



**FEDERAL UNIVERSITY OF TECHNOLOGY
MINNA**

**PLANT GENETIC RESOURCES
AND FOOD SECURITY:
INCREDIBLE GENEROSITY,
INCREDIBLE RESPONSIBILITY**

OLAMIDE FALUSI

B.Sc., M.Sc. (Ilorin), PhD (Minna)

Professor of Plant Cytogenetics and Breeding

Dean, School of Life Sciences,

Federal University of Technology, Minna

INAUGURAL LECTURE SERIES 31

20TH NOVEMBER, 2014



**FEDERAL UNIVERSITY OF TECHNOLOGY,
MINNA**

**PLANT GENETIC RESOURCES AND FOOD SECURITY:
INCREDIBLE GENEROSITY, INCREDIBLE RESPONSIBILITY**

By

OLAMIDE FALUSI

B.Sc., M.Sc. (Ilorin), PhD (Minna)

Professor of Plant Cytogenetics and Breeding

Dean, School of Life Sciences,

Federal University of Technology, Minna

INAUGURAL LECTURE SERIES 31

20TH NOVEMBER, 2014

This 31st Inaugural Lecture was delivered under the Chairmanship of:

Professor M. A. Akanji, FNSMBM
Vice-Chancellor
Federal University of Technology, Minna

Published by:
University Seminar and Colloquium Committee,
Federal University of Technology, Minna.

20th November, 2014

Design + Print:
Global Links Communications, Nigeria
©: 08056074844, 07036446818



OLAMIDE FALUSI

B.Sc., M.Sc. (Ilorin), PhD (Minna)

Professor of Plant Cytogenetics and Breeding

1. INTRODUCTION

Mr. Vice-Chancellor, Sir, it is indeed an honour for me to present the 31st inaugural lecture of this great University, which incidentally is the first inaugural lecture from the vibrant and dynamic School of Life Sciences and Department of Biological Sciences. I am very grateful to the Almighty God for the wonderful privilege He has given me to be here today. Many have dreamt of giving Inaugural Lectures, but never got the opportunity to do so. Yet others got the opportunity, prepared their lectures, fixed a date, but for one reason or the other, never got to deliver them. Therefore, I am most grateful to God for making today a reality for me. I also use this opportunity to pray that God will help all those who are aspiring to achieve this bar, in Jesus name: *Ire a kari wa o, Amin.*

As a prelude to this lecture, I thought I must reflect briefly on my impressions about this occasion. This day, in particular this lecture marks the pinnacle of my academic career. Indeed this lecture does not only represent the consummation of my efforts in pursuit of knowledge, but it also induces in me a need to take a pause and reflect on the journey traveled to this end. It is at this point when I fully realize that in spite of this journey having been turbulent at times, in the final analysis it was a journey worth travelling. Yes, it is in times such as this, when the magnitude of the grace lavished upon one's life by the Almighty God becomes more vivid. Like **David in Psalm 124, I am persuaded to say: "If the Lord had not been on my side when the storms of life raged against me, I would have been swallowed alive.** But praise be to God who has not allowed lack to define my destiny. Ladies and gentlemen, just imagine with me a young fellow who spent much of his youthful years in the farm (Cocoa farm), this afternoon presenting a professorial inaugural lecture to you. Surely, it can only be by grace, the grace of the Almighty God. Mr. Vice Chancellor sir, I could not have found words or scripture, which better encapsulates my experiences than this account by

David: **The race is not to the swift, or the battle to the strong Eccl. 9:11.** So, it is with total humility and immense gratitude to the Almighty God, the “I am that I am” that I stand before this august gathering to deliver this Inaugural Lecture. I am very happy to share with you and the audience present here this afternoon, some of the knowledge I have **amassed** over the years in the field of Applied Plant Genetics and Breeding.

Based on the near abstract nature of this discipline, I will crave your indulgence, Mr. Vice- Chancellor sir, to first of all give some background information on Genetics, Plant genetic resources and food security.

2.0 DEFINITIONS

2.1 Genetics

The word “genetics” was derived from the Greek and Latin word “*genesis*”, which means birth, origin or creation. Interestingly, it has something in common with Genesis – the first book of the Old Testament in the Bible. Thus, genetics is the study of birth or, more broadly the study of heredity. It is a branch of Biology concerned with heredity and variation. Genetics is all about the origin of variation, its organization and how it is transmitted from generation to generation or from parents to offspring. Although various fields of learning try to elucidate the creativity and ingenuity of the Master Creator, there is no other field that is as interesting, dynamic, revealing, challenging and promising as the discipline of genetics. This is because the study of genetics is about the why and what is responsible for the differences in and between various organisms. It is about why you are who you are. It is also about why you look like your brother, sister, mother, father, grandparent or even great grandparent. It is actually the reason why you should accept to be who you are and do your very best with it (Ayorinde, 2004). Genetics is a science which surrounds us and determines our everyday lives. As a fundamental life science, it has been in a state of exceptionally vigorous growth. It has

found applications not only in basic biological disciplines such as taxonomy and evolution, but even in applied areas such as human and livestock medicine, agriculture and horticulture even in unrelated disciplines of psychology, sociology, criminology and law.

The first scientific studies in Genetics were carried out by a man called Gregor Mendel who lived between 1822 and 1882. It was through his experiments that the mechanism of inheritance became known. His investigations were on hybridization of plants particularly Garden pea. In his results, Mendel showed that a character was controlled by a factor, which was later termed 'gene'. He explained that a gene has two alleles and there are two forms of an allele: the dominant and the recessive forms. The dominant form expresses itself in the presence of another dominant form or a recessive form. On the other hand, the recessive form can only be expressed in the absence of a dominant form (allele) of the gene. Mendel established the law of segregation, which showed that during gamete formation, the two alleles separate or segregate and enter different gametes. As a result, each pollen grain, ovule, sperm or ovum carries only one of each pair of parental alleles.

Mendel carried out both monohybrid and dihybrid crosses and his experimental results became his two laws of heredity namely, Law of segregation and law of independent assortment of genes respectively. The law of segregation of hereditary factors states that the two particulate members of a gene pair segregate from each other into the gametes, so that half the gametes carry one member of the pair and the other half of the gametes carry the other member of the pair. The law of independent assortment of genes, on the other hand, states that during gamete formation, the segregation of the alleles of one gene is independent of the segregation of the alleles of another gene. Mendel's experimental findings and laws of heredity, published in 1865, remain the basic principles of heredity and classical laws of genetics without

which our understanding of genetics today would be incoherent. For this reason, Gregor Mendel is regarded as the father of modern genetics.

2.2 Genes and the Chromosomes

A gene is a code that governs how we appear and what characters we have. There are genes in everything that lives, or has lived (whether plants or animals). The idea that “something” is responsible for the appearance of characters of parents in their children had for a long time taken firm root in the minds of early Biologists. This “something” was given different names by different people at different times. It took the classical experiments of Gregor Mendel to correctly associate the substance that is responsible for the appearance of characters with the sex cells and showed their mode of transmission and expression, generation after generation. This substance according to Okoli (2003) was first called gene by Johannsen in 1909. The word gene is, therefore, used to describe the unit of heredity whose expression leads to the appearance of characters in living organisms. Genes along with the environment, defines the identity and the uniqueness of every organism through their phenotypic effects (Morakinyo, 2003). They are the principal determinants of all life processes, from cell structure and function to reproduction of the organism (Okoli, 2003). The study of genetics involves knowing what genes are, how genes are transmitted from generation to generation, how genes are expressed and how gene expression is regulated.

The Chromosomes on the other hand are definite structures found in the nucleus and on which the genetic materials are located. They are microscopic and appear in a cell nucleus during cell division. Each chromosome is double stranded and each strand is called a chromatid. The two chromatids run parallel to each other, as they are exactly alike in morphology and quality. They are held together at one point only along the length. This

