

**ETHNOBOTANY, INTRA-SPECIFIC GENETIC DIVERSITY AND  
EVOLUTIONARY RELATIONSHIP IN *GONGRONEMA LATIFOLIUM*  
BENTH., ACROSS SOUTHERN NIGERIA**

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**BY**

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES  
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BIOLOGICAL SCIENCE, COLLEGE OF SCIENCE AND TECHNOLOGY,  
COVENANT UNIVERSITY, OTA, OGUN STATE, NIGERIA.**

**OCTOBER, 2021**

## ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfilment of the requirements for the award of degree of Master of Science in Biology (Applied Biology and Biotechnology) in the Department of Biological Science, College of Science and Technology, Covenant University, Ota, Nigeria.

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## **DECLARATION**

I, **ONUSELOGU, CHINEDU CHARLES** with (13CO015799), declare that this dissertation was carried out by me under the supervision of **PROF CONRAD A. OMONHINMIN** of the Department of Biological Science, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria. I attest that this dissertation has not been presented either wholly or partially for the award of any degree elsewhere. All sources of data and scholarly information used in this thesis are duly acknowledged.

**ONUSELOGU, CHINEDU CHARLES**

.....

**Signature and Date**

## CERTIFICATION

We certify that this dissertation titled “**ETHNOBOTANY, INTRA-SPECIFIC GENETIC DIVERSITY AND EVOLUTIONARY RELATIONSHIP *GONGRONEMA LATIFOLIUM* BENTH., ACROSS SOUTHERN NIGERIA**” is an original work carried out by **ONUSELOGU, CHINEDU CHARLES (13CO015799)** in the Department of Biological Science, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria, under the supervision of **PROF. CONRAD A. OMONHINMIN**. We have examined and found this research work acceptable as part of the requirement for the award of Master in Biology (Applied Biology and Biotechnology).

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## **DEDICATION**

This research work is dedicated to almighty God, who provided the wisdom, knowledge and finance throughout this program; to my parents Ven. Dr and Engr (Dr) H. Onuselogu and my sincere friend, Keziah Damilola Olaniyi for their sincere love, prayers and unwavering support.

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## ABSTRACT

*Gongronema latifolium* Benth., is an important medicinal and leafy vegetable endemic in the southern part of Nigeria. The ethnobotany on the species is incomplete and information on the genetic diversity and phylogenetic relationship within the species is lacking. This study exhaustively documented indigenous knowledge about the species among Igbo-speaking people in the region; as well as investigated the intra-specific diversity and the evolutionary status of the species using the nuclear ribosomal DNA - internal transcribed spacer (*ITS* 4 and 5) region. A total of 130 respondents; of 80.8% female and 19.2% male were interviewed for the ethnobotanical survey, using a semi-structured questionnaire with interview. A total of 50 accessions of *G. latifolium* were collected across Anambra, Abia, Enugu, Imo, Ebonyi, Akwa Ibom and Cross River states for the molecular analysis. Standard molecular protocols and bioinformatic tools were employed to generate Genomic DNA and Consensus sequences that were submitted on NCBI's GenBank with accredited accession numbers. Four use categories; medicine, food, fencing and linguistic interactions were recorded for the species. The species was recorded to be used for the treatment of diabetes, ulcer, high blood pressure, whooping cough, amongst several other ailments. Linguistic interactive uses were generally negative in connotation, as its bitter taste was of primary expression. A relatively high level of genetic diversity and a low level of nucleotide diversity were detected among the 50 accessions. AMOVA indicated that genetic variations within populations (93%) was higher than between populations (6%). The accessions MZ853412.1 (Akwa Ibom), MZ964896.1, MZ853424.1 and MZ964895.1 (Ebonyi) recorded high levels of nucleotide variability and were genetically distant from the other accessions, asserting to a possible sub-speciation within the population. The phylogenetic relatedness of *G. latifolium* to the Southeast Asian species *Marsdenia tenacissima* (Apocynaceae) following the *ITS* evidence, shows that the species share a linkage with other members of the sub-family Asclepiadoideae and might be more closely related to its Asia cousins than other African species.

**Keywords:** *G. latifolium*, Ethnobotany; Genetic diversity, Evolutionary status, *ITS*

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background Study

Tropical leafy vegetables are vegetables (TLV) that can grow in tropical soils and are native to Sub-Saharan Africa (Kelechi and Dorothy, 2015). Leafy vegetables are considered such an important part of the Nigerian diet that they are assumed to be missing from a traditional dinner (Badmus, 2010). According to (Fasuyi, Dairo and Adeniji, 2008), green leafy tropical vegetables are important components of human nutritional regimes because they provide the vitamins and minerals that the body requires. In tropical Africa, leafy greens are commonly ingested to deal with vitamin shortages and malnutrition (Ingbian and Akpapunam, 2005). Anti-nutrients are also present, which reduce the bioavailability of some nutrients (Akindahunsi and Salawu, 2005). Green vegetables, on the other hand, are a popular food and culinary herb in Southern and Eastern Nigeria (Agbugba and Thompson, 2013). Cooked, boiled, and consumed in a number of ways, leafy vegetable leaves and young shoots contribute to a varied diet rich in proteins, vitamins, and minerals, and so improve nutritional quality (Agbugba and Thompson, 2013).

Certain tropical leafy vegetables (TLV) cultivars that are commonly grown and marketed in Nigeria, notably in the south-eastern region, must be mentioned (Chubike, Okaka and Okoli, 2013). *Gnetum africanum* (Okazi), *Pterocarpus soyauxii* (Camwood leaf or Oha), *Pterocarpus santalinoides* (Nturukpa), *Vernonia amygdalina* (Bitter leaf or Onugbu), *Talinum triangulare* (Water leaf or Mgborodi), *Telfairia occidentalis* (fluted pumpkin leaf or Ugu), *Amaranthus esculentus* (Green or African spinach) (Bush buck or Utazi). They provide the nutrients that the human body requires for good health and development. In other words, the nutritional security of a society or country can only be achieved if adequate vegetable elements are consumed (Pasquini and young, 2009). They have significant potential to mitigate against poverty and nutritional security because they are easy to cultivate, highly inexpensive, easily available, and require minimal production inputs (Nwauwa and Omonona, 2010).

These tropical green vegetables are primarily gathered from the wild, and they are constantly threatened by deforestation, overexploitation, and the urbanization of rural areas (Emodi *et al.*, 2017). Despite the benefits afforded by these veggies, academics, policymakers, and funding