Traditional use of lentisk pistachio in Algeria

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Contexte

43% of the EU surface is covered by forests and wooded areas. These surfaces constitute a set of fragile ecosystems that contribute to the fight against global warming. When managed sustainably, they are a major source of wealth and provide people with many services. Wood is the forest product that comes to mind spontaneously, but forests provide a whole variety of non-timber forest products (NTFPs), such as cork, resins, and edible products such as nuts, mushrooms and truffles.

These NTFPs play an important role in improving the livelihoods of people living near forests who are involved in their harvesting, processing and trade.

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Plan

1. **Ecological and botanical properties**
2. **Traditional use of lentisk pistachio**

2.1. Traditional oil production process

2.2. Ethnobotanical uses of the different organs

3. **Valuation**

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1. Ecological and botanical properties

Consists of a brief overview of the distribution of the plant in Algeria; and the main botanical properties that characterize the species

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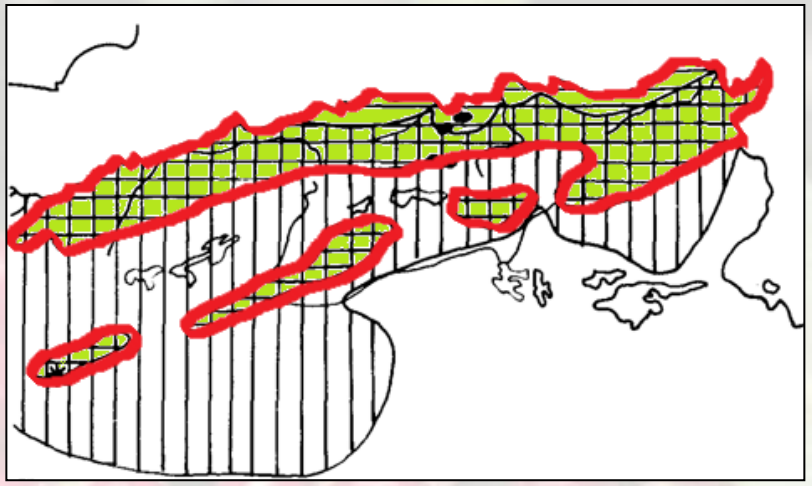
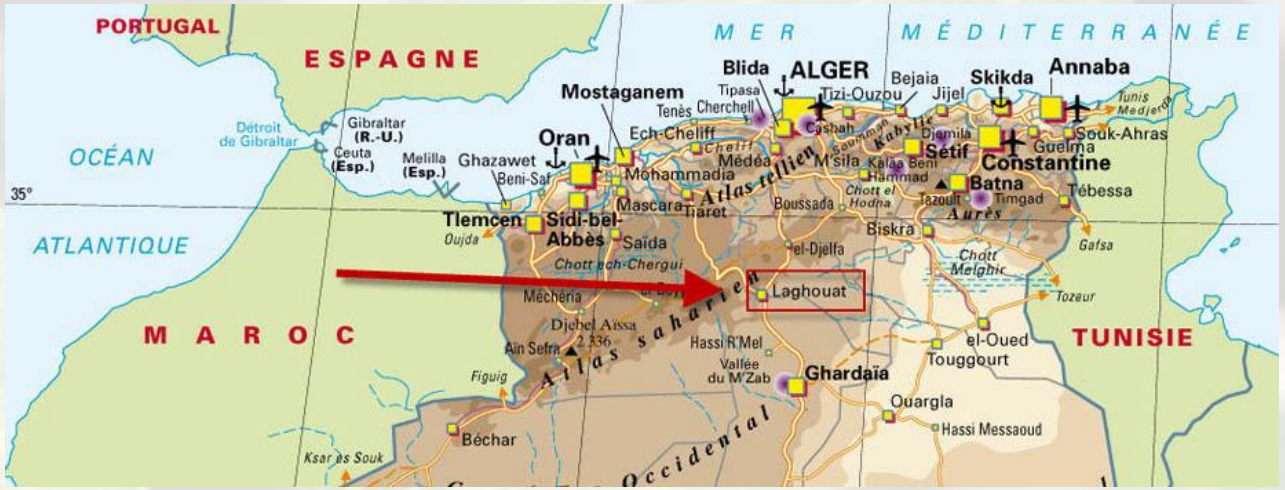
Distribution



Distribution area of *P. Lentiscus* L. in Algeria and Tunisia (Quezel and Santa, 1963 modified).



The plant extends to the south of the Saharan Atlas (in the Laghouat Region. Inventory of Floristic Species of Laghouat, 2015, Conservation des Forets Laghouat)

http://jevisitelalgerie.com/index.php/m-les-wilayas/112-free-

A species with an important ecological valence: survive in the Littoral and Tell (Humid and Subhumid), in the Highlands (Semi-arid) and in the Sahara (Arid)

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Biotope

Under cork oak
(in a cork forest)

Very abundant in Maquis

Mixed stand of cork oak and eucalyptus

Pistacia lentiscus-Eucalyptus globulus association
(phytotoxic species) ⟹ positive allelopathy

Matorral

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Regeneration

Natural regeneration by sowing
(At the base of a wall)

Regeneration by seedling

Vegetative and sexual multiplication

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Reproduction

Male and female flowers are borne by different plants

male plant: flowering twigs

female plant: fruiting twig

Dioecious plant

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Polymorphism

important polymorphism (Juvenility phenomena!)

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Maturity and Fructification

Berry cluster peduncle attachment points:
Fruiting age: 13 years (Sebti, 2016)

According to the bibliography, Fructification of *P. Lentiscus* takes place between 10 and 15 years

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2. Traditional use of lentisk pistachio

An overview resulting from several ethnobotanical and pharmacological surveys, from which different methods are mentioned

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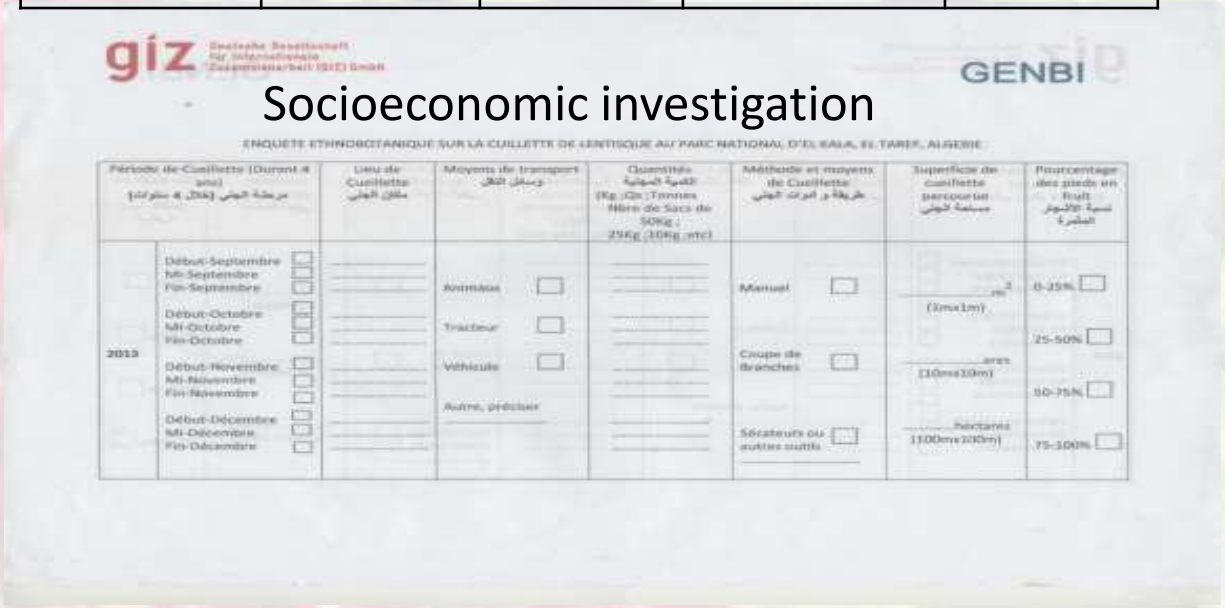
Investigation

Etnopharmacological investigation

Disease	Used part of the plant	Method of preparation	Administration mode	Treatment Period

Socioeconomic investigation



ENQUETE ETHNOBOTANIQUE SUR LA CUILLETTE DE LENTISQUE AU PARC NATIONAL D'EL KALA, EL TARF, ALGERIE

Période de Cueillette (Durant # ans) فترة الجني (خلال # سنوات)		Lieu de Cueillette مكان الجني	Moyens de transport وسائل النقل	Quantités الكمية المجنية (Kg ;Qx ;Tonnes Nbre de Sacs de 50Kg ; 25Kg ;10Kg ;etc)	Méthode et moyens de Cueillette طريقة و أدوات الجني	Superficie de cueillette parcourue مساحة الجني	Pourcentage des pieds en fruit نسبة الأشجار المثمرة
2013	Début-Septembre Mi-Septembre Fin-Septembre Début-Octobre Mi-Octobre Fin-Octobre Début-Novembre Mi-Novembre Fin-Novembre Début-Décembre Mi-Décembre Fin-Décembre		Animaux Tracteur Véhicule Autre, préciser		Manuel Coupe de Branches Sécateurs ou autres outils	m² (1mx1m) ares (10mx10m) hectares (100mx100m)	0-25% 25-50% 50-75% 75-100%

Free survey / Snowball / Questionnaire sheet / Interview / Testimonials. With adults and the elderly living in rural and peri-urban areas (Helal, 2021; Sebti, 2020; Sebti, 2016)

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Nom français	(N%)	Nom scientifique	Partie utilisée	But d'utilisation
Lavande	**(35)**	*Lavandula stoechas L.*	Sommités fleuries	Calmant, maladies respiratoires
Origan	**(33)**	*Origanum sp*	Plante entière	Douleurs abdominales
P.Lentisque	**(65)**	***Pistacia lentiscus L.***	**Oil, Berries, Leaves, Wood, Resin**	**Healing, Digestion, decongestant, Skin.**
Myrte	**(41)**	*Myrtus communis L.*	Tige	Tension artérielle
Ail Triquètre	**(12)**	*Allium triquetrum*	Plante entière	Diarrhée et intoxication
Sarriette	**(35)**	*Calamintha hispidula*	Feuilles, Tige	Cicatrisant l'ulcère et plaie
Consoude	**(26)**	*Pulicaria odora*	Feuilles, sommités fleuries	Articulations et muscles
Menthe F Rondres	**(4)**	*Mentha rotundifolia*	Plante entière	Calme la toux
Menthepouliot	**(10)**	*Mentha pulegium*	Feuilles, Tiges	Irritations cutanées
Achilée	**(8)**	*Achilea sp*	Feuilles, Graines	Fortifiant
Laurier sauce	**(4)**	*Laurus nobilis*	Feuilles	Grippe, Rhume
Eucalyptus	**(8)**	*Eucalyptus sp*	Cônes	Hémorroïdes
Cyprès	**(2)**	*Cupressus sempervirens*	Plante entière	Tension artérielle, Estomac
Marrube	**(2)**	*Marrhubium vulgare*		

Those most frequently used across the study region, namely: **65% for Pistachio mastic : *Pistacia lentiscus* L.)**; 41% for Myrtle: *Myrtus communis* L., 35% for Lavender: *Lavandula stoechas* L. and 35% for Savory: *Calamintha hispidula* (Boissier & Reuter) M. and *Calamintha baborensis* Batt. Briq. (Sebti, 2020).

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Forêt Modèle de Provence

2.1. Traditional oil production process

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Picking drupes

Vernacular names of the plant: Godhime (Center); gadhoum (Extreme East); dro or tro (East); Amadagh (Kabyle)

Manual picking at National Park of El Kala (PNEK) where women are the main players in the sector (GIZ/GENBI, 2016)

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Other methods of picking drupes

Pole picking

Destructive cuts

Wood dieback

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Traditional method lentisk oil extraction (GIZ/GENBI, 2016)





Long and painful traditional process with a low yield (closed to 5%)

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Ancestral belief Slogon ≃ lentisk pistachio bears fruit one year over two year!

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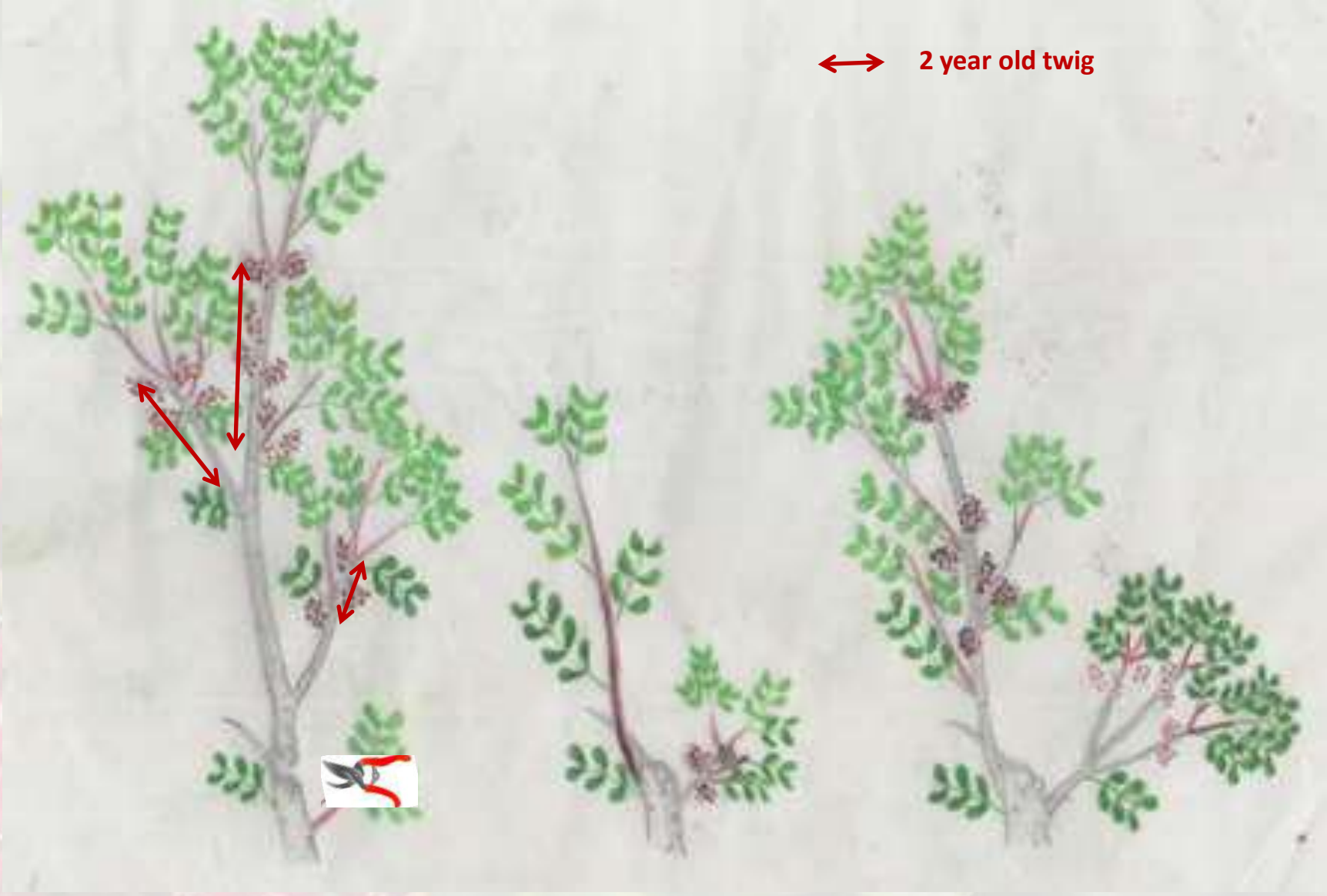
Forêt Modèle de Provence



First year (cutting) Second year (shoot rejection) Third year (fruit)

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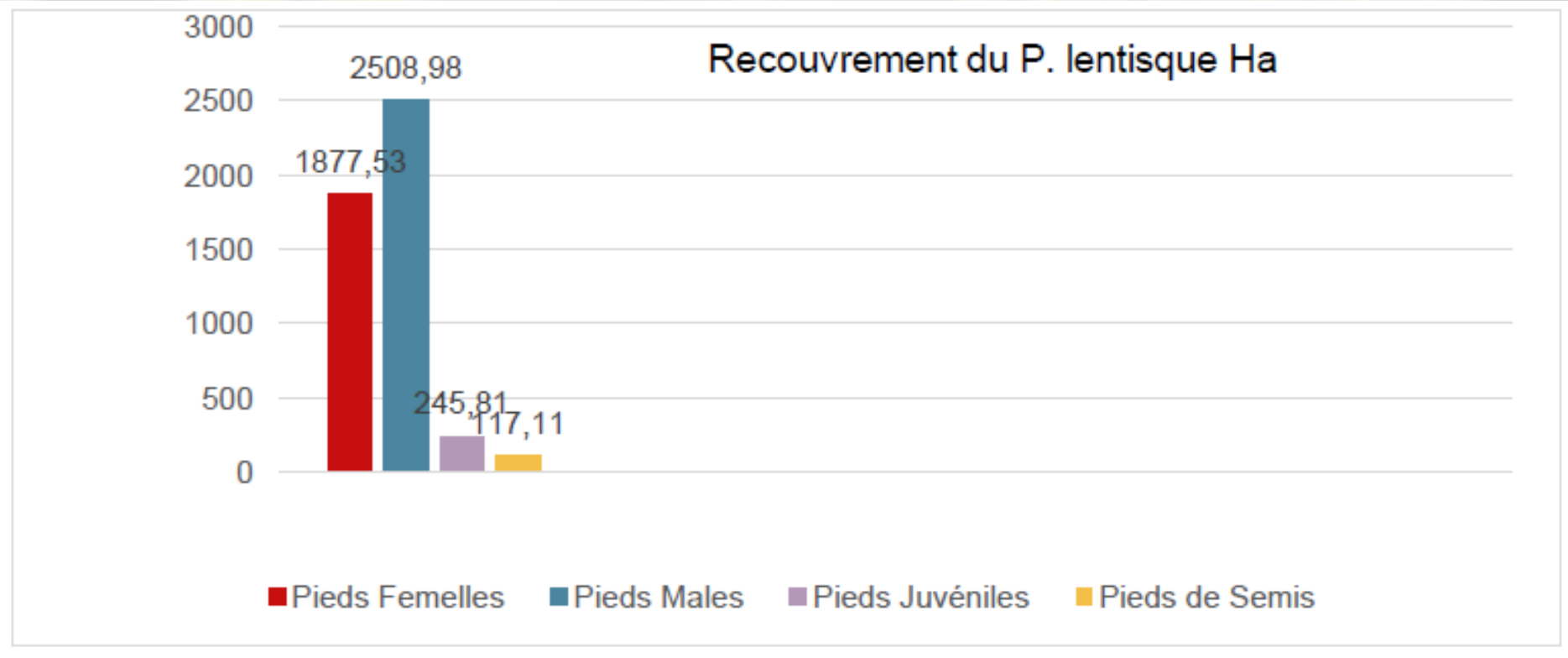
Forêt Modèle de Provence

Coverage and inventory foot by foot (El Kala)



Consequence of destructive cuts: Male plant > female plant (Sebti, 2016)

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Production and yield

Mastic pistachio cover

Fruit production:
Biomass berries Bb = 0.245 Kg / m2

Oil: Yield 20% (Nabati Society)

With modern equipment and good practices, efficiency increases

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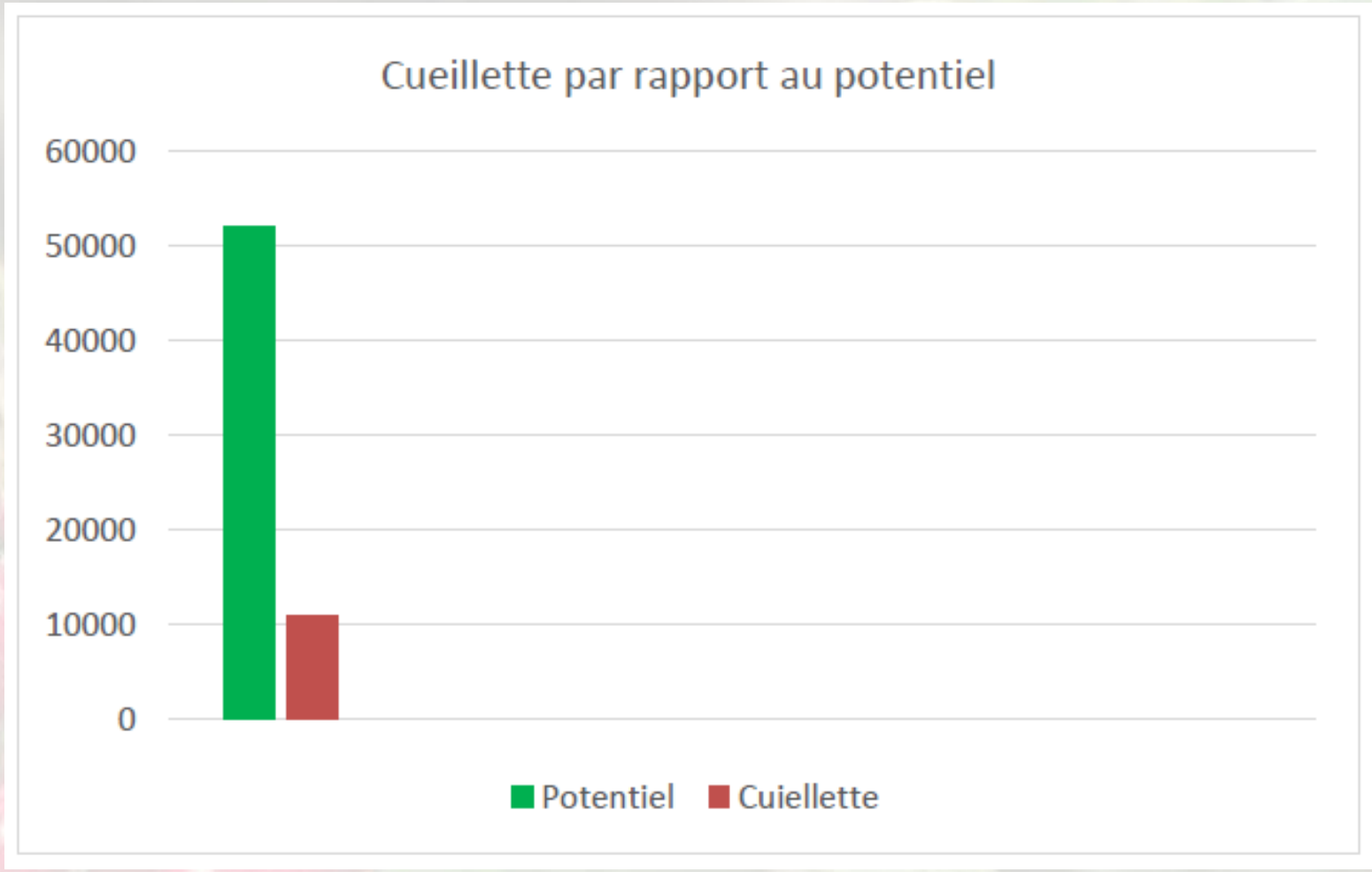
Production potential



Harvest vs. **production potential** (Sebti, 2016)

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2.2. Ethnobotanical uses of the different organs

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Fresh leaves

Leaf scented drinking water against bloating

Leaf macerate for watering poultry against avian influenza

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Fresh leaves

Twig in whey

Twig in curdled milk

Preservative / Improves organoleptic / hygienic quality

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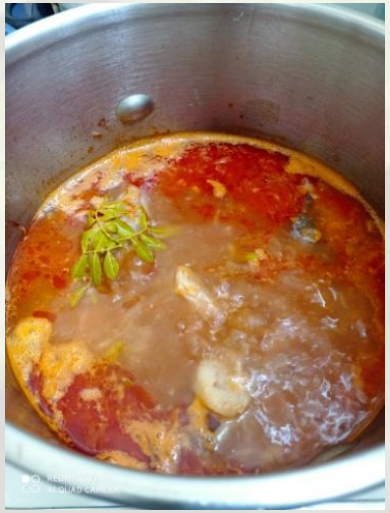
Fresh leaves

Other uses related to the circumstances of war: Substitute for cooking salt (NaCl) and rinsing pottery

Fresh branch for desittering of the acorns of *Q. suber* L. (Sebti, 2017)

Culinary dish seasoned with fresh leaves



Branch = Salt (Na Cl) (substitute salt)

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Fresh leaves

Fresh branch = Alum KAI (SO4) 2.12H2O ➡ astringent

Alum substitute as a color fixer for clothes

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Fresh leaves

Twig tuft for shower and bath used as a vegetable sponge and soap

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Fresh leaves

Hot water

https://materiel.hellopro.fr/fut-metallique-a-ouverture-totale-gris-213-l-502818-3005679-produit.html

Leaves

Bath → Scabies

https://www.mpedia.fr/art-gale/

7 leaves to rub on the wart

https://www.consoglobe.com/17-secrets-anti-verrues-cg

Rinsing with macerate → acne

http://jeunesse-eternelle.net/acne-voici-le-meilleur-traitement/

Skin diseases: scabies, acne and warts

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Fresh leaves

Fresh leaves and ash
of fig or olive wood

Dry distillation

Solution obtained by dry distillation is used as Champoings

https://youtu.be/pSWd7mwnC3Q

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Forêt Modèle de Provence

Why Fresh leaves !

Olfactory test

Spieces	*C. hispidula*		*C. baborensis*		*L. stoechas*		*M. communis*		***P. lentiscus***	
Status of Leaves	FL	DL	FL	DL	FL	DL	FL	DL	**FL**	**DL**
Smell	+	+	+	+	+	+	+	+	+	-

FL: Fresh Leaves, DL: Dead Leaves

Rapid loss of smell

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Essential oil storage sites (Sebti, 2020)

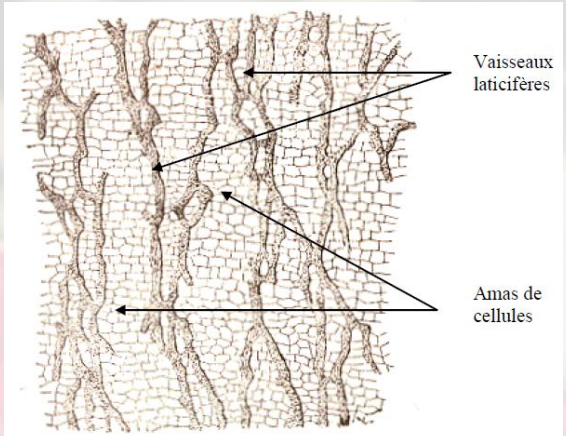

Fig. 11 Réseau de vaisseaux laticifères (Scorsonère)

Laticifers

Laticifers come in the form of single cell laticifers or multicellular laticifers. Those of the first type, according to Pizon (1934), consist of plurinucleated cells which have developed between tissues throughout the length of a plant, producing ramifications here and there, and which come from a single initial cell. The multicellular laticifers are formed by series of cells, arranged either in rows or in a network (Fig. 11).

Lysigenic glandular canals

Pistacia lentiscus L. (Anacardiaceae) stores and decrees its essential oils in lysigenic glandular ducts (Fig. 23). Glandular canals are found in all coniferous woods and in particular in Abietaceae and Cupressaceae; maritime pine is an example. The following families also contain species with this type of gland: the Apiaceae (the fruits), the Dipterocarpaceae, the Burseraceae and the Anacardiaceae (Garneau, 2001).

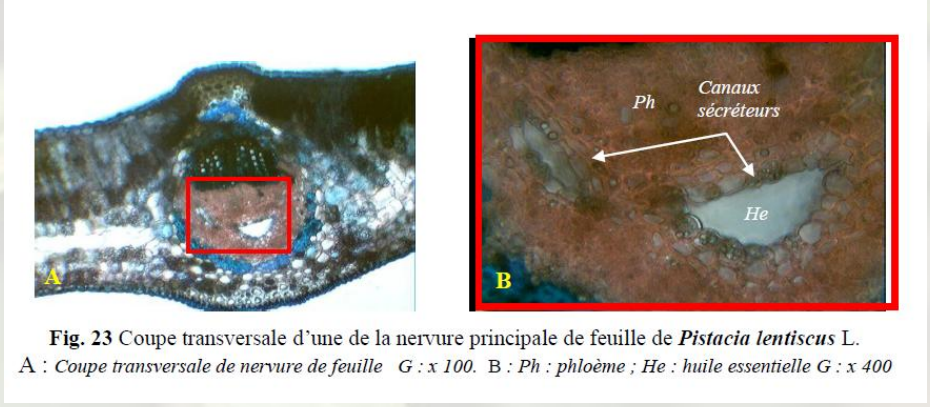

Fig. 23 Coupe transversale d'une de la nervure principale de feuille de ***Pistacia lentiscus*** L.
A : *Coupe transversale de nervure de feuille G : x 100.* B : *Ph : phloème ; He : huile essentielle G : x 400*

The Essential Oils would be mixed with the resin and stored in the resin channels

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Resin

Resin Chewing

- Bad breath, lung and respiratory diseases
- Diabetics

Bride gift

- Hygiene and Treatment
- Perfume
- Jewelry

Valuable product → Vegetable gold

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Wood

https://www.frederiqlouvet.com/2020/07/histoire-deau-le-sourcier/

Y-shaped fresh wood for detecting groundwater by dowsers

Wood ash

(for its basic pH)

http://2.bp.blogspot.com/-kSpM5WFrmLA/TzPaQgeWgII/AAAAAAAACjY/j3gI7afwBUA/s1600/100_5017.JPG

Ash soap

Analyse de tabac | UFAG Laboratorien AG

Chewing tobacco

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Fruits

- Meslouk and cherchem (traditional dish)
- As an appetizer (fresh fruit, digestible)

Sale of ripe berries in the market

Meslouk and cherchem (traditional dish, Agence de tourisme, Jijel)

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Vegetable oil

Not a single family does not have lentisk oil in their home for the following uses:

- Colyre
- Healing
- Against burns (analgesic and healing)
- Anti inflammatory
- Anti alergizing
- Against sunburn
- Youth button

First degree burn after a week

The fixed oil extracted from the ripe fruits (berries) of *Pistacia lentiscus* is the main product Advantage: whatever the sandstone burn, this oil does not leave a scar The main use in Algeria: against burns

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3. Valuation

The plant is used for several purposes and deserves to be studied for its many virtues and for optimal use

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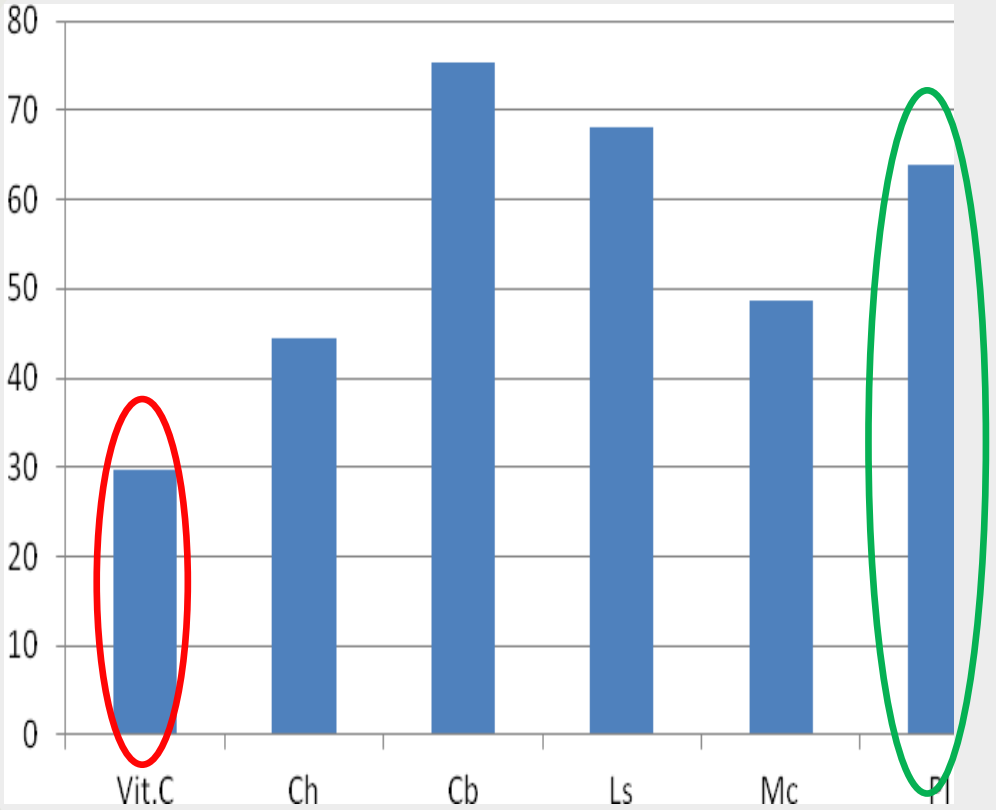
Toxicity and antioxidant activity of Essential Oils (Sebti et al., 2020)

Toxicité Cutanée		15 Min	24H	48H	72H
	M. communis	**Démangeaison**	Négatif	Négatif	Négatif
	P. lentiscus	**Itching Démangeaison**	**Negative Négatif**	**Negative Négatif**	**Negative Négatif**
	C. baborensis	**Démangeaison Irritation Inflammation**	**Inflammation Irritation**	**Irritation**	**Irritation**
	C. hispidula	**Démangeaison irritation**	**Irritation**	**irritation**	**irritation**
	L. stoechas	Négatif	Négatif	Négatif	négatif



Recommendation: use of diluted Essential Oils

Essential oil a good food and cosmetic preservative

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Major compounds in essential oils (Sebti, 2020)

The essential oils of P. lentiscus are characterized by 12 compounds, the majority of which is **O-Cymene** and represents the largest proportion which is **22.94%** followed by **Menthone (12.09%), β- pinene (10.35 %), α-pinene (9.41) and α- Farnesene (9.22)**. β- myrcene (7.69%), trans-pinocarveol (6.86%), limonene (6.34%), pulegone (5.29%) and verbenone (4.45%).

Composants	Pourcentages %	IR
α-pinene	9.41	972
β-pinene	10.35	993
β-myrcene	7.69	1004
O-cymene	22.94	1022
Limonene	6.34	1029
Hexanoic acid 2-methyl-	3.19	1111
Trans-pinocarevol	6.86	1115
Menthone	12.09	1139
4-terpineol	2.17	1163
Verbenone	4.45	1170
Pulegone	5.29	1302
α-Farnesene	9.22	1350

Aromatherapy

Alfa and beta Pinene: decongestant

Biological control

Alfa- farnasene : Aphid pheromone

Can be valued in different fields: food, cosmetics, pharmaceutical and pharmaceutical

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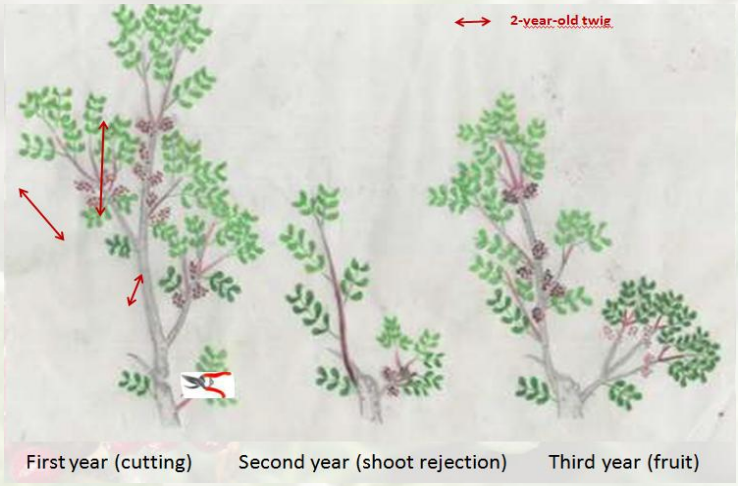
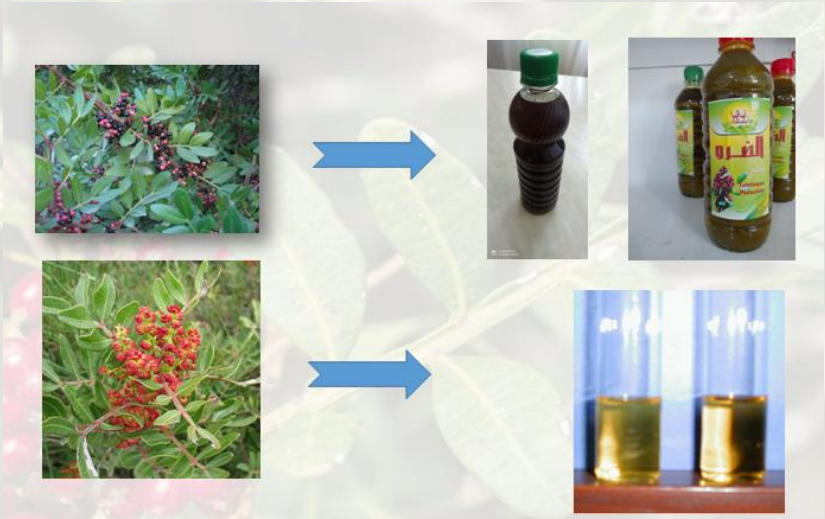
Training and sensitization of rural women

(Sebti, 2016)

Training, Extension, Awareness



Good practices



Female plant for fixed oil and male plant for essential oil

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Value chain development

(Benguedouar et Sebti, 2018; Sebti, 2016)

Domestic activities to strengthen the capacities of rural women

Demonstration exhibition

Ash soap

With lentisk paste

scented candles with essential oil of mastic pistachio

Fixed oil + essential oil

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Conclusion

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- The traditional use and the preservation of ancestral knowledge of the *Pistacia lentiscus* tree would be linked to the abundance of the plant: widely used in the east, moderately in the center, little in the west and rare in the south
- Fixed oil or Lentisk oil remains the main product used against burns and as antiallergenic
- It is a generous plant: all its parts can be used
- The plant giving the fruit is exploited in a fallacious way, even overexploited
- There are more male plant than female plant, due to the poor management of the plant
- It can contribute in the development of several fields.

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