Journal of Ethnopharmacology 144 (2012) 618–626

Contents lists available at SciVerse ScienceDirect

Journal of Ethnopharmacology

journal homepage: www.elsevier.com/locate/jep

Ethnobotanical survey for potential anti-malarial plants in south-western Nigeria

I. Precious Dike [a], O. Olawole Obembe [a,*], F. Ezekiel Adebiyi [b]

[a] Department of Biological Sciences, Covenant University, Nigeria
[b] Department of Computer and Information Sciences, Covenant University, Nigeria

ARTICLE INFO

Article history:
Received 4 July 2012
Received in revised form
2 October 2012
Accepted 3 October 2012
Available online 18 October 2012

Keywords:
Ethnobotany
Anti-malarial
South-western Nigeria
Persea americana
Ludwigia peruviana

ABSTRACT

Aim of study: The ethnobotanical study surveyed the different types of medicinal plants used for the treatment of malaria in the south-western region of Nigeria.
Materials and methods: Information was collected by interviewing indigenous people, using a semi-structured questionnaire. Collected plant samples were identified and authenticated in Forestry Research Institute of Nigeria, Ibadan, Nigeria.
Results: A total of 151 respondents were interviewed of which 64% were females and 36% males. This population comprised of herbal medicine sellers (39%), traditional doctors (15%), housewives (24%) and farmers (22%). Twenty two plants species used in the treatment of malaria belonging to 18 families were identified and compiled detailing information such as common and vernacular names, parts used, methods of preparation and previous scientific reports. Of the plants identified during the survey, *Azadirachta indica* (12.9%), *Alstonia congensis* (11.9%) and *Cymbopogon citratus* (11.3%) showed the highest incidence of encounter whereas *Nauclea latifolia* recorded the lowest incidence of encounter (0.2%). The traditional usage of *Persea americana* and *Ludwigia peruviana* in the treatment of malaria is reported here for the first time.
Conclusion: Though a large number of traditionally used plants for the treatment of malaria were identified, scientific validation of the traditional claims of anti-malarial properties is imperative. This would establish their candidature for any possible future research for active principles and the possible development of new cheaper and more effective anti-malarial drugs, as well as in the conservation of this rich diversity of anti-malarial plants.

1. Introduction

Ethnobotany is the study of how communities of a particular region employ indigenous plants for food, clothing, medicine and other activities (Aiyeloja and Bello, 2006), the documentation of which is crucial for the conservation and utilization of biological resources (Muthu et al., 2006).

Plant materials have been a major source of natural therapeutic remedies and are used to treat various infectious diseases in many developing countries (Ody, 1993). Nowadays, natural products of plant sources have been the centre of focus as the main source of new, safer and more effective bioactive compounds with medicinal properties (Nitta et al., 2002).

A vast majority of prescription drugs used in the world contain compounds that are directly or indirectly, via semi-synthesis, derived from plants (Oksman-Caldentey and Inzé, 2004). Even the synthetic drugs and compounds used in modern times owe their active chemical compound to a bioactive compound in a plant, which has been identified and then copied (Rates, 2001). Thus, plants continue to be a very important resource for new medicines and beneficial compounds. African flora is greatly rich with a lot of medicinal plants, which indigenous people are familiar with and have used over time. Sofowora (1982) reported that Africa has as much as three hundred thousand medicinal plants. In African countries, approximately 80% of the population uses traditional medicine for the treatment of various diseases and ailments like malaria, typhoid, ulcers, skin diseases, diabetes, reproductive problems, aches and pains for various socio-cultural and economic reasons. Ethnobotanical surveys have shown that these traditional medicines have been found to be effective especially in the treatment of malaria which is of great concern to any African nation (WHO, 2002).

The constant evolution of the malaria parasite has rendered the cheapest and most widely available anti-malarial treatments ineffective—more so with the recent reports about the increasing resistance of *Plasmodium falciparum* to artemisinin-based compounds (Htut, 2009; Cui et al., 2012). Accordingly, there is deep concern that

* Corresponding author. Tel.: +23 481 309 28965.
E-mail address: olawole.obembe@covenantuniversity.edu.ng (O.O. Obembe).

0378-8741/$ - see front matter © 2012 Elsevier Ireland Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.jep.2012.10.002

this parasite will soon develop total resistance to such orthodox treatments. Hence, the search for newer more effective malaria cures is a major thrust of global research today. Therefore, there is an urgent need to explore and utilize the naturally endowed rich biodiversity of indigenous communities through research that could translate to benefits for mankind. Such investigations on medicinal and beneficial plants could provide useful leads for the synthesis of important active compounds. Various studies have been documented with over 1200 plant species from 160 families used in the treatment of malaria or fever (Willcox and Bodeker, 2004). Similar investigations have been carried out in many African nations like Ethiopia (Bekalo et al., 2009), Kenya (Bussmann, 2006; Njoroge and Bussmann, 2006), Ghana (Asase et al., 2005), Cameroon (Titanji et al., 2008) and Nigeria (Odugbemi et al., 2007; Ajibesin et al., 2008; Olowokudejo et al., 2008; Idowu et al., 2009; Kayode et al., 2009). The cited studies in Nigeria were mostly restricted to single states in the federation. This may have posed some limitations on reach such as the exclusion of some potential candidates. The present study however covers the south-west regions of Nigeria with the intent of filling these gaps and identifying newer plants that are traditionally employed in the treatment of malaria across geopolitical boundaries.

Njoroge and Bussmann (2006) examined the utilization of traditional plant medicines in managing the malaria menace in Central Kenya. Their results showed a total of 58 species in 54 genera and 33 families to have been used in the treatment of malaria. Forty-one species belonging to 17 families were encountered during a study in Ghana. Of the 17 families studied, Leguminosae and Anacardiaceae predominated in terms of number of species used to treat malaria. Eight plant species namely, *Afraegle paniculata* (Rutaceae), *Haematostaphis barteri* (Anacardiaceae), *Indigoera pulchra* (Leguminosae), *Monanthotaxis* sp. (Annonaceae), *Ozoroa insignis* (Anacardiaceae), *Strychnos innocua* (Loganiaceae), *Strychnos spinosa* (Loganiaceae) and *Xeroderris stuhlmannii* (Leguminosae) which had not been previously documented for the treatment of malaria in Ghana were identified (Asase et al., 2005). *Azadirachta indica,* (Meliaceae), *Morinda lucida* (Rubiaceae) and *Nauclea latifolia* (Rubiaceae) – which were noted to have been utilised in the treatment of malaria in Ghana – were also identified to be used in the south-western regions of Nigeria (Ayitey-Smith, 1989; Abbiw, 1990; Mshana et al., 2001).

Thus, it is evident that the vast chemical diversity of plants in a bio-diverse region such as Nigeria is a promising source of novel lead compounds that is still relatively unexplored. Concomitantly, the use of ethnobotanical survey to cumulate the indigenous knowledge of traditional medicinal plants is envisioned as a valuable tool for targeting potentially active species from the wealth of anti-malarial plants. Though, studies have been conducted to identify plants traditionally used in the treatment of malaria, there is still a gamut of plants that are yet to be discovered. Therefore this study aimed at documenting ethnobotanical potentials, mainly anti-malarial activity of common herbs in the south-western region of Nigeria, and providing comprehensive details to back up their anti-malarial potential based on the information obtained during the survey such as frequency of usage, number of times the plant was mentioned, and previous literature on said plant.

2. Materials and methods

2.1. Study area

The study area covers south-western Nigeria, comprising of 5 states namely Delta, Edo, Ondo, Ogun, and Osun positioned between 7.08°N, 6.28°W and 3.05°N, 5.94°W (Fig. 1). The indigenes encountered in these regions were mainly farmers by occupation. Two main ethnic groups were encountered in these areas namely the Yoruba and Edo. The selected states were found to be malaria endemic states in the south-west regions with similar tropical climatic conditions. Their tropical climate is characterized by two distinct conditions of wet and dry seasons. These regions experience high rainfall and high humidity for most of the year with an average annual rainfall of 250 cm near the coastal area and 150 cm in the northern parts of the region.

2.2. Ethnobotanical survey

Large-scale studies investigating the potential of medicinal plants have reported a high correlation between the traditional

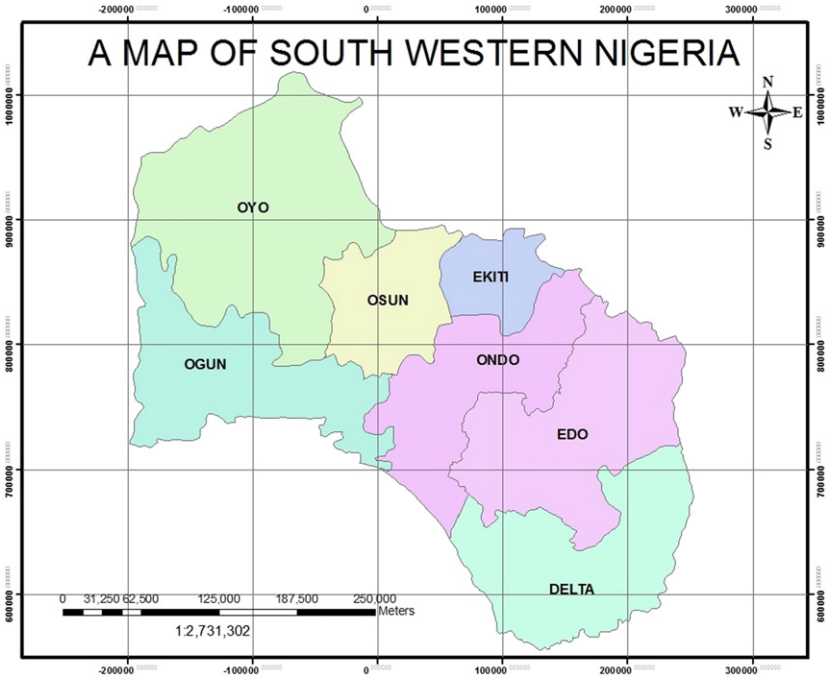

Fig. 1. Geographic location of area of study.