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## Journal of Ethnopharmacology

journal homepage: [www.elsevier.com/locate/jep](http://www.elsevier.com/locate/jep)

## Research Paper

## An ethnopharmacological assessment of the use of plants against parasitic diseases in humans and animals

Flávia dos Santos Silva<sup>a</sup>, Ulysses Paulino Albuquerque<sup>a,\*</sup>, Livio Martins Costa Júnior<sup>b</sup>, Aldilene da Silva Lima<sup>b</sup>, André Luiz Borba do Nascimento<sup>a</sup>, Júlio Marcelino Monteiro<sup>c</sup><sup>a</sup> Laboratório de Etnobiologia Aplicada e Teórica (LEA), Departamento de Biologia, Universidade Federal Rural de Pernambuco, Rua Dom Manoel de Medeiros, s/n, Dois Irmãos, CEP 52171-900 Recife, PE, Brazil<sup>b</sup> Laboratório de Parasitologia (LAPA), do Centro de Ciências Agrárias e Ambientais, CCAA - UFMA, Maranhão, Brazil<sup>c</sup> Universidade Federal do Piauí, Campus Professora Cinobelina Elvas, Bom Jesus, PI, Brazil

## ARTICLE INFO

## Article history:

Received 4 April 2014

Received in revised form

7 July 2014

Accepted 17 July 2014

Available online 27 July 2014

## Keywords:

Brazil

Ethnoveterinary

Traditional botanical knowledge

Tick

Insecticidal activity

## ABSTRACT

**Ethnopharmacological relevance:** Ethnobotanical surveys are detecting an increasing frequency of exotic plant species in pharmacopeias, which has led researchers to investigate the role of such species in traditional medical systems. According to the diversification hypothesis, exotic species are included to complete pharmacopeias, i.e., to treat diseases for which no native species are known, thus broadening the scope of the plant repertoire.**Materials and methods:** The present study was conducted at two rural communities in northeastern Brazil aiming at a survey of the plants known or used by the population to treat endo- and ectoparasitic diseases in humans and animals. In addition, plant extracts exhibiting acaricide activity were assessed using the engorged female immersion and larval packet tests (LPT).**Results:** The results of the present study showed a tendency for native species to be used against ectoparasites and exhibit a broader scope of use compared to exotic species. In turn, exotic species were predominantly indicated to treat diseases caused by endoparasites, although there was an overlap of native and exotic species relative to some therapeutic purpose, e.g., ticks. Only two of the plant species tested exhibited acaricide activity (*Nicotiana glauca* Graham and *Croton blanchetianus* Baill.), and in both cases, the activity was weak.**Conclusion:** The ethnobotanical data do not fully support the suggested hypothesis. Overall, the wide versatility of exotic species was not exclusively used to treat parasitic diseases in humans and animals. In addition, the selection of acaricide plants based on the ethnopharmacological study generated uninteresting results.

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## 1. Introduction

The search for plants that are potentially useful against diseases, e.g., parasitic diseases, has recently increased because of the resistance of parasites to available synthetic agents (see Echevarria et al. (1996), Martins (2006), and Molento (2009)). Lans and Tumer (2011) showed that using plant products against parasites reduces drug use in animal health care, and plant products are also relevant from an environmental perspective because they do not contaminate the soil.

Ethnobotanical studies provide a satisfactory approach to discovering novel active substances because they investigate the knowledge of individuals who utilize plants. The selection of plants by

human populations has been a target of studies that aim to assess the process involved in elaborating pharmacopeias and identifying species with the greatest potential for bio-prospecting. In that regard, some authors have questioned the role of exotic species in local medical systems (Alencar et al., 2010; Medeiros et al., 2013). Until recently, the inclusion of exotic species in local medical systems was considered to denote cultural loss (Caniago and Sibert, 1998). From a chemical perspective, Albuquerque (2006) formulated the diversification hypothesis, according to which exotic species might be introduced in a given culture to diversify its pharmacopoeia.

Albuquerque's (2006) hypothesis was tested by Alencar et al. (2010) at a semi-arid site in northeastern Brazil. These authors observed evidence that support the diversification hypothesis because the exotic species examined exhibited greater chemical diversity compared to the native species. Thus, exotic species might be introduced to ensure a supply of substances to treat diseases for which no native species are known.

\* Corresponding author.

E-mail address: [upa@db.ufrpe.br](mailto:upa@db.ufrpe.br) (U.P. Albuquerque).

Therefore, the aims of the present study were to investigate (1) whether there are differences in the diversity of uses for exotic species that fight parasitic diseases in humans and animals compared to native species and (2) whether there is specificity for using of exotic or native plant species indicated for parasitic diseases. In addition, we tested the acaricide activity of the plant species that were directly reported against ticks.

## 2. Materials and methods

### 2.1. Study location

This study was conducted in two rural communities, Carão Site and Letreiro Site, located in Altinho County, Pernambuco (northeastern Brazil) (Fig. 1) 162 km from Recife, which is the state capital. This area has a hot, semi-arid climate that corresponds to

type BSh in Köppen's classification, with an average annual temperature of 23.1 °C (Itepe/Lamepe, 2007). The area vegetation is hypo-xerophilous Caatinga (savanna like vegetation) and contains deciduous and sub-deciduous species (Lins Neto et al., 2012). The two communities share several traits, including their distance from urban areas, location by the Letreiro Mountains (690 m high) (Almeida et al., 2011) and vegetation comprised of shrubs and trees, which supply the residents with plants to satisfy various needs.

#### 2.1.1. Carão site

Carão is located 16 km from the next town (08° 35' S and 36° 05' W) between two low mountains. Agriculture in this area fulfills human and animal subsistence. Livestock are partially fed plants extracted from anthropogenic areas, such as on the sides of roads and cultivated land where maize (*Zea mays* L.) and Barbary figs (*Opuntia ficus-indica* (L.) Mill) are grown (Santos et al., 2009). The use of plants in daily sustenance most likely generated

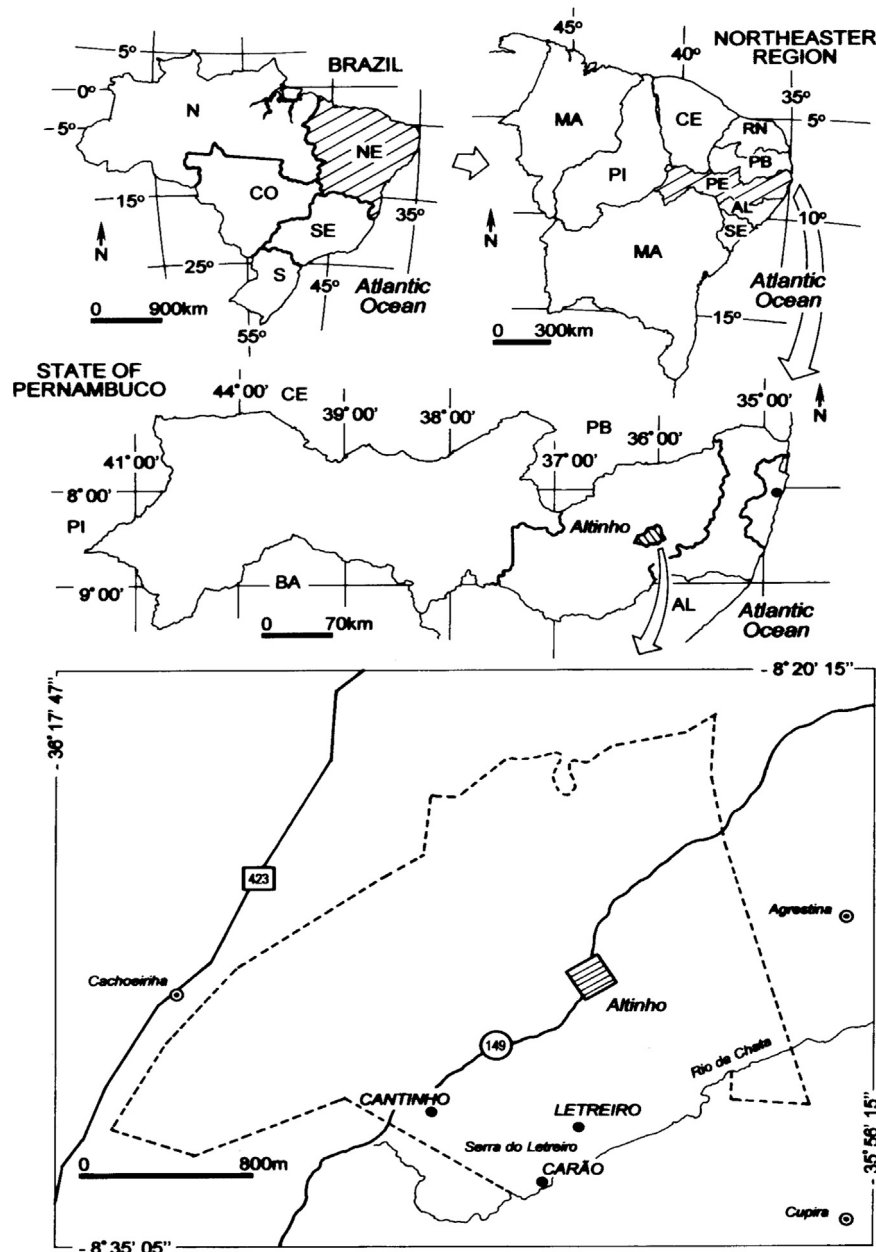


Fig. 1. Location of the Carão and Letreiro communities, Altinho, Pernambuco (Northeast Brazil). Source: Alencar et al. (2010).

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