

Current Use of Native Medicinal Species Recorded by European Naturalists in the 19th Century along the Royal Road, Minas Gerais, Brazil

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ABSTRACT

Medicinal plants are widely used as home remedies both by rural and urban inhabitants of Brazil but the intermixing of cultures has led to introduction of several exotic species into popular medicine. The continuous destruction of botanically rich native ecosystems has also contributed to a gradual loss of knowledge about native medicinal plants. In this study, we have gathered information about the actual use of native species in three municipalities along the Royal Road, visited by European naturalists in the 19th century. Local informers (one woman and nine men, ages ranging from 60 to 95 years old) were interviewed about their native medicinal plant knowledge. A total of 69 native species were recommended for use by the informers within the studied area, 36 (52%) had been previously observed by the European naturalists but only 17 (24.6%) are used now for the same purpose as they had been in the past.

Keywords: biodiversity, European naturalist, native medicinal species, Royal Road

Abbreviations: FBRAS, Farmacopéia Brasileira (Brazilian Official Pharmacopoeia); IBGE, Instituto Brasileiro de Geografia e Estatística; UNESCO, United Nations Educational, Scientific and Cultural Organization; WHO, World Health Organization

INTRODUCTION

The Brazilian flora represents one of the world's richest sources of material for pharmacological use, owing to an astonishing mega-diversity. Despite this abundant flora and escalating intellectual development, Brazil remains only a supplier of raw botanical material for international market (Barreiro and Bolzani 2009). The pilocarpine extracted from the leaves of jaborandi (*Pilocarpus* spp.), the alpha-bisabolol taken from the candeia wood (*Vanillosmopsis erythropappa*), the rutine obtained from favela fruits (*Dimorphandra mollis*), the ipê-roxo bark (*Tabebuia avellenadae*) and the copaíba (*Copaifera* spp.) balsam are examples of natural products obtained from Brazilian native plants that are almost exclusively used by international pharmaceutical corporations (Nogueira *et al.* 2010).

For decades several native medicinal species have been used by pharmaceutical companies in Brazil to create commercial products. These companies are represented by small laboratories that evaluate their products on the basis of traditional formulas. However, very often these preparations may not meet the minimal standards of the WHO recommendations for products for traditional use (Brandão *et al.* 2010). Since 1995, the Governmental Health Agencies of Brazil, following the recommendations of WHO, established a series of regulations in order to improve the quality of commercial herbal products (Carvalho *et al.* 2008). Some effort has been made by the companies to develop standardized phyto-medicines from native species with proof of quality, safety and efficacy, but only a few successful examples can be mentioned. Acheflan[®] is one of those rare examples – it is produced with essential oil obtained from *Cordia verbenaceae*, a native species used in Brazilian traditional

medicine to treat inflammations (Calixto 2005). Valorization of the plants is also considered one of the most important strategies for the conservation of native vegetation biomes, especially in developing countries (Newmann and Cragg 2007; Li and Vederas 2009; Nepstadt *et al.* 2009). Given this situation, there is an urgent need to invest in research and development of products from the Brazilian native flora.

Currently, medicinal plants are widely used as home remedies by both rural and urban Brazilians, due to the high cost of industrialized drugs. However, intermixing of cultures (Native, African and European) over several centuries has led to introduction of several exotic species into the popular medicine (Dean 1996). The accelerating destruction of Brazil's botanically rich native ecosystems has also contributed to a gradual loss of knowledge about native plants used in traditional medicine, including those found in the Atlantic Forest and in areas of the Amazon, where recent occupation is taking place (Begossi *et al.* 2002; Brandão *et al.* 2004; Shanley and Rosa 2005; Bussman and Sharon 2006). The threat to conservation highlights the urgent need to accrue information on the past and present uses of medicinal plant species and to promote studies on their ecology and conservation.

Historical research can play an important role in recovering valuable ethnopharmacological data regarding the use of plants (Medeiros 2010). Much of the available information about the use of native medicinal plants in Brazil has been compiled by European naturalists that traveled throughout the country in the 19th century. The data recorded in their books served as important source of information about the use of plants – at that time the native flora was yet conserved and the use of plants was done with Bra-

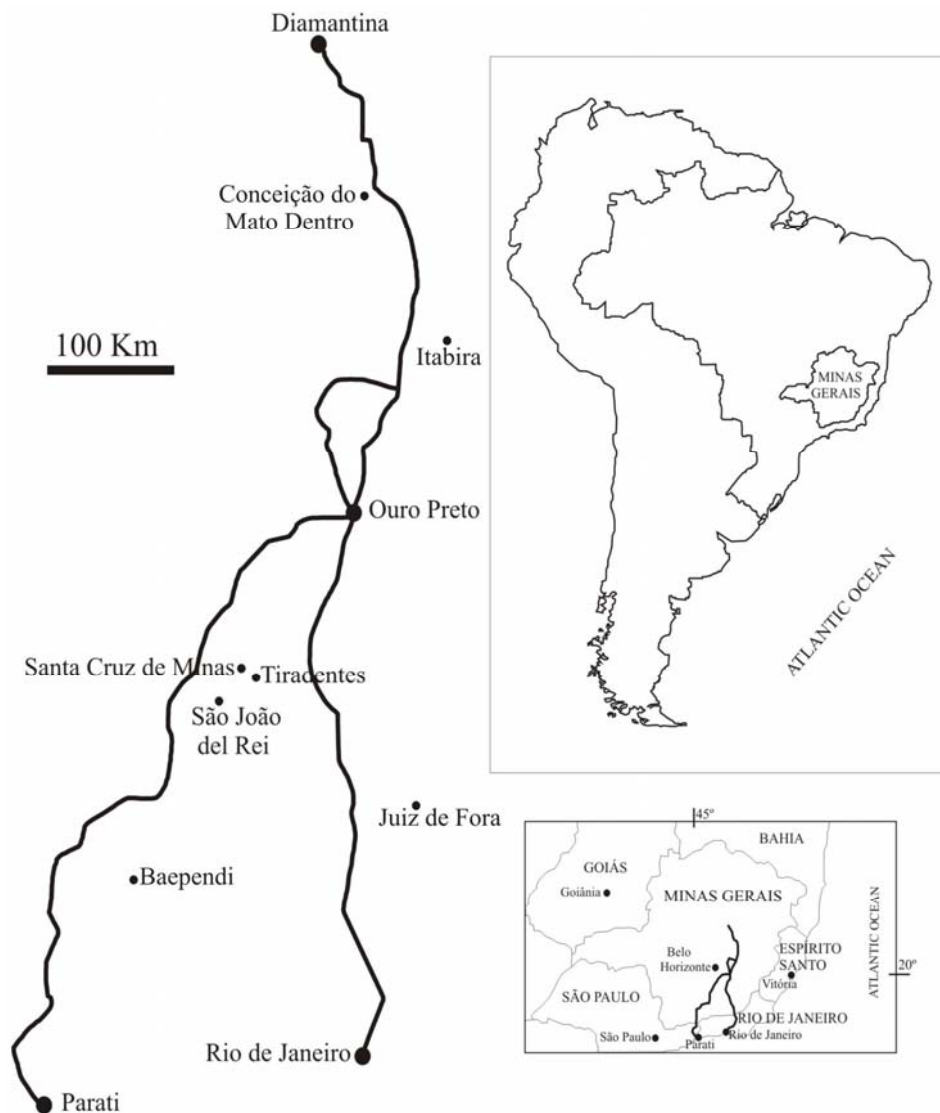


Fig. 1 Location of the Royal Road in Minas Gerais, in Brazil, and the places of study (Santa Cruz de Minas, São João del Rei and Tiradentes).

zilian species. The contributions made by these naturalists to the knowledge of the Brazilian flora are incalculable – hundreds of new plants were discovered and innumerable new genera were described based on the material that they collected. Several naturalists traveled widely in the Southwest Province of Minas Gerais, and have recorded both the biological and mineral richness of the region (Brandão *et al* 2008). In this paper, we have gathered information about the current use of medicinal plants in three municipalities along the Royal Road, visited by the European naturalists in 19th century, and compared their current use with data recorded by them.

MATERIALS AND METHODS

Ethnopharmacological literature survey

Historical data about the use of plants were obtained in books written by three European naturalists who traveled throughout the Royal Road in the 19th century: the Frenchman A Saint-Hilaire (1779-1853; Saint-Hilaire 1975), the German KF von Martius (1794-1868) and the Austrian Johann E Pohl (1782-1834; Pohl 1976). The species described by A Saint-Hilaire and J.E. Pohl in their books were confirmed by consulting their original botanical collections in Natural History Museums in Paris and Vienna respectively; species mentioned by von Martius were verified on the website www.florabrasiliensis.cria.org.br. English names for each species and their families' placement were updated using data from the Missouri Botanical Garden's website Tropicos (www.mobot.org). Correlated pharmacological studies were searched for

in Science finder. Data about the use of the plants in the conventional medicine was searched in the Brazilian Official Pharmacopoeia (Brandão *et al.* 2009).

Field work

Field work was conducted in Santa Cruz de Minas, São João Del-Rei and Tiradentes, three municipalities along the Royal Road, in the Brazilian southwest State of Minas Gerais (Fig. 1). The studied area is located between the mountains named Serra de São José and Serra do Lenheiro (21° 03' to 21° 63' latitude, 44° 11' to 44° 28' longitude). The climate of the region is tropical, with mean temperature ranging from 15 to 22°C and presenting two defined seasons (a hot humid summer and a cold dry winter) with annual average precipitation around 1500 mm. According to the 2007 census, the total population recorded in Santa Cruz de Minas was 7,347 inhabitants, with 81,918 in São João del Rei and 5,759 in Tiradentes, of which 80% of the total population was in the urban areas (IBGE 2007). Only 3% of the population was older than 60 years at the time of the census. São João del Rei is a well-structured city with 46 hospitals and other health centres, two Universities and several cultural Programs. Santa Cruz de Minas and Tiradentes are smaller and have two and five health services, respectively.

This study was performed with the collaboration of ten local informers (one woman and nine men, ages ranged from 60 to 95 years old) indicated by the community as experts on the use of native medicinal plants. They are retired and live in urban areas but had activities co-related with agriculture, such as farming, in the past. Voucher specimens of the plants used were deposited in

Table 1 Native medicinal species with the same traditional use as in the 19th century, number of informers (n=10) and historical reference.

Species/ Family/ Popular Names (Voucher specimen)	Number of healers (n=10) cited use and historical reference
<i>Aristolochia cymbifera</i> Mart. & Zucc./ Aristolochiaceae/ jarrinha (A.C.P.S. 18367) *#	(10) febrifuge (Martius, 1824)
<i>Baccharis trimera</i> (Less.) DC. / Asteraceae/ carqueja (A.C.P.S. 2055)*	(10) tonic, febrifuge (Martius, 1824)
<i>Boerhavia diffusa</i> L. / Nyctaginaceae/ erva-tostão(A.C.P.S. 10299)	(8) liver disorders (Martius, 1824)
<i>Borreria poaya</i> (A. St.-Hil.) DC. (<i>Spermacoce poaya</i>) / Rubiaceae/ poaia-roxa (A.C.P.S. 3902)	(8) expectorant and bronchitis (Saint-Hilaire, 1824)
<i>Buddleja brasiliensis</i> Jacq. ex Spreng./ Loganiaceae / barbasco (A.C.P.S. 11073)*	(10) anti-hemorrhoidal (Martius, 1824)
<i>Byrsonima verbascifolia</i> (L.) DC./ Malpighiaceae/ murici-cascudo (A.C.P.S. 17228)	(7) astringent (Saint-Hilaire, 1975)
<i>Chiococca alba</i> (L.) Hitchc./ Rubiaceae/ cainca (A.C.P.S. 18867)*	(7) “depurative”, diuretics (Martius, 1824)
<i>Croton antisiphiliticus</i> Mart. / Euphorbiaceae/ perdiz (A.C.P.S. 16438)	(6) Wound healing (Martius, 1824); diuretics (Saint-Hilaire, 1975, Martius, 1824)
<i>Dorstenia brasiliensis</i> Lam. / Moraceae / carapiá (A.C.P.S. 16991)*#	(7) Febrifuge, emmenagogue (Martius, 1824)
<i>Ilex paraguariensis</i> A. St.-Hil./ Aquifoliaceae/ congonha-dourada (A.C.P.S. 19023)* #	(10) Stimulant (Martius, 1824)
<i>Lantana camara</i> L./Verbenaceae/ chumbinho (A.C.P.S. 11658)*#	(6) rheumatism (Martius, 1824)
<i>Palicourea rigida</i> Kunth/ Rubiaceae/ congonha-bate-caixa (A.C.P.S. 18178)	(6) diuretics and rheumatism (Martius, 1824)
<i>Peltodon radicans</i> Pohl / Lamiaceae / hortelã (A.C.P.S. 16802)*	(6) Bronchitis (Martius, 1824)
<i>Senna occidentalis</i> (L.) Link/ Fabaceae/ fedegoso (A.C.P.S. 16822)*#	(8) Purgative, liver disorders (Saint-Hilaire, 1975)
<i>Solanum cernuum</i> Vell./ Solanaceae/ panacéia (A.C.P.S. 18187)	(6) “depurative”and wound healing (Martius, 1824)
<i>Stachytarpheta cayennensis</i> (Rich.) Vahl / Verbenaceae/ gervão (A.C.P.S. 16622)	(1) Stimulant (Pohl, 1976)
<i>Stryphnodendron adstringens</i> (Mart.) Coville/ Mimosaceae/ barbatimão (A.C.P.S. 17227)*#	(10) astringent, anti-diarrheic and anti-ulcers (Martius, 1824; Pohl, 1976)

#Amerindian origin

* Included in Brazilian Official Pharmacopoeia (Brandão *et al.* 2009)

the Herbarium of Federal University of Lavras (UFLA) (Licenses for plant collection from Instituto Estadual de Florestas – IEF - 034/2005 and 028/2009; Ethical Committee Approval 175/2007-UFVJM).

RESULTS AND DISCUSSION

The current use of native medicinal plant species was verified in three municipalities along the historical Royal Road (RR), in the Brazilian southwestern State of Minas Gerais (Fig. 1). Minas Gerais State includes a spatial and cultural diversity within its territory (which has an area approximately the size of France) and, in contrast to Rio de Janeiro and São Paulo, it maintains strong regional and cultural traditions. RR is considered today a union of three routes that were formed at different moments of Brazilian history: two routes intersect in the city of Ouro Preto, the most prosperous locality of inner Brazil in the 17th and 18th centuries; and the northern route goes to Diamantina city that, besides Ouro Preto, is considered World Cultural Heritage site by UNESCO. Other historical cities along the RR are Baependi, Juiz de Fora, Itabira and Conceição do Mato Dentro (www.estradaareal.org.br).

A total of 69 native useful plant species were cited by the informers within the studied area and the use of 36 (52%) of them had been observed previously by European naturalists in the 19th century (data not shown). From the total of useful plants, only 17 (24.6%) were indicated for the same purpose as they had been in the past (Table 1). The plants are used as diuretics (*Chiococca alba* (L.) Hitchc., Rubiaceae, cainca; *Croton antisiphiliticus* Mart., Euphorbiaceae, perdiz; *Palicourea rigida* Kunth, Rubiaceae, congonha-bate-caixa), to treat liver disorders, bronchitis, rheumatism, as astringent, depurative, stimulant and wound healing (*Croton antisiphiliticus* Mart., Euphorbiaceae, perdiz; *Solanum cernuum* Vell., Solanaceae, panacéia) as emmenagogue, expectorant and to treat hemorrhoids.

The use of roots of *Aristolochia cymbifera* Mart. & Zucc (jarrinha) as a febrifuge, stems of *Baccharis trimera* (Less.) DC (carqueja) as a treatment for liver disorders, leaves of *Buddleja brasiliensis* Jacq. ex Spreng (barbasco) as an anti-hemorrhoidal, leaves of *Ilex paraguariensis* A. St.-Hil. (congonha dourada) as a stimulant and bark of *Stryphnodendron adstringens* (Mart.) Coville (barbatimão) as astringent, anti-diarrheic and anti-ulcers was recommended by all the informers. These same traditional uses were registered by the naturalists when they traveled throughout that region. Despite its use for centuries, few studies have been done in order to verify the efficacy of these remedies.

The stimulant effect of *I. paraguariensis* A. St.-Hil. is well known and is due to its caffeine content. The astringency of *Stryphnodendron adstringens* (Mart.) Coville bark is a consequence of the high tannin content, which promotes the anti-diarrhetic and anti-ulcer effects (Audi *et al.* 1999; Martins *et al.* 2002). The conclusive results of pharmacological studies led to the inclusion of this plant in the recent edition of FBRAS, demonstrating its importance also in official medicine (Brandão *et al.* 2009). Other remedies widely used in the region (8 informers) and confirmed by pharmacological studies are the roots and leaves of *Senna occidentalis* (L.) Link as purgative and this effect is due to the presence of anthracenic compounds (Nadal *et al.* 2003).

The use of some species in 19th century was considered important by von Martius and Saint-Hilaire and they have included them in their books specific about medicinal plants: *Plantes Usuelles des Brasiliens* (Saint-Hilaire 1824) and *Systema de Materia Medica Vegetal* (Martius 1854). Remedies using the roots of *Borreria poaya* (A. St.-Hil.) DC. as an expectorant and to treat bronchitis, for example, as well as the roots and leaves from *Boerhavia diffusa* L. to treat liver disorders were already described by Saint-Hilaire and von Martius, respectively. The use of both species for the same purpose is currently recommended by eight informers of the studied area. However, none or few studies have been performed with these species in order to verify the efficacy of the remedies. The same can be observed for the other plants from Table 1 which have their traditional use preserved throughout the centuries.

The Traditional Medicine Division of the WHO recognizes the importance of the century-old plant species, including the Amerindian, and advises that their efficacies be evaluated through pharmacological and toxicological studies (WHO 2005). Six of the current used species have Amerindian origin (*Aristolochia cymbifera* Mart. & Zucc., *Dorstenia brasiliensis* Lam., *Ilex paraguariensis* A. St.-Hil., *Lantana camara* L., *Senna occidentalis* (L.) Link, *Stryphnodendron adstringens* (Mart.) Coville) some of which were described by Pisonis, a European naturalist that studied the Brazilian biodiversity already in the 16th century. The current use of these species shows the importance of these remedies in Brazil throughout the centuries (Brandão *et al.* 2008; Pisonis 1648). These same species, in addition to another four listed in Table 1 (*Baccharis trimera* (Less.) DC., *Buddleja brasiliensis* Jacq. ex Spreng., *Chiococca alba* (L.) Hitchc., *Peltodon radicans* Pohl), have been included in the first Edition of FBRAS, published in 1929, due their importance in Brazilian conventional medicine (Brandão *et al.* 2009). However, the lack of results on pharmacological and

toxicological studies led to exclusion of them from official medicine.

Despite being considered a local-level study our results indicate that few native plant species are still being used in the same manner as the past in that region and efforts are need to preserve this traditional knowledge. The study also points to an urgent need for pharmacological and toxicological studies of the native medicinal species, as well as studies on their ecology and conservation.

ACKNOWLEDGEMENTS

To all the local informers and to Eduardo van den Berg (UFPA) for herbarium facilities. Research grants and fellowships from Fundação de Amparo a Pesquisa de Minas Gerais (FAPEMIG) and Conselho Nacional de Desenvolvimento Científico (CNPq).

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