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Ethnobotanical Survey of Medicinal Plant Mentha rotundifolia (L.) Huds. in El Tarf, Extreme Northeast of Algeria

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ABSTRACT

In the aim of gather information on medicinal uses of Mentha rotundifolia (Mentha x rotundifolia (L.) Huds., 1762) in the extreme northeastern of Algeria and safeguard cultural heritage, an ethobotanical survey was conducted in El Tarf area (North-East of Algeria). Our field study was carried between January and May 2020. Data were collecting by interviewing local informants using semi-structured questionnaires. Demographic features of informants; life form, part used, methods of preparation, modes of application and ethnomedicinal uses were documented. Data were analyzed and compared to Algerian literature. The use value index (UVd) was used to calculate the citation of diseases only for single plant species. A total of 200 persons were interviewed; women dominates. About 45% were between 40-60 years. It was recorded that leaves were the most commonly used plant part, while infusion was the most common method of traditional drug preparation. The results found that the plant has a long history of therapy for 11 different types of ailments and diseases. The high UVd value were for gastrointestinal problems, fever and headache (0.63, 0.29 and 0.26 respectively).The present study highlighted that Mentha rotundifolia is one of the valuable wild plant that grown naturally in Algeria and plays a vital role in health in this area. These information could be useful in novel drug discovery and to validate the ethomendicinal knowledge.

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INTRODUCTION

Over the last decade, the return to traditional medicine has garnered much interest around the world.[1] Owing to the prevalence of several ailments and diseases without effective medication available, drug discovery studies are needed. Thus, ethnomedicinal studies are of significant value to discover contemporary drugs from medicinal plant resources.[2]

The geographical location of Algeria and climatic diversity have allowed the development of a very rich and highly diversified aromatic and medicinal plants with 4000 species,[3] which was used since time immemorial to treat several diseases.[4]

Phytotherapy is an integral part of the Algerian local culture; population has an important indigenous knowledge acquired empirically through the generations[5] but this knowledge that belongs essentially to traditional practitioners is still transmitted orally,[6, 7] thus, this herbal traditional practice is at risk of disappearing without being safeguarded.[4, 6, 8]

The genus Mentha gathers a group of aromatic and medicinal plants from the Lamiaceae family.[9] According to the flora of Algeria, this genus is represented by five major species: Mirabilis rotundifolia, Mentha longifolia, M. spicata, M. aquatica and M. pulegium.[10]

Mentha rotundifolia commonly known as “Applemint” is a wild growing perennial, herbaceous plant and widely distributed in North Algeria in sub-humid areas, along rivers in plains and mountains where

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it is known as "Timija or Timarssat".[11] Although according to Hayes and Lawrence (2007),[12] M. suaveolensis the synonym of M. rotundifolia, the latter is nowadays known as a hybrid of M. longifolia and M. suaveolens.[13]

Despite its importance as a medicinal with industrial potentials, investigations regarding inventory and ethnobotany surveys [4, 14] of M. rotundifolia in Algeria are still limited. Only a few studies have been conducted regarding biological activities of Algerian M. rotundifolia namely, the antibacterial effect,[15-17] the antioxidant effect[18, 19] and the antifungal effect[20].

The aim of this study is to collect informations on therapeutic applications and traditional uses of M. rotundifolia and safeguard cultural heritage as recognized by the UNESCO in 2003.[21]

MATERIALS AND METHODS

Study area

El Tarf city is situated along the coastline in the far east of Algeria (geographical coordinates: Latitude: 36° 45' 21.0888'' N, Longitude: 8° 13' 16.6728'' E). It extends over an area of 3,339 km² partitioned into seven sectors. Bordering Tunisia (Figure 1), the chief town of the city is located 650 kilometers east of the Algerian capital.

The study area is one of the wettest regions in northeastern Algeria. The climate is Mediterranean humid, marked by an annual rainfall of 1200 mm, giving rise to a very extensive water network (rivers, streams, lakes, lagoons, ponds, swamps, deltas, etc.) that can accommodate several microclimates favorable for Lamiaceae population's development.

El Tarf city has nine RAMSAR classified wetlands classified wetlands, with an exceptional fauna and flora richness; out of 50 sites nationwide. It contains the largest wetlands in North Africa.

Interviews

We conducted a survey between January and May 2020 via a semi-structured interview of informants including male, female respondents and traditional healers. After prior informed consent was verbally obtained, data on age, gender, part(s) used methods of preparation and applications were documented. Informants were interviewed at their homes without time limit according to ISE code of ethics.

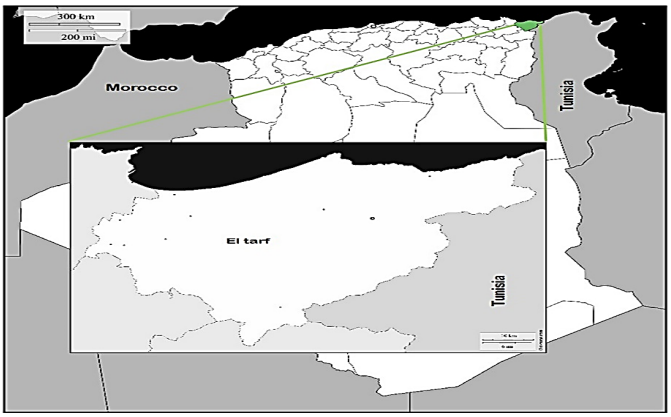

Fig.1: Study area.

Data Analysis

The recorded data was statistically analyzed using Microsoft Office Excel software (2013). Data given by the informants in the study area were compared with several national and international ethnopharmacological references. Additionally, the use value (UVd) of taxa was developed and determined.

Use-value for One Species

The use-value index (UVd) was developed and used to calculate the citation of diseases only for one plant species during interviews. This can be used to quantitative analyses of medicinal uses of one plant within the whole study in order to identify the therapeutic potential of particular plant species.[22] It is calculated as follows:

$$UVd=\sum U/n$$

U: the sum of the total number of use citations by all informants for a given specific diseases, n: the total number of informants usually is fixed.

UVd values range between 0 and 1, where 1 indicates the highest level of informant consent and 0 the lowest. A high use value indicates the potential importance of the plant species for specific ailment conditions reported.

RESULTS AND DISCUSSION

Demographic Characteristics of Informants

Two hundred people participated in this study; 144 (72%) of respondents are women and 56 (28%) are men (Figure 2A). Based on demography these informants were categorized into three different age groups (20-40, 40-60 and > 60 years). People between 40 and 60 use the plant the most (56%) followed by the age class (20-40) and finally (>60) with 28%, and 27% respectively (Figure 2B).

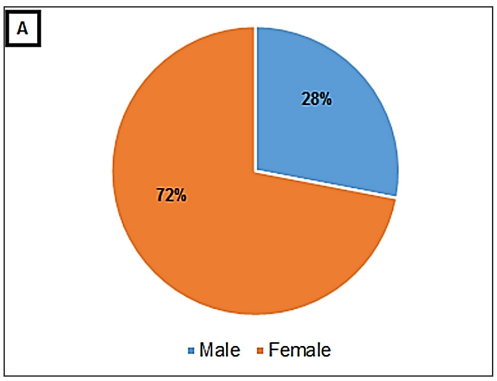

Fig. 2A: Use of Mentha rotundifolia according to gender

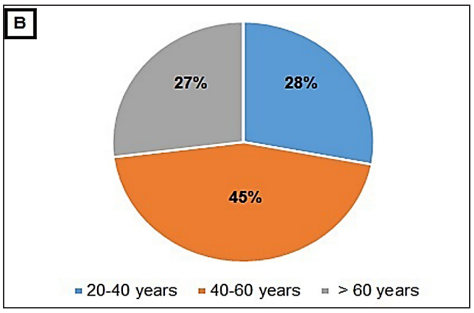

Fig. 2B: Use of Mentha rotundifolia according to age

The analysis of these results shows that women have more knowledge compared to men. This could be explained by the women's occupation of preparing plant-based recipes. The same results were found by.[5, 14, 23]

The maximum information was collected from the informants between 40 and 60. This has been observed in other studies.[14, 24, 25, 26] People over 50 years had the most knowledge about medicinal plants. Whereas little information was shared by young respondents. This may be due to changing lifestyle, increase in the use of all allopathic medicine and urbanization.[2]

Used plant parts

Data on different plant parts used in traditional medicine are indicated in Figure 3. Collected information has shown that the leaves of Mentha rotundifolia are the most used with a majority of 88%. Only 12% of the people questioned in the localities of El Tarf use the combination of leaves and stems. The frequent use of leaves in traditional medicine was found in several ethnobotanical surveys.[27-29] The leaves are very abundant and their harvest is very easy.[30, 31] In addition, Bradacs et al., (2011)[32] and Leto et al., (2013)[33] reported that the use of leaves is better for the survival of medicinal plants collected compared to the collection of whole plant which may cause severe threats and might cause its disappearance.[34] This result can also be explained by the fact that these leaves are at the same time the center of chemical reactions and the reservoir of organic matter, which derived from it.[35] They provide the majority of alkaloids, heterosides and essential oils. Indeed, it was reported that these have proprieties anti-inflammatory, antibacterial, antifungal, antipyretic etc.[24, 36, 37]

Method of preparation

Local inhabitants of the study area use different modes of administration are prescribed: internal (infusion) and external use (cataplasm, powder, vapor bath and dyeing). Infusion (44%) followed by cataplasm (30%) were the most common methods of preparation followed by vapor bath and dyeing (20% and 13% respectively). Whereas, powder was used only in 1% application method (Figure 4). Similar results were obtained in previous surveys in Algeria and other parts of the world,[04, 05, 38, 39, 40] Infusion method is the most used because extraction of active substances using heat is faster.[41]]

Ailments treated by plant

In the study area, Mentha rotundifolia is traditionally used to treat 11 different types of ailments and diseases. Table 1 lists the utilized plant classed by botanical name, medicinal uses, number of use reports and UVd index.

This plant provides an important medicinal uses through gastrointestinal disorder, fever, headache, skin injury, anti-inflammatory, gynecologic diseases, rheumatism, hemorrhoids, clearing mouth, reducing stress. The use value index (UVd) shows the importance of the medical plant for a specific disease based on its relative use among local informants. The highest UVd was recorded for gastrointestinal ailments,(0.63) followed by fever, headache and skin diseases (0.29, 0.26 and 0.14), respectively. El Hassani et al., (2020),[09] Chermat and Gharzouli, (2015)[28] and El Hilaly et al., (2003)[42] reported similar finding. However, Gonzale-Tejero et al., (2008)[43] described more number of use report to treat dermatological ailments compared to gastrointestinal diseases.

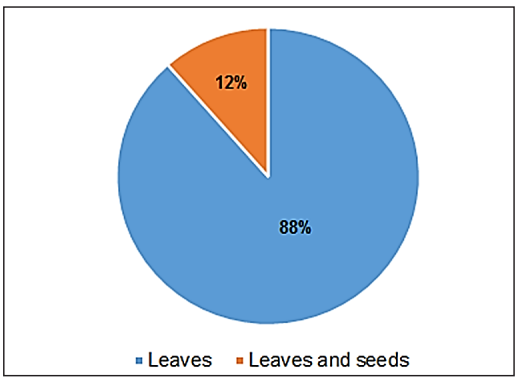

Fig. 3: Use of Mentha rotundifolia according to part used

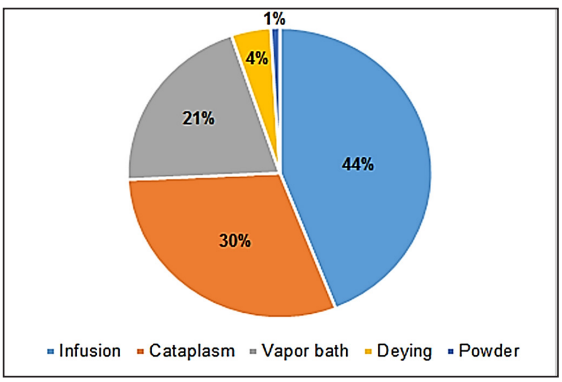

Fig. 4: Use of Mentha rotundifolia according to method of preparation

Table 1: Traditional medicinal uses of Mentha rotundifolia in El Tarf area

Botanical name	*Ailments and diseases treated*	*Number of use report*	*UVd*
Mentha rotundifolia	Gastrointestinal system disease	127	0.63
	Fever	58	0.29
	Headache	53	0.26
	Skin diseases	28	0.14
	Anti-inflammatory, Analgesic	28	0.14
	Gynecologicdisease	25	0.12
	Rheumatism	20	0.1
	Hemorrhoids	20	0.1
	Oral sphereproblems	14	0.07
	Metabolic system disease	8	0.04
	Anxiety	6	0.03

CONCLUSION

The «Timarssat» is one of the plants that grown naturally in Algeria for many years. It has played an important role in health through ethnopharmacological activity. The present ethnobotanical survey is the first on the medicinal uses of Mentha rotundifolia. Our findings provide a baseline data to establish a connection between the traditional health practitioners and scientific communities, which could be substantial in novel drug discovery. Furthermore, it contribute in safeguarding cultural heritage as well as encourage young generations to learn about traditional medicinal knowledge with the aim of preserving it.

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