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Ethnobotanical study of medicinal plants used by traditional healers in Mascara (North West of Algeria)

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ABSTRACT

Ethnopharmacological relevance: Medicinal plants are considered as a rich source of bioactive compounds. The present study aimed to document the local knowledge of medicinal plants' use by traditional healers in Mascara, North-west Algeria.

Materials and methods: The present study was carried out in Mascara (North West of Algeria). Ethnobotanical data were recorded from 43 traditional healers practicing in Mascara. Data collected was analysed using quantitative indices such as the use value (UV), fidelity level (FL) and Informant Consensus Factor (F_{IC}).

Results: Traditional healers reported 141 medicinal plant species belonging to 54 families and 125 genera for the treatment of different ailments grouped into 14 ailments categories. *Lamiaceae* were the most represented family with 19 species (13.57%) followed by *Asteracea*, *Apiaceae* and *Fabaceae*. *Thymus vulgaris* L. was the most frequently used by local informants, with the highest UV of 0.883 (38 use reports). Our findings revealed that 39 species have not been previously reported as medicinal plants in the region. Furthermore, we report for the first time a total of 100 new therapeutic uses for 37 known plant species. F_{IC} values ranged from 0.125 to 0.658. Gastro-intestinal diseases had the highest F_{IC} (0.658) with 60 species and 261 use reports.

Conclusion: The present study revealed the important local knowledge as showed by the variety of species used to treat several ailments. Recorded species with high UV should be subjects of further pharmacological studies to validate their popular use and to isolate the bioactive compounds.

1. Introduction

Medicinal plants currently used for primary healthcare in developing countries, are considered as a promising source of important bioactive compounds. About 80% of the world's population use medicinal plants for health purposes (Agisho et al., 2014). At least, 25% of modern drugs contain one or more active principles of plant origin (Enyew et al., 2014). Ethnobotanical studies are necessary to reveal locally important medicinal plant species, and to document popular knowledge, which is under threat of being lost (Magwede et al., 2014). Indeed, the ethnobotanical approach resulted in the discovery of digoxin, extracted from *Digitalis purpurea*, a plant used by European populations for its positive cardiovascular effects and the identification of anticancer etoposide and teniposide extracted from *Podophyllum peltatum* (Tan et al., 2010).

For centuries, medicinal and aromatic plants are used by Algerian populations to treat several ailments (Reguieg, 2011). Algeria is characterized by a flora rich in medicinal and aromatic plants, due to its climatic and topographic diversity (Azzi et al., 2012). Algeria is considered as one of the richest Arab countries in terms of plant diversity with 3164 species of vascular plants (Vasisht and Kumar, 2004). Although, in recent years, several studies have been undertaken to explore biological activities of Algerian medicinal plants (Benarba et al., 2012a, 2012b, 2014a), ethnobotanical investigations remain insufficient to document the ancestral knowledge. In this context, the present study aimed to document the local knowledge of medicinal plants' use by traditional healers in Mascara, North-west Algeria. To our knowledge, this is the first ethnobotanical investigation carried out in the region, one of the most important departments (wilayas) in Algeria.

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2. Materials and methods

2.1. 2.1. Study area

Algeria covers an area of 2.381.741 km^2, of which 84% is the Sahara, one of the largest deserts in the world. Mascara province (5941 km^2) is located in the North West of Algeria (at N 35°26′, E 02°11′) with Mediterranean climate and mean annual precipitations of about 450 mm (Benarba et al., 2014b). Population of the region is estimated to be 1.000.000 with an average growth rate of 1.99%. The average population density is 168 Hab/ Km^2 (Fig. 1).

2.2. Data collection

In total 43 traditional healers practicing in Mascara were interviewed. Most of them (83.72%) were illiterate. Demographic characteristics of the traditional healers are shown in Table 1. Open questions were asked to record the use of medicinal plants (vernacular names, ailments treated, parts used, modes of preparation/administration, ingredients). Local names were given in Arabic and/or in Amazigh languages.

2.3. Ailment categories

The ailments were categorized into 15 categories according to the use-reports mentioned by traditional healers of the study area (Table 2). Each citation of a particular part of a particular plant was recorded as one use report. If one informant used a plant to treat more than one disease in the same category, it was considered as a single use-report (Musa et al., 2011).

2.4. Data analysis

Data collected was analyzed using the following indices (Morvin Yabesh et al., 2014).

Table 1
Demographic characteristics of the traditional healers interviewed.

Demographical characteristics	n (%)
Age (years)	
20–40	21 (48.83)
41–50	11 (25.58)
51–70	11 (25.58)
Education level	
Illiterate	36 (83.72)
Primary level	4 (09.30)
Secondary level	3 (06.97)

1. **Use-value (UV):** was calculated using the formula $\mathbf{UV}=\Sigma \mathbf{U/n}$ U is the number of use reports cited by each informant for a given plant species and n is the total number of informants interviewed for a given plant.
2. **Fidelity level (FL)**: fidelity level was calculated according to the following formula FL (%)= (Np/N)*100 wher Np refers to the number of use-reports for a given species reported to be used for a particular ailment category, and N is the total number of use reports cited for any given species.
3. **Informant consensus factor** (F_{IC}) was calculated according to the formula: $F_{IC}=(Nur-Nt)/(Nur-1)$ **w**here Nur is the number of use citations in each category and Nt is the number of species reported in each category.

3. Results and discussion

3.1. Botanical diversity

In the present study, local healers reported 141 medicinal plant species belonging to 54 families and 125 genera for the treatment of different ailments. Our findings demonstrate the importance of knowledge of local healers regarding the use of medicinal plants to

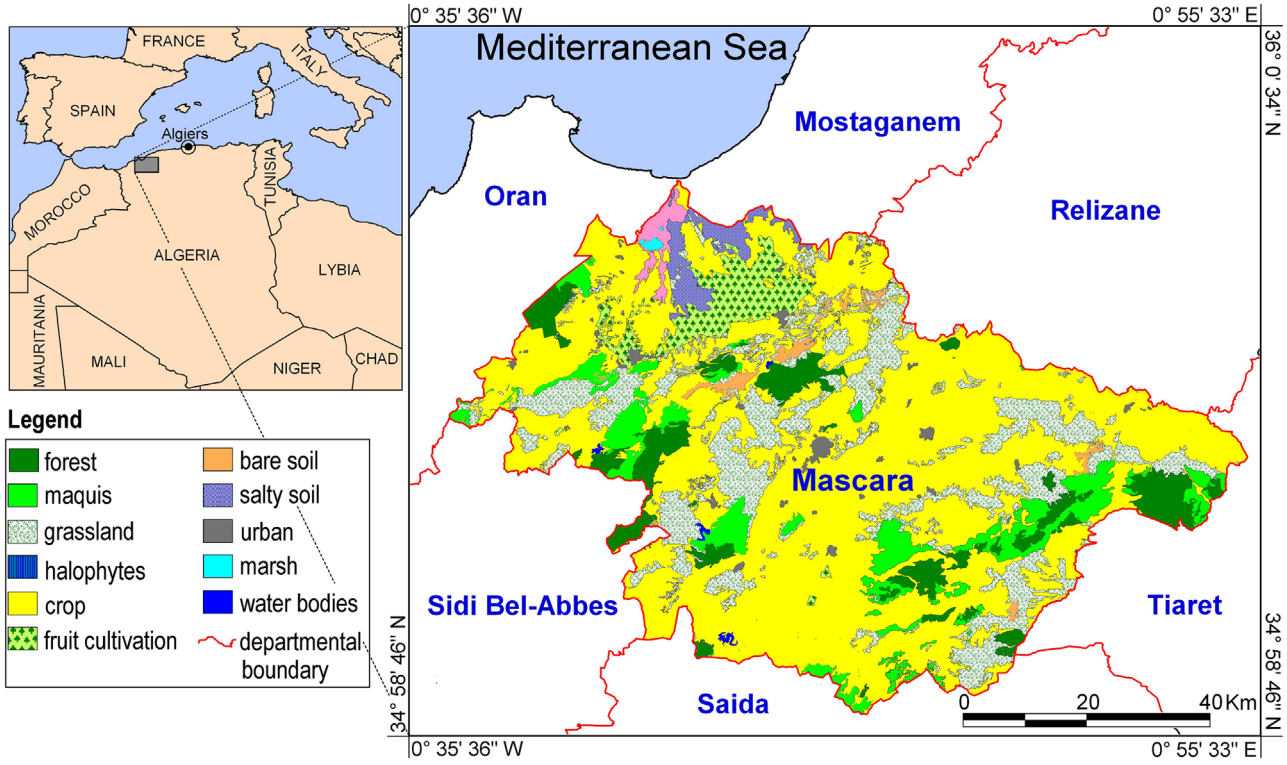

Fig. 1. Location of the study area (Mascara, North West Algeria).