquisition metabolism, gene and ORF gene_fhuA and AHA_1953 that encoded ferrichrome-iron receptor protein responsible for siderophore uptake transmembrane transporter activity and iron-ion homeostasis; gene and ORF genes (Fur, b0683, JW0669, PA4764, VAA_03429, VP0833) coding for ferric uptake regulation protein responsible for ferrous iron binding and involved in siderophore biosynthetic process among others were identified in the cowpea soil samples. Similarly, functional diversity revealed that *Pseudomonas aeruginosa*, *Synechocystis sp.*, *Escherichia coli*, *and Bacillus subtilis, among others, were significantly higher in the Winter Season (WS) than in the Summer Season (SS), while Mycobacterium tuberculosis, among others,* was slightly higher in SS than WS. Conclusively, iron metabolism's functional activities and diversity were significantly higher in WS than SS.

Keywords: Winter season (WS), Summer season (SS), Functional diversity, Iron metabolism

Enhancing biogas yield from bamboo wastes (*Bambusa vulgaris* L.) through pre-treatment techniques

Anoliefo GO, Ugheighele FO, and Ikhajiagbe B
Department of Plant Biology and biotechnology, University of Benin, Benin City
beckley.ikhajiagbe@uniben.edu

ABSTRACT (54)

Bambusa vulgaris, a rapidly growing perennial woody plant, is a versatile and sustainable biomass resource with numerous applications. This study seeks to optimize pre-treatment techniques to enhance biogas yield from bamboo wastes, thereby advancing waste management and eco-friendly sustainable energy production. The research addresses the complex lignocellulosic structure of bamboo, which hinders effective anaerobic digestion, by evaluating various pre-treatment methods and assesses the impact of specific biological pre-treatment techniques to increase biogas yield and improve system efficiency. Results unveil varied gas production dynamics and substrate characteristics among different treatments, with poultry dung-adjusted bamboo substrate (PGbmb) demonstrating the highest gas production rates, peaking at 975 ml at 200 hours. Regression analysis establishes significant correlations between gas production volume and time, highlighting the effectiveness of certain pre-treatment methods. The rate of gas production varies among treatments, with PGbmb achieving the highest rate of 14.84 ml/hr, while gas production in the yoghurt-enhanced substrate (YGbmb) had the lowest rate at 0.46 ml/hr. Nutrient analysis of biodigestate revealed differences in nutrient content among bamboo-modified substrates, with PGbmb, CDbmb, and YGbmb exhibiting higher nitrogen and phosphorus levels compared to the control. Observations of substrate characteristics, including odor and vapor coverage, provide insights into the effects of pre-treatment on substrate composition and anaerobic digestion processes. YSbmb produced the strongest (pungent) smell. Vapor coverage varies among treatments, with CDbmb showing the highest coverage at almost 60% of the measuring cylinder. Overall, this research contributes to the optimization of biogas production from bamboo wastes.

Keyword: *Bambusa vulgaris,* biogas, biodigestion, optimization, biomass

Enhancing Vegetative Growth of *Talinum triangulare* L. in Urban Agriculture: The Impact of Stored Human Urine as an Organic Manure in Alihame Community, Nigeria

U. A., Akporobaro[1*], and E. P. Akporobaro[2], and J. A. Obiaigwe[3]

[1, 3]Department of Plant Science and Biotechnology, Faculty of Science, University of Delta, Agbor, Delta State, Nigeria; [2]Aradhe Grammar School, College Road, Kwale Ozoro Road, Delta State, Nigeria;

*agnesuyoyou@gmail.com;

ABSTRACT (55)

This study examines the efficiency of 17-day stored human urine as an organic manure to improve the growth and productivity of *Talinum triangulare* in Alihame Community, Nigeria. Given the economic hardships faced by local farmers and declining soil fertility, this research aimed to determine if stored human urine could be a viable alternative to replenish infertile soil. Experimental pots were treated with two different concentrations of human urine (360.10 mL and 620.10 mL) and compared against a control (0 mL). Key growth parameters were plant height, number of leaves, number of branches, and stem girth were measured at 11, 18, 25, and 30 days while chlorophyll content, leaf relative water content, and fresh weight of leaves, shoots, and roots were measured at 30 days. The results revealed significant improvements in all parameters with urine treatments compared to the control. *Talinum triangulare* treated with 620.10 mL of urine exhibited the highest growth metrics across all parameters. This study demonstrates that 17-days stored human urine can be as effective as organic manure in improving plant growth and productivity, suggesting its potential for sustainable agricultural practices.

Keywords: Stored urine, organic manure, *Talinum triangulare,* soil fertility, plant growth, sustainable agriculture.

Nourishing the Future: The Impact of Climate Change, Legume Production on Nutrition in Africa

Nneji Ifeyinwa Umeokeke and Adebola Adekunle Shote
ifeyinwaumeokeke9@gmail.com

ABSTRACT (56)

Over 700 million people globally are undernourished with the highest impact in sub-Saharan Africa especially in Central Africa. Global food demand is projected to increase by more than 50% by 2050. However, the impact of climate change is expected to drive down crop productivity. Global food security is threatened by overreliance on a few staple crops, including maize, wheat, and rice. Underutilized legumes are high in protein and secondary metabolites, highlighting their role in correcting nutritional inadequacies. Assessing the trend in underutilized crops like beans and groundnuts and their contribution to addressing malnutrition is vital in ensuring health. This research evaluated the contribution of leguminous crops and climate change to food security (undernourishment) in Central Africa. Data on temperature change, the number of undernourished people, and crop yield (beans and groundnut) were obtained from the FAOSTAT spanning from 2010 to 2022. The Vector Autoregressive (VAR) and Panel Vector Autoregressive (PVAR) models were used to assess the impact of climate change, and crop yield on undernourishment. To complement the results, temperature, and crop yield forecast maps were obtained from the FAO's Global Agro-Ecological Zones (GAEZ) dataset. Results showed previous or past incidences of undernourishment significantly and positively affect the present value of undernourishment in Cameroon, DRC, and Chad. An increase in groundnut yield significantly reduced the number of undernourished by 50 persons in Central Africa. Also, in fifteen years, the number of undernourished people significantly increased due to an increase in temperature. Crop yield will fluctuate as a result of temperature change. The study calls for smart strategies that will ensure the use of climate-smart technologies in the production of groundnuts.

Keywords: Undernourishment, Climate change, legume yield, Africa

Proximate and selected phytochemical characteristics of cookies produced from blends of Cassava and Bambara nut flour

Akintola A.,[1*] Anifowose, M. T.,[2] Oyeniyi, A. O.,[3] Ogunsola, F. O.,[3] Akintola T. M.,[4] and Joseph, C. A.[3]

[1]Department of Agricultural and Bio-Environmental Engineering, Oyo State College of Agriculture and Technology, Igboora. [2]Department of Post-Harvest Technology, Oyo State College of Agriculture and Technology, Igboora. [3]Department of Food Technology, Oyo State College of Agriculture and Technology, Igboora.[4]Department of Food Technology, University of Ibadan, Ibadan. akintunde.akintola@yahoo.com

ABSTRACT (57)

Cookies were made from Bambara nut and cassava based composite flour to improve the nutritional balance of the product. Bambara was listed among the top three crops with protein contents. The proximate and phytochemical characteristics of cookies made from blends of cassava and Bambara nut (BC) flour were analyzed in this study. The cookies were prepared using different proportions: 30:70, 40:60, 50:50, 60:40 and 70:30 of Bambara nut and cassava flour, respectively using 100% of cassava flour as control. The samples were then tested for their nutritional content as well as their phytochemical content, including phenolic compounds and antioxidant activity. The data obtained was statistically analyzed using analysis of variance (ANOVA). Proximate composition of cookies showed that BC composite flour significantly reduced the carbohydrate content and it ranged from 50.86-61.67% with the lowest gotten from 40:60 while the control had a very high carbohydrate content of 81.71%. Protein content ranged from 13.47-23.77% with the highest protein content in blend 40:60 while fat content ranged between 10.58 and 12.00%, these values are significantly higher than the control at $p< 0.05$. The phytochemical properties of the blends were significantly higher than the control at $p< 0.05$ with Tannin and Saponin content ranged from 0.06 – 0.18mg/100g and 0.43 – 0.77mg/100g, respectively. Cyanide content was comparably low in all the blends. This showed that inclusion of Bambara nut flour in the composite flour reduced the cyanide content of the cassava flour. Cookies produced with addition of Bambara nut flour with up to 40% substitution in cassava flour will produce a more nutritional balance with considerable number of phenolic compounds and antioxidants and as well promote utilization of Bambara nut.

Keywords: Bambara nut, Cassava flour, cookies, nutrition, antioxidants, phenolic compounds.

Food safety, nutrition and cooking preferences of underutilized legumes in sub-Saharan Africa

[1,2,3]Adegboyega Taofeek Tope, [4]Oluwafunmilayo Olarewaju, Aminu, [5]Olawale Olatidoye, [6]Samson Olusoji Afolabi, [1]Hassan Madinat, [7]Fagbemi Stephen Akintomide, Oluranti Olubukola Babalola, [8]Ikhajiagbe Beckley.

[1]Air Force Institute of Technology, Kaduna, Kaduna State, Nigeria. [2]Food Security and Safety Niche Area, Faculty of Natural and Agricultural Sciences, North-West University, Mmabatho, 2735, South Africa.[3]Department of Microbiology & Parasitology, University of Rwanda.[4]Department of Agricultural Economics and Extension, Olusegun Agagu University of Science and Technology, Ondo State, Nigeria. [5]Department of Food Technology, Yaba College of Technology, Lagos, Nigeria. [6]Glorious Vision University, Ogwa, Edo State, Nigeria [7]Nigerian Institute of Food Science and Technology, Abuja, Nigeria.[8]Dept. of Plant Biology and Biotechnology, University, Benin City

tope.gboyega@yahoo.com

ABSTRACT (58)

Sub-Saharan Africa's underutilized legumes (UL) hold significant nutritional value, yet their consumption is limited by knowledge gaps surrounding food safety, nutrition, and culinary appeal. This study investigates the food safety profiles, nutritional content, and cooking preferences of underutilized legumes. Using Google Forms, a cross-sectional survey was conducted among a convenience sample of 146 respondents. Means, percentages and Chi-square were used for data analysis. Majority were males (51.0%). Most available UL are Bambara groundnut (48.3%) and African yam bean (46.9%). UL is mostly consumed weekly (49.7%). UL meals consumed include beans porridge (58.6%), bean-based soup (46.2%), moin-moin (46.2%), akara (40.0%) and okpa (36.6%). Majority agreed that consumption of UL is highly beneficial to human health (mean=4.23) and safe (mean=3.89). The main barriers to UL consumption were long cooking time (61.4%), lack of knowledge/skills of cooking (39.3%), and scarcity of seeds (29.7%). Household members consumed UL based on main household cook (32.2%), household food purchaser (31.5%) or family head (29.5%) decisions. Majority were non-vegetarian (100.0%) and had no medical complication consuming UL (88.3%). There was a significant relationship between sex (X^2=11.334; p≤0.01), age (X^2=25.820, p≤0.05) and dietary categories of the respondents. These findings provide valuable insights into the attitudes/perceptions, consumption patterns and needs of UL consumers. The study identifies areas for educational interventions to promote safe consumption and handling of underutilized legumes, thereby contributing to improved food security and nutrition in sub-Saharan Africa.

Keywords: Underutilized legumes, food safety, nutrition, cooking preferences, sub-Saharan Africa, sustainable agriculture.

Comparative Studies of Phytochemical Properties of *Carica papaya* (Pawpaw) Leaves and Roots

[1]Aasa-Sadique A.D, [2]Oladipupo A.O and [3]Abejoye A.O.

[1]Department of Science Education, School of Vocational and Technical Education, [2]Department of Applied Sciences [3]Department of Science Laboratory Technology, Osun State Polytechnic, Iree.

ABSTRACT (59)

Carica papaya is an herbaceous plant whose fruits, leaves, seeds and roots are used medicinally. Leaves and roots were collected from Iree town in Boripe Local Government Area of Osun State, Nigeria and screened for qualitative and quantitative phytochemical content using standard methods of analyses. Six out of the seven phytochemical determined were present and at appreciable amount. The phytochemical quantities were more in the leaves than the roots. This implies that to effectively maximize the impacts of the phytochemical determined, the leaves are preferred. The various phytochemical compounds detected are known to have beneficial uses in industry and medical science and also exhibit physiological activities.

Keywords: Phytochemical, Carica papaya, Medicinal, Leaves, Quantitative

Underutilised Legumes as Possible Sources of Antioxidant and Antidiabetic Agents

Islamiyat O. Arilomo[1*], Priscilla O. Aiyedun[1,2], Mubo A. Sonibare[1]
[1] *Department of Pharmacognosy, Faculty of Pharmacy, University of Ibadan, Ibadan, Nigeria.*
[2]*Genetic Resource Center, International Institute of Tropical Agriculture, Ibadan, Nigeria.*
arilomoislamiyat@gmail.com

ABSTRACT (60)

Diabetes rates are increasing globally. The pathophysiology of many diseases, including diabetes, is linked to oxidative stress. Antioxidants help balance pro- and anti-oxidants. Due to the side effects of synthetic antidiabetic drugs, natural alternatives are important. This study investigates the antioxidant and antidiabetic properties of seeds from three underutilised legumes- C*anavalia gladiata* (TCg), *Psophocarpus tetragonolobus* (TPt), and *Sphenostylis stenocarpa* (TSs). Dried seeds of accessions of the legumes were collected, pulverised, macerated in distilled ethanol and concentrated *in vacuo*. Crude extracts of the plants were assayed for their total phenolic content (TPC), total flavonoid content (TFC), and 2,2-Diphenyl-1-picrylhydrazyl (DPPH) scavenging activities. Antidiabetic activity was assessed by testing the extracts' ability to inhibit α-amylase and α-glucosidase enzymes with standard acarbose. Percentage inhibition and IC_{50} values were calculated. The extracts of TCg-1 (322.2 mgGAE/g), TPt-31 (76.5 mgGAE/g) and TSs-156 (389.9 mgGAE/g) had the highest TPC, while TCg-4 (18.99 mgREQ/g), TPt-31 (31.63 mgREQ/G), TSs-121 (37.32 mgREQ/g) had the highest TFC. The DPPH scavenging activities of the samples ranged from 0.11 mg/mL (TPt-33) to 3.07 mg/mL (TCg-3). None of the extracts inhibited α-glucosidase at 1 mg/mL compared to acarbose (IC_{50}: 0.40 mg/mL), TSs- 121 and TCg-4 (IC_{50}: 0.90 mg/mL and 0.98 mg/mL) moderately inhibited α-amylase, compared to the standard drug acarbose (IC_{50}: 0.35 mg/mL). The significant TPC and TFC in *Canavalia gladiata*, *Psophocarpus tetragonolobus* and *Sphenostylis stenocarpa* and the α-amylase inhibition observed in *Sphenostylis stenocarpa* (TSs-121) and *Canavalia gladiata* (TCg-4), highlight the therapeutic potential of these underutilised legumes, suggesting them as viable sources of natural antioxidant and antidiabetic agents.

Keywords: Underutilised legumes, Fabaceae, Antioxidant, Antidiabetic

Grain Amaranth (*amaranthus hypochondriacus*) as a source of plant protein for sustainable livelihoods.

AFOLABI Samson Olusoji (PhD)
Glorious Vision University (formerly Samuel Adegboyega University), Farm and Environment Unit, Ogwa, Edo State, Nigeria sofolab@googlemail.com +2348032519376

ABSTRACT (61)

The emerging role of Grain Amaranth (*Amaranthus hypochondriacus*) as an opportunity crop in view of the current increasing global challenges of food insecurity and emerging diseases is the focus of this review study. It is one of about sixty species in Amaranthus genus in the Amaranthaceae family. The crude protein content of 17.4% made it a choice vegetable for the leaves and the seed which is grain cereal with cream colour . The seed can be consumed directly or processed into various forms for different uses or as food supplement. The protein value with its essential amino acid contents is very close to the optimum balance required in human diet based on Food and Agriculture Organization and World Health Organization standards. The vitamins A, B2 and C with mineral contents of calcium, iron and potassium placed the value on the crop as source of antioxidant and detoxifier. Conclusively the growing threat of food insecurity and malnutrition underscores the value of this crop for commercial exploitation as an opportunity crop to enhance sustainable livelihoods. The recommendation is on need for further research to unearth the value of its phytonutrients on human health.

Keywords : Grain Amaranth. Cereal. Grains. Protein. Antioxidant.

Analysis of a Combined Effect of Socio-Economics and Agribusiness Factors on Soybeans Production as an Opportunity Crop in Dutse LGA, Jigawa State, Nigeria.

A. B. Aliyu*[1] and J. Usman[2]

[1]Department of Agricultural Economics and Extension, Faculty of Agriculture, Federal University Dutse. [2]Adamawa State University, Mubi. Adamawa Stat

abdualiyu14@ymail.com, abdurrahma.aliyu@fud.edu.ng

ABSTRACT (62)

The study examined the combined effects of socioeconomics characteristics and agribusiness factors on soybean as an opportunity crops in Dutse Local government area, Jigawa state, Nigeria. Primary data were collected with the aid of questionnaires from 150 respondents using simple random sampling technique. Data were analysed using descriptive statistics and multiple linear regressions model. The results revealed that majority of the respondents (76% were male), 40% attended secondary eduction,60% has no formal access to credit facilities, 70% had no extension contact. Regression analysis indicated that both socio-economic factors such as income, education, age, gender and access to credit facilities and agribusiness factors such as market access, value addition and extension services significantly affect soybeans profitability. The study recommends improvement in respondents' access to credit facilities, enhances market access and value addition for soybeans and promoting soybeans production and marketing in Dutse LGA.

Keywords: Socio-economics, Agribusiness, Soybeans, Opportunity crop, Dutse LGA.

Influence of watering regime and inoculant on germination and performance of African yam bean under drought conditions in Ado-Ekiti.

[1]Olajide O.O and [2]Alabi B.T

[1] Department of Crop Horticulture and Landscape Design, Ekiti State University, Ado-Ekiti, Ekiti State.
[2]Department of Agricultural Science and Technology, [2]Bamidele Olumilia University of Education, Science and Technology, Ikere Ekiti, Ekiti State.
olubunmi.olajide@eksu.edu.ng; +234 8035645259

ABSTRACT (63)

This study was carried at the Teaching and Research Farm of Ekiti State University (EKSU), Ado-Ekiti, Ekiti State to examine the Influence of watering regime and Inoculant on germination performance of African Yam Bean under drought condition in Ado-Ekiti. The experiment was designed using a Complete Randomized Design (CRD) with three replicates, involving two accessions of African yam bean (Tss67 and Tss10), two watering regimes (well-watered and water stress), and four Rhizobium strains; RAM122, NAK128, USDA9032, and RACA6. Prior to planting, AYB seeds were soaked with each Rhizobium strain for 24 hours. Growth parameters taken include; Days to seed emergence (DTSE), vine length (VL), number of leaves per plant (NLP-1), and stem girth (SG), measured at 2, 4 and 6 weeks after planting. The results revealed that the NAK128 strain consistently enhanced growth of the accessions across the parameters measured. Well-watered conditions improved vine length and leaf production, thus underscoring the critical role of adequate irrigation in AYB cultivation during drought period. Interaction analysis demonstrated the effectiveness of certain Rhizobium strains, such as RAMI22 and RACA6, which were more pronounced under well-watered conditions, while NAK128 maintained stronge performance across both water regimes. The study concluded that selecting appropriate Rhizobium strains, particularly NAK128, and ensuring consistent irrigation are essential for optimizing AYB seedling growth during prolong drought period.

Keywords: African Yam Bean, watering regimes, and Rhizobium strains

Nitrogen fixation in common green bean (Phaseolus vulgaris L.)– A review

Victor Adebanjo Dada[1, 2 3*], Olaniyi Oyatomi[2] Olubukola Oluranti Babalola[1] and Michael Abberton[2]

[1]Food Security and Safety Focus Area, Faculty of Natural and Agricultural Sciences, North-West University, Private bag X2046 Mmabatho, 2735, South Africa. [2] Genetic Resources Center, International Institute of Tropical Agriculture (IITA), PMB 5320, Oyo Road, Ibadan, Nigeria.[3] Department of Crop and Soil Science, Washington State University, Pullman, United State.

v.dada@cgiar.org

ABSTRACT (64)

Legumes have the ability to form symbiotic relationship with nitrogen fixing soil bacteria called Rhizobia. As a result of this symbiosis nodules form on the root of the plant. The common green bean (*Phaseolus vulgaris L.*) exhibits nitrogen fixation which is an essential biological activity that supports soil fertility and plant growth. This procedure is carried out in a symbiotic connection with nitrogen-fixing bacteria, mainly Rhizobium species which create root nodules where the nitrogenase enzyme converts atmospheric nitrogen (N_2) to ammonia (NH_3). The plant absorbs this ammonia and uses it to produce vital nitrogen compounds, such as amino acids, which aid in growth and development. Common beans, on the other hand, require additional nitrogen fertilizer frequently due to their relatively low nitrogen fixation efficiency when compared to other legumes. The success of nodulation and nitrogen fixation is dependent on a number of factors, including soil pH, moisture content, nutrient availability, and the potency of Rhizobium strains. To enhance nitrogen fixation in common green bean strategies such as inoculating common beans with efficient Rhizobium strains and enhancing soil conditions to promote nodulation and nitrogen uptake are essential. This review emphasizes sustainable agricultural practices while highlighting the mechanisms, difficulties, and possible solutions to enhance nitrogen fixation in common bean cultivation.

Keywords: Agronomic practices, biological nitrogen fixation, nitrogenese, rhizobium, soil fertility

Effect of phosphorus levels on soybean nodulation and some post-harvest soil properties

***Okunade, R.F.[1] Onasanya, R. O.[1] Makinde I. A. [1], Isiak T[2]**

[1]School of Agriculture, Federal College of Agriculture, Moore plantation, Ibadan [2]Department of Agricultural Extension and Management, FCA Moor Plantation Ibadan

racheal.okunade@yahoo.com +2347032789474.

ABSTRACT (65)

Phosphorus is known to be a major nutrient that has significant effect on the growth and nodulation of legumes. A field experiment was conducted at the experimental site of the Federal College of Agriculture, Moor Plantation, Ibadan to determine the effect of phosphorus levels on soybean (*Glycine max*) nodulation and on some post-harvest soil properties. The experiment was laid out in a Randomized Complete Block Design (RCBD) with four treatments replicated three times, the treatments which were different levels of phosphorus fertilizer are 0, 20, 40 and 60kg/ha. Two seeds of Soybean sown per hole. Parameters taken were Yield of soybean, Number of Nodules, Weight of Nodules, nitrogen fixation by soybean, available phosphorus and organic matter of the post-harvest soil. The result obtained showed that the treatment of soybean with 60kg /ha of P_0O_5 gave the highest yield of 979.73kg/ha, Similarly, produced the highest nitrogen content (1.40g/kg) and highest organic matter content (24.26g/kg) in the post-harvest soil. However, the highest number of nodule was produced by the soybean treated with 20kg/ha of P_0O_5 (6.08), least number was produced with 60kg/ha of P_0O_5 (2.92 nodules). Phosphorus levels had no significant effect on weight of nodules. It is therefore recommended that 60kg/ha of P_0O_5 on soybean is more promising for optimum yield, more nitrogen fixation by soybean and more organic matter in the postharvest soil which of course will be beneficial to the subsequent crop.

Keywords: soybean, nodulation, nitrogen content, organic matter, phosphorus

Influence of associated anions on the morphological responses and rhizospereric bacteria composition of *Celosia argentea* L. to sodic salinized soil

Deborah Efoise Ero-Omoighe[1], Uzoamaka N. Ngwoke[2], Boniface O Edegbai[1], Saikat Mazunder[2], Beckley Ikhajiagbe[1]

[1]Department of Plant Biology and Biotechnology, University of Benin, Benin City, Nigeria [2]Benson Idahosa University Benin City, Nigeria. [3]Guru Nanak Institute of Technology, Kolkata

beckley.ikhajiagbe@uniben.edu

ABSTRACT (66)

This study examines the impact of associated anions on the morphological responses and rhizospheric bacterial composition of Celosia argentea L. grown in sodic salinized soil. Conducted in the University of Benin's Department of Plant Biology and Biotechnology botanic garden, the experiment aimed to elucidate the effects of sodic salinization on plant growth and microbial communities. Soil samples were collected, bulked, and distributed into 44 bowls, which were then sodicized with NaCl solution for six weeks to simulate saline conditions. Comprehensive analyses revealed significant variations in morphological parameters, including plant height (24.85-34.85 cm), leaf number (29.17-49.55), leaf area (19.11-30.93 cm^2), seed weight (0.542-0.69 g), above-ground biomass (14.58-21.61 g), and foliar yield (4.128-6.914 g). Physicochemical characterization showed pH ranges of 5.75-5.85, electrical conductivity of 89.20-131.38 µS/cm, and varying levels of organic carbon (0.012-0.48%), total nitrogen (0.01-0.04%), and essential minerals (Na, K, Ca, Mg). These findings demonstrate the complex interactions between sodic salinization, plant growth, and soil properties. Molecular identification revealed a diverse array of bacterial strains, including *Klebsiella aerogenes, Serratia marcescens, Escherichia coli, Bacillus safensis,* and *Enterobacter cloacae*, inhabiting the rhizosphere of *C. argentea*. The study's outcomes suggest that optimal growth and development of *C. argentea* occur in moderately saline soils, with 100% germination achievable in NaCl-free nurseries and maximum growth upon transplantation to moderately saline soils. These findings have profound implications for enhancing food productivity and ensuring food security, particularly in regions with saline soils. The research provides valuable insights into the effects of sodic salinization on plant-microbe interactions, informing strategies for sustainable crop production in saline environments.

Keywords: Sodic Salinization, Rhizospheric Bacteria, *Celosia argentea,* Plant Growth, Soil Microbial Communities, Saline Soil Tolerance

Growth responses of *Sorghum bicolor* (L) Moench in a ferruginous soil after chemo-priming

Beckley Ikhajiagbe[1], Florence N. Egbenoma[1], Afamefuna Dunkwu-Okafor[2]; Blessing I. Odeh[1]

[1]Department of Plant Biology and Biotechnology, University of Benin, Benin City
[2]Dept of Microbiology, University of Benin, Nigeria. beckley.ikhajiagbe@uniben.edu

ABSTRACT (67)

Food insecurity is a major problem in most developing countries in the world. Sorghum being a staple food and an important cereal grown in arid and semi-arid regions of the world can be produced to address this global challenge. In order to achieve this objective, it is important to ensure capacities for the plant to grow particularly under environmentally stressed conditions are enhanced. In this present study, seeds that were exposed to ferrugenicity were chemo-primed using sodium nitroprusside, thiourea, and vitamin c at three respective concentrations of 50ppm, 250ppm and 450ppm each. Before seeds were exposed to ferrugenicity, there were first primed in these solutions for 3hrs. Result showed that, chemo-priming with the test treatments did not significantly impact peak period of germination, median germination time as well as germination percent. However, the time spread of germination was significantly impacted when seeds where primed with 450ppm Sodium nitroprusside form 22.5hrs to 49.1hrs, thereby indicating a significant delay. Although it was expected that chemo-speed, but it did not in the present study within the concentrations considered. However, with regards to rooting parameters exposure of seeds to chemo-priming prior to sowing, significantly enhanced capacity of the roots to produce branches; they were an average of four root branching in the control and seeds exposed to ferrugenicity (without priming); compared to 6.0-7.0 root branching per plant with the test treatments. No significant impact on chlorophyll content index was reported; chlorophyll content index ranged for 1.1-2.2 CCI. In the present study, result showed generally that although no significant impact in germination time and capacity was reported, the significant enhancement on rooting parameters where however recorded. This is critical for crop development as the root is a plant structure for obtaining necessary nutrient and moisture for further development.

Keywords: Seed priming, *Sorghum bicolor,* germination, ferruginous soil, iron toxicity

Comparative Analysis of Morphological Variations and Nutrient Absorption Between Hydroponics and Soil Cultivated Lima Bean (*Phaseolus Lunatus*)

Odesola, K. A.[1,2], Etatuvie, U. E.[1], Ogunsola, K. E.[1].
[1]*Department of Biological Sciences, Bells University of Technology, Sango Ota, Ogun State Nigeria.,*
[2]International Institute of Tropical Agriculture, Idi-Ose, Oyo Road, Oyo State, Nigeria
kaodesola@bellsuniversity.edu.ng

ABSTRACT (68)

Soil degradation and climate change are affecting agricultural land and food production. Soilless farming, or hydroponic farming, offers a solution to mitigate soil damage and improve sustainable food security. This study compared the morphological traits and nutrient uptake among Lima Bean (*Phaseolus lunatus)* plants hydroponically cultivated to those on soil. Thirty Lima Bean accessions were grown in both a low-cost hydroponics (Deep-Water Culture) system and on potted soil. Morphological parameters (plant height (PH), leaf length (LL), leaf width (LW), branching orientation, ramification index, leaf anthocyanin, and leaf color intensity) were measured bi-weekly for 8 weeks Nutrient uptake was assessed by monitoring the electrical conductivity (EC) and pH levels of the hydroponic solution. No significant differences ($F = 0.160$, $p > 0.689$) were found in PH between hydroponically (2.7-235.0cm) and – soil cultivated plants (2.7-170.9cm) Similar results were obtained for branching orientation, ramification index, leaf anthocyanin, and leaf color intensity between the two cultivation methods. Hydroponics however produced higher LL (15.4cm) and LW (5.4cm) than the soil-grown plants (9.3 and 2.2cm). The accessions exhibited significant heterogeneity in electrical conductivity (EC) values across different time periods. The hydroponically grown consumed nutrients at a fast rate indicated by the rapid decline in nutrient concentration (EC) within the hydroponic system. This indicated that hydroponics effectively supports plant growth with higher leaf length and width, and dynamic nutrient uptake capabilities. The study suggests that hydroponic cultivation is a viable alternative to traditional soil-grown system.

Key words: Hydroponics; Nutrient uptake; Morphological parameters; *Phaseolus lunatus*; Electrical conductivity

The chemical composition of some browse leaves in Ikole-Ekiti, local government area, Nigeria.

***O.M. Lala[1], A.H. Ekeocha[1], A.A. Aganga[1]**
*[1]Department of Animal Production and Health, Federal University Oye-Ekiti, Ekiti State, Nigeria.*oyepejulala@gmail.com

ABSTRACT (69)

Browse leaves are a potential alternative feed source for livestock due to their higher protein content compared to mature grasses. Given the rising costs of conventional feed ingredients, identifying cheaper alternatives is crucial for sustainable livestock production. Fresh leaves of *Gmelina arborea, Gliricidia sepium*, *Moringa oleifera, Magnifera indica* and *Anacardium occidentale* browse leaves were collected from three (3) different areas in Ikole-Ekiti, evaluating their composition and mineral content as a feed source for livestock. This finding is crucial for sustainable livestock production. The chemical composition was determined according to the method of AOAC 2000 while data obtained was subjected to analysis of variance and significant means were separated using turkeys honestly significance. The study found that *Gmelina arborea* had the lowest crude protein content, while *Moringa oleifera* (19.94 ± 0.20%) had the highest. *Anacardium occidentale* had the highest dry matter, fat, ash and crude fiber content as well as soluble carbohydrates. *Gliricidia sepium* had the lowest amount of soluble carbohydrates. *Moringa oleifera* had the highest potassium, sodium, iron, and phosphorus levels, while *Anacardium occidentale* had the highest concentrations of calcium, magnesium, manganese, zinc, and copper. *Moringa oleifera* leaves, rich in essential minerals and protein, are a valuable feed ingredient for livestock, providing cost-effective and nutritious alternatives to conventional feed. If to be ranked A. Occidentale is next to M. Oleifera in terms of nutritive value.

Keywords: Browse leaves, *Gmelina arborea*, *Gliricidia sepium, Anacardium occidentale,* Proximate and Mineral composition.

Proximate composition of twenty accessions of eggplant fruits in Nigeria

Aladele S.E [1]; Okere A. U[1]; *Ighere D.A[2]; Afolayan G.[1]; Nwosu D. J[1] and Olufelo A.T[3]

[1]National Centre for Genetic Resources and Biotechnology (NACGRAB), Moor Plantation, Ibadan, Nigeria. [2]National Centre for Genetic Resources and Biotechnology (NACGRAB), South-South Zonal Office, Benin City, Nigeria

[3]National Biotechnology Development Agency (NABDA)

dighere@yahoo.com, *+2348051859840*

ABSTRACT (70)

Eggplant is a staple in various culinary traditions and a significant source of income for farmers, particularly in developing countries such as Nigeria. The study explores the nutritional evaluation of 20 different eggplant accessions or cultivars in Nigeria, highlighting the variations in proximate and mineral profile (Calcium, Iron and Zinc content), and their implications in nutrition. Fresh fruits of eggplants were harvested for proximate and mineral analysis using standard laboratory procedures as described by AOAC in 2019. The results revealed that eggplant is high in moisture and low in fats and carbohydrates contents, making it suitable for low energy diet. The results further revealed that eggplant is high in mineral and iron content, making it a micronutrient beneficial staple that can help in combating incidents of micronutrient deficiency amongst its consumers. Statistical analysis (ANOVA) revealed that, there exists significant variability among the accessions or cultivars. The findings underline the nutritional versatility of eggplants and their potential role in balanced diets. These insights are crucial for optimizing eggplant cultivation and leveraging its nutritional benefits within the Nigerian context.

Keywords: Eggplant, Accession, Cultivar, Nutrition and *Solanum melongena*

Nutritional Contents, Challenges and Prospects of Plant-based meat in Africa

Jacob O. Popoola[1]*, Peace. I. Ayankoya[2], Abiodun S. Oyelakin[3], Oluwadurotimi S. Aworunse[2], Idowu A. Obisesan[1], Favour Olaoluwa[1], Ayantade Dayo Victor Ayansina[4], and Omena B. Ojuederie[5,6]

[1]Pure and Applied Biology Programme, College of Agriculture Engineering and Science, Bowen University, Iwo, Nigeria. [2]Department of Biological Sciences, College of Science and Technology, Covenant University, Ota, Nigeria. [3]Department of Pure and Applied Botany, College of Bioscience, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria. [4]Microbiology Programme, College of Agriculture Engineering and Science, Bowen University, Iwo, Nigeria. [5]Department of Biological Sciences, Faculty of Science, Kings University, Odeomu, Osun State. [6]Food Security and Safety Focus, Faculty of Natural and Agricultural Sciences, North-West University, South Africa.

***Correspondence:** jacob.popoola@bowen.edu.ng, +234(0)8064640018

ABSTRACT (71)

The Africa sub-region is projected to experience a double-fold increase in its population to around 2.5 billion by the year 2050, with more than 60% of this forecasted figure expected in urban areas. Whereas increasing disposable income is expected to cause a surge in the demand for and consumption of meat in the region, smallholder livestock production contributes a significant proportion to global greenhouse gas (GHG) emissions. Besides, farmer-herder conflicts, food insecurity, malnutrition, and the burden of diet-related non-communicable diseases are major concerns. To offset these problems, the need for the adoption of meat analogs and alternative meat production systems as viable solutions to meet the rising meat demand in Africa becomes imperative. Plant-based meats (PBM) are meat alternatives developed from plant-derived sources (peas, soy, and other legumes) and mimic conventional meat's organoleptic and nutritional properties. Tempeh, an example of PBM, is rich in protein, fiber and vitamins. Nutritional benefits, taste, cultural preferences, income, and regional challenges are among several factors that have shaped the acceptance and adoption of PBM alternatives in Africa. PBM production is sustainable and could help control weight, prevent diet-related ailments, and boost the immune system. Nutritionally, PMBs are superior to traditional animal meat since they have less saturated fat, no cholesterol, and a high content of dietary fiber. This paper reviews the historical perspective of PBM in Africa, its nutritional composition, ingredients, challenges and health benefits. Though PBM's scalability and capacity to challenge conventional animal husbandry methods are issues, it offers a chance for agricultural diversification and a step toward more sustainable food systems.

Keywords: Legumes; nutritional composition; product development, sustainable development, zero hunger.

Nutritional Quality, Sensory Profile and wrapping material of oleleh (Bean Porridge) produced from cowpea and soybean composite

Georgiana Allie, Sallu Karteh, Martha Shirley Epiphaneia Williams-Ngegba, Millicent Jinnah Sandy, and Dominic Musa Ibrahim-Sayo.
gallie@njala.edu.sl

ABSTRACT (72)

Oleleh (Bean porridge) is a snack in Sierra Leone made from cowpea steam beans paste. This study investigated the utilization of soybean as composite paste in producing Oleleh. This research evaluates the proximate composition, sensory profile and consumer acceptability of Oleleh produced from different proportions; 0:100, 100:0, 60:40, 40:60 & 50:50 of cowpea and soybean composite, as well as comparing two wrapping materials (banana leaf and aluminum foil). The study revealed that nutritional composition of the samples increased with the substitution of soybean, except for the carbohydrate for which the 100% cowpea recorded the highest. The moisture content ranges from 75.51 to 80.34, Ash 4.80 to 7.85, crude fat 9.42 to 22.05, crude fiber 2.8 to 6.45, crude protein 18.69 to 36.46, carbohydrate 9.68 to 40.63. The 60:40 & 40:60 composite of the cowpea and soybean showed better nutritional qualities. The sensory profile scored above 5, which means all products were liked with 100% of cowpea steamed in banana leaves scoring the highest followed by the 60:40 & 40:60 Cowpea to Soybean composite steamed in banana leaves. Consumer acceptability revealed that wrapping Oleleh using banana leaves showed a higher impact on acceptability than using aluminum foil. Overall, substituting cowpea by either 40 or 60 with Soybean is acceptable and yields high sensory quality and improved proximate composition for Oleleh production.

Keywords: Oleleh, Cowpea, Soybean, Proximate properties, consumer acceptability, underutilized legumes.

Mineral strength of different accessions of Roselle calyces (*Hibiscus sabdariffa L.*)

***Omenna, E. C., Olanipekun, O .T. and Adetumbi, J.A.**
Institute of Agricultural Research and Training, Obafemi Awolowo University, Moor Plantation Apata, Ibadan, Oyo State, Nigeria.
emmanuelomenna@gmail.com +2348039334092; +2348055007555

ABSTRACT (73)

Freshly harvested calyces of Roselle are used to produce pro-health drinks. Fresh and dried roselle calyces are used to produce other food-products due to its high vitamin C and anthocyanins contents. However, there is limited information about the Roselle accessions/varieties and their nutritive compositions. A study was conducted to determine the nutrient strength of thirteen accessions of Roselle calyces. The macro– and micro-nutrient analyses were carried out following the standard protocols. The results of macronutrients showed that V_{10} (2.18%) variety contained significantly higher amount of potassium followed by R_5 (2.07%) variety and thenV_1 (2.00%) variety. Similarly, V_1 variety had the highest amount of phosphorus followed by V_{12} and then V_{11} variety. These macronutrients are essential in body metabolism. Potassium is a major component of intra-cellular fluids of human body, it helps muscle contraction and supports- normal blood pressure whereas phosphorus is needed for the growth, maintenance and repair of all tissues and cells, and for production of genetic building blocks. Ash and moisture contents were significantly higher in V_4 (11.00%) and V_5 (10.38%) respectively. On the other hand, micro-nutrient evaluations revealed that iron content was significantly higher in V_{12} (600mg/kg) variety followed by R_5 (515mg/kg) and then V_6 (482mg/kg) variety. While manganese was significantly higher in V_7 (569mg/kg) variety followed by V_{11}(412mg/kg) and V_8(400mg/kg) variety. Micro-nutrients are co-factors which plays significant role in metabolic processes like fat and carbohydrate metabolism as well as blood sugar regulation. Conclusively, this study observed that there were significant variations in the mineral strength across different accessions of Roselle calyces. Remarkably, the following accessions: V_{10}, V_1, V_{12} and V_7 were richer in potassium, phosphorus, iron and manganese respectively while accession V_9 contained significantly lower amount of minerals.

Keywords: Roselle calyces, *Hibiscus sabdariffa,* Nutrients-dense**,** Health, Accession, Metabolism

Competencies needed by secondary school graduates in sweet melon (Cucumis melo) production for sustainable agriculture and food security in Ovia North East LGA, Edo State, Nigeria

[1] Alilo Stephen Akeshire, [2]Ojomu Adeniyi Andrew, [3]Onah Frederick Chinedu & [4]Eneji Emmanuel Esidene

[1]Department of Early Childhood Care and Education, Federal College of Education (Technical) Ekiadolor, Benin City, Edo State. [2-4]Department of Agricultural Education, University of Nigeria, Nsukka, onah.frederick@unn.edu.ng

ABSTRACT (74)

This study identified competencies needed by secondary school graduates in sweet melon production for sustainable agriculture and food security in Ovia North East L.G.A. of Edo State, Nigeria. Survey research design was adopted for the study. Three research questions were answered for the study. The population for the study was Agricultural Science Teachers and Agricultural Extension Officers in Benin City, Edo State. The sample for the study was 300 respondents made up of 250 Agricultural Science Teachers and 50 Agricultural Extension Officers which was drawn using multistage sampling technique. A 32-item structured questionnaire titled: Competency Needs of Secondary School Graduates in Sweet Melon Production Questionnaire (CNSSGSMPQ) was used to collect data for the study. The instrument was validated by three experts from the University of Benin. Cronbach Alpha method was used to determine the internal consistency of the instrument which yielded a reliability coefficient 0f 0.80. The data collected were analyzed using weighted mean and standard deviation to answer the research questions. It was found that secondary school graduates in Benin City, Nigeria needed 8 competencies in pre-planting operations for sweet melon production, 8 competencies in planting operations for sweet melon production, 8 competencies in post-planting operations for sweet melon production and 8 competencies in harvesting/handling and marketing operations for sweet melon production. It was therefore recommended among others that competencies identified by this study in sweet melon production should be used to train secondary school graduates and other students and farmers as well for their employment as sweet melon producers, integrating the identified competencies into the curriculum of Agricultural Science for secondary schools for the purpose of adequate skill acquisition upon graduation and replicating this study by researchers at state or federal levels for the purpose of generalization.

Keywords: Competencies Needed, Secondary School Graduates, Sweet Melon Production, Food Security, Agricultural Science Teachers and Extension Officers.

Contributions of smallholder women farmers to food security in Idanre Local government area of Ondo State, Nigeria.

Rasaki,W.A., Awolola, A.A. Taiwo. A.M and Okunlola, V.O.
Department of Agribusiness and Management, Oyo State College of Agriculture and Technology, Igboora, Oyo State, Nigeria. adedamolawasiu2011@gmail.com

ABSTRACT (75)

it has been established that Smallholder farms, often managed by women, provide a significant portion of the food consumed locally, contributing to both food and nutrition security. Therefore, this research instigated the Contributions of smallholder women farmers to food security in Idanre Local government area of Ondo State, Nigeria. Idanre is located at the foot of the scenic Idanre hill which is of unique cultural and environmental significance, and attracts many tourists. The main occupation in the area is agriculture with over 90% of its population engaged directly or indirectly in crop productions. Multi-stage sampling technique was used to select 180 smallholder women farmers. The data were analysed using descriptive statistics (frequency table, percentages, mean) and inferential statistics (Foster-Greer-Thorbeck, Probit regression). The result revealed that majority (80.88%) were married and have families to catered for. Most of the respondents (79.55%) had no formal education and engaged primarily (91.25%) on crop production. It was identified that the challenges faced by the women farmers were limited access to resources, insufficient land. Cultural barrier outdated technologies, and systemic barriers. FGT result revealed that majority (about 90%) of female ended households were secured. Probit Regression analysis showed that level of education (p=0.003), years of farming experience (p=0.030), farm size (p=0.000), major occupation (p=0.015) and women contribution (p=0.000) have positive significant effect on the security status of the households in study area. It is recommended that government should address identified challenges in order to enhancing their productivity and ensuring national food security.

Keywords: Food security, Women, Probit.

Leveraging Digital Platforms for Plant Information Dissemination: A Scoping Review

Victoria Olufunmi Adeyemo-Eleyode[1]*, Oluwaseun Iyadunni Oluwasogo[2], Ayomiposi Oluwatosin Akanmu[1], Adekunle Adeoye Eludire[1]

[1]Department of Biological Sciences, College of Agriculture and Natural Sciences, Joseph Ayo Babalola University, Ikeji-Arakeji (JABU), P.M.B 5006 Ilesha, Osun State, Nigeria. [2]Soil Science Laboratory, School of Applied Biosciences, Kyungpook National University, Daegu, 41566, Republic of Korea.

victoriaeleyode@gmail.com, +2347063235564

ABSTRACT (76)

The rapid growth of online technologies has transformed the way plant information is disseminated and accessed. This scoping review explores the value, uses and benefits (VUB) of websites and social media platforms in sharing plant-related knowledge (soil-plant biota, plant pathogens, plant species identification and plant microbiota, plant pests). The digital platforms VUB includes trainings, farm/ livestock security, farmers/ gardeners' safety, collaboration, increased plants and plant products sales, enhanced climate change surveillance, dissemination on plant usefulness, improve plant identification (such as Neglected and underutilized species: NUS and so on), dissemination and dissipation on causes of plant diseases, outbreaks and control. The application of these knowledge has enhanced sustainable farming through limiting theft or its fear, waste and loss; thereby promoting agricultural development and global economy. A comprehensive search of academic databases and grey literature yielded 259 relevant articles, which were analyzed to identify key themes and trends. The findings highlight the increasing adoption of digital platforms by plant enthusiasts, researchers, and educators for information sharing, networking, and community building. The benefits of using websites and social media for plant information dissemination include enhanced accessibility, increased reach, and improved engagement. However, challenges such as information accuracy, credibility, and digital divide were also identified. This review provides insights into the potential of digital platforms for democratizing plant knowledge and promoting plant health, plant conservation and plant utilization.

Keywords: Plant Information; Plant Microbiota; Websites; Social Media; Knowledge Dissemination; Digital Platforms VUB; Plant Education; Soil-Plant Biota.

Analysis of food insecurity status among women headed household and coping strategies adopted in Iwajowa local government area of Oyo State, Nigeria.

Rasaki,W.A., Awolola, A.A,. Olojede, M.O and Ogundele, O.D
Department of Agribusiness and Management, Oyo State College of Agriculture and Technology, Igboora, Oyo State, Nigeria. adedamolawasiu2011@gmail.com

ABSTRACT (77)

Food insecurity remains a critical issue in Nigeria, particularly among women-headed households (WHHs). These households are often more vulnerable due to socio-economic, cultural, and political factors that limit their access to resources and opportunities. Hence, this study investigated food insecurity status among women headed household and coping strategies adopted in Iwajowa local government area of Oyo State. Iwajowa local government area is one of 33 local government areas in Oyo State and it is an agrarian area. Simple random sampling technique was used to sampled 190 respondents. The data collected were analysed using descriptive statistics (frequency table, percentages, mean) and inferential statistics (Foster-Greer-Thorbeck, Probit regression). The result revealed that a majority of these households experience moderate to severe food insecurity, primarily due to limited access to resources, lower income levels, and socio-cultural factors. Common strategies include skipping meal, reducing meal portions, seeking assistance from relatives, engaging in petty trade, agricultural activities, dietary adjustments, selling assets, casual labor, women's groups, seasonal migration, family and community support. Result of Probit regression revealed that Education level, farm size, access to credit facility, access to farming equipment and year of farming experience have positive effects on food security. Policy recommendations include enhancing social safety nets, improving access to credit and agricultural inputs, and promoting gender-sensitive interventions.

Keywords: Food insecurity, Women-headed, Coping strategies.

Effect of germination and fermentation with *Rhizopus* species on some qualities of flour and starch produced from velvet bean seeds

Ifejesu O. Balogun[1], Olawale P. Olatidoye[2, 3*], Ezekiel T. Otunola[4] and Hammed Agboola[5]

[1, 2]Department of Food Science and Technology, Yaba College of Technology, P.M.B 2011, Yaba, Nigeria. [3]Yaba College of Technology SDG 03 (Good Health and Wellbeing Research Cluster), Nigeria. [4,5]Department of Food Science and Engineering, Ladoke Akintola University of Technology, Ogbomosho, Nigeria. waleolatidoye@gmail.com +2348037284556

ABSTRACT(78)

The influence of dehulling on nutritional properties of velvet bean (*Mucuna utilis*) flour and starch fermented with *Rhizopus oligosporus* and *Rhizopus stolonifer* was examined. The fermented flour samples were dried in hot air oven at 55 ^{o}C for 24 h, milled and analyzed for proximate, functional, mineral and antinutritional content while starch samples were analyzed for physicochemical, functional and pasting properties at 12 h intervals. The results showed that moisture content decreased from 7.32% to 5.02% and 6.95% to 5.08% in undehulled and dehulled samples respectively. Amylose and amylopectin contents ranged from 15.35-84.65% in undehulled and 27.95-72.05 % in undehulled samples while water binding capacity, water absorption capacity, swelling capacity and solubility decreased significantly. Bulk density, titratable acidity, reconstitution index and pH ranged from 510-620Kgm^{-3}; 4.13-5.63; 63.20-70.95mls; 2.85-5.05 respectively for undehulled samples and 520-602Kgm^{-3}, 3.33-6.43, 61.35-67.35mls; 3.53-4.82 respectively in dehulled samples. The pasting characteristics of starch showed the potential use of the flours in weaning formulas due to reduced viscosities in both dehulled and undehulled by *R. oligosporus a*nd the mixed culture. Thus, mucuna flour could be utilized for product development in different food system, and industries.

Keywords: *Velvet bean, Rhizopus spp.*, fermentation, germination, L-DOPA, nutrition

Effect of staking methods on pod and grain yield of african yam bean (*Sphenostylis stenocarpa* Hochst. Ex. A. Rich) Harms

Oguntuase*, O. Mayowa. and Adewale, B. Daniel

Department of Crop Science and Horticulture, Federal University Oye-Ekiti, Ikole-Ekiti Campus, Nigeria. Oguntuaseobed@gmail.com

ABSTRACT (79)

African yam bean (AYB) is an obligate climber. The present study investigated the effect of different staking methods on pod and grain yield in African yam bean. The objective of the study was to assess grain yield variation among five AYB breeding lines as affected by two staking methods – individual and trellis. The field experiment was split plot at the Teaching and Research farm, Federal University Oye-Ekiti. Ikole-Ekiti campus with staking method and breeding lines as main and sub-plot factors respectively. The data collected were number of pods per plant, pod weight per plant, pod length, seed weight per pod, number of unfilled pods per plant, 100 seed weight, seed weight per plant, number of seed per pods, grain yield per hectare. The data was submitted for analysis of variance and means separation. This project highlights the significant impact of both genotype and staking methods on yield and related traits of AYB. The trellis consistently enhanced higher performances in pods per plant, pod weight per plant, pod length, seed weight per pod, and grain yield per hectare. Performances of the breeding lines differed with the staking methods, however, DW5b and DW6 exhibited exceptional performances, particularly under the trellis staking method. The trellis method effectively enhanced optimal exposure to sunlight for active photosynthesis and overall productivity. The study revealed that the trellis method of staking significantly aided optimum pod and seed productivity in African yam bean.

Key words: African yam bean, breeding lines, grain yield, staking, trellis

Exploring opportunities: underutilized wild grasses from Sahelian zones of Nigeria for sustainable agriculture and livelihoods

Adamu Ibrahim Tahir[1,2] , Rusly Rosazlina[1] and Bello Abubakar[3]

[1] School of Biological Sciences, Universiti Sains Malaysia, 11800, Minden, Penang, Malaysia. [2] Department of Biology, Federal College of Education Katsina, PMB 2041 Katsina, Nigeria.[3]Department of Biology, Umaru Musa Yar'adua University, P.M.B. 2218, Katsina, Nigeria,ibrahimhdj@gmail.com

ABSTRACT (80)

The Sahelian region of Nigeria, characterized by its arid climate and challenging agricultural conditions, is home to a diverse array of wild grasses that serve as vital food resources, particularly during periods of scarcity. These wild grass species, found in the Sahelian zones of Nigeria, represent a significant yet underutilized resource with potential for sustainable agriculture and livelihood development. This study examines the potential of several wild grass species, encountered within Hadejia Nguru wetland flood plain such as *Oryza barthii* (African wild rice), *Panicum laetum* (Wild Millet), *Echinochloa crus-galli* (Barnyard Grass), *Brachiaria ramosa* (Browntop Millet), *Sorghum arundinaceum* (Wild Sorghum), *Pennisetum glaucum* (Wild Millet), *Cenchrus biflorus* (Indian Sandbur), and *Setaria pumila* (Yellow Foxtail), to contribute to food security in this region. These species are well-adapted to the harsh environmental conditions of the Sahel, exhibiting resilience to drought and poor soil fertility. Nutritionally, they provide essential carbohydrates, proteins, and micronutrients, making them valuable alternatives to more commonly cultivated crops. The traditional uses of these grasses for making porridge, flatbreads, and other staple foods underscore their cultural significance and potential for wider adoption in sustainable agricultural systems. This paper advocates for the increased utilization and conservation of these wild grasses, emphasizing their role in enhancing food security, supporting biodiversity, and promoting resilience in Sahelian agro-ecosystems. The study highlights the need for further research into the agronomic practices, processing methods, and market integration of these underutilized species to fully realize their potential as staple foods in the Sahelian region of Nigeria.

Keywords: Sahel, wild grasses, food security, agro-ecosystem, biodiversity

Investigation of cyanide in *Phaseolus lunatus* L. (lima bean) accessions.

Quadri, Z. T[1, 2], Olawuyi, O. J.[1]Abberton M.T.[2], and Oyatomi O.J.[2]

[1]Department of Botany, Genetics and Molecular unit, Faculty of Science, University of Ibadan, Nigeria ; [2]Genetic Resources Centre, International Institute of Tropical Agriculture, Ibadan, Oyo State, Nigeria. m.abberton@cgiar.org

ABSTRACT (81)

Phaseolus lunatus **(**Lima bean) is an underutilized legume in Nigeria, and the only Phaseolus species that contains cyanogenic glycosides (linamarin). Long-term consumption of cyanogenic glycosides through food has been linked to a number of illnesses and little research . Therefore, this study was carried out to determine the variability in the level of hydrogen cyanide (HCN) content in dry lima bean seeds. Fifty- one (51) lima bean accessions were obtained from the Genetic Resource Centre of the International Institute of Tropical Agriculture (IITA) Ibadan, Nigeria and their HCN contents were determined using automated enzymatic assay method. The result showed that 12 accessions had HCN > 10 mg/kg, while 31 accessions had HCN < 10 mg/kg. Accession TPI-2454 had the highest cyanide content of 14.06 mg/kg followed by TPI-2456 (13.79 mg/kg), while accession TPI-175 had the least (1.00 mg/kg). Therefore, accession TPI-175 which had the permissible level of HCN (10 mg/kg) according to World Health Organization toxicity standard could be basis in breeding for low cyanide content in lima bean.

Keywords: *Phaseolus lunatus*, HCN, Linamarin, Variability

The SOCIETY FOR UNDERUTILIZED LEGUMES (SUL)

The name of the association shall be SOCIETY FOR UNDERUTILIZED LEGUMES (SUL), herein refers to as the association.

MOTTO: For Food, health and nutritional security
SLOGAN: Pulses with pluses

AIMS OF THE ASSOCIATION:

The SOCIETY FOR UNDERUTILIZED LEGUMES (SUL), shall strive to provide opportunity to individual researcher (s) and organizations (universities, research institutes and donor agencies) to disseminate research outputs aimed at conserving and utilizing underutilized legumes in the African continent and the world at large.

MISSION:

To aggregate a community of reliable and committed researchers in Africa involved in basic and applied research on the conservation, utilization and other component of research of underutilized legumes genetic resources.

OBJECTIVES:

1) To provide a platform for members to share research experiences and outcomes
2) To provide information and orientation on various opportunities inherent in the underutilized legumes to members, the public and corporate organizations
3) To provide expertise guidance and advice to members of the public and corporate organizations on the utilization of the underutilized legumes
4) To engage in national and continental exploration of the genetic resources of the underutilized legumes.
5) To stimulate the interest of African governments, NGOs, national and international agricultural organizations to promote research and utilization of the underutilized legumes.
6) To seek for fund and carry out applied research on underutilized legumes
7) To engage in collaborative research with national and international agricultural institutes

SUL NATIONAL EXECUTIVES

Ass. Prof B.D Adewale	National President
Dr T.T Adegboyega	National General Secretary
Prof. C.V. Nnamani	National Treasurer
Ass. Prof. O.J. Popoola	National Linkage Officer (Universities)
Ass. Prof. Y. Jeff-Agboola	National Linkage Officer (Intl Affairs)
Dr O.A Oyatomi	National Linkage Officer (Res. Inst)

Correspondence:

Genetic Resources Center,
International Institute of Tropical Agriculture (IITA),
Ibadan, Nigeria.
Call: +2348033784501, +2348039228085, +2348034840801, +2348064640018

ANNEX III

NOTES ON CHAIRMAN AND KEYNOTE SPEAKER, PLENARY CHAIR

Dr Olaniyi A. Oyatomi – Chair, LOC, SUL-IITA 2024

Ms Ufuoma Akpojotor– Secretary, LOC SUL- IITA 2024

Name	Address	Title
Keynote Speaker: Prof Enoch G. Achigan-Dako,	Genetics, Biotechnology and Seed Science Unit (GBioS), University of Abomey-Calavi, Republic of Benin.	Opportunity Crops: A drive for viable current and future livelihoods
Prof. B. Ikhajiagbe (EiC, JUL)	Department of Plant Biology and Biotechnology, University of Benin, Nigeria	Session chair: Plenary Session 1
Prof. Happiness Oselebe	Director, Centre for Crop Improvement, Nutrition and Climate Change (CCINCC), Ebonyi State University, Nigeria.	Plenary Speaker 1: Exploration and Utilization of Indigenous Plant Genetic Resources
Prof. Abiodun Musa Aibinu	Vice-Chancellor, Summit University, Offa, Kwara State. Nigeria.	Plenary Speaker 2: Artificial Intelligence for Opportunity Crops' Promotion
Prof. Sola Ajayi	Vice-Chancellor, First Technical University, Ibadan, Oyo State, Nigeria.	Plenary Speaker 3: Genetic Improvement, Biotechnology and Crop Modelling of opportunity
Prof. Sylvester Uhunoma Ewansiha	University of Benin	Exploration and Utilization of Indigenous Plant Genetic Resources

Ass. Prof. Jacob Popoola	Bown University, Iwo, Osun State, Nigeria.	Genetic Improvement, Biotechnology and Crop Modelling
Dr Lava Kumar	IITA	Crop Production and Health
Dr Kareem Titilope	IAR&T	Healthy Nations through Opportunity Crops
Prof. Charity Aremu	Landmark University, Omu-Aran, Kwara State, Nigeria.	Session chair: Plenary Session 2
Prof. Olubukola Oluranti Babalola,	Vice President, TWAS & OWSD. Research Director, North-West University, South Africa. Provost Visiting Professor, Imperial College London.	Plenary Speaker 4: Natural Resources Management and Climate Change
Prof Kehinde Soetan	Department of Veterinary Physiology and Biochemistry, University of Ibadan, Nigeria	Nutrition, Food Processing and Value Addition
Asso. Prof Omena Ojuederie	Kings University, Ode-Omu, State and North-West University, South Africa.	Natural Resources Management & Climate Change
Prof Marshall A. Azeke	Ambrose Alli University, Ekpoma, Edo State, Nigeria	Socio-economics and Agribusiness in Opportunity Crops
Prof Catherine V. Nnamani	Ebonyi State University, Abakaliki.	Gender-Responsive Innovations for Food Security and Policy
Dr Rajneesh Paliwal	IITA	Artificial Intelligence for Opportunity Crops Promotion

REVIEWERS LIST

	Name	Address
1	Ass Prof. Adewale B. Daniel	Department of Crop Science and Horticulture, Federal University, Oye-Ekiti, Ekiti State, Nigeria.
2	Dr. Bernard O. Ojuederie	Kings University, Ode-Omu, Osun State, Nigeria/Food Security and Safety Niche, Faculty of Natural and Agricultural Sciences, North-West University, Mafikeng, South Africa.
3	Prof. Beckley Ikhajiagbe	Department of Plant Biology and Biotechnology, University of Benin, Nigeria
4	Prof. Kehinde Soetan	Department of Veterinary Physiology and Biochemistry, University of Ibadan, Nigeria
5	Dr Odesola Kafilat	Bells University of Science and Technology, Ota, Ogun State, Nigeria.
6	Dr Adegboyega Taofeek Tope	Air Force Institute of Technology, Kaduna, Nigeria/North-West University, South Africa.
7	Dr Mansurat Shoge	Air Force Institute of Technology, Kaduna, Nigeria
8	Dr. Osundare Tunde	Federal University of Agriculture, Akure
9	Dr. Rajneesh Paliwal	Genetic Resources Center, IITA
10	Dr. Olaide Ogunsanya	Greenwich University, UK
11	Ass. Prof. Jacob Popoola	Bown University, Iwo, Osun State, Nigeria.

SPONSORS