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Algerian Ethnobotanical Knowledge in Late Nineteenth Century

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ABSTRACT: Algerian ethnobotanical knowledge has deep historical roots in North Africa. It developed and evolved over generations, strengthening the bond between Indigenous people and their natural environment. This article aims to explore the state of that knowledge at the end of the 19th century, just before the wave of modernization and technological advances began to gradually erase most of its original traces. The ethnobotanical practices revealed from that period highlight scientific, ancestral, and symbolic dimensions, through which Algerians crafted tools and made extensive use of plants in construction, food, and medicine. This study also examines the characteristics of this ethnobotanical heritage and addresses the criticisms directed at its scientific validity and relevance. Given the cultural and ecological significance of this ancestral legacy, it is essential to shed light on it today in order to preserve, valorize, and reintegrate it into modern life, particularly through initiatives such as ethnobotanical gardens and cultural tourism for current and future generations.

INTRODUCTION

Plants have shared a long-standing relationship with humans since their earliest appearance on Earth, a mutually beneficial bond in which humans have relied on the virtues of plants, while plants have, in turn, benefited from human activities that promote their dispersal and adaptation. Global ethnobotanical knowledge represents an invaluable ancestral reservoir, offering deep insights into the sustainable use of natural resources to meet essential human needs such as food, medicine, construction, and tools. By the end of the 20th century, the World Health Organization's Traditional Medicine Program estimated that 80% of pharmaceutical compounds in use had been employed for similar or related purposes in traditional medicine (Celidwen *et al.* 2023). Additionally, the selection and preservation of locally adapted plant varieties (such as wheat, fruit trees, alfa grass, olive trees, and grapevines), the development of seed conservation techniques, and the morphological recognition of plant varieties, all reflect a deep-rooted ethnobotanical heritage. Moreover, the use of plants in basketry, weaving, tanning, house construction, and the crafting of tools and household items further illustrates the rich and multifaceted relationship between humans and plants. However, the continued existence and transmission of this knowledge remain a subject of debate today (Panigrahi *et al.* 2021, Ramirez 2007).

The nations that are parties to the Convention on Biological Diversity acknowledge the importance of equitably sharing the benefits derived from the use of traditional knowledge, innovations, and practices that are relevant to the conservation of biodiversity and the sustainable use of its components. They also commit to protecting and promoting the customary use of biological resources in accordance with traditional cultural practices, as long as these practices are compatible with conservation and sustainability goals. Furthermore, they encourage and develop cooperative approaches for the advancement and application of technologies, including indigenous and traditional technologies (CBD 2011). This international trend toward the protection of traditional knowledge emerged during the last decades of the 20th century, as a response to growing

threats to cultural heritage, particularly ethnobotanical knowledge, in a rapidly globalizing world marked by modernization and technological revolution (Cámara-Leret *et al.* 2014, Panigrahi *et al.* 2021).

Algeria was colonized by French forces in 1830, and the resistance movements that opposed them delayed their expansion, preventing them from reaching the far south until the 20th century. The botanical, medical, and anthropological missions that accompanied colonization provided valuable testimony on the lives of the indigenous Algerian populations and the state of their traditional knowledge. This knowledge was reflected in the diverse uses of both organic and inorganic materials to meet everyday needs. In this context, the ethnobotanical knowledge documented in books, articles, and herbarium collections offers one of the last authentic snapshots of a millennia-old ancestral heritage, captured just before the onset of technological modernity and the gradual distancing of people from their traditional practices. This study provides an overview of that legacy, along with a critical analysis focused on the ethnobotanical materials used at the time, offering insights that can be compared with recent Algerian ethnobotanical surveys to better understand the evolution of this traditional knowledge.

MATERIALS AND METHODS

This study is based on a comprehensive, systematic review of digital databases, including Google Books, the Biodiversity Heritage Library, Archive.org, Gallica, and Google Scholar. The research focused on historical ethnobotanical uses in Algeria, specifically those documented between the 19th and early 20th centuries by contemporary botanists, ethnologists, and explorers. Additional data was extracted from the digitized herbaria of the *Muséum National d'Histoire Naturelle* (MNHN) in Paris, notably from the collections of Thérèse Rivière, Jacques Lizot, and Henri Lhote. Several keywords were employed to refine the search, primarily in French as it was the language of the majority of studies published during that period on this subject, with a few exceptions, such as Hilton-Simpson's work on Chaouia medicine. The keywords used included; *médecine Algérie indigène*, *médecine arabe Algérie*, *Ibn Hamadouch*, *médecine Touareg*, *médecine Kabyle*, *médecine Chaouia*, *pharmacie indigène Algérie*, *plantes médicinales Algérie*. To ensure taxonomic accuracy, all historical scientific names were verified and updated to their currently accepted nomenclature using the Plants of the World Online (POWO) database. The selection of studies describing the ethnobotanical knowledge of that era, though limited in number, was based on specific criteria. The author must indicate the ethnicity or region, the plant's scientific name (or at least its complete local name), the specific plant part used, and whether the information was provided by a healer (*Tebib*) or tribal members. Additionally, the preparation method, whether the part was used alone or in a mixture with other ingredients, was also required.

The ethnobotanical data in this study were originally documented by several authors. Émile Louis Bertherand (1821–1890), a physician, surgeon-major, founder of the Algerian Climatology Society (1864), and editor-in-chief of the *Gazette Médicale d'Algérie* (1868), severely criticized Algerian indigenous medicine in his book "*Médecine et hygiène des arabes*". Despite this, he published another work on what this medicine could offer to European pharmacopoeia, titled "*Ressources que la matière médicale arabe peut offrir aux pharmacopées française et algérienn*". Lucien Leclerc (1816–1893), a military doctor, translator, and historian of Arab and Algerian medicine, was interested in the origins of Algerian pharmacological knowledge. Consequently, he translated the work of the Algerian author Ibn Hamadouch on disease treatments, entitling it "*Traité de matière médicale arabe*", having previously published his own analysis of indigenous Algerian medicine under the title "*De la médecine arabe et particulièrement de la médecine arabe en Algérie*". Henry Foley (1871–1956), a military physician and researcher in human pathology and parasitology, served as Director of the Health Service for the Southern Algerian Territories and later as head of the Saharan Laboratories at the Pasteur Institute of Algeria. He described Touareg life and aspects of plant use in his book "*Maurs et médecine des Touareg de l'Abaggar*". The British traveler and ethnologist Melville William Hilton-Simpson (1881–1938) focused on the life and medicine of the Chaouias, notably in his book "*Arab medicine and surgery; a study of the healing art in Algeria*". French anthropologist Mathéa Gaudry (1884–1966) studied the societies of Djebel Ksel, Djebel Amour, and the Aurès. Thérèse Rivière (1901–1970), an ethnologist at the *Musée d'Ethnographie du Trocadéro*, also studied the way of life of the Chaouias, and her specimens, especially medicinal plants, are preserved at the MNHN (*Muséum National d'Histoire Naturelle*). Henri Lhote (1903–1991), an ethnologist, archaeologist, and naturalist, likewise has his specimens, primarily of medicinal plants, conserved at the MNHN. Finally, Jacques Lizot (1938–2022), a French ethnologist, described the traditional uses of plants by the populations of the Ouarsenis on specimen sheets also preserved at the MNHN.

RESULTS

Characteristics of the Ethnobotanical Heritage in Algeria

Building upon the various dimensions that shaped ethnobotanical knowledge in 19th-century Algeria, its richness can be viewed as the result of a cumulative process over centuries, deeply influenced by the anthropological and regional diversity of the autochthonous populations. Plants served as an essential pillar of daily life, making their knowledge and use a necessity passed down from generation to generation. Several aspects of this knowledge are summarized in Table 1. The ethnobotanical materials used by nomadic populations of the Sahara and steppe, as well as by mountain communities in the Atlas regions, were sourced directly from their native habitats, landscapes that were not only home to these plants but also to the people themselves. For instance, pine and poplar trees were found in the Tell region, while Acacia species were common in the Sahara, all used for construction. Seasonal journeys in search of annual forage plants for livestock, especially by steppe nomads, were known as "*Achabas*". Edible plants, as well as those used for medicinal purposes, varied significantly between the Tell and the Sahara. It was primarily among urban indigenous practitioners, such as city-based physicians, herbalists, *Talebhs*, and itinerant healers, that one encountered the use of exotic ingredients or complex formulas combining elements of diverse origins.

The vernacular names attributed to plants during that period reflect the indigenous populations' keen ability to distinguish between different species. Regional, linguistic, and cultural diversity, particularly between Arabic- and Berber-speaking communities, often resulted in a wide array of synonyms. In other cases, however, a single name, whether Arabized or Berberized, was commonly used across regions. Examples include Harmel for *Peganum harmala* L. and Deries for *T. garganica*, Tasselgha for *G. alypum*, Harharha for *Lepidium lepidioides* (Coss. & Durieu) Al-Shehbaz, El Aima for *Convolvulus lineatus* L., Ledna for *Bituminaria bituminosa* (L.) C.H.Stirt., Lezzaz for *Daphne gnidium* L., Nims for *Aegialina pubescens* (Lam.) Quintanar & Barberá, Ansel for *Drimia maritima* (L.) Stearn and Taida for *Pinus halepensis* Mill. (Foureau 1896, Mercier 1908). Algerians demonstrated a remarkable ability to develop plant nomenclature based on dominant characteristics such as flowers, leaves, stems, scent, or traditional use. As a result, more localized or narrowly distributed species often received specific and unique names. However, in some cases, due to overlapping traits or common usage, vernacular names were generalized or confused with those of more familiar plants. A notable example is the widespread use of the term "Zaatar" to refer not only to aromatic *Thymus* spp., but also to *Origanum* spp. and various other Lamiaceae rich in thymol. Similar naming overlaps are observed with *Mentha pulegium* L. (Fliou) and *Ziziphora hispanica* L. (Fliou Djebel). Some vernacular names reflect a keen and insightful observation of plant morphology and behavior. For example, "El Haiya ou El Maita", meaning "the living and the dead", is the name given to "*Orchis*" species, referring to the dual tubers, one of which shrivels as the other develops for the following season. Fruits bearing hooked spines that cling to clothing are creatively named "Khodna Maak", which translates to "Take me with you". Algerians also coined imaginative names for introduced plants: "Fattatet El Hadjar" (Crusher of kidney stones) for *Herniaria fontanesii* J. Gay; "Euchq Echems" (Sun lover) for *Helianthus annuus* L.; "Ouard El Merdja" (Marsh rose) for *Hibiscus palustris* L.; and "Batata Khorchof" (Artichoke potato) for *Helianthus tuberosus* L. (Tahri *et al.* 2020, Trabut 1935).

This ethnobotanical knowledge was not merely a tool for everyday life, it also served as a crucial survival strategy during times of hardship, such as the famines of the 1860s and later periods following World War II. In these times of scarcity, indigenous populations turned to wild edible plants like *Diploaxis pitardiana* Maire, *D. duveyrieriana* Coss., *Eruca vesicaria* (L.) Cav., *E. aurea* Batt., *Coincya tournefortii* (Gouan) Alcaraz, T.E.Díaz, Rivas Mart. & Sánchez-Gómez, *Malva sylvestris* L., *Rumex vesicarius* L., *R. spinosus* L., *Atriplex halimus* L., *Ziziphus lotus* (L.) Lam., *Schouwia purpurea* (Forssk.) Schweinf., *Pistacia* spp., and *Quercus* spp., as well as the roots of *Pseudopodospermum undulatum* (Vahl) Zaika, Sukhor. & N.Kilian, *Silybum marianum* (L.) Gaertn., and *S. eburneum* Coss. & Durieu. They also relied on fungi for sustenance, notably species of *Agaricus* and *Terfezia*, which through experience they associated with *Helianthemum* species. In addition to food, fungi from the genera *Tylostoma* and *Podaxon* were employed in traditional medicine, particularly for dressing wounds and treating burns (Foley 1995, Ozenda 2004). In the Sahara, plants served as vital ecological indicators for the Touareg in their search for water. Certain species were used to assess the quality of available water sources. Some plants (such as *Tripidium ravennae* (L.) H.Scholz, *Typha domingensis* Pers., and *Cyperus rotundus* L.) indicated the presence of fresh, drinkable water; others (like *Phoenix dactylifera* L., *Populus euphratica* Olivier, *Phragmites australis* subsp. *australis*, and *Polypogon monspeliensis* (L.) Desf.) pointed to water that is potable but slightly saline. Some species (e.g., *Tamarix* spp., *Nitraria retusa* (Forssk.) Asch., *Imperata cylindrica* (L.) Raeusch., and *Alhagi maurorum* Medik.) were

associated with brackish to saline waters, while others (such as *Halocnemum strobilaceum* (Pall.) M.Bieb., *Zygophyllum album* L.f., *Z. simplex* L., and *Arthrocaulon macrostachyum* (Moric.) Piirainen & G.Kadereit) signaled highly saline water (Ozenda 2004).

Table 1. Diverse Algerian ethnobotanical uses from the late 19th century.

Species	Vernacular Name	Type	Uses	Reference*
<i>Ajuga reptans</i> (L.) Schreb.	Chendgoura	Health	Mixed with olive oil and highly salted water, it was ingested abundantly as a remedy for cholera. Also, crushed and blended with onion juice, it was used as a treatment for deafness.	(Bertherand 1855)
<i>Agave americana</i> L.	Aoud El Qomari	Health	Wood crushed and mixed with alum to stop excessive sweating and simultaneously remove hair from the underarm area.	(Bertherand 1855)
<i>Anabasis articulata</i> (Forssk.) Moq.	Tasa	Hygiene	Stems pounded in a mortar and reduced to a paste produced abundant foam when used to wash white woolen cotton fabrics.	(Foley 1995)
<i>Artemisia herba-alba</i> Asso	Chih, Izri	Health	Crush the Izri plant and apply it to scraped wounds. Make a mixture of pounded Izri with luban, frankincense, oteb, cloves, ifelfel, black pepper, mswak, walnut bark, semmot, snuff tobacco, ison, salt, hamomt, honey, zict, and oil. Coat an unwashed wool ball the size of an olive and insert it into the vagina against sterility, abdominal pain, or kidney ailments.	P00803047
<i>Artemisia judaica</i> L.	Tehereggele	Health	Crushed in butter to make a kind of ointment used against human scabies.	(Foley 1995)
<i>Asphodelus ramosus</i> subsp. <i>ramosus</i>	Berruagh	Technology	Manufacture of toys.	P00803067
<i>Asphodelus</i> spp.	Tazia	Nutrition	Seeds in cakes. In porridge with dates. Mixed with cow's butter which one applies with a finger against nostril ulcers.	P00803018
<i>Balanites aegyptiaca</i> (L.) Delile	Tabourak	Technology	Wood for making spoons.	(Foley 1995)
<i>Brassica napus</i> L.	Left	Health	Seeds crushed in honey to rub on bald spots against alopecia. Seeds with radish seeds crushed with oil, then a little vinegar is added; eat a small amount before the meal to treat chest ailments.	(Bertherand 1855)
<i>Calotropis procera</i> (Aiton) W.T.Aiton	Tourha	Health	The roots are scraped, crushed into a paste, diluted in a lot of water to make a drink (after which the sick person eats goat meat), causing syphilis to appear on the skin; the lesions are then scraped until they bleed and then cauterized.	(Foley 1995)
<i>Capparis spinosa</i> L.	Haylalut	Magic	Talisman: against the evil eye.	P00803106
<i>Centaurea calcitrapa</i> L.	Asolgaz	Health	Apply a poultice made with dried and chewed gum against whitlow. Heat a preparation of mixed garlic, tar, and bitter gum, and apply it to the anus after hemorrhoid removal. In the mountains, throw barley, flour, and benzoin resin over Asolgaz; uproot it, take the roots, and boil them in a pot sealed with dough, pierced with holes to let the steam escape. Then the	P00803059

			woman squats over the pot; when the steam subsides, she replaces the lid with a funnel, inserting its spout into the vagina against syphilis. The next day, she drinks the water from the warmed roots; repeat three times, with three-day intervals. For skin irritation: sprinkle with powdered Asolgaz.	
<i>Centaurea calcitrapa</i> L.	Asolgaz	Technology	Violet dye with peach tree root.	P00803059
<i>Centaurea</i> spp.	Bou-Menguar	Health	Leaves crushed in oil as a poultice to cover wounds.	(Bertherand 1855)
<i>Chrozophora senegalensis</i> (Lam.) Spreng.	Aferegak	Health	The ash forms a coating that protects the wound from air contact, accelerating wound healing.	(Foley 1995)
<i>Cistanche lutea</i> (Desf.) Hoffmanns. & Link	Ahahel, Ahliou	Nutrition	The fleshy underground parts, crushed then sun-dried, cook under ashes to make porridges or flat cakes.	(Foley 1995)
<i>Cistus monspeliensis</i> L.	Tuzzala	Technology	They are used to make brooms. Plants harvested year-round, as needed.	P00925762
<i>Citrullus colocynthis</i> (L.) Schrad.	Handale	Health	Pounded in water with garlic stripped of its outer leaves, to drink after a bite.	(Bertherand 1855)
<i>Commiphora africana</i> var. <i>africana</i>	Adaras, Teranrert	Health	Gums for treating wounds: on the first day sugar is placed on the wound, and the next day the wound is filled with bdellium reduced to powder.	(Foley 1995)
<i>Cynomorium coccineum</i> L.	Aoukal	Nutrition	The fleshy underground parts, crushed then sun-dried, are cooked in ashes to make porridges or flat cakes.	(Foley 1995)
<i>Cyperus rotundus</i> L.	Saad	Nutrition	Used when baking bread. The flat cake is placed on it to prevent coals from sticking and to give the bread a good fragrance.	P00925769
<i>Deverra scoparia</i> subsp. <i>scoparia</i>	Tattait	Technology	Stems for making mats, a kind of movable screen.	(Foley 1995)
<i>Dittrichia viscosa</i> (L.) Greuter	Souaq Ennebi	Health	Rub the armpits and body surface with fresh leaves to stop excessive sweating and simultaneously remove hair from the axillary regions.	(Bertherand 1855)
<i>Ferula assa-foetida</i> L.	Haltit, Hentit	Magic	This was included in other indigenous preparations such as mixtures intended for fumigation, combined with aromatics like benzoin, borax, and sulfur to ward off the blows of witchcraft and the evil eye.	(Bertherand 1855)
<i>Ficus carica</i> L.	Karma, Tukag	Health	Heat a fig or very hot ash, place it on the boil to bring it to a head against furuncles. Take male fig tree latex, soak a tuft of wool, reinsert the hemorrhoids and leave in place. For swollen spleen: place a mud cake on the spleen, attach a fig leaf to the wall against which the woman lies, remove the mud poultice when the leaf is dry, the spleen will have deflated.	P00803068
<i>Globularia alypum</i> L.	Tasselgha	Health	As a decoction against intermittent fevers complicated by headache.	(Bertherand 1855)
<i>Juniperus phoenicea</i> L.	Araar, Zimba	Nutrition	Leaves smoked and seeds cooked and consumed as mash during famine periods; one must eat a little every year to avoid losing the habit.	P00803053
<i>Juniperus phoenicea</i> L.	Araar, Zimba	Technology	Crushed leaves: tanning of sheepskins.	P00803053
<i>Laurus nobilis</i> L.	Rande	Health	Fine powder mixed with oil introduced into the ear	(Bertherand

			canal for ear pain.	1855)
<i>Lawsonia inermis</i> L.	Henna	Health	Treatment of nursing fissures (sometimes treated with alum powder alone or mixed with a few drops of flower water).	(Bertherand 1855)
<i>Linaria multicaulis</i> subsp. <i>heterophylla</i> (Desf.) D.A.Sutton	Bug'lam	Health	As a decoction: taken by women who cannot have children but wish to. Treats children's cough.	P00925766
<i>Macrochloa tenacissima</i> (L.) Kunth	Halfa, Agi	Magic	To detect the causes of illness: plant alfa grass blades in a ladle containing flour and pour water; the sorceress will know which djinn are responsible and how to appease them. Tying knots in a clump of alfa protects against travel dangers - untie them upon return. Hanging an alfa sandal at a garden's entrance protects against wild boars.	PAT000583
<i>Mahua sylvestris</i> L.	Khubiz	Nutrition	It is mixed with a cereal porridge.	P00925768
<i>Mahua sylvestris</i> L.	Khobbeiz	Health	Leaves crushed in oil as a poultice to cover wounds.	(Bertherand 1855)
<i>Mentha × rotundifolia</i> (L.) Huds.	Timarssat	Health	As a decoction, it treats heart conditions. It is also made into brooms which are reputed to leave a pleasant scent in rooms swept with them.	P00925763
<i>Mentha pulegium</i> L.	Flio	Health	Taken as an infusion to treat cough, blended with tea or used as a mint substitute. Harvested in June-July. Dried on house roof.	P00925765
<i>Mentha spicata</i> subsp. <i>spicata</i>	Naana	Nutrition	Mint used for tea preparation: added to tea or infused plain. It is collected in summer at flowering time, hung from a house beam, and kept thus until winter.	P00925761
<i>Nerium oleander</i> L.	Defla	Health	Seeds pounded in cow's bile against psoric affection for three days, while drinking water.	(Bertherand 1855)
<i>Olea europaea</i> L.	Zitun, Azemug	Nutrition	Oil and fruits.	P00803112
<i>Olea europaea</i> L.	Zitun, Azemug	Technology	Very hard wood for making utilitarian objects (spoons).	P00803112
<i>Opuntia ficus-indica</i> (L.) Mill.	Kermouss Ennsara	Health	Leaves moderately heated under ashes, opened before application to treat stirrup tumor.	(Bertherand 1855)
<i>Orobancha aegyptiaca</i> Pers.	Efetekchi	Nutrition	The fleshy underground parts, crushed then sun-dried, are cooked in ashes to make porridges or flat cakes.	(Foley 1995)
<i>Orobancha cernua</i> Loefl.	Efetekchi	Nutrition	The fleshy underground parts, crushed then sun-dried, are cooked in ashes to make porridges or flat cakes.	(Foley 1995)
<i>Panicum turgidum</i> Forsk.	Afezou	Technology	Stems for making mats, a kind of movable screen.	(Foley 1995)
<i>Papaver rhoeas</i> L.	Ben Naaman	Health	Flowers in small quantity of a mixture with equal parts licorice root, germander, pepper, sour milk, sugar, and mastic tree sap, to be introduced into all foods against chest ailments.	(Bertherand 1855)
<i>Peganum harmala</i> L.	Harmel	Health	Broth in oil, and when the decoction has thickened sufficiently, will be applied against ringworm. Decoction boiled with barley flour as an epicranial poultice against cephalalgia, but before application, one must take care to oil the scalp thoroughly.	(Bertherand 1855)

<i>Pergularia tomentosa</i> L.	Tachkat	Technology	Pounded and the crushed product is introduced into the fresh skin and left overnight, after which the hairs remove very easily to proceed with tanning.	(Foley 1995)
<i>Pinus halepensis</i> Mill.	Senouber	Health	forte décoction de graines avec d'anis noir pour traiter l'odontalgie.	(Bertherand 1855)
<i>Punica granatum</i> L.	Aragamo, Er-Rumman	Magic and health	On May 1st, plant Aragamo above doors and windows against djinn, scorpions, and vipers. Pomegranate bark (sour variety) mixed with bramble leaves and pearled barley, pounded and boiled together to encircle the neck against scrofula.	PAT000657, (Bertherand 1855)
<i>Punica granatum</i> L.	Aragamo, Er-Rumman	Health	Sprinkle burns with aragamo ashes. Mix sour pomegranate juice with goat urine, pour into the patient's ear against ear abscess. Poultice with pomegranate leaves and mennod (plant) (crushed and boiled in butter), apply to the affected eyelid and secure with a black band.	PAT000657
<i>Reseda alba</i> L.	Hadlalut	Health	Calming properties.	PAT000675
<i>Retama raelam</i> (Forssk.) Webb & Berthel.	Retem	Health	Stems with wax and pine cone, all thoroughly ground and pounded in oil, then boiled to coat complicated wounds.	(Bertherand 1855)
<i>Rhus oxyacantha</i> Schousb. ex Cav.	Tahotinek	Technology	The bark used in tanning.	(Foley 1995)
<i>Ricinus communis</i> L.	Kharoua	Health	Rubbing with leaf sap to eliminate various pustules that appear on the face.	(Bertherand 1855)
<i>Rosa canina</i> L.	Allaiq	Health	Leaves crushed in oil as a poultice to cover wounds.	(Bertherand 1855)
<i>Rubus ulmifolius</i> Schott	Allaiq	Health	Leaves thoroughly pounded to wrap around the neck against scrofula.	(Bertherand 1855)
<i>Ruta montana</i> (L.) L.	Fijel, Imogwi	Magic	Place the plant with 'written papers' for the djinn.	P00803055
<i>Ruta</i> spp.	Feidjel	Health	Decoction of seeds in which ginger has been macerated, prescribed against tertian fever. Seeds crushed and mixed with warmed oil, then introduced into the ear canal for ear pain.	(Bertherand 1855)
<i>Salvia rosmarinus</i> Spenn.	Lazir	Health	Leaves with celery leaves boiled with honey, eaten in the morning against chest ailments.	(Bertherand 1855)
<i>Salvia</i> sp.	Cahobbelu	Nutrition	Dried, highly aromatic leaves.	P00803025
<i>Scabiosa stellata</i> L. ssp. <i>monspeliensis</i> (Jacq.) Rouy	Ketela	Health	As a decoction against intermittent fevers complicated by headache.	(Bertherand 1855)
<i>Scirpoides holoschoenus</i> (L.) Soják	Smar	Nutrition	Used when baking bread: placed between the baking slab and the flatbread to perfume it and prevent coals from sticking.	P00925770
<i>Tamarix aphylla</i> (L.) H.Karst.	Tabarekkat	Technology and health	Wood for making handled vessels. Resin mixed with honey as an ointment against ophthalmia. Three-day maceration of the wood while eating only garlic and honey pounded together in the treatment of spleen diseases.	(Bertherand 1855, Foley 1995)
<i>Tencrium capitatum</i> L.	Timarssat	Health	As a decoction, it treats heart conditions and those who 'drink too much water'.	P00925764

<i>Tenarium polium</i> subsp. <i>Polium</i>	Djaida	Health	It treats heart diseases. It prevents drinking in 'those who drink excessively'.	P00925767
<i>Thapsia garganica</i> L.	Azagyit	Health	Scrape azagyit roots, boil them in oil; upon waking, take 2 full spoonfuls and eat nothing all day against constipation. Burn roots, pound them, spit on them, and rub vigorously for joint pain. Rub the forehead with root to treat intermittent fevers complicated by headache.	P00803070, (Bertherand 1855)
<i>Typha elephantina</i> Roxb.	Tahle	Nutrition	The fleshy underground parts, crushed then sun-dried, are cooked in ashes to make porridges or flat cakes.	(Foley 1995)
<i>Vachellia seyal</i> (Delile) P.J.H.Hurter	Tamat	Technology	Leaves used for tanning, mixed with fruits of <i>Acacia scorpioides</i> (L.) Chev. and galls of <i>Tamarix aphylla</i> (L.) Karst.	(Foley 1995)
<i>Ziziphus jujuba</i> Mill.	Annab	Health	Wood ashes mixed with vinegar and fig tree wood ashes as a poultice on the wound after a bite.	(Bertherand 1855)
<i>Ziziphus lotus</i> (L.) Lam.	Sedr	Health	Fresh leaves with those of <i>Ajuga iva</i> , crushed to obtain a juice for gargling.	(Bertherand 1855)
<i>Ziziphus lotus</i> subsp. <i>sabarae</i> (Batt. & Trab.) Maire	Abaka, Ibekaten	Nutrition	Berries gathered, crushed and reduced to powder to be mixed with flour.	(Foley 1995)

*To access references from the National Museum of Natural History herbarium, simply use this link: (<http://coldb.mnhn.fr/catalognumber/mnhn/p/>) + the code appearing in the Table.

DISCUSSION

The mediated nature of 19th-century ethnobotanical records

The ethnobotanical and ethnopharmacological records compiled in the 19th century, while invaluable to modern science, were not always faithful, objective transcriptions of Indigenous knowledge systems. These records were frequently mediated through the lens of colonial, Eurocentric perspectives, which shaped what was documented, how it was interpreted, and what was omitted. The collectors, often explorers, missionaries, colonial officers, or early anthropologists, operated within a paradigm that viewed Indigenous knowledge as "data" to be extracted and integrated into Western scientific frameworks, rather than as sovereign intellectual traditions. This process inevitably led to a translation, and often a distortion, where complex, culturally-embedded practices were stripped of their ritual, spiritual, and ecological context to fit into categories of "medicine" or "economic botany." As a result, these archives present a filtered and fragmented view, showing Indigenous knowledge from the recorder's point of view and for their purposes, whether scientific, commercial, or imperial (Hayden 2003).

A critical indicator of this extractive dynamic is the pervasive anonymity of Indigenous informants. In most cases, 19th-century records meticulously document the plant species, their uses, and preparation methods, yet conspicuously fail to mention the names, lineages, or positions of the knowledge-holders who provided the information. This omission was not merely an oversight but a reflection of contemporary attitudes that rarely credited Indigenous individuals as intellectual authorities. By erasing specific authorship, these records facilitated the appropriation of knowledge, allowing it to be presented as a discoverable "natural fact" or as the generalized property of a "tribe," thereby severing it from the specific individuals and communities who generated and stewarded it across generations. This practice decontextualized the knowledge and laid the groundwork for its commodification without benefit or recognition for its origins (Nesbitt 2014, Schultes and Reis 2008).

Modern scholarship has critically re-examined these historical collections, highlighting their biases and seeking to re-contextualize the knowledge within them. Contemporary researchers emphasize that these records are not transparent windows into the past but are themselves cultural artifacts of colonial science. For instance, the drive to identify "active compounds" often overshadowed understanding the holistic therapeutic philosophy, while spiritual or ceremonial uses were frequently dismissed as superstition or simply not recorded. Therefore, while 19th-century records remain foundational for

identifying biologically active plants and tracking ecological knowledge, they must be read with a critical awareness of their inherent partiality and the power dynamics that shaped their creation (Turner 2020).

Dimensions of Ethnobotanical Knowledge among Algerian Populations in the 19th Century

By the end of the 19th century, the ethnobotanical knowledge of indigenous populations in Algeria had been shaped by a variety of influences, contributing to its richness and diversity across all regions of the country. This knowledge can be characterized by scientific, ancestral, and talismanic dimensions, each reflecting the practices and formulas employed by indigenous healers, herbalists, *Taleb*s, and traditional practitioners, who were distinguished by both the content and application of their knowledge. Medical, botanical, and anthropological investigations from that period provide valuable insights into the deep connection between these communities and their natural environment, particularly among nomadic groups and mountain dwellers. However, most of the written records from the time tend to focus on ethnopharmacology, offering a reflection of the medical practices that prevailed in Algeria.

The use of plants for therapeutic purposes during this period was shaped by two distinct approaches: one rooted in the legacy of medieval Islamic medicine, and the other based on purely empirical ancestral knowledge. Indigenous physicians of the time, and occasionally herbalists, often referred to classical medical texts in their prescriptions, including Avicenna's Canon of Medicine, Dawud al-Antaki's *Tadbkira*, Ibn al-Baytar's *El-jami li Mo'fradat el Adwiya wa el Aghdiya*, and *Kashf al-Rumuz fi Sharh al-Aqaqir wa al-Ashab* by Abderrazak Ibn Hamadouch. As a result, their remedies included a variety of preparations such as decoctions, macerations, fumigations, and poultices, often based on complex therapeutic formulas. These could involve precise quantities of plants, combinations of botanical ingredients with inorganic substances, or even mixtures of plants with animal-derived components (Hanoteau and Letourneux 1898, Tahri *et al.* 2020, 2021). As an example, for the treatment of trichiasis, physicians of the time prescribed rubbing the eyes with a mixture of honey and garlic, or with antimony infused with saffron, *Andropogon* spp., and benzoin. They also recommended eye washes using gazelle bile or, in more complex preparations, a powdered blend of copper sulfate, black pepper, saffron, ammonium carbonate, copper carbonate, alum, antimony, arsenic sulfide, safflower, and salt. A small quantity of this powder was wrapped in a cloth and inserted into a reed whose ends were sealed with bread dough. The reed was then placed in a strainer above boiling water and left there until all the moisture had evaporated. Once cooled, the reed was opened to reveal a stone-like substance. This was then crushed into a fine powder, stored in another reed, and the process repeated. The final product was applied to the eyes daily in small amounts (Bertherand 1855).

Empirical ancestral knowledge was passed down from generation to generation within families or tribes, primarily highlighting the use of native flora in a variety of preparations to harness their healing properties. This was especially true for nomadic and mountain communities who lived far from urban centers where medicine often relied on imported or hard-to-obtain ingredients. As a result, their remedies were generally simple, involving decoctions, infusions, macerations, or fumigations made purely from plants, or occasionally combined with inorganic substances such as antimony and alum. For example, nomads of the Saharan Atlas used a lavender decoction as a mouthwash to treat gum inflammation; parsley and celery tea to relieve stomach pain; and a plant-based decoction, *Artemisia herba-alba* Asso., *A. campestris* L., *Thymus* spp., *Salvia rosmarinus* Spenn., and *Mentha pulegium* L., to treat diarrhea. Another common remedy included a decoction of galangal, ginger, black pepper, and lemon peel boiled in milk (Gaudry 1961). Another example comes from the *Touareg* people, who treat rheumatism using the therapeutic properties of *Solenostemma argel* (Delile) Hayne. The plant is first dried in a sheltered place, then mixed either with dates or with a flour-based porridge. After ingesting this remedy, the patient takes shelter from the wind and covers themselves entirely with clothing until they begin to sweat. This is followed by an application of melted butter as a topical ointment (Foley 1995).

The ancestral dimension encompassed not only ethnopharmacological knowledge, as previously discussed, but also the technological use of plant resources to facilitate the daily lives of indigenous populations (Schultes 1960). Among nomads, certain plant species like *Macrochloa tenacissima* (L.) Kunth, *Ampelodesmos tenax* (Vahl) Link and *Lygeum spartum* Loefl. ex L. were commonly used in making cordage and woven items, while harder kitchen utensils were crafted from the wood of species like *Quercus* spp. and *Balanites aegyptiaca* (L.) Delile. Additionally, other plants, such as *Calligonum comosum* L'Hér., *Aerva tomentosa* Forssk. and *Artemisia campestris* L., were employed as natural cleaning agents. Local populations also distinguished edible plant species based on their region of settlement or transhumance routes. For example, Saharan nomads incorporated into their diet the fruits of certain herbs, shrubs, or trees such as *Citrullus colocynthis* (L.) Schrad., *Panicum turgidum* Forssk., *Stipagrostis*

pungens (Desf.) De Winter, *Ziziphus lotus* (L.) Lam., *Searsia tripartita* (Ucria) Moffett, *Ficus subulata* Blume, *Maerna crassifolia* Forssk., *B. aegyptiaca*, and *Faidherbia albida* (Delile) A.Chev.; the leaves of species like *Rumex vesicarius* L. and *Schouwia purpurea* (Forssk.) Schweinf.; and the shoots or tubers of plants such as *Juncus maritimus* Lam. and *Albagi maurorum* Medik. Other species, including *Myrtus nivellei* Batt. & Trab., *Brocchia cinerea* (Delile) Vis., *Mentha longifolia* (L.) L., *Tephrosia purpurea* subsp. *leptostachya* (DC.) Brummitt, *A. herba-alba*, and *Artemisia judaica* L., were used as condiments or added to tea and coffee to enhance flavor (Foley 1995, Ozenda 2004, Tahri *et al.* 2020). The experience of nomadic and mountain dwelling communities was reflected in their ability to distinguish toxic plants, such as *Perralderia coronopifolia* Coss., *Hyoscyamus muticus* subsp. *falezlez* (Coss.) Maire, *Albuca amoena* (Batt.) J.C.Manning & Goldblatt, *Phalaris minor* Retz. and *Lotus jolyi* Batt. (which posed serious risks to livestock), as well as others like *Thapsia garganica* L., *Asphodelus ramosus* L. at certain growth stages, *Suaeda vermiculata* Forssk. ex J.F.Gmel., *Zygophyllum album* L.f., *Z. geslinii* Coss., *Deverra scoparia* Coss. & Durieu, *Nerium oleander* L., and *Orbea decaisneana* (Lem.) Bruyns (Hammiche *et al.* 2013, Ozenda 2004, Tahri *et al.* 2020).

Talismanic and superstitious use represented another dimension of plant application, where botanical ingredients were often combined with inorganic or animal-based substances. This practice was mainly the domain of religious brotherhood members, known as *Talebs*, who engaged in ritualistic traditions of varying complexity. At the time, recipe books that blended Quranic verses, Islamic codes, astrology, and magical practices were widely used. Notable examples include *Kitab al-Risalat al-Yaqutiyya fi al-Kayfiyyat al-Haruniyya* by Massih Ibn Hakim al-Dimashqi and *Kitab Dhahab al-Kusuf wa Nafy al-Zulma fi 'Ilm al-Tibb wa al-Taba'i* by Abdullah Ibn Azzouz al-Marrakshi (Hamès 2001, Hilton-Simpson 1915, Tahri *et al.* 2020). These amulet-based therapeutic formulas were prescribed for a wide range of ailments, from scorpion stings and tertian, intermittent, or quartan fevers to evil eye, skin and nervous disorders. For example, to treat a patient suffering from generalized pain, particularly in the head, limbs, abdomen, and heart, the *Taleb* would write a specific obligatory phrase on seven pieces of paper or on a plate. The same plate would then be filled with water, and the papers would be torn into the smallest possible pieces and dissolved in it. For seven consecutive days, the patient would rub their body with a mixture of oil, Harmal, anise, and sesame as part of the healing ritual (Bertherand 1855). In certain regions of the Saharan Atlas, *Talebs* prescribed a ritual remedy for toothache that involved uprooting a *Thapsia garganica* L. plant and placing seven barley grains in its place while reciting the phrase: "I honor you, grant me health". Upon returning home, the patient would boil the uprooted *Thapsia* plant in butter and then lie down, fully covered, to allow the remedy to take effect (Gaudry 1961). In the Aurès region, traditional protective practices employ specific materials and protocols to ward off supernatural threats. Garlic, red pepper, and copper are commonly used as charms against the "evil eye". To repel the jinn believed to carry this affliction, people often hang small packets of *Ferula assa-foetida* L. resin (known locally as *Hentit*) or bundles of *Cuminum cyminum* L. seeds (*Kammoun*), relying on their strong odor as a deterrent. Similarly, it was held that jinn dislike the bitter taste of certain herbs, such as *Ruta* spp., *Peganum harmala* L., and *Citrullus colocynthis* (L.) Schrad., which were thus utilized for protection. Beyond these applications, strict protocols govern the collection of some species. For instance, leaves of *Nerium oleander* L. are picked before dawn on the feast of *Ashura* (the tenth day of *Muharram*). These leaves are not only burned to fumigate fever patients but are also stored in homes to ward off injurious creatures and moths. Likewise, *Thapsia garganica* L. is to be gathered on the first day of the third lunar month (*Rabi' al-Annaw*), and *Artemisia campestris* L. is collected during a specific forty-day period known as "*Semayem*," which falls between July 25th and September 2nd (Hilton-Simpson 1915).

Critiques of 19th-Century Ethnobotanical Practices

Following the colonization of Algeria, French military scientists began extensive investigations, particularly in the medical, botanical, and anthropological fields. They frequently described the indigenous knowledge of the time as primitive. In their view, indigenous medicine did not deserve the title of "science", as it lacked a foundation in preliminary observation of natural phenomena or reasoned experimentation. Moreover, it was not structured around a coherent body of knowledge derived from theoretical principles tested by practical application. According to these scientists, traditional healers (*Tebibs*) had no understanding of surgical indications or contraindications, constitutional health conditions, or the seasons more or less favorable to recovery (Bertherand 1859). They further described indigenous surgery as "among the most ignorant", stating: "Their surgical arsenal consists of a cupping device, a piece of infernal stone, tinder, lint, to which one must add a pair of scissors, a lancet, and a scalpel, all essentially filthy and rusted" (Bertherand 1855, de Bussy and Rousseau 1840).

At the time, indigenous medicine was often regarded as a degraded form of Avicenna's legacy, influenced heavily by religious prescriptions and the enduring presence of ancient traditions. Practitioners maintained a direct connection with the works of

Hippocrates, Galen, Aristotle, and other classical figures, extending the legacy of ancient masters (Leclerc 1854). However, critics attributed the proliferation of irrational and often "ridiculous" therapeutic formulas, including so-called panaceas and incoherent mixtures of potentially incompatible substances, to the lack of well-defined principles guiding the rational composition of remedies (Bertherand 1859). French physicians of the era argued that the complete absence of knowledge in plant and animal physiology prevented indigenous healers from selecting active substances, discarding inert parts, and preparing medications according to systematic procedures. Moreover, they highlighted the lack of standardized dosing as another flaw in indigenous medical practice (Bertherand 1855, 1859, Leclerc 1854). Despite these criticisms, colonial scientists ultimately acknowledged that Algerian indigenous *materia medica*, particularly regarding plant-based remedies, could include some of the most effective and trustworthy treatments (Bertherand 1859). One notable example is a plaster made from the resinous root bark of *Thapsia garganica*, which was adopted into the European pharmacopoeia in the late 19th and early 20th centuries for its vesicant properties, serving as a valuable alternative to croton oil, mezereon, and other counter-irritants (Reboulleau 1857).

The often negative, and at times openly insulting, critiques of the lifestyle and cultural practices of Indigenous Algerians during the colonial period can be understood as part of France's broader colonial project: a mission to "civilize" what it considered a primitive people. Yet, Algerian ethnobotanical knowledge of that era reveals a deeply rooted and dynamic relationship between local communities and their environment. Despite elements of superstition, unverified beliefs, and non-scientific uses, the decades following the French occupation exposed the true face of colonial "civilization", marked by the destructive exploitation of natural resources such as the "alfa" steppes, forests, and mines, accompanied by the displacement of Indigenous populations and the erosion of their cultural identity. Colonial policies deliberately undermined traditional ethnobotanical practices, notably through the imposition of the French Forest Code (1827), which criminalized long-standing Indigenous land-use methods like controlled burning for soil enrichment, forest grazing, and wild plant gathering. This was further reinforced by repressive laws, including the 1874 collective liability law on fires, the 1885 ban on underbrush clearing and grazing, and the 1903 law permitting expropriation for reforestation, all of which severely restricted local communities' access to essential resources (Davis 2013). The impact of colonialism on Algeria's ethnobotanical heritage continues to resonate today through the abandonment of local plant varieties and traditional practices, the homogenization of plant resources, and the erosion of cultural diversity. Additionally, younger generations are increasingly disconnected from ancestral knowledge, now often dismissed as outdated in the face of imported modern technologies.

CONCLUSION

By the end of the 19th century, the ethnobotanical knowledge of Indigenous Algerians reflected a deep and resilient connection between humans and their environment, evident in the diversity of plant species used, the complexity of prescribed therapeutic formulas, the craftsmanship of tools, and a wide range of daily applications. In the decades that followed, Western civilization increasingly permeated Indigenous Algerian communities, gradually severing this bond and leading to the loss of traditional practices, plant varieties, handmade tools, and ancestral oral knowledge. Under more supportive and respectful conditions, this rich heritage could have been preserved, enhanced, and integrated into modern contexts. Reviving and revalorizing this knowledge today would not only serve cultural and scientific purposes but also offer meaningful opportunities for sustainable development through tourism and ethnobotanical gardens.

Declarations

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