GREEN GOLD: PRESERVING THE PAST, CULTIVATING TOMORROW AND UNLOCKING THE POTENTIAL OF AFRICAN LEAFY VEGETABLES FOR FOOD SECURITY.

An Inaugural Lecture Delivered at Oduduwa Hall, Obafemi Awolowo University, Ile-Ife, Nigeria.
On Tuesday, 8th September, 2026.

By
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Inaugural Lecture Series 429

Preamble

Providence charted my academic career right from the very beginning, from Ebire Nursery and Primary school, Felele, Ibadan to being the very first set of students of the Federal Government Girls' College Yola, to this level; hence, it is with total humility and immense gratitude to the Almighty God that I stand here today and before this august assembly to deliver this inaugural lecture. I thank God Almighty for giving me the grace and the privilege.

After taking JAMB three times with the hope of scoring a mark high enough to study medicine, being admitted to the University of Ibadan to study Veterinary Medicine and rejecting it because my father did not see any prospects in it, I was determined to enter into the University for whatever course I was given at my 4th attempt. My Father brought me to Ife but the admission process was already over. In 1986, I found myself in the University of Ilorin with an offer of admission to study Botany and I made up my mind to study medicine after the first degree in Botany but God had other plans for me. By the time I graduated, I had lost the passion to study medicine and settled for becoming a "doctor" even if it was not a medical doctor.

From University of Ilorin, I proceeded to Kano for my Service year and thereafter, to the University of Ibadan for a Master's degree in Agricultural Biology. I worked for the next five years since there was no one to sponsor my education any longer. In I998, my husband was posted to Rhema Chapel Ile-Ife as the Minister in charge and God ordered my steps and I met Mr Wole Adedeji now, Prof Wole Adedeji. We had served together in Kano in 1990 and this was our first meeting after service year. He encouraged me to apply to the Department of Botany where his wife, Mrs. Olubukola Adedeji, now Prof Olubukola Adedeji works. I took his advice and as the saying goes, the rest is history. After I was employed, I earned another Master's degree in Botany and went on to pursue my doctoral degree and by 2011, this my dream of being a "doctor" had been fulfilled.

Today, a higher dream is being fulfilled as I deliver the 429th Inaugural Lecture in Obafemi Awolowo University, Ile-Ife. The 9th from the Department of Botany, the second in the Plant Physiology unit, and the second to be delivered by a female professor from the Department of Botany.

Introduction

Mr. Vice-Chancellor Sir, an inaugural lecture is an occasion of significance in the career of an academic staff and a central part of university tradition worldwide. Inaugural lectures provide professors with the opportunity to inform colleagues, the campus community and the general public of their work to date, including current research and future plans. It is recognized as a platform for a professor to address his/her audience in his/her area of specialization by presenting his/her contribution to knowledge or scholarship. In the light of the foregoing, I have decided to make a presentation of my academic stewardship and the compass for my future research endeavors. I have carefully x-rayed my research trajectory over the past 26 years and chosen to speak on the topic **Green Gold: Preserving the Past, Cultivating Tomorrow and Unlocking the Potential of African Leafy Vegetables for Food Security.**"

Importance of African Leafy Vegetables

Our global food system is facing a quiet crisis: the loss of agricultural biodiversity. By replacing traditional crops with genetically uniform, high-yielding varieties, we have lost roughly 75% of our plant genetic diversity in just a century (FAO,1999). This massive decline leaves us incredibly vulnerable to climate change, environmental damage, and food insecurity (Elouafi, 2024). There is increasing evidence to suggest that nutritional success is linked to diversification of the food base (Altieri *et al*., 1987). Hassan *et al*., (2024), reported that profound changes in agricultural practices and in culinary and nutritional habits, have brought about a global decline in food diversity; with many local varieties of crops being threatened with extinction and most wild edible plants not being consumed anymore or only seldomly.

Africa has a rich biodiversity and cultural heritage which holds the keys to unlocking a nutritious and sustainable food future. African leafy vegetables (ALVs) have been a consistent accompaniment to staples in traditional cuisine, providing essential vitamins, minerals, and also income opportunities for local communities. However, the influence of modern dietary pattern which is high in processed foods have led to the neglect of these indigenous vegetables. ***'Preserving the past, cultivating tomorrow'*** is more than rhetorics - it's a call to action to revive the cultivation and consumption of ALVs, promoting food security, preserving biodiversity, and empowering African farmers. By unravelling the potentials of these forgotten greens, we can nourish a resilient and healthier future for generations to come.

African leafy vegetables (ALVs) encompass plant species that are either indigenous to a specific area or have been cultivated there long enough to adapt through natural evolution and selective farming. Reflecting their diverse history and usage, these plants are referred to by various terms in literature, such as, indigenous leafy vegetables (ILVs), traditional leafy vegetables (TLVs) and wild vegetables (Maseko *et al*., 2018). African leafy vegetables in the context used in this lecture, are plant species which are used as leafy vegetables in Nigerian communities, especially in the South western region. They are mostly referred to as "*Efo ibile*" and this embraces indigenous, indigenised and recently introduced leafy vegetable species. The majority of these vegetables are not cultivated and are still being harvested from the wild. These species usually have high nutritional value and they are good sources of phytonutrients, protein, energy, and fiber (NUS, 2023).

Climate-resilient and highly nutritious, African leafy vegetables play a crucial role in advancing the UN's Sustainable

Development Goals (SDGs) across the continent. These crops are vital for fighting malnutrition being rich sources of micronutrients, boosting smallholder farmer incomes, and fostering ecologically sustainable agriculture. They are well-adapted to the local weather with many of the species being drought-tolerant, pest-resistant, and flourishing in soils where exotic vegetables cannot. Cultivating ALVs directly supports SDGs 2, 3, 5, and 13 by addressing critical socioeconomic and ecological challenges. They address Zero Hunger (SDG 2) and Good Health (SDG 3) by offering a resilient, localized food source that diversifies diets, fights micronutrient deficiencies, and prevents chronic, diet-related illnesses. Additionally, because women dominate the ALV trade, targeted investments promote Gender Equality (SDG 5) by expanding their financial independence. Finally, incorporating these crops into local farming systems through methods like intercropping with maize enhances agro-biodiversity, driving effective Climate Action (SDG 13) through helping farms withstand extreme weather (Maseko *et al.*, 2018).

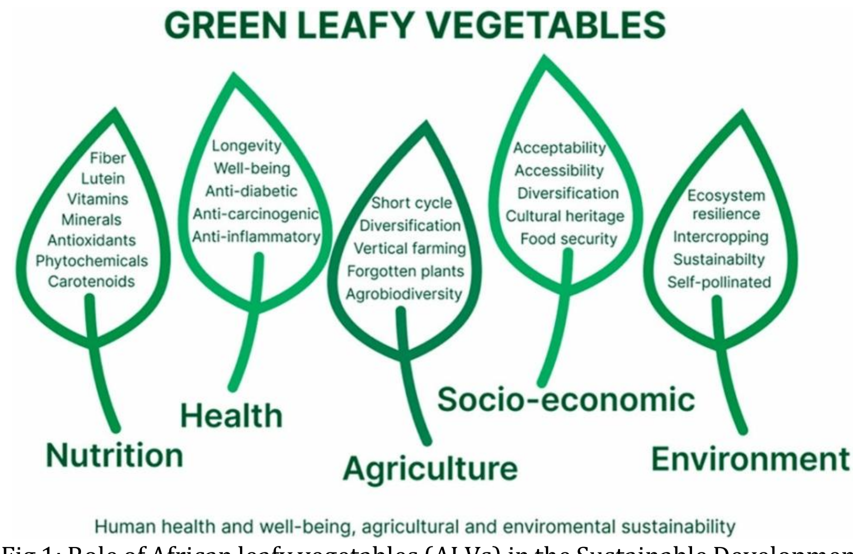

Fig 1: Role of African leafy vegetables (ALVs) in the Sustainable Development Goals (SDGs) (Knez *et al.*, 2024)

As of July 2025, more than 307 million Africans, representing over 20 per cent of the continent's population, were affected by hunger (Gustafson, 2025). FAO (2025) in their report on the state of food security put the cost of a healthy diet per person per day in Nigeria (as at 2024), as $4.72 which is approximately ₦7,080. They further reported that 79.3% of Nigerians were unable to afford a healthy diet. They defined a healthy diet as one comprising four key aspects: diversity (within and across food groups), adequacy (sufficiency of all essential nutrients compared to requirements), moderation (of foods and nutrients that are related to poor health outcomes) and balance (energy and macronutrient intake).

Vegetables are an essential and irreplaceable part of healthy diets. Low vegetable consumption is associated with poorer health, and diets low in vegetables are associated with 1.5 million deaths globally per year through cardiovascular diseases alone, with impacts felt particularly in low- and middle-income countries (Harris *et al*., 2022). This team further reported that, global vegetable production was insufficient to meet the WHO dietary recommendations. Where vegetables are available, they are unaffordable for many, with fruits and vegetables, along with animal-source foods, being the most expensive element and comprising around 40% of the cost of a healthy diet. Even when vegetables are available and affordable, most people still do not consume large enough quantities, particularly if they are not considered as an acceptable or ***desirable*** food choice, for instance due to taste preferences, or cultural appropriateness.

As reported by Malebo (2023), consumer acceptability and perceptions about ALVs have generally influenced their limited consumption and propagation. The perceptions that exist in communities affect the marketing of ALVs as an alternative source of nutrition despite their nutritional and medicinal properties known by indigenous people. They reported that, ALVs are perceived as foods with low social status and only meant for the poor by certain communities. While young consumers still prefer Western-based diets which are widely promoted on media platforms and represent a higher-class status within their communities.

Therefore, despite their benefits, ALVs are often under-researched and underutilized. As reported by Gockowski et al., (2003), there is also concern over a continued narrowing of the number of food species as fewer and fewer crops remain in local farming systems. Associated with this loss is the disappearance of local knowledge for their production and use (Gockowski *et al*., 2003).

Bioversity International, a global research-for-development organization, worked with partners in Kenya between 1996 and 2004. Their focus was to revive the interest of researchers, growers and consumers in African leafy vegetables. This resulted in increased production, consumption and marketing of a wide range of local leafy vegetables and an improvement in household wellbeing (Khire, 2013). If we are to improve the potential contribution of African Leafy Vegetables towards food diversity and food security in Nigeria, the active conservation, promotion and use of African Leafy Vegetables are important.

Mr. Vice Chancellor sir, my research focus over the past 26 years has been on understanding the physiological, developmental, and reproductive biology of indigenous vegetables and other plants, with the aim of providing a scientific foundation for their propagation, conservation, and genetic improvement. In this inaugural lecture, I present a synthesis of these research efforts, highlighting key contributions in seedling physiology, germination ecology, and plant tissue culture regeneration.

AFRICAN LEAFY VEGETABLES - MY RESEARCH CONTRIBUTION

***Launea taraxacifolia* (Willd.) Amin ex C. Jeffrey (Yanrin)**

Fig 2: Leaves of *Launea taraxacifolia*

In the course of my studies on *Launea taraxacifolia* (Yanrin) (Sakpere & Aremu, 2008; Sakpere *et al*., 2011a; Sakpere & Jaiyeoba, 2013), my students and I employed an experimental research design, using a combination of cultivation experiments and chemical analysis to investigate the growth pattern and shading response of *Launaea taraxacifolia*. We found that *L. taraxacifolia* propagates efficiently through rhizomes, with sprouting occurring within ten days of planting. Plants grown under direct sunlight showed significantly better performance in most growth parameters, in contrast, shading reduced overall growth and completely inhibited flowering. Nutritional analysis revealed that *L. taraxacifolia* is a valuable source of minerals such as phosphorus and iron, contains some protein, and has high moisture content. The optimal harvest period was identified as between the 6th and 8th weeks after planting, when vegetative yield and nutritional quality are highest (Sakpere & Aremu, 2008).

We also adopted an *in vitro* tissue culture experimental approach to assess the regenerative potential of *Launaea taraxacifolia* and to investigate the effect of different growth regulators and explants on this indigenous African leafy vegetable. Leaf and stem explants were excised, surface-sterilized, and cultured under aseptic conditions. Explants were inoculated on full-strength Murashige and Skoog (MS) medium supplemented with varying concentrations of 2,4-dichlorophenoxyacetic acid (2,4-D) (0.1, 0.4, and 0.8 mg/L), either alone or in combination with kinetin (0.5 or 1.0 mg/L) and BA–NAA combinations. From these studies, the first documented evidence of successful *in vitro* regeneration and first documented protocol for multiple adventitious shoot regeneration in *Launea taraxacifolia* was obtained.

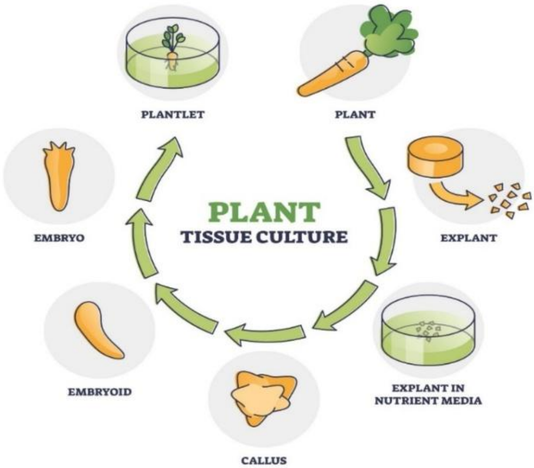

Fig 3: Illustration of Plant Tissue Culture (©Dreamstime.com)

Leaf explants showed superior responsiveness compared to stem explants, producing higher frequencies of callus, root, and shoot formation. Shoot regeneration was achieved only from leaf explants cultured on MS medium supplemented with 0.5 mg/L kinetin and 0.1 mg/L 2,4-D. establishing leaf explants as the most suitable explant source (Sakpere *et al*., 2011a). Sakpere & Jaiyeoba, (2013) went further to investigate the effect of other growth regulators (Naphthalene Acetic Acid (NAA) + Benzyl Adenine (BA)) and explants (nodal). We found that leaf and nodal explants responded to growth regulators, while stem explants still showed no organogenic response and that media containing BA + NAA were significantly more effective for shoot induction than those containing 2,4-D + kinetin. Only leaf explants produced multiple adventitious shoots. The best response (100% regeneration) was achieved on MS medium supplemented with 0.1 mg L^{-1} NAA and 2.0 mg L^{-1} BA, producing an average of 13.3 ± 2.4 shoots per explant with over 50% of shoots rooted successfully on the same induction medium, indicating ease of plantlet formation.

The studies provided baseline agronomic and physiological data on *Launaea taraxacifolia*, quantitatively demonstrating the plant's poor tolerance to shade and establishing sunlight as a critical factor for its growth, flowering, and rhizome development. Additionally, the research highlights the crop's nutritional potential supporting its domestication as a nutritious vegetable. By documenting growth timelines, reproductive limitations, and optimal harvest periods, the study contributes valuable insights for cultivation, conservation, and future breeding efforts, particularly in addressing seed viability challenges.

Telfairia occidentalis **Hook. F (fluted pumpkin/Ugu)**

The main use of fluted pumpkin or Ugu, as it is commonly called, is as a leaf and seed vegetable. The tender shoots, succulent leaves and immature seeds are cooked and consumed as a vegetable (Odiaka & Schippers, 2004). The leaves are used alone or together with other vegetables like okra or with egusi seeds. It is used with the vegetable Gbure (*Talinum triangulare*), to prepare the Nigerian delicacy called *Edika ikong* which is native to the Efik people of Cross River state.

Ajayi *et al*., (2006) reported that fluted pumpkin can be propagated only by seeds, but their availability for planting is a major problem and cannot satisfy the widespread interest in the cultivation of the plant (Odiaka & Schippers, 2004). The seeds are difficult to conserve during the intervening period between fruit harvesting at the end of one season and seed planting at the beginning of the next.

Fig 4: Leaves of *T. occidentalis*

Fig 5: *T. occidentalis* showing developing fruits

Fig 6: Seeds of *Telfairia occidentalis* (fluted pumpkin)

Because of this short storage life span, Akoroda (1986) classified the seeds as recalcitrant, although the water concentration was not quantified.

(Recalcitrant seeds are seeds that cannot survive drying (desiccation) or freezing.)

In order to provide solution to some of these identified problems, my colleagues and I embarked on a series of studies on the species. We investigated the vegetative propagation of fluted pumpkin using stem cuttings as an alternative to seed propagation, which is limited by the short shelf life and recalcitrant nature of the seeds. The results demonstrated that vegetative propagation of fluted pumpkin using stem cuttings is feasible and can overcome the limitations of seed propagation (short shelf life, poor storage viability). We were also able to establish that IBA (a rooting hormone) significantly enhances rooting and sprouting, with liquid formulations being more effective for shoot development and root elongation. The study also highlighted the role of sexual dimorphism (*the existence of two distinct forms (morphs) within the same species*) with female cuttings rooting better than male cuttings. We have provided practical benchmarks for developing vegetative propagation protocols: Use one-nodal, semi-hard cuttings from female plants and apply IBA in liquid formulation at 5,000–10,000 ppm for optimal rooting and shoot growth (Sakpere *et al*., 2011b).

Vegetative propagation allows farmers to select and multiply plants of a desired sex and genotype, ensuring a more dependable and efficient yield.

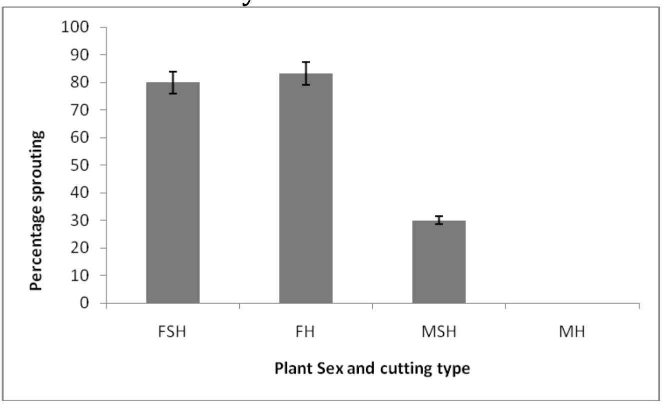

Fig 7 : Effect of IBA on percentage sprouting of stem cuttings from male and female *T. occidentalis* cuttings

Cuttings - FSH – Female semi hard; FH – Female hard; MSH – Male semi hard; MH – Male hard cuttings

We also used an *in vitro* tissue culture approach involving manipulation of plant hormones and explant (*a piece of living tissue (plant or animal) that is removed from its original site in an organism and transferred to an artificial, sterile environment (in vitro) for culture*.) sources to determine the effects of different plant growth regulators and explant types on callus (*Mass of* *undifferentiated cells*) induction. The study aimed to establish a reliable protocol for callus initiation, which is essential for micropropagation, conservation, and biotechnology applications. The study was able to optimize conditions for callus induction in fluted pumpkin, showing that 2,4-Dichlorophenoxyacetic acid (2,4-D) + kinetin (especially at 5 mg/L + 0.1 mg/L) is the most effective combination, with stem and leaf explants being the best sources laying the groundwork for somatic embryogenesis, conservation, and possible biotechnological exploitation of the species (Sakpere *et al*., 2014). I also employed a laboratory-based molecular genetics approach to identify suitable Inter Simple Sequence Repeat (ISSR) primers for genetic analysis of the species and established reliable primers and optimal Polymerase Chain Reaction (PCR) conditions (Sakpere, 2011).

Another study was carried out on the developmental biology of Fluted Pumpkin (*Telfairia occidentalis*), specifically aiming to pinpoint the exact transition point where the plant shifts from being a seedling to an independent plant. There is no universally accepted biological marker to pinpoint the timing of seedling transitions into the juvenile stage. Our research sought to establish an objective, quantitative method to define this transition, particularly for *T. Occidentalis*. Understanding this transition is critical for determining the optimal timing for transplanting and applying fertilizers.

Our data revealed a specific timeline for the early development of the fluted pumpkin, linking growth rate dynamics to developmental phase changes. The results showed that the seedling phase of *T. occidentalis* ends exactly two weeks (14 days) after emergence. This 14-day mark coincided with the attainment of the Maximum Relative Growth Rate (RGRmax). It was observed that, before the 14-day mark, the plant relies heavily on the nutrients stored in its large cotyledons, after this point, the plant's own physiological processes (photosynthesis and root uptake) become the primary drivers for growth. By the end of this two-week period, the seedlings were found to have established enough leaf area and root structure to support rapid, independent vegetative growth (Sakpere & Adetunji, 2014).

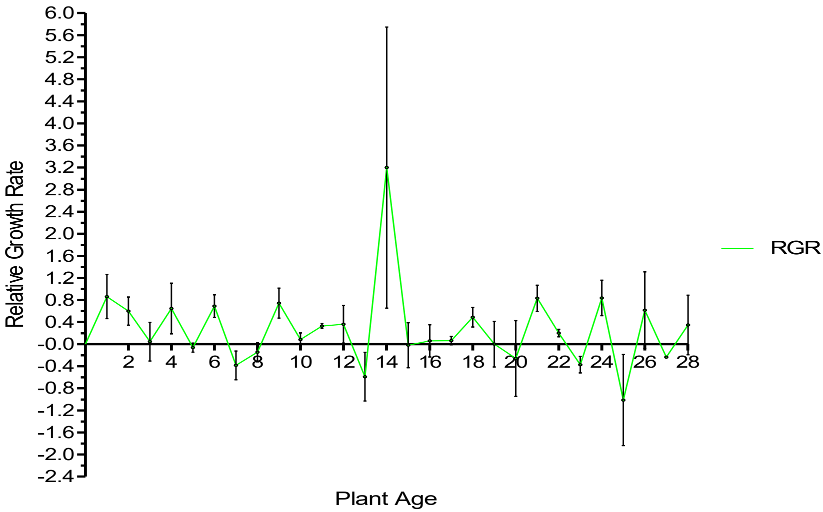

Fig 8: Effect of plant age (in days) on relative growth rate of *T. occidentalis* seedlings

The role of cotyledon persistence and reserves in the early growth of *Telfairia occidentalis* seedlings was also investigated (Sakpere *et al*., 2015b), focusing on how cotyledon removal, seed size, and morphotype influence seedling development. The findings showed that although exposed cotyledons developed chlorophyll and demonstrated limited photosynthetic capacity, their primary function was storage rather than photosynthesis. Cotyledon removal significantly reduced seedling growth parameters, including biomass accumulation, leaf production, vine length, and root development, indicating that cotyledon reserves are essential for early seedling establishment. The negative effects were most severe when cotyledons were removed during the first two weeks or at early leaf stages, demonstrating a critical period of dependence on stored reserves as shown by Sakpere & Adetunji (2014).

Seed size and morphotype were also found to influence seedling response, with seedlings from larger seeds and narrow-leaf morphotypes showing greater dependence on cotyledon reserves and reduced ability to compensate for cotyledon loss. The study contributes to knowledge by establishing that cotyledons play a crucial physiological role in supporting early seedling growth in *Telfairia occidentalis*, primarily through reserve mobilization rather than photosynthesis, and highlights the importance of cotyledon persistence, seed characteristics, and developmental timing in determining seedling survival, growth performance, and developmental success. The findings highlight the fact that farmers must protect young seedlings from pests (like beetles or rodents) that consume cotyledons, as damage within the first 7–14 days is likely to be fatal or cause permanent stunting.

Although cotyledons drive early regeneration in fluted pumpkins, by the eighth (8th) week of growth, tuberous roots become the main reserve organs, enabling shoot regeneration even after cotyledon loss (Sakpere & Obisesan, 2017). This research provided the first precise timeline for tuberous root initiation in *T. occidentalis*, identifying again, the 14-day mark as the critical physiological transition. It scientifically validates the plant's status as a "perennial" by demonstrating the root's role in survival and regrowth, moving beyond anecdotal evidence. The findings suggest that if farmers harvest shoots for consumption, the plant can recover effectively provided the tuberous root has had at least 14–21 days to establish itself in the soil. Understanding the root's storage capacity opens possibilities for managing *Telfairia* as a multi-year crop rather than an annual plant. It also helps to identify the tuberous root as a potential target for genetic improvement, particularly for traits related to drought resistance and rapid regrowth after harvesting.

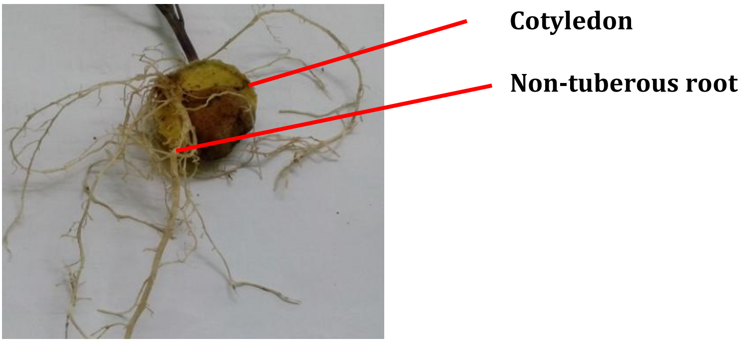

Fig 9: Root of *T. occidentalis* before tuberization (4 weeks old) (X1.6).

Fig 10: Root of *T. occidentalis* after tuberization (9 weeks old) (X 1.6).

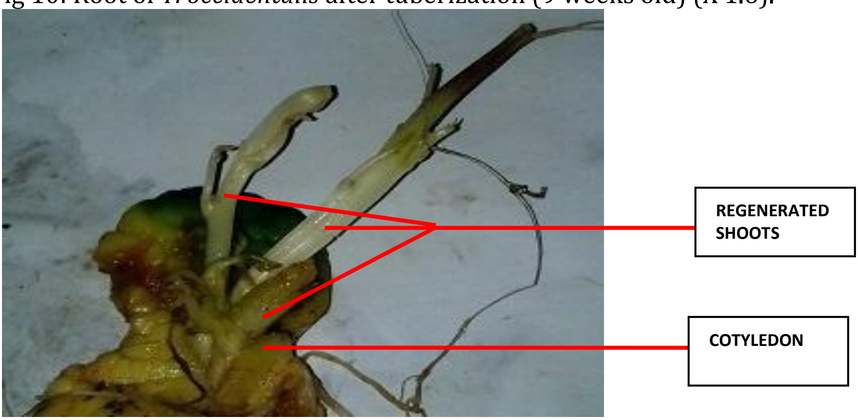

Fig 11: Shoot regeneration from 3 weeks old *T. occidentalis* seedlings after shoot excision (cotyledon and non-tuberous root intact). (X1.6)

Looking at the recalcitrant nature of the seeds and in an attempt to quantify the water concentration of the seeds, Sakpere *et al*., (2016) provided important physiological insights into the germination ecology of *Telfairia occidentalis*, particularly by quantifying critical and lethal moisture thresholds essential for seed survival and germination. The study confirmed that germination in this species is independent of light but highly dependent on adequate moisture availability, reinforcing its classification as a recalcitrant seed species. We provided a specific numerical value of 30.73% for the "critical water content," which is a vital reference point for gene banks and farmers trying to store or transport these recalcitrant seeds.

The findings regarding water potential help in predicting crop success in regions with inconsistent rainfall. It establishes the limits of "physiological drought" that the species can withstand during its most vulnerable stage. Also, by demonstrating that seed weight does not dictate germination percentage, the study encourages the use of all viable seeds in a fruit, instead of discarding smaller ones based on the assumption of poor performance.

Quantitative evidence that fruit size does not reliably predict seed number, challenging assumptions that larger fruits produce more seeds was provided by Sakpere *et al*., (2019). Our study expanded existing knowledge of seedling phyllotaxy (*the arrangement of leaves on an axis or stem*) by identifying seven distinct phyllotaxy patterns and conclusively demonstrating that phyllotaxy cannot be used for early sex determination in this dioecious species.

(*A dioecious plant is a species with distinct male and female individuals, meaning separate plants produce either male (pollen-producing) or female (ovule-producing/fruit-bearing) flowers, but not both*).

Fig 12: Female flowers of *T. occidentalis*

Fig 13: Male flowers of *T. occidentalis*

Fig 14: Fruits and seeds of *T. occidentalis*

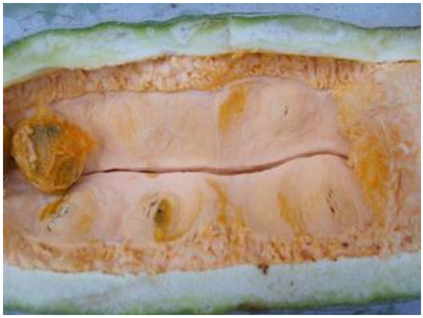

Fig 15: Orange pulp colour of *T. occidentalis*

Our study showed that fruit length is the most important attribute for characterizing fruit size, more reliable than circumference. The result of our study also showed that seed number and polyembryony are independent of fruit size. We highlighted high variability in seed and pulp colour, reflecting genetic diversity and cross-pollination effects. Our study also showed that unfilled seeds are linked to developmental stage rather than fruit size, refining understanding of fruit maturity and seed viability. These insights strengthen breeding, yield estimation, and genetic diversity studies in this important West African crop.

While polyembryony (*Polyembryony in plants is the phenomenon of producing two or more embryos within a single seed, leading to the development of multiple seedlings from one seed*) is widespread in fluted pumpkin seeds, only a small fraction emerges at germination, demonstrating a "biological insurance" strategy where the plant packs multiple embryos into one seed, but suppresses the smaller ones (rudimentary embryos) to ensure the strongest seedling has enough resources to establish. By showing that rudimentary embryos can emerge after the primary shoot is damaged, Sakpere & Ozobia (2023), highlighted the plant's inherent resilience to early-stage herbivory or physical damage. However, even though rudimentary embryos provide a survival mechanism, multiple embryos reduce seedling vigor and show slow germination. For plant breeders and farmers, the finding that heavier seeds contain more embryos—but germinate more slowly—provides a nuanced understanding of how to select seeds based on whether they prioritize seedling number or germination speed.

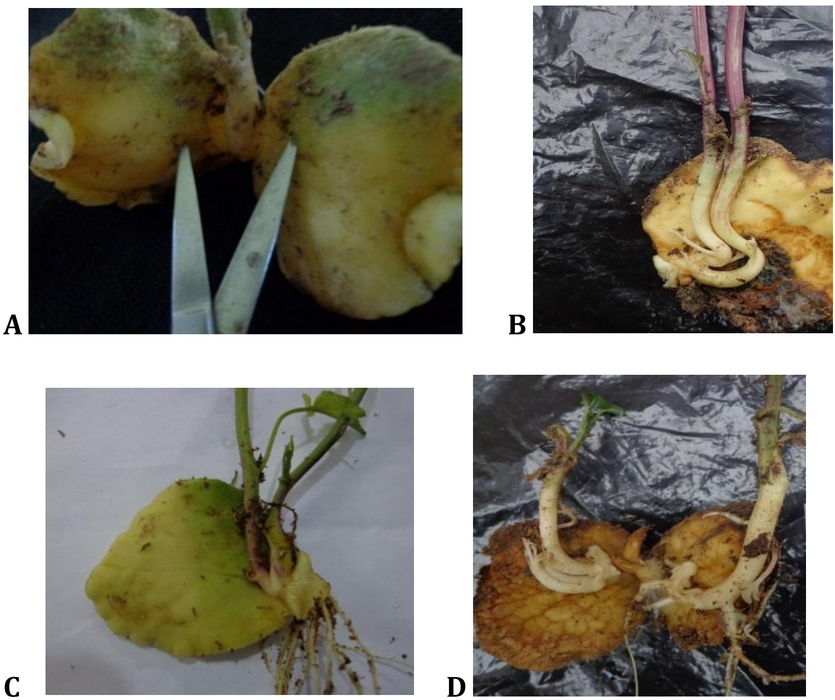

Fig 16: Embryo types in *T. occidentalis*: **A-** A single embryo which emerged at germination (S); **B-** Two embryos which emerged at germination (D2); **C-** Three embryos with only two emerging at germination (T2); **D-** Four embryos with only two emerging at germination (Q).

***Amaranthus hybridus* L. (Tete) and *Corchorus olitorious* L. (Ewedu)**

Knowing that farmers plant dry season vegetables beside water bodies, my colleagues and I examined the susceptibility of *Amaranthus hybridus* and *Corchorus olitorius* to the allelopathic effects of two aquatic weeds, *Ludwigia decurrens* and *Ludwigia adscendens* (Sakpere *et al*., 2010; Sakpere *et al*., 2012), (Allelopathy – Certain plants release substances (exudates) that affect the growth and yield of other plants around them)

We sought to determine if allelochemicals released by these weeds influence seed germination, early seedling development, and the growth of established plants. The methodology involved applying exudates from the weeds to seeds and seedlings of *Amaranthus hybridus* and *Corchorus olitorius* at various stages, measuring germination percentages, early growth parameters (hypocotyl and radicle length), and the response of established three-week-old plants. We found that while the exudates from the weeds did not prevent seeds from germinating, they caused significant mortality and growth reduction in early seedlings, with *L. adscendens* exhibiting a stronger inhibitory effect than *L. decurrens* on both species. Three-week-old seedlings were not affected by the exudates suggesting that as the plant matures, it develops biochemical or physical barriers that neutralize the allelopathic interference.

Key contributions to knowledge include the first documentation of the allelopathic potential of these *Ludwigia* species on two common Nigerian vegetables, providing critical evidence of how aquatic weeds can negatively impact nearby vegetable crops through "chemical warfare,". Furthermore, the findings revealed that established plants (older than 3 weeks) were less affected, unlike young seedlings which were highly vulnerable.

Farmers can mitigate weed interference by germinating seeds of the species in clean nurseries before transplanting them into the field which is a superior strategy to direct seeding in fields infested with *Ludwigia* weeds.

Crassocephalum crepidioides **(Benth.) S. Moore (Ebolo) and** ***Celosia trigyna*** **L. (Ajefowo)**

Studies on breeding of improved cultivars of Ebolo, germination and seed production, as well as solving the problem of seed availability that has hitherto limited its cultivation have been scanty (Denton, 2004). My colleagues and I therefore carried out a study aimed at understanding the plant's flowering patterns, seed development, and germination requirements, while also testing vegetative propagation as a more reliable alternative to seeds for cultivation. The methodology involved monitoring the flowering sequence and post-pollination development in a controlled field setting, analyzing the quality and dispersal mechanisms of the resulting fruits (achenes) and conducting laboratory germination trials under various light and storage conditions. Additionally, we evaluated the regenerative capacity of stem cuttings to determine their suitability for vegetative propagation.

Our findings revealed several biological bottlenecks in the plant's sexual reproduction, including a high frequency of immature seeds due to rapid maturation period. The seeds were found to be light-sensitive (positively photoblastic) providing critical instruction for planting depth. They lose their viability quickly during storage, which explains the difficulty of establishing the crop via seed. In contrast, though the stem cuttings achieved a 100% regeneration rate, the termination of the vegetative stage and beginning of the flowering stage almost immediately after sprouting frustrates the purpose of vegetative propagation with reference to harvest of leaves (Sakpere *et al*., 2013). The timing of onset of flowering is crucial to plant survival in sexual reproduction but early flowering can be a hindrance to vegetative growth during vegetative propagation. The study's key contributions to knowledge is the identification of specific reproductive failures that limit the plant's natural spread.

Since vegetative propagation through stem cuttings of *C. crepidioides* proved difficult, we investigated the use of micropropagation using tissue culture methods. We tested how the auxin Naphthalene Acetic Acid (NAA) and the cytokinin Benzyl Adenine (BA), alone and in combination, influence callus initiation and plant regeneration from leaf and nodal explants. The study established that *in vitro* regeneration is feasible and identifies explant specific responses to common growth regulators. We were able to prove that BA promotes shoot multiplication from nodal explants and that a BA–NAA balance shifts outcomes toward plantlet formation rather than multiple shoots or callus. Nodal explants were more amenable to organogenesis (regeneration), while leaf explants were better for callus induction (Sakpere & Olubunmi, 2018). The protocol that was developed serves as a vital tool for the *ex-situ* conservation of the species, ensuring that germplasm can be maintained in a controlled environment regardless of seasonal changes or wild habitat loss.

My colleagues and I (Ogbimi *et al*. 2024), also carried out a preliminary study focused on the conservation of *Celosia trigyna* commonly known as Ajefowo or wool flower. *Celosia trigyna* is a nutrient-rich and medicinally significant indigenous leafy vegetable in Nigeria that remains largely underutilized and neglected. Despite its diverse uses—ranging from treating gastric ulcers and heart conditions to applications in women's health—this plant is rarely cultivated and no information exists on its collection and conservation (Denton, 2004). It therefore, faces genetic erosion due to continuous harvesting from the wild without replacement.

The primary objective of our research was to develop a disinfection protocol for the explants of *Celosia trigyna* and test its potential for micropropagation using an *in vitro* tissue culture experimental approach in order to facilitate its conservation. Our study identified the most effective method for disinfecting nodal explants. This was done by using 5% (v/v) Clorox (NaOCl) for 9 minutes followed by 1% (w/v) Mancozeb for 5 minutes. This protocol yielded the highest percentage of aseptic, alive, and clean cultures, successfully removing both bacterial and fungal contaminants without damaging the plant tissues, producing the first report of *C. trigyna*'s response to tissue culture techniques. By documenting these preliminary findings, the study provides a vital technical framework for the mass production and germplasm conservation of this threatened species. It lays the groundwork for future research to refine micropropagation protocols for the species.

***Solanecio biafrae* (Oliv. & Hiern) C. Jeffrey (Worowo) and *Clerodendrum volubile* P. Beauv. (Marugbo)**

Mr. Vice Chancellor Sir, just like most other African Leafy Vegetables, *S. biafrae* and *C. volubile*, could make important contributions to combating micronutrient malnutrition, but they have been neglected by researchers. My students and I investigated the nutritional composition and vegetative propagation potential of the two underutilized leafy vegetables with the aim of evaluating their nutrient contents and also to determine effective methods for their propagation in order to promote their utilization and conservation.

We found that both vegetables contain appreciable levels of nutrients and can contribute significantly to dietary vitamin and mineral intake. *C. volubile* is a rich source of vitamin C and *S. biafrae* contains substantial iron, copper, and zinc. The vegetables have dietary relevance: The daily requirements for vitamin C in adults can be met by consuming 400g of worowo (*S. biafrae*) or 200g of Marugbo (*C. volubile*). Worowo (*S. biafrae*) was rooted successfully from two and three node cuttings, making short cuttings practical for propagation unlike the longer cuttings that was previously utilized. Marugbo (*C.*

volubile) on the other hand, showed highest shoot development from tip (80%) and softwood (60%) cuttings with hardwood cuttings failing to sprout. This is the first report of vegetative propagation of *C. volubile* in which tip and softwood cuttings were found to be best for vegetative propagation. Both species are amenable to tissue culture providing baseline information for mass multiplication and conservation of the species (Sakpere *et al*., 2015a).
Based on the baseline information on the potential of worowo for micropropagation, we set out to establish an efficient *in vitro* clonal propagation protocol for the species. The specific objectives were to identify the most suitable explant type (nodal vs. leaf) and determine the optimal concentrations of plant growth regulators for inducing callus formation and shoot proliferation. It was observed that, n odal explants were significantly more effective than leaf explants, demonstrating a 100% success rate for shoot regeneration even though there is a need for optimization to generate more shoots. The most effective treatment for rapid shoot proliferation was a high cytokinin / low auxin combination of 1.25 mg/L BA and 0.5 mg/L NAA, which supported simultaneous shooting and rooting. While leaf explants were capable of forming callus, they were unable to regenerate into full plantlets under the tested conditions (Ogbimi *et al*., 2016). This report is the first on *in vitro* propagation of *S. biafrae* and provides a vital baseline tool for the conservation and rapid multiplication of the species.

Elucidating further on the nutritional profile of Marugbo (*Clerodendrum volubile*), we carried out a study to determine how its health-promoting properties change during plant development. The study's primary aim was to compare the phytochemical, proximate, and elemental compositions of the leaves at two critical growth phases: the pre-flowering and post-flowering stages. Our findings revealed that while the plant contains a consistent array of bioactive compounds—including alkaloids, flavonoids, tannins, and saponins—their concentrations are highly dependent on the growth stage.

Specifically, the pre-flowering stage was found to be more nutrient-dense, boasting significantly higher levels of protein, crude fat, and essential minerals. In contrast, certain secondary metabolites, such as alkaloids and phenols, increased in concentration after the plant began to flower (Olukoya *et al*., 2018a).

We went further to investigate the physiological and biochemical resilience of Marugbo (*Clerodendrum volubile*) to drought, providing critical data for the cultivation of this medicinal vegetable in a changing climate. We looked at how varying levels of water stress impact the plant's growth and its production of health-promoting phytochemicals with the goal of identifying watering regimes that improve leaf quality without unacceptable yield loss. All growth parameters observed in plants subjected to drought stress were significantly reduced compared to control plants. Water stress imposed at the pre-flowering stage enhanced the phenol, alkaloid and tannin concentration in *C. volubile* while water stress imposed at the post-flowering stage enhanced the flavonoid concentration. Watering at 3–7day intervals improved phytochemical quality while limiting biomass loss, making these regimes attractive where water is scarce or where higher leaf value offsets modest yield declines (Olukoya *et al*., 2018b).

Apart from the identification of significant antioxidant and medicinal compounds validating its traditional use as a functional food, the key contribution of this research is the establishment of optimal harvesting guidelines. By demonstrating that the nutritional value peaks before flowering, the study provides a scientific basis for farmers and consumers to maximize the dietary benefits of the plant by harvesting before flowering. Furthermore, the study shows that Marugbo is relatively drought tolerant and that controlled water stress can be used strategically to enhance desirable phytochemicals in leaves. These findings support using deficit irrigation and stage specific harvests to increase the nutritional or medicinal value of this leafy vegetable.

Solanum scabrum Mill. (Ogumo)

Today, the biggest challenge for farmers isn't just growing enough food—it's doing so in the face of environmental stresses resulting from intensifying global warming and climate change. Fertility of the soil is important if successful cultivation is to be achieved, making the application of fertilizers and manures to soil imperative. The future of food security lies in working *with* nature rather than against it. To foster sustainable agro-ecosystems, we must move beyond chemical dependency.

While working on *Moringa oleifera*, Akinyemi and Sakpere (2015) observed that extracts from *M. oleifera* has been reported by many authors (Abdalla, 2013; Anyaegbu, 2014; Aslam et al., 2016) as growth enhancer. Investigations carried out on the effect of different formulations of fruit peels also revealed that they increased fertility of soil and soil microorganisms and that most of the fruit peels contain potassium, vitamins, minerals and some essential elements which enhanced the growth of plants (Mercy et al., 2014; Omoni et al., 2015).

My students and I therefore carried out a study to test whether *Moringa oleifera* extracts and a mixture of banana and orange fruit peels can serve as effective biofertilizers for *Solanum scabrum*, (Ogumo or African nightshade) which has been used for many centuries for its nutritive and pharmacological benefits. We compared the effect of these biofertilizers on seedling growth and biomass with conventional NPK fertilizer and an untreated control. The goal was to identify organic, safe, ecofriendly and accessible alternatives to synthetic fertilizers that could enhance the production of this underutilized medicinal vegetable as a template for other vegetables.

Our results highlight the efficacy of *Moringa*-based treatments, as every extract tested significantly outperformed the untreated control in *S. scabrum* seedlings. Although fruit peel extracts increased shoot height and leaf area, they did not lead to a higher dry weight. The most striking finding was the narrow margin between organic and synthetic treatments; NPK fertilizer was only **10%** more effective than *Moringa* leaf extracts indicating that the organic alternative is nearly as effective as synthetic options (Sakpere *et al*., 2018).

We went further to investigate the use of these biofertilizers to mitigate the negative effects of drought on *S. scabrum*. We evaluated the effectiveness of dry powder biofertilizers—specifically *Moringa oleifera* leaves used alone or in combination with fruit peels (banana/plantain and orange), in enhancing the growth performance and chlorophyll content of *Solanum scabrum* under conditions of water stress (Sakpere *et al*., 2019).

Our findings highlighted the power of synergistic organic amendments, that is, things working together to produce better result than they could alone. Only the combination of *Moringa* leaves and fruit peels significantly boosted both plant growth and chlorophyll levels. Interestingly, *Moringa* leaf powder alone resulted in poorer growth than the untreated plants. This research provides information on a practical, waste-repurposing solution for regions facing irregular rainfall. By optimizing the plant's internal chemistry (chlorophyll levels), this blend of *Moringa* leaves and fruit peels provides a "cushion" against water stress, helping farmers maintain the productivity of this vital indigenous crop.

Afzelia africana **Sm. ex Pers. (Igi Apa)**

Mr. Vice Chancellor Sir, some African leafy vegetables are obtained from trees. *Afzelia africana* (African mahogany/Apa-Igbo, Apa (Yoruba), Akpari (Edo), or Kawa (Hausa).) is a deciduous tree whose young, bright green leaves are cooked and eaten as a leafy vegetable in many parts of West Africa. In traditional medicine leaf decoctions and macerations are taken or applied externally against dysmenorrhoea, epilepsy, oedema, migraine, stomach-ache, asthenia, trypanosomiasis and as anodyne (Gérard and Louppe, 2011). Although it is a widespread species, the population has declined in numbers. In 1998, it was re-assessed and re-classified as 'Vulnerable' on The International Union for Conservation of Nature (IUCN) red list of species due to the threat of over-exploitation for timber on the international market (Tropical Plants Database).

We therefore, carried out some studies to address the urgent need for conservation and reforestation of the species. The primary objective of the study was to develop an efficient protocol for the propagation of *Afzelia africana* by determining the most effective pre-treatment regime to overcome the physical dormancy of the seeds, testing different types of stem cuttings, varying ages of parent plants and the application of growth hormones. We also aimed at developing a protocol for *in vitro* regeneration of the species with the aim of providing a reliable method for the mass production of this threatened tree, bypassing the challenges associated with seed dormancy and slow natural growth.

Our research confirmed that scarification with acid is effective for the pre–treatment of *A. africana* seeds to overcome dormancy, and 10% HNO_3 for 30 minutes is a better alternative for sterilization than 10% H_2SO_4 for 30 minutes. However, physical scarification (mechanical) was the most effective method for improving the germination of the seeds, achieving the highest germination percentage (up to 92%) and the fastest germination rate. This method, even though cost effective, is time consuming and laborious (Ogbimi and Sakpere, 2021). Our studies showed that cuttings from 2-year-old saplings exhibited significantly higher rooting and survival rates compared to those from 20-year-old mature trees, which exhibited very poor rooting ability, establishing that herbaceous

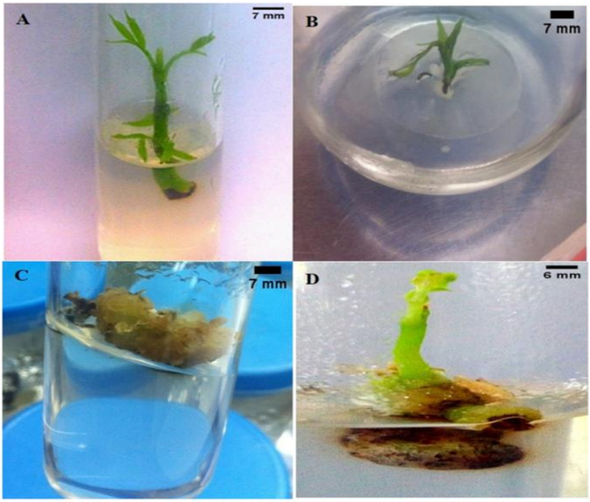

Fig 17: Nodal explant of *Afzelia africana* -(A). Young developing bud formed on MS + 1 mg/L BA.; (B). Multiple shoots formed on MS + 20 mg/L BA. ; (C). Friable callus formed on MS + 20 mg/L BA+ 5 mg/L NAA. ; (D). Thick shoot & basal callus formed on MS + 20 mg/L BA + 5 mg/L IAA.

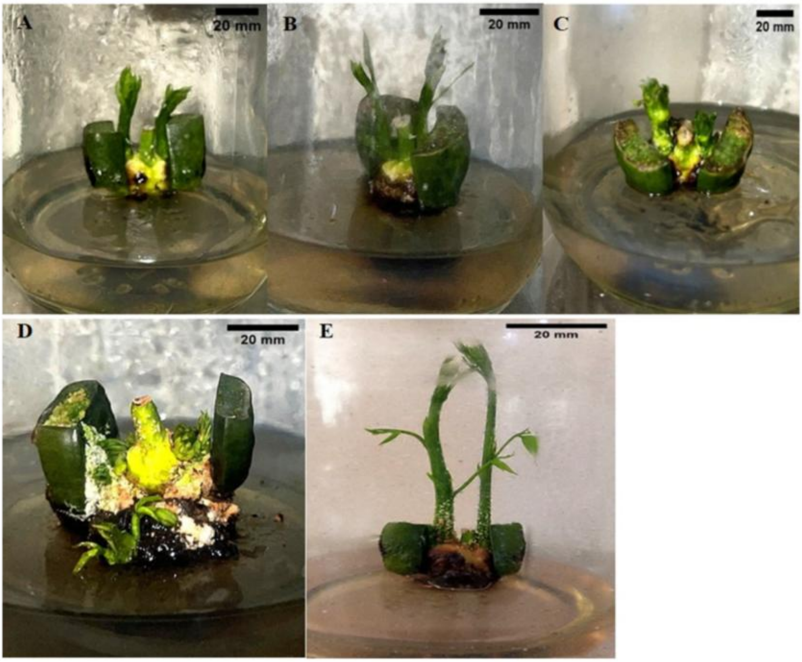

Fig 18: Shoot multiplication and elongation from cotyledonary node of *Afzelia africana* (A). Multiple shoots on MS + 15 mg/L BA + 15 mg/L PG; (B). Multiple shoots on MS + 15 mg/L BA + 20 mg/L PG; (C). Multiple shoots on MS + 15 mg/L BA + 15 mg/L PG + 5 mg/L TDZ ; (D). Multiple shoots on MS + 15 mg/L BA + 15 mg/L PG + 10 mg/L TDZ ; (E). Elongated shoots on MS + 15 mg/L BA + 15 mg/L PG

(non-lignified) cuttings are superior to semi-hardwood (lignified) cuttings for this species (Ogbimi *et al*., 2020). The presence of leaves on cuttings was also demonstrated to be essential for survival and root development in the species having an interactive effect with IBA treatment. From the study, we concluded that, herbaceous leafy stem cuttings of *A. africana* treated with 400 ppm IBA and planted on river sand is suitable for rooting stem cuttings of *A. africana* for raising seedlings for reforestation, afforestation and other conservation purposes.

We were also able to confirm that regeneration of *A. africana* is feasible through *in vitro* propagation. Ogbimi *et al*., (2024), through a comparative analysis of various plant parts (Leaf, nodal, cotyledonary node (CN), shoot tip, stem and hypocotyl explants), identified the cotyledonary node (CN) as the most effective explant for shoot induction in this species. Multiple (10.00 ± 0.00) shoots were generated from cotyledonary nodes (CN) cultured on MS supplemented with 15 mg/L BA,15 mg/L phloroglucinol (PG) and 5 or 10 mg/L TDZ thus, providing clear technical direction for future efforts in clonal propagation.

Moringa oleifera **Lam. (Gbogbonise)**

Moringa oleifera (miracle tree) is an edible nutrient-rich plant that supports health and serves as an essential food source for ensuring food security in economically disadvantaged regions (Milla *et al*., 2021). Akinyemi and Sakpere, (2015) explored the physiological requirements and resilience of the versatile "miracle tree" under various environmental pressures. The effect of light, sowing depth and water stress on seed germination and seedling growth of *Moringa oleifera* was studied. Results obtained from the study showed that *Moringa oleifera* is sensitive to germination under water stress but germinates well under both light and dark conditions. The results also suggest that drought tolerance depends on root characters. Our work adds valuable physiological insights into the propagation of *Moringa oleifera*, emphasizing the species' sensitivity to water stress at the seedling stage and the importance of root development for its drought resilience.

***Piper guineense* Schumach and Thonn (Iyere)**

Piper guineense is a wild climbing shrub that originated from the tropical regions of Central and West Africa. It is a West African spice whose fruits are commonly called Ashanti pepper or African black pepper (Ameh *et al*., 2011). It is known in Nigeria as Uziza in Igbo and Iyere in Yoruba. The leaves are used as vegetable while the fruits are used as spice in preparation of local dishes in the Igbo communities in Nigeria. The leaves and seeds are important ingredients used to prepare special soups for post-partum women (Okoye and Ebeledike, 2013), as it is claimed that it stimulates uterine contractions, therefore aiding the return of uterine muscle to the original shape. It also has antimicrobial properties as reported by Okigbo and Igwe, (2007). In some Yoruba communities in Nigeria, the dried fruits are used in the preparation of herbal drug while ashes from the plant is used as salt substitute for medicinal preparations (Tropical Plants Database). Research also shows that *Piper guineense* has food preservatives and antioxidant properties (Nwozo *et al*., 2017).

The continuous loss of forest plants due to deforestation, and the increasing demand for *Piper guineense* because of its medicinal and food value, has put permanent pressure on its population in the wild where it is majorly collected. Different parts of the plant such as the root, stem, fruits, seeds and leaves are utilized in Nigeria and the plants will go extinct except conscious efforts are made to propagate them outside the forest. A method for conservation and mass propagation is therefore required. My students and I carried out studies to investigate the potential of *Piper guineense* for vegetative propagation and micropropagation.

Plate1: *Piper guineense* staked under tree shade

Plate 2: Ripe *Piper guineense* fruits

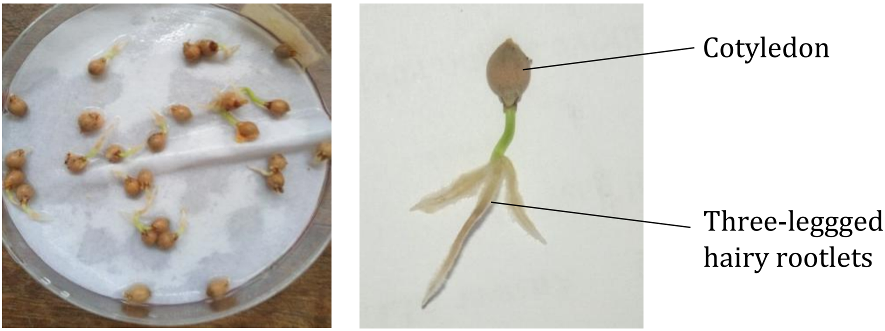

Plate 3: Germinating *P. guineense* seeds in a Petri dish.

We established the first successful protocol for its micropropagation. We reported in Sakpere and Ezenu (2023) that, standard surface sterilization (using ethanol and sodium hypochlorite) is insufficient for *P. guineense* nodal explants due to endogenous or deep tissue contaminants. We established that double sterilization process using Plant Preservative Mixture (PPM)—specifically adding 0.4 ml/L PPM to the media and soaking explants in 5% PPM for a minimum of 2 hours—is essential to achieve sterile cultures. Eighty percent shoot induction was obtained when nodal explants were cultured on MS media supplemented with 1.5 mg /L BA alone and thereafter, sub-cultured on MS media supplemented with 0.5 mg/L NAA to obtain roots. For vegetative propagation, treating two-nodal stem cuttings with 2000 ppm Indole-butyric acid (IBA) significantly optimizes sprouting (80%) and rooting, with higher concentrations (2500 ppm) becoming inhibitory.

Ezenu *et al*. (2024) identified *Piper guineense* seeds as recalcitrant, meaning they lose viability rapidly if dried and must be sown fresh to germinate. This finding resolves long-standing contradictions and failures in local and scientific propagation attempts. We reported that unlike the single radicle of related species like *Piper nigrum*, *P. guineense* develops three-legged hairy rootlets.

We identified the period between the 4th and 5th month as a critical development phase. During this time, the plant prioritizes leaf area expansion over shoot height and leaf number, indicating a shift in "sink strength" to developing leaves. Within six months, seedlings can reach a mean height of approximately 188.5cm with nearly 29 leaves.
By establishing that *P. guineense* requires fresh, de-pulped seeds for successful propagation, and all the other reports on vegetative and micropropagation, the studies provide a "roadmap" for sustainable commercial cultivation. These studies are essential for transitioning the plant from a wild-harvested forest product to a domesticated crop, ensuring that its medicinal and nutritional benefits remain available despite declining forest covers.

African leafy vegetables in health management
Mr Vice Chancellor Sir, apart from investigating physiological and reproductive mechanisms of these vegetables, I took interest in examining the medicinal roles of African Leafy Vegetables in health management using Osun state, South-Western Nigeria as a template. Downer *et al*. (2020) reported that, owing to the global epidemic of diet-related chronic diseases, food has become a formal part of patient care and treatment. They cited an “emerging but compelling body of research that indicates that the introduction of food and

nutrition in the healthcare system might be related to improved health outcomes and reduced healthcare usage and costs". Therefore, indicating "the potential for food and nutrition interventions to play a prominent role in the prevention, management, treatment, and in some cases reversal of diseases". My colleagues and I therefore, conducted an extensive literature survey and a field survey to substantiate existing reports on the ethnomedicinal uses of African leafy vegetables in managing various health conditions within Osun State. A multistage sampling procedure was adopted for the fieldwork.

Our study, as reported in Sakpere *et al*., (2023), identified 12 vegetable species from eight families (mostly Asteraceae) that are used both for food and medicine in Osun State. They include *Vernonia amygdalina* (Ewuro) which was found to be the most culturally important and frequently cited medicinal vegetable, used for treating at least four different ailments, including diabetes, measles, epistaxis (Nosebleed), and hemorrhoids (Piles). Other significant medicinal vegetables based on the Cultural Importance Index (CII) and Relative Frequency of Citation (RFC) include, *Talinum triangulare* (Gbure) – for the treatment of infant anemia and boils; *Solanum nigrum* (Odu) for the treatment of stomach ache and to suppress the effect of snake venoms; and *Launaea taraxacifolia* (Yanrin) for the treatment of diabetes and constipation. We also reported the use of *Corchorus olitorius* (Ewedu) for the treatment of measles and easing labor and *Celosia trigyna* (Ajefowo) for eczema.

The medicinal uses of these ALVs were categorized into nine areas: respiratory problems, reproductive issues, urinary tract infections, circulatory problems, degenerative diseases, nervous system disorders, wound healing/skin inflammations, digestive ailments, and other conditions. The most common method of medicinal application is direct consumption (eating cooked or raw vegetables), followed by maceration, juice extraction, decoctions, and topical pastes.

Our study provides a systematic ethnobotanical documentation of ALVs in Osun State, demonstrating them as dual-purpose plants: food and medicine. It also highlights their potential in modern healthcare integration, especially for chronic disease prevention and management, reinforcing the importance of preserving indigenous knowledge amidst urbanization and dietary shifts. This therefore, is a pointer to the fact that we need to preserve the past in order to be able to cultivate these vegetables for tomorrow and unlock their potential for food security. The literature survey on the various ALVs has revealed that they have high medicinal value and the study has given justification to the traditional uses of these vegetables by the indigenous communities in Osun State. According to clinical and epidemiological research, 80% or more of current chronic ailments and premature deaths can be prevented with changes in diet and lifestyle (Katz et al., 2018; WHO, 2025). In a country, where affordability and access to quality medicines is a major challenge, there is a need to aim at preventing diseases by eating right and treating food as medicine, especially ALVs, which can be used as functional foods for the prevention and management of different health challenges, especially neurodegenerative diseases.

Other Studies

Mr. Vice Chancellor Sir, distinguished audience, my research has not been limited to the physiological, developmental, and reproductive biology of indigenous vegetables but has been extended to other plants such as *Glycine max* (L.) Merril. (soybeans), *Pycnanthus angolensis* (African false nutmeg; Akomu [Yoruba]) and *Pachyrhizus erosus* L. (sese, sheshe).

Our study on soyabeans (*Glycine max*) suggests that under local conditions, applying 25–50 kg P/ha is the most effective range to optimize soybean seed yield and growth, balancing performance with environmental concerns (Togun and Sakpere, 2004).

In Akinropo and Sakpere (2019a) we reported our study on *Pycnanthus angolensis* (African false nutmeg), a tropical tree species known for its medicinal and economic value. This research provided a definitive identification of the germination behavior of *P. angolensis* as cryptogeal - a specialized seed germination strategy where, an apparent radicle is produced that carries the plumule below the soil surface before the shoot (plumule) emerges, often as an adaptation to survive wildfires, drought, or grazing. It is characterized by an initial downward growth of the cotyledonary tube, forming a subterranean storage organ or tuber.

Our finding confirms that *P. angolensis* seeds are recalcitrant, meaning they lose viability rapidly when dried or stored. Our reports were contrary to previous reports that suggested that its germination was hypogeal. We documented a unique process where the plumule emerges from a cotyledonary petiole below the ground, a mechanism often viewed as an evolutionary adaptation to reduce water loss or survive environmental stressors like fire.

In another study, Akinropo and Sakpere (2019b), we reported a significant contribution to the conservation and propagation of *Pycnanthus angolensis* by developing the first successful vegetative propagation protocol for the species. Prior to this research, vegetative propagation attempts via stem cuttings had failed, leaving the species—which is vulnerable due to overexploitation and low annual seed production—reliant on slow and inconsistent natural regeneration. A critical finding of the study is that the ability of *P. angolensis* cuttings to form roots is strictly dependent on the age of the donor plant and that adequate hydration is a prerequisite for successful macropropagation of this tree. Our protocol specifies that cuttings must be soaked in water for nine hours prior to auxin treatment to maintain cell viability and overcome sensitivity to dehydration.

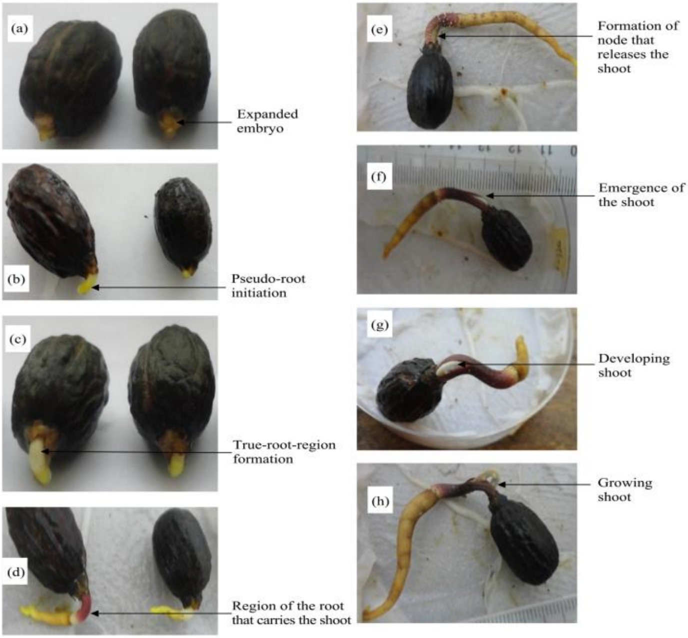

Plate 4: Germinating seeds of *Pycnanthus angolensis* shown at (a) day 4, (b) day 6, (c) day 7, (d) day 8, (e) day 21, (f) day 23, (g) day 25, and (h) day 30

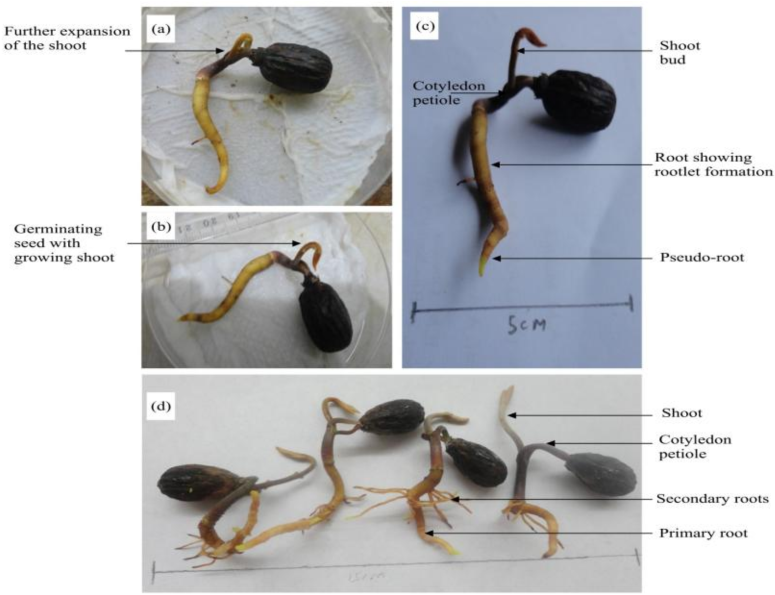

Plate 5: Germinating seeds of *Pycnanthus angolensis* shown at (a) day 32, (b) day 34, (c) day 38, and (d) before transplanting, respectively

Another plant that we studied apart from indigenous vegetables, is the tropical legume *Pachyrhizus erosus* (L.) Urb. commonly called Jicama. *Pachyrhizus erosus* is an underutilized crop plant belonging to the Fabaceae family. In recent years, the plant received huge attention and was introduced in different countries owing to properties such as a high nutritional content, its nitrogen-fixing abilities, and different biological activities such as its antioxidant, immune modulation, anticancer, anti-diabetes, anti-osteoporosis, antiviral, and antiaging affects, among others (Jaiswal *et al*., 2021). *Pachyrhizus erosus* was introduced in Africa to boost food security and reduce child malnutrition, offering nutrients that are absent in staple tuber crops.

My team and I investigated the physio-biochemical adjustments of the plant to drought at the seedling stage. We identified that while *P. erosus* seedlings are sensitive to dehydration, they possess a resilient drought-adaptive strategy through a combination of morphological adjustments (Reducing leaf area to minimize water loss while simultaneously extending its root system to seek deeper soil moisture) and biochemical resilience (increased SOD (Superoxide Dismutase) and CAT (Catalase) enzyme activities) to scavenge reactive oxygen species and prevent oxidative damage. We reported in Obisesan *et al*., (2021a) that, *P. erosus* is a sustainable candidate for cultivation in drought-prone developing countries like Nigeria. Its ability to "self-regulate" through growth reduction and enzymatic protection ensures it can survive seasonal drought periods effectively.

Our work has also established a micropropagation protocol with the aim of providing a viable alternative to traditional seed-based propagation which suffers from very low seed viability. We reported that the most effective way to obtain sterile explants for this species is through *in vitro* germination. Seeds sterilized with 10% sodium hypochlorite (NaOCl) for 10 minutes yielded the highest percentage (90%) of clean seedlings. This method specifically overcomes the challenge of high contamination rates common in field-sourced legumes by utilizing "glabrous" (hairless) *in vitro* tissues that lack the microbial-trapping epidermal hairs found on field plants. Nodal explants derived from these *in vitro* germinated seedlings are best for shoot regeneration compared to stem, leaf, or tuber explants. These nodal explants cultured on Murashige and Skoog (MS) medium supplemented with 1.0 mg/L Benzyladenine (BA) produced the highest number of multiple shoots, thereby providing a reliable method for mass multiplication and a foundation for future genetic modification of *Pachyrhizus erosus* (Obisesan *et al*., 2021b).

CONCLUDING REMARKS

Mr. Vice Chancellor Sir, distinguished audience, in this presentation, I have tried to draw our attention to the "Green Gold" we have in this part of the world which, if properly harnessed can become a global commodity. There is a need to promote increased utilization and consumption of ALVs which double as potent nutraceuticals, as they are functional foods that are not only a source of nutrients but antioxidants and other beneficial bioactive components.

Thus, drawing recommendations from all these are in order.

Recommendations:

1. There is a need for synergy in the studies regarding African Leafy Vegetables. On this campus alone, several researchers are carrying out studies on different research aspects of ALVs. If there is synergy, the impact will be significantly higher. Therefore, I recommend that here at Obafemi Awolowo University, Ile-Ife, we should have a Centre for African Leafy Vegetable Research whose function should be to **coordinate** research on the nutritional value, improvement, conservation, sustainable cultivation, promotion and value-chain enhancement of indigenous African Leafy Vegetables in Nigeria. This will ensure the consolidation of efforts by individual

researchers into a single more effective research output and ensure adequate promotion of our indigenous vegetables to the younger generations. In the words of Prof Samson Olajide Oke during his inaugural lecture, "*It is important to educate the youths on the importance of the world's rich biodiversity and why we need to protect it for many generations to come. We inherited the biodiversity from our parents and borrow it from our children*." Recognizing the need to preserve and promote our indigenous plant heritage, I authored a book documenting selected African leafy vegetables to familiarize younger generations with these valuable yet often overlooked crops. Through the generous support of family and friends, this book has been freely distributed at this inaugural lecture.

2. We must actively protect our environment and indigenous vegetables to preserve the language and culture tied to them. This requires a concerted effort to mitigate ecological disruption caused by aggressive commercialization and modern farming practices like excessive herbicide use. Efforts to conserve these vegetables should be strengthened by developing domestication protocols for those collected from the wild.

3. There is a also a need to move in the direction of automated or urban cultivation of our ALVs by introducing hydroponic protocols.

4. Science reveals what is possible, while policy shapes how society adopts, supports, finances, and regulates those possibilities. I therefore recommend that there should be a legislature to enforce a *Nigerian Indigenous Leafy Vegetable Protection Act* to promote the utilization of these vegetables and ensure that they do not go into extinction.

5. Conservation of Flora/vegetation cover needs to be encouraged. On OAU campus, many stands of important trees species no longer exist, if areas need to be cleared for whatever

purpose, this should be carried out in conjunction with professionals in the department of Botany to limit Indiscriminate felling of trees. Architects should also be encouraged to design around trees. Designing around existing trees turns living nature into the core framework of a building. Instead of clearing a site entirely, architects should use mature trees to dictate layouts.

Teaching and Community Service

Mr. Vice Chancellor Sir, and my distinguished audience, my contributions are not limited to research alone but extend to other services within and outside the university. I have had the privilege of teaching hundreds of students across many faculties and of supervising several undergraduate projects. I have also successfully supervised and mentored 11 Masters as well as two Doctoral candidates (another ready for oral examination and two others ongoing) and all of them are doing very well in various fields in different parts of the world. I am thankful to God for the first fruit of my project supervision, my very first undergraduate project student, Oladapo Aremu, who is now a professor in South Africa carrying on the vision of preserving plant cultural heritage. He is an expert in the conservation of African floras especially those with medicinal, horticultural and nutritional potential. Two of my Doctoral students, Dr Eje Ogbimi and Dr Idowu Obisesan (*Dr Idowu Plant Therapy* on YouTube) are now Senior Lecturers also carrying on the vision. My other students, both post graduate and undergraduate are equally progressing in different fields across the world.

I have maintained an active presence within the academic community through regular participation in numerous local and international conferences. At these conferences, I have presented my research findings and, on some occasions, served as session chair. I am a member of different national and international professional bodies including Botanical Society of Nigeria, (BOSON); The Botanical Society of America (2003, 2018 – 2024) and the Organization for Women in Science for the

Developing World (OWSD). I have served and I am still serving in several capacities in this University and other Universities - as Internal Examiner in many Departments in the University; as external examiner in universities within and outside Nigeria and as reviewer for various national and international journals. I have also assisted in assessing colleagues to the rank of Professor and Associate Professor in several Universities (Federal, State, and Private). I have served as Head of Department (2020 - 2022); Treasurer, ASUU-OAU (2014 - 2016); Vice Chairperson, Organization for Women in Science for the Developing World (OWSD), OAU Chapter (2015 – 2019); Chairperson, OWSD OAU Chapter (2019– 2023); Vice Chairperson, Obafemi Awolowo University International School, Ile-Ife, P.T.A. (2012 – 2016); Member, User's Committee (Biology Unit), Central Science Laboratory (2001); Member, University Research Ethics Committee (2024 – to date); Chairperson, University Research Ethics Committee (Plants subcommittee) (2025 – to date); Member; University Academic and Research Excellence Committee (2024 -Till Date); Chairperson, University Research Fair sub-committee (2024 – Till Date) and Senate Representative to the Joint Council and Senate selection Board for the appointment of the Bursar (2023).

Appreciation and Acknowledgement
Mr. Vice Chancellor Sir, permit me to quickly appreciate all those though, too numerous to mention, that God has used to position me and also serve as my helper in life and career progression.

I am deeply grateful to Obafemi Awolowo University, Ile-Ife, for providing me, over the years, with the opportunity and platform to develop and advance my research career. I also sincerely appreciate my teachers and colleagues in the Department of Botany as well as many others too numerous to mention, whose support, guidance, and contributions have significantly enriched my research endeavours. I further acknowledge the University's support through the provision of travel grants on

few occasions, which enabled me to attend academic conferences both within and outside Nigeria.

I am grateful to my parents, Mr. Jacob Bamidele Ogundare and Late Mrs. Comfort Adebisi Ogundare who laid the foundation of my educational journey while my mother completed it. My mother (1944 - 2018) prayerfully supported me from my childhood till the time she left this world. I wish she was here today. I am grateful to my siblings, Dapo and Toyin Ogundare, Toyosi Ogundare and Tope and Sola Adeyemo, I say a big thank you for always being there for me.

I appreciate my all my uncles and aunties, cousins, nieces and nephews – The Ogundares'; the Oladimejis'; The Odejides' and Oyeyiolas'; Mr. Oyinloye "Baba Mayowa"; I say a big thank you.

I acknowledge the unwavering love of my mother in-love, Mama Gubroma Sakpere, my siblings in love and their families, Late Mr. Augustine Sakpere, Ven. Prof Adefolarin and Prof (Mrs.) Sylvia Malomo, Mr. J.B and Mrs. Pat Sakpere, Mrs. Iroro Olanlokun, Mr. Joseph and Mrs. Dorcas Sakpere, Dr Wilson and Dr (Mrs.) Ronke Sakpere. Thank you for your love and constant support. I couldn't wish for a better family.

I appreciate all my teachers and those that have mentored me through the years. Prof Emmanuel Obukohwo Etejere (who supervised my Bachelor's degree in Botany at the University of Ilorin and laid a good foundation for academic research); Prof Adeniyi Olumuyiwa Togun (who I share my birthdate with, supervised my Master's degree in Agricultural Biology at the University of Ibadan and remains till today an academic father and mentor); Late Prof Abiodun Craig Adebona (who supervised my Master's degree in Botany and introduced me to the world of Tissue Culture alongside Dr B. E. Ayisire) I am eternally grateful; Prof. Adekunle Ajayi Adelusi (who supervised my doctoral degree in Botany, for his constant support from the time I came for interview through my academic journey in OAU. I am grateful and I appreciate his fatherly role in my life); Prof

Sola Ajayi (who co-supervised my doctoral degree in Botany, I appreciate your contributions to my life).

I can never forget the role played in my life by late Prof Olufisan Oladele Taiwo of blessed memory (1945 – 2002). He stood by and encouraged me during my interview; your seed will not beg for bread. I also thank Professor Obafemi and Mrs Ronke Ajibola for their support over the years; Professor Omotoye Olorode, who continues to mentor me even in his retirement, and for writing the foreword for my book, thank you sir; Prof Olajide Oke, thank you for always being there with valuable advice. I am very grateful to all of them and many others that space and time will not permit me to mention.

All these research works have not been my solo efforts, but joint efforts with my colleagues, mentors and mentees. Therefore, I appreciate all my colleagues that I have worked with over the years, thank you for the part you played in shaping my research.

I also acknowledge all my undergraduate and postgraduate students, I have learned a lot from them over the years and I thank them for their contributions to my research efforts. I appreciate them all.

I appreciate God for the uncommon grace I have received to minister alongside my husband in the vineyard of faith. I cannot separate my success and life achievements from the support of my spiritual family over the years. All members of Upperroom Believers Assembly, Ile-Ife, my daughters and sons in the faith, I appreciate you all. Apostle Kingsley and Reverend (Mrs.) Gbemisola Alfred of Nations Light Ministries, who God used to ordain us ministers, I am thankful and grateful. I appreciate members of Rhema Chapel, Ile-Ife where we started out. My God's Chosen family, the Abrahams, the Afolabis, the Ajiboyes, the Odunlades, the Olayinkas' and the Orifowomos'. "*For God is not unjust to forget your work and labor of love which you have shown toward His name, in that you have ministered to the saints,* *and do minister*". Words are not enough to thank you for your contributions in my life. *'The Lord bless you and keep you; the Lord make his face shine on you and be gracious to you; the Lord turn his face toward you and give you peace*.'

To all my friends and colleagues who organized this inaugural, Prof Saheed Adekilekun and the inaugural committee team, and those who reviewed my submissions, Prof Tope Oladipo, Prof Sola Salami, Prof Folashade Hunsu and all others who worked behind the scenes to ensure the success of this inaugural lecture, I say a big thank you and I appreciate you greatly. I thank all those who supported this Inaugural Lecture financially and spiritually. I am eternally grateful. I thank you, my audience from far and near, you are highly appreciated. Thank you all for listening.

To my husband, Randy Oyovwevotu Sakpere, thank you for your love and support over the years and for believing in me. Migwo! I appreciate you and our children, Oghenetejiri, Oghenetobore and Oghenetega for your wonderful and unflinching support and encouragement as well as the immense sacrifice you have all had to make at one time or the other, in order for me to qualify to stand on this podium today. I say a big thank you.

Above all, I ascribe all adoration to the Most High God, the Beginning and the End, my ever-present help, my shield and buckler, my glory and the lifter of my head, my rock, my strong tower, my sustainer, the one that fights my battles for me. I am a product of God's grace, favour and mercy.

Today, as I turn 58, if I could summarize my journey in one sentence, it would be this: **Mercy kept me, Grace carried me**. There were times I had nothing left but faith. And somehow, God sustained me.

At 58, I no longer celebrate only accomplishments. I celebrate survival, I celebrate healing. I celebrate wisdom. I celebrate purpose. I celebrate the woman I've become, and the woman I am becoming, the prayers that were answered, the battles I survived, and the dreams I'm still chasing.

Today, I honor every version of me that survived:
The version that cried in private, the one who carried weight no one else saw, the praying me, the healing me, the rebuilding me, and the version who didn't give up when it would have been easier to quit.

In everything God has brought me through, I've learned to trust in Jesus, I've learned to depend upon His Word.
I am not here because life was easy.
I am here because God was faithful.
I am still standing.
I am still becoming.
By mercy.
By grace.
To GOD alone be all the glory.

References

Abdalla, M. M. (2013). The potential of *Moringa oleifera* extract as a biostimulant in enhancing the growth, biochemical and hormonal contents in rocket (*Eruca vesicaria* subsp. sativa) plants. *International Journal of Plant Physiology and Biochemistry*, 5(3): 42-49. DOI:10.5897/IJPPB2012.026

Ajayi, S.A., Berjak, P., Kioko, J.I., Dulloo, M.E. and Vodouhe, R.S. (2006). Responses of fluted pumpkin (*Telfairia occidentalis* Hook. f.; Cucurbitaceae) seeds to desiccation, chilling and hydrated storage. *South African Journal of Botany*, 72(4): 544-550 ISSN 0254-6299. https://doi.org/10.1016/j.sajb.2006.02.001 (https://www.sciencedirect.com/science/article/pii/S0254629906000913)

Akinropo, M.S. and **Sakpere, A. M. A.** (2019a). Seed germination and seedling growth of *Pycnanthus angolensis* (Welw.) Warb. (African false Nutmeg). *Sciences in Cold and Arid Regions*; 11(5):0350–0359. DOI:10.3724/SP.J.1226.2019.00350.

Akinropo, M.S. and **Sakpere, A. M. A.** (2019b). Macropropagation of *Pycnanthus angolensis* (Welw.) Warb. (African false Nutmeg). *FUTA Journal of Research in Sciences*, 15 (2): 254 – 263.

Akinyemi, T. E and **Sakpere, A.M. A.** (2015). Effect of light regime and water stress on germination and seedling growth of *Moringa oleifera* Lam. *FUTA Journal of Research in Sciences*; 11(2): 369 – 377

Akoroda, M.O. (1986). Seed desiccation and recalcitrance in *Telfairia occidentalis*. *Seed Science and Technology* 14: 327–332

Altieri, M. A., Merrick, L.C., Anderson, M.K. (1987). Peasant agriculture and the conservation of crop and wild plant resources. *Conservation Biology*, 1: 49-58

Ameh, S. J., Obodozie, O. O., Inyang, U. S., Abubakar, M. S. and Garba, M. (2011). Climbing Black Pepper (*Piper guineense*) Seeds as an Antisickling Remedy (Chapter

40). Editor(s): Victor R. Preedy, Ronald Ross Watson, Vinood B. Patel, In: Nuts and Seeds in Health and Disease Prevention, Academic Press, Pages 333-343, ISBN 9780123756886, https://doi.org/10.1016/B978-0-12-375688-6.10040-4. (https://www.sciencedirect.com/science/article/pii/B9780123756886100404)

Anyaegbu, P. O. (2014). Assessment of effect of *Moringa oleifera* extracts, NPK fertilizer and poultry manure on soil properties and growth performance of *Solanum menlongina* in Abuja. *Journal of Agricultural and Crop Research*, 2(5): 88-93. https://www.ajol.info/index.php/naj/article/view/110040

Aslam, M., Sultana, B., Anwar, F. and Munir, H. (2016). Foliar spray of selected plant growth regulators affected the biochemical and antioxidant attributes of spinach in a field experiment. *Turkish Journal of Agriculture and Forestry*, 40: 136-145. DOI: http://journals.tubitak.gov.tr/agriculture/ doi: 10. 3906/tar-1412-56

Denton, O. A. (2004). *Crassocephalum crepidioides* (Benth.) S. Moore In: Grubben, G.J.H. & Denton, O.A. (Editors). PROTA 2: Vegetables/Légumes. [CD-Rom]. PROTA, Wageningen, Netherlands

Downer, S., Berkowitz, S. A., Harlan, T. S., Olstad, D. L. and Mozaffarian, D. (2020). Food is medicine: actions to integrate food and nutrition into healthcare. BMJ 2020;369:m2482 doi: https://doi.org/10.1136/bmj.m2482

Elouafi, I. (2024). https://www.cgiar.org/news-events/news/producing-more-with-less-cgiars-ismahane-elouafi-on-climate-and-food-security. Accessed 22/07/2026.

Ezenu, V. N., Akinropo, M. S., and **Sakpere, A. M. A**. (2024). Study of Germination and Seedling Growth of *Piper guineense*. *Journal of Tropical Crop Science*, 11(01): 74–81. https://doi.org/10.29244/jtcs.11.01.74-81FAO (2025)

FAO. (1999). Agricultural Biodiversity, Multifunctional Character of Agriculture and Land Conference, Background Paper 1. Maastricht, Netherlands. September 1999.

Gérard, J. & Louppe, D., (2011). *Afzelia africana* Sm. ex Pers. [Internet] Record from PROTA4U. Lemmens, R.H.M.J., Louppe, D. & Oteng-Amoako, A.A. (Editors). *PROTA* (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. <http://www.prota4u.org/search.asp>. Accessed 26 March 2026.

Gockowski, J., Mbazo'o, J., Mbah, G. and Moulende, T. F. (2003). African traditional leafy vegetables and the urban and peri-urban poor. Food Policy, 28(3): 221-235 https://doi.org/10.1016/S0306-9192(03)00029-0 https://www.sciencedirect.com/science/article/abs/pii/S0306919203000290 Accessed 30/01/2026

Harris, J., Tan, W., Raneri, J. E., Schreinemachers, P. and Herforth, A. (2022). Vegetables for Healthy Diets in Low- and Middle-Income Countries: A Scoping Review of the Food Systems Literature. *Food and Nutrition Bulletin*, 43(2):232-248. doi:10.1177 /03795721211068652

Hassan, J., Gomasta, J., Ali, L., Nizer Sultana, S., Zubayer, Md., Saiful Islam, Md., Ashab, K. R., Shanta, S. H. and Kayesh, E. (2024). Transforming Weeds to Edible Vegetables: An Alternative Sustainable and Ecofriendly Approach to Weed Management. *IntechOpen*. doi: 10.5772/intechopen.1004883

Jaiswal, V., Chauhan, S. and Lee, H. J. (2021). The Bioactivity and Phytochemicals of *Pachyrhizus erosus* (L.) Urb.: A Multifunctional Underutilized Crop Plant. *Antioxidants (Basel)*, 11(1):58. doi:10.3390/antiox11010058

Katz, D.L., Frates, E.P., Bonnet, J.P., Gupta, S.K., Vartiainen, E. and Carmona, R.H. (2018). Lifestyle as Medicine: The Case for a True Health Initiative. *American Journal of Health Promotion*, 32(6):1452-1458. doi: 10.1177/0890117117705949. Epub 2017 May 19. PMID: 28523941.

Khire, K. (2013). African leafy vegetables come out of the shade. https://cgspace.cgiar.org Accessed 30/01/2026

Knez, M., Mattas, K., Gurinovic, M., Gkotzamani, A. and Koukounaras, A. (2024). Revealing the power of green leafy vegetables: Cultivating diversity for health, environmental benefits, and sustainability. *Global Food Security*, 43: 100816. ISSN 2211-9124, https://doi.org/10.1016/j.gfs.2024.100816.

Malebo, N. J. 2023. Nutritional and Functional Value of African Leafy Vegetables: Advantages and Limitations In: ED - Hernández-Ledesma, B. Plant-Based Diet. IntechOpen London. https://doi.org/10.5772/intechopen.112972 Accessed 30/01/2026

Maseko, I., Mabhaudhi, T., Tesfay, S., Araya, H.T., Fezzehazion, M. and Du Plooy, C.P. (2028). African leafy vegetables: A review of status, production and utilization in South Africa. *Sustainability*, 10:16. DOI: 10.3390/su10010016

Mercy, S., Mubsira, B.S. and Jenifer, I. (2014). Application of different fruit peels formulations as a natural fertilizer for plant growth. *International Journal of Scientific and Technology Research*, 3(1): 300-307.

Milla, P.G., Peñalver, R. and Nieto, G. (2021). Health Benefits of Uses and Applications of *Moringa oleifera* in Bakery Products. *Plants (Basel)*, 10(2):318. doi:10.3390/plants10020318

NUS - Neglected and Underutilized Species [Internet]. Texas: College of Agriculture Food and Natural Resources; 2023. Available from: https://www.pvamu.edu/cafnr/homepage/research/plant-system/nus/ Accessed 20/01/2026

Nwozo, S.O., Lewis, Y.T. and Oyinloye, B.E. (2017). The Effects of *Piper guineense* versus *Sesamum indicum* Aqueous Extracts on Lipid Metabolism and Antioxidants in Hypercholesterolemic Rats. *Iranian Journal of Medical Sciences* 42(5):449-456. PMID: 29234177; PMCID: PMC5722962.

Obisesan, I.A., **Sakpere, A.M.A.**, Amujoyegbe, B.J., Obuotor, E.M. and Ogundepo, G.E. (2021a). Drought Response of a tropical legume (*Pachyrhizus erosus* L.): physio-biochemical adjustments at seedling stage. *Journal of Plant Science*, 16: 1-9.

Obisesan I.A, **Sakpere, A.M.A.,** Amujoyegbe, B. J. and Akinropo, M. S. (2021b) Explants selection for in vitro propagation of *Pachyrhizus erosus* L. *Notulae Scientia Biologicae* 13(1):10844 DOI:10.15835/nsb13110844

Odiaka, N.I. & Schippers, R.R., 2004. Telfairia occidentalis Hook.f. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. <http://www.prota4u.org/search.asp>. Accessed 11 March 2026.

Ogbimi, E.R. and **Sakpere, A.M.A.** (2021). Germination and seedling growth in *Afzelia africana* Sm. ex. Pers. *Ife Journal of Science*, 23:41-50 https://doi.org/10.4314/ijs.v23i1.5

Ogbimi, E., Omisope, B., **Sakpere, A.,** and Afolayan, A. (2024). Tissue Culture Propagation of *Afzelia africana* Sm. Ex. Pers. – A Potential Candidate for Biofuel. *Journal of Tropical Biology and Conservation (JTBC)*, 21, 120–134. https://doi.org/10.51200/jtbc.v21i.5234

Ogbimi E. R., **Sakpere, A. M. A**. and Ayisire, B. E. (2016). Effect of Naphtalene Acetic Acid and Benzylaminopurine on *in vitro* clonal propagation of *Solanecio biafrae* – A threatened indigenous leafy vegetable. *FUTA Journal of Research in Sciences*, 12 (2): 211- 218

Ogbimi, E.R., **Sakpere, A.M.** and Akinropo, S.M. (2020). Vegetative propagation of *Afzelia africana* Sm. Ex Pers.: a multipurpose and threatened tree. *International Journal of Biological and Chemical Sciences*, 14(1): 204-212. 8350-IJBCS [DOI: https://dx.doi.org/10.4314/ijbcs.v14i1.17]

Okigbo, R.N. and Igwe, D.I. (2007) The Antimicrobial Effects of *Piper guineense* "Uziza" and *Phyllantus amarus* "Ebe-Benizo" on *Candida albicans* and *Streptococcus faecali*. s. *Acta Microbiologicaet Immunologica Hungarica*, 54: 353-366. https://doi.org/10.1556/AMicr.54.2007.4.3

Okoye E.I. and Ebeledike A.O. (2013). Phytochemical constituents of *Piper guineense* (Uziza) and their health implications on some micro-organisms. *Global Research Journal of Sciences*, 2(2): 42 – 46.

Olukoya, B. M., **Sakpere, A. M. A**. and Adetunji, A. E. (2018). Phytochemical, Proximate and Elemental Analysis of *Clerodendrum volubile* (Lamiaceae) at Different Stages of Growth. *Phytologia Balcanica*, 24(1): 45 - 49

Olukoya, B.M., **Sakpere, A.M.A**. and Adetunji, A. (2018). Water stress effect on growth and phytochemical content of *Clerodendrum volubile*. *Acta Horticulturae* 1225; 281-288, Proceedings of the III All Africa Horticultural Congress, Ibadan, Nigeria August 7-12, 2016. Editors: Aiyelaagbe, I.O.O., Akintoye, H.A. and Adeoye, I.B. https://doi.org/10.17660/ActaHortic.2018.1225.39 (BELGIUM)

Omoni, V.T., Aguoru, C.U., Edoh, E.O. and Makinde, O. (2015). Biostimulation of hydrocarbon utilizing bacteria in soil contaminated with spent engine oil using banana and plantain agro-wastes. *Journal of Soil Science and Environmental Management*, 6(8): 225-233. DOI: 10.5897/JSSEM15.0505

Sakpere, A. M. A. and Adetunji, A. E. (2014). End point of seedling phase in *Telfairia occidentalis* Hook F. *Nigerian Journal of Horticultural Science*; 19: 75 - 79

Sakpere, A.M.A and Aremu, O.A. (2008). The growth of *Launaea taraxacifolia* (Asteraceae) and its response to shading. *Research Journal of Botany*; 3(2): 90-96

Sakpere, A. M. A. and Jayeoba, T. (2013). Effect of different growth regulators and explants on wild Lettuce [*Launea taraxacifolia* (Willd) Amin, ex. C. Jeffrey], an African leafy vegetable. *Nigerian Journal of Horticultural Science*; 18: 78-84

Sakpere, A. M and Obisesan, I. A. (2017). Tuberous Root Initiation and Shoot Regeneration in *Telfairia occidentalis* Hook. F. *IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)* 12 (3): 06-13. E-ISSN: 2278-3008, p-ISSN: 2319-7676. DOI: 10.9790/3008-1203070613

Sakpere, A. M. A. and Olubunmi P. O. (2018). Effect of Naphthalene Acetic Acid and Benzyl Adenine on Callus Initiation and Plant Regeneration of *Crassocephalum crepidiodes* [Benth] S Moore. *Ife Journal of Science and Technology*; 2(1): 01-07

Sakpere, A.M.A. and Ozobia, I. R. (2023). Polyembryony in *Telfairia occidentalis* (Cucurbitaceae). *Ife Journal of Science and Technology* 7(1): 144–159

Sakpere, A. M., and Ezenu, V. N. (2023). Vegetative and micropropagation potential of *Piper guineense* (Schumach and Thonn). *International Journal of Horticultural Science*, 29(1): 29–36. https://doi.org/10.31421/ijhs/29/2023/12554

Sakpere, A. M. A., Ajayi, S. A. and Adelusi, A. A. (2016). Light and water requirements for germination of Fluted Pumpkin seeds. *Nigerian Journal of Botany*, 29(2): 191 - 203

Sakpere, A. M. A., Ajayi, S. A. and Adelusi, A. A. (2019). Fruit Characterization and Phyllotaxy of Fluted Pumpkin from Osun State, Nigeria. *Ife Journal of Science*. 21(3): 263-271 https://dx.doi.org/10.4314/ijs.v21i3.21

Sakpere, A.M.A., Oladipo, O.T., Mukaila, Y.O., Ayinde, J.O., Oluwaniyi, O.M. (2023). Indigenous Leafy Vegetables and Health Management in South-Western Nigeria: A Review Based on Osun State. In: Babalola, O.O., Ayangbenro, A.S., Ojuederie, O.B. (eds) *Food Security and Safety* Volume 2. Springer, Cham. https://doi.org/10.1007/978-3-031-09614-3_6

Sakpere, A. M., Oziegbe, M. and Bilesanmi, I. A. (2010). Allelopathic effects of *Ludwigia decurrens* and L.

adscendens subsp. diffusa on germination, seedling growth and yield of *Corchorus olitorious* L. *Notulae Scientia Biologicae*; 2(2): 75-80

Sakpere, A. M., Ayisire, E. R. and Abioye, O. I. (2011a). Potential of *Launea taraxacifolia* (Willd) Amin Ex. C. Jeffrey for *in vitro* regeneration. *Notulae Scientia Biologicae*, 3(3): 93-96

Sakpere, A. M. A, Adelusi, A. A. and Ajayi, S. A. (2011b). Influence of Indole-3-butyric acid on the vegetative propagation of Fluted Pumpkin (*Telfairia occidentalis* Hook F.) *Nigerian Journal of Botany*, 24(2): 289 - 301

Sakpere, A. M.A, Oziegbe, M. and Monyei, H. (2012). Allelopathic effect of two *Ludwigia* species on the germination and seedling growth of *Amaranthus hybridus* L. *Nigerian Journal of Botany*, 25(2): 301 - 308

Sakpere, A. M. A, Adedeji, O. and Folashade, A. T. (2013). Flowering, post-pollination development and propagation of Ebolo (*Crassocephalum crepidioides*) (Benth.) S. Moore in Ile-Ife, Nigeria. *Journal of Science and Technology*; 33(2): 37-49

Sakpere, A. M. A., Ajayi, S. A and Adelusi, A.A. (2014). Effect of growth regulators and explant types on callus induction in *Telfairia occidentalis* Hook F. *African Journal of Biotechnology*, 13(20): 2015-2021.

Sakpere, A. M, Olaitan, T. R. and Alonge, O. B. (2015a). Investigation of nutritional composition and vegetative propagation of two leafy vegetables. *International Journal of Vegetable Science*, 21(2): 148-156.

Sakpere, A. M. A., Ajayi, S. A and Adelusi, A. A. (2015b). Cotyledon persistence and seedling growth in Fluted Pumpkin (*Telfairia occidentalis* Hook. F.). *International Journal of Biological and Chemical Sciences*, 9(2): 593-602.

Sakpere, A. M. A., Bankole, M., Oyekola, O.B., Akinyemi, O.S., Akosile, O.R., Adegboye, O.A., Akinropo, M.S. and Obisesan, I.A. (2018). Effect of different *Moringa oleifera* extracts and fruit peels on the growth of *Solanum* *scabrum*. *International Journal of Biological and Chemical Sciences*, 12(4):1543- 1549

Sakpere, A. M. A., Ajayi, S. A. and Adelusi, A. A. (2019). Fruit Characterization and Phyllotaxy of Fluted Pumpkin from Osun State, Nigeria. *Ife Journal of Science*. 21(3): 263-271 https://dx.doi.org/10.4314/ijs.v21i3.21

Sakpere, A. M. A. (2011). Identification of ISSR primers for genetic analysis of *Telfairia occidentalis* Hook F. *Ife Journal of Science*; 13(1): 129-131.

Togun, A.O and **Sakpere, A.M.A.** (2004). The effects of phosphorus nutrition on the growth and seed yield of Soybean (*Glycine max* (L.) Merril.); *Environtropica*, 1(2): 54 – 61.

Tropical Plants Database, Ken Fern. tropical.theferns.info. 2026-07-24. <tropical.theferns.info/viewtropical.php?id=Piper%20guineense>

WHO (2025). Noncommunicable diseases. https:// www.who.int / news-room/fact sheets/detail/ noncommunicable-diseases