SYSTEMATICS OF LOGANIACEAE IN WEST AFRICA

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CERTIFICATION

THIS IS TO CERTIFY THAT THE THESIS:

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IS A RECORD OF ORIGINAL RESEARCH CARRIED OUT BY

ODUOYE, OLUSOLA THOMAS

IN THE DEPARTMENT OF BOTANY

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DEDICATION

I want to dedicate this work to: the Alpha and Omega, the beginning and the ending, which is, which was, and which is to come, the Almighty. It goes also to those who started the journey; my late father, Evangelist Samuel Oduoye Abidoye and my mother, Mrs Deborah Oluwemi Oduoye. The work is yours my wife Mrs Oluwaseun Deborah Oduoye and my Children; Samuel Temiloluwa and David Opeoluwa. It also belongs to the indefatigable siblings of mine and optimistic mentors and helpers whom God has used to bring me this far.

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ABSTRACT

Loganiaceae is a family of trees, shrubs and tendril-bearing lianas with 13 genera and about 350 species distributed mainly in the tropics, subtropics and a few in temperate regions of the world. The family was described by Von Martius in 1827 but has undergone numerous revisions that have expanded and contracted its circumscription, ranging from one genus at its smallest to 30 at its largest. This study addressed taxonomic problems of familial circumscription, generic delimitation and species identification that exist within the family. It utilized both gross morphology and molecular motifs for the delimitation of genera and species in the family. The taxonomy of the family was evaluated using macro and micro morphological characters with molecular studies. Environmental parameters adopted from the WorldClim database designed for West Africa revealed that the species distribution is affected mostly by the precipitation of coldest quarter of the year; precipitation of the driest month and least affected by precipitation of the warmest quarter of the year. A wide range of epidermal features provide taxonomically useful anatomical characters. The presence of stomata on both adaxial and abaxial surfaces (Amphistomata) distinguished *Anthocleista djalonensis, Anthocleista procera and Strychnos spinosa* from other species in the family. Anisocytic, anomocytic, paracytic and staurocytic stomata types occur in the family. Trichomes found in the family include simple unicellular, stellate, dendritic and conical types. There are different types of cuticular foldings, wax coatings and other ergastic substances in the family. Molecular studies involved four different gene regions which were sequenced across the selected 21 representative species from the family, for phylogenetic analysis. Sequences alignment and phylogenetic analyses revealed that 3 genera: *Anthocleista, Mostuea* and *Nuxia* which were originally circumscribed with the family should

be separated from it. This is because of low bootstrap values below 40 % and the difficulty encountered in their alignment which showed that they are evolutionarily divergent and distant from the family. This study revealed that Loganiaceae is composed of 3 genera: *Spigelia*, *Strychnos* and *Usteria* with 39 species in West Africa as opposed to the 6 genera originally circumscribed in the family. In addition, one new species, *Strychnos* sp. (*species nova* - P01860082) was described for the first time while *Strychnos tomentosa* was also newly introduced and a taxonomic key for identifying the genera and species of the family was produced.