Local knowledge, use pattern and geographical distribution of *Moringa oleifera* Lam. (Moringaceae) in Nigeria

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ABSTRACT

Ethno-pharmacological relevance: All parts of *Moringa oleifera* are medicinally valuable with overlapping uses in treating myriads of ailments and diseases including body pains and weakness, fever, asthma, cough, blood pressure, arthritis, diabetes, epilepsy, wound, and skin infection. *Moringa* also has robust ability to challenge terminal diseases such as HIV/AIDs infections, chronic anemia, cancer, malaria and hemorrhage. The present study was to obtain ethnobotanical information on the use and local knowledge variation, geographical distribution, and to collect different landraces of *Moringa oleifera* from the different agro-ecological regions in Nigeria, for further studies.

Materials and methods: Ethnobotanical data were collected through face to face interviews, semi structured questionnaires and discussions with selected people who had knowledge about the plant. The fidelity level (FL %) and use value for different use categories of *Moringa oleifera* and its parts were estimated. The variation in ethnobotanical knowledge was evaluated by comparing the mean use value among ethnic, gender and age groups using sample T test. Garmi GPS was used to determine the locations (latitude and longitude) and height in different areas to assess the geographical spread of the species.

Results: Seven (7) categories of use (Food, medicine, fodder, fencing, firewood, gum and coagulant) were recorded for *Moringa oleifera*. Food and medicinal uses showed highest fidelity level while the leaves and the seeds were the plant parts most utilized for the same purposes. There were significant differences among the ethnic, gender and age groups regarding the ethno-botanical use value. The geographical distribution pattern shows that the *Moringa oleifera* is well distributed in all ecological zones of Nigeria, well adapted to the varied climatic conditions and gaining unprecedented awareness among the people.

Conclusion: Though considered an introduced species, *Moringa oleifera* has found wide acceptance, recognition and usefulness among the various ethnicities in the studied areas. The sources of introduction, domestication and ethnic differentiation influenced the distribution pattern across the geographical areas.

1. Introduction

Plants serve as a rich source of food, medicine, energy, shelter, fodder feeds and other forestry products (Ogunkunle and Oladele, 2004; Houessou et al., 2012). Different plant species have been universally utilized in the preparation of traditional medicines for the cure of several ailments and diseases and for other plant bio-products. The knowledge of such uses had always been transferred orally from generation to generation. Today, great emphasis is being placed on the consumption of food that will not only provide nutrients to the body but also helps in the prevention of diseases

(Dike et al., 2012). Plants are being explored and engineered more than ever to produce recombinant pharmaceuticals, genetically modified food, industrial proteins and other secondary metabolites (Obembe et al., 2011).

Moringa oleifera is a multipurpose plant that fits properly into the above uses. It is economically useful as source of food, natural medicine, animal fodder, natural coagulants, forestry products, fertilizer, living fence, alley cropping and fueling (Fahey, 2005; Anwar et al., 2007; Pandey et al., 2012). *Moringa* is considered rich with several medicinal properties as all the parts have been reportedly engaged singly or with other plants for treating diverse illnesses and diseases (Mughal et al., 1999; Fuglie, 1999; Pamok et al., 2012). A review of medical evidence for the use of *Moringa oleifera* for nutrition, therapeutic and prophylactic properties indicated that the demand for it is on the increase in scientific research and in terms of global use (Fahey, 2005).

Each culture has different perspectives to plant use and application, thus ethnobotany and geographical distribution survey are the right steps in driving its domestication, widening its genetic diversity and expanding its economic uses. Drug discovery, design and development, cultural use of plant species, timber processing, soup making and other areas of plant products have long recognized the usefulness of ethnobotanical studies. Most studies on ethnobotanical knowledge have always concluded that there is an unequal indigenous knowledge concerning plant use among local populations with respect to differences in ecological regions, ethnicities, gender, age, professions, religion, cultural beliefs, abundance and usefulness of the species (Ayantunde et al., 2008; Omonhinmin, 2012). Knowledge about the geographical distribution of plant species is crucial for genetic diversity studies particularly for determining the various ecotypes/accessions that are best suited for each economic value and product.

In spite of its enormous properties and uses, *Moringa oleifera* is considered under-exploited, under-utilized, neglected (NRC, 2006; GFU, 2012) and even cited among the lost crops of Africa (NRC, 2006). Ethno-botanical use value and pattern, distribution pattern, reproductive biology, ecology and genetic variability studies are needed in order to evolve a better conservation strategy and genetic improvement programme (NRC, 2006; GFU, 2012). Our initial survey revealed that *Moringa oleifera* had been available in local communities of the different ecological zones in Nigeria, although the local knowledge of its use was quite weak in most ethnicities except the Hausas. There was therefore a compelling need to assess the use pattern by the locals of the different ethnic groups within Nigeria and determine the geographical distribution pattern so as to avoid the loss of relevant ethnobotanical infor-mation and initiate participatory conservation strategy for the species. The study also intended to gather relevant indigenous information on the ecotypes, collect accessions, evaluate pattern of ecological distribution to assess genetic variation, all of which are necessary to initiate a robust breeding strategy that will lead to appropriate genetic improvement as well as sustainable utilization.

2. Methods

2.1. Ethnobotany

2.1.1. Study area and socio-demographic characteristics

The study was carried out in selected areas in Nigeria, covering the major agro-ecological regions (Fig. 1). The geography lies between 5.48–13.057°N and 3.234–11.001°E within the humid, sub-humid rainforest, savannah and arid regions of Nigeria.

The selected states cut across the Southern and Northern regions of Nigeria. The tropical climate of the Southern Nigeria is characterized by two distinct conditions of wet and dry seasons of high rainfall ranging from 2000 mm to 4000 mm. The mean annual temperature is 30 °C and the vegetation is composed mostly of forest trees, shrubs and savannah trees. The Northern part, made up of savannah and arid region, exhibits moderate rainfall between 500 mm and 1000 mm annually with long period of dry seasons. The mean annual temperature is about 38 °C in the Northern part and the vegetation is characterized by grassland, shrubs and sparse trees.
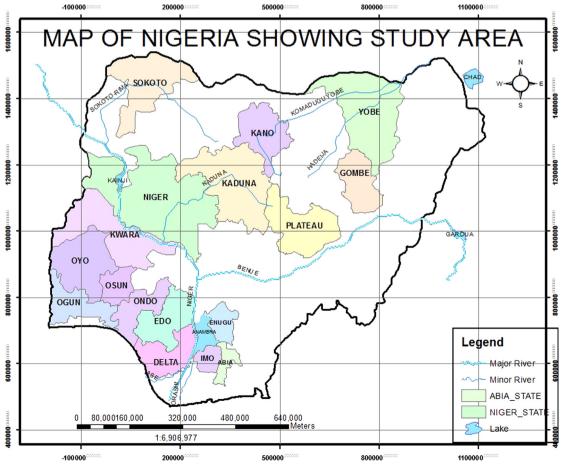

Fig. 1. Geographic location of area of study.