Socio-economic value and ethnobotanical study of Moroccan wild *Leopoldia comosa* L. Parl. bulbs

Mohamed Boulfia, Fatima Lamchouri, Nacima Lachkar, Abdelmajid Khabbach, Abdelouahab Zalaghi and Hamid Toufik

Abstract

Background: *Leopoldia comosa* (L.) Parl. (Syn. *Muscari comosum* (L.) Mill.), or Toupee *Muscari* is a perennial in the *Asparagaceae* growing in Morocco and the Mediterranean area. In the Moroccan Rif mountains, it is found in significant quantities. In the spring, large quantities of the plant are marketed weekly in the souks (weekly markets) for export abroad, mainly to Italy. Little research has been conducted on the species and its trade-in Morocco or other southern Mediterranean countries. Given the lack of information about this plant, this study aims to reveal for the first time the socio-economic value and ethnobotanical data of this species in Morocco.

Methods: Socio-economic and ethnobotanical data were collected from March 2018 to May 2019 by direct interviews with vendors and wholesalers of the plant using a designated questionnaire in seven municipalities (Aknoul, Meknassa Acharqia, Bab Marzouka, Bni Lent, Ras-El-Ma, Meknassa Al Gharbia, Oued Amlil) of the Province of Taza-Morocco.

Results: The results of the surveys revealed that Moroccan *L. comosa* bulbs are commonly known as "Bassila," and represent an important source of income for vendors and wholesalers. The profit varies from 7 MAD / 0.64 € per kg of fresh bulb to 3 MAD / 0.27 € per kg of fresh bulb for vendors and wholesalers respectively. Locally, the bulbs are used in the treatment of dermatological affections and digestive disorders.

Conclusions: *L. comosa* bulbs represent an important source of income for the population and a promising source of bioactive molecules to treat different diseases.

Keywords: Income; Interviews; Questionnaire; Wholesalers; Province of Taza - Morocco.

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Ethnobotany Research & Applications
20:05 (2021)

Résumé

Contexte: *Leopoldia comosa* (L.) Parl. (Syn. *Muscari comosum* (L.) Mill.), ou *Muscari* à toupet est une plante vivace de la famille des *Asparagacées* qui pousse au Maroc et dans la zone méditerranéenne, on la trouve dans les régions du Rif avec des quantités importantes. Au printemps, de grandes quantités de la plante sont commercialisées chaque semaine dans les souks (marché hebdomadaire) pour une exportation à l'étranger, principalement vers l'Italie mais aucune étude scientifique n'a été menée sur celle-ci ni au Maroc ni dans les pays méditerranéens sud. Vu le manque d'informations sur cette plante, la présente étude vise à révéler pour la première fois la valeur socio-économique et les

Manuscript received: 22/10/2020 - Revised manuscript received: 26/12/2020 - Published: 02/01/2021

http://dx.doi.org/10.32859/era.21.05.1-17

données ethnobotaniques des bulbes de *Leopoldia comosa* L. Marocaine.

Méthodes: Les données socio-économiques et ethnobotaniques ont été recueillies de Mars 2018 à Mai 2019 par des interviews face à face avec les exploitants et les grossistes de la plante en utilisant une fiche questionnaire dans sept communes (Aknoul, Meknassa Acharqia, Bab Marzouka, Bni Lent, Ras-El-Ma, Meknassa Al Gharbia, Oued Amlil) de la Province de Taza - Maroc.

Résultats: Les résultats des enquêtes ont révélé que *Leopoldia comosa* marocaine communément appelée «Bassila» constitue une source importante de revenus pour les exploitants et aussi pour les grossistes et que ces revenus varient de 7 MAD / 0,64 € par kg de bulbe frais à 3 MAD / 0,27 € par kg de bulbe frais pour les vendeurs et les grossistes respectivement. Localement, les bulbes sont utilisés dans le traitement des affections dermatologiques et des troubles digestifs.

Conclusion: *Leopoldia comosa* représente une source importante de revenus pour la population et une source prometteuse des molécules bioactives pour traiter différentes maladies.

Mots-clés: Revenu ; Interviews ; Questionnaire ; Grossistes ; Province de Taza - Maroc.

الملخص:

السياق: *Leopoldia comosa* (L.) Parl. مرادف *Muscari comosum* (L.) Mill.أو *Muscari à toupet* هو نبات معمر من فصيلة *Asparagaceae* التي تنمو في المغرب ومنطقة البحر الأبيض المتوسط، وتوجد بكميات كبيرة في مناطق الريف. في الربيع، تُباع كميات كبيرة من هذه النبتة كل أسبوع في الأسواق (الأسواق الأسبوعية) للتصدير للخارج، بشكل أساسي نحو إيطاليا، ولكن لحد الآن لم يتم إجراء أي دراسة علمية عنها سواء في المغرب أو في دول جنوب البحر الأبيض المتوسط. نظرًا لقلة المعلومات حول هذا النبات، تهدف الدراسة الحالية إلى الكشف لأول مرة عن القيمة السوسيواقتصادية وسرد المعطيات الإثنوبولوجية لـ *Leopoldia comosa*المتواجدة بالمغرب.

الأساليب: تم جمع البيانات السوسيواقتصادية والإثنوبولوجية من مارس 2018 إلى مايو 2019 من خلال مقابلات مباشرة مع مستخدمي وبائعي النبتة بالجملة وذلك باستخدام استبيان على مستوى سبع بلديات (أكنول، مكناسة الشرقية، باب مرزوقة، بني لنت، رأس الماء، مكناسة الغربية، واد امليل) تنتمي إلى إقليم تازة - المغرب.

النتائج: كشفت نتائج الاستطلاعات أن *Leopoldia comosa* المغربية المعروفة باسم "بصيلة" تشكل مصدر دخل مهم لمستخدمي النبتة وكذلك لتجار الجملة. يتراوح الربح من 7 دراهم/ 0.64 يورو لكل كيلوغرام إلى3 دراهم من النبتة الطرية للبائعين وتجار الجملة على التوالي. محليا، تستخدم النبتة لأهداف طبية خاصة لعلاج الأمراض الجلدية واضطرابات الجهاز الهضمي.

الخلاصة: تمثل *Leopoldia comosa* مورد دخل مهم للسكان المحليين ومصدرًا مهما للجزيئات النشطة بيولوجيًا لعلاج الأمراض المختلفة.

الكلمات المفاتيح : الدخل ؛ مقابلات؛ استبيان؛ تجار الجملة؛ إقليم تازة - المغرب.

Background

Leopoldia comosa L. of the *Asparagaceae* family is a wild, perennial plant that regenerates from a bulb and is native to the Mediterranean region (Casoria *et al.* 1999, Casacchia *et al.* 2017). In Morocco, the plant is widely distributed, commonly known as "Bassila" with geographic dominance in the Rif and Middle Atlas regions (Valdés *et al*. 2002). During the spring period, large quantities of the plant are transported weekly in the souks (weekly market) for marketing and export abroad, mainly to the Italian market (Khabbach *et al.* 2012).

According to our bibliographical research, no scientific studies have been carried out on *Leopoldia comosa* in Morocco or other southern Mediterranean countries. The only works we identified were from Italy where Casoria *et al.* (1999) reported *L. comosa* as one of the wild plants most used in the food habits of the population of southern Italy and that the bulbs have diuretic and astringent proprieties (Casoria *et al.* 1999). In 2012, Bonasia and collaborators reported *L. comosa* as is part of the diet and is used in traditional medicine in the treatment of gastronomic problems in the South. In the past in Italy, the bulbs were mainly taken from wild populations, but nowadays, the expansion of agriculture and the increased costs in harvesting have favored the import of the bulbs, mainly from North Africa and especially from Morocco and Tunisia (Bonasia *et al*. 2012).

Today, there is a progressive awareness of the medical and economic potential of natural resources. Morocco and more particularly the province of Taza is characterized by a rich floristic and natural phytodiversity, which makes the province a subsistence economy zone through the commercialization of some products such as *Origanum* spp, *Ziziphus* spp, and *Capparis spinosa* L. (Khabbach *et al*. 2012). Within the framework of the valorization of the plants of origin of Taza, we have chosen for the present study, *Leopoldia comosa*, a very abundant plant in our study area but few studies on this plant.

This study aims to assess for the first time the socio-economic value and ethnobotanical data of this plant using a questionnaire which contains two parts, the first deals with the medicinal aspect of the plant such as the part used, method of use and preparations, nutritional value, the dose used and the main diseases treated and the second the socio-economic aspect which was concerning the sale price in kg, the quantity of the plant sold per year, the quantity of the

plant harvested per day or per week, number of employees per household and total income per year.

Material and Methods

Socio-economic and Ethnobotanical Data Collection

Socio-economic and ethnobotanical data of *Leopoldia comosa* (L.) Parl. (Fig. 1) were collected from March 2018 to May 2019 in seven municipalities (Aknoul, Meknassa Acharqia, Bab Marzouka, Bni Lent, Ras-El-Ma, Meknassa Al Gharbia, Oued Amlil) of the Province of Taza (Geographical coordinates: N 34°13'56.0" W 3°59'50.4", Altitude 421 m) which is located in the North East of Morocco (Fig. 2). The Province has 38 municipalities and is bordered to the North by the Provinces of Al Hoceima and Driouch, to the South by the Province of Sefrou, and to the West by the Province of Taounate. At the northernmost tip of the Middle Atlas Mountains, close to Taza, extends the Tazekka National Park, gazetteer in 1950, and extending over a length of 50 km and a width of 15 km (Fig. 2). The choice of study stations was made following the recommendations of the population, regarding the abundance of this plant in these municipalities.

The study was conducted in the form of questionnaire-guided interviews (Appendix 1) consisting of both closed and open-ended questions which we have prepared regarding previously conducted studies and which aims to collect information on the interviewees (age, sex, level of education, ethnic group, profession, family situation); vegetable species and/or plant (vernacular names, type of plant: wild or cultivated, harvest season, etc); medicinal aspect of the plant such as the part used, method of use and preparations, nutritional value, the dose used and the main diseases treated (Heinrich *et al*. 2009, Zahoor *et al.* 2017). Information about socio-economic value was concerning the sale price in kg of fresh bulb of *L. comosa*, the quantity of the plant sold per year, the quantity of the plant harvested per day or per week as presented in previous works (Gharnit *et al.* 2006, Baydoun *et al.* 2017), number of employees per household, and total income per year (Appendix 1).

As there is a diversity of local dialects in the study area: tribes (Ghiata, Tssoul, Branés) who speak the Moroccan Arabic dialect called "Darija" or Amazigh who speak one of the 3 Amazigh dialects ("Tamazight", "Tarifit" and "Tachelhit or Tasousit"). The interviews were conducted through a local translator knowledgeable in both Arabic or Amazigh dialects for respondents who cannot use either the Arabic or French survey form.

Respondents were informed of the objectives of the study and the fact that the information collected will be posted for scientific and non-commercial purposes and thus agreed to participate in the survey.

Plant Material

Leopoldia comosa (L.) Parl. (Fig. 1) were harvested in the province of Taza (Morocco) (Fig. 2) during the spring, March 2018, and the plant was identified by Dr. Abdelmajid Khabbach, the botanist of the Laboratory of Natural Substances, Pharmacology, Environment, Modelling, Health & Quality of Life (SNAMOPEQ), Polydisciplinary Faculty of Taza (FPT), Sidi Mohamed Ben Abdellah University of Fez, Morocco. A voucher specimen was deposited in the herbarium under the code SA 2018/05.

Statistical analysis

Descriptive statistics were used to summarize the data. Frequencies were expressed as the number and percentage of vendors.

Results

Socio-economic and Ethnobotanical Data of *Leopoldia comosa* bulbs

Socio-demographic Characteristics of the Respondents

During this study, a total of 100 people were interviewed in seven municipalities (Aknoul, Meknassa Acharqia, Bab Marzouka, Bni Lent, Ras-El-Ma, Meknassa Al Gharbia, Oued Amlil) of the Province of Taza, Morocco chosen according to the abundance of the plant in these municipalities. The interviewees included 85 vendors and 15 wholesalers or “Jemmalla” (Table 1). Demographic characteristics of the respondents were determined and recorded through face-to-face interviews. All the interviewees were men because we have not met any woman who participates in the marketing of this plant, with an average age of 32 years, and with a primary education level of 38%, secondary education of 39%, and 23% for illiterate people.

The number of respondents per municipality depends on the quantity of the plant produced in each municipality and the demand for the plant by the wholesalers or "Jemmalla" of that plant.

Socio-economic Value of Leopoldia comosa bulbs

To assess the socio-economic value of *L. comosa*, we conducted a survey with local vendors and wholesalers during the plant's harvest period. Interviews focused on the selling price of the raw material in kilogram (kg), the quantity of the plant sold per week, and the total revenue per week. Table 2 shows the results of the economic value of *L. comosa*

Figure 1. a. *Leopoldia comosa* L. Parl in the souk (weekly market); b. Bulbs dried at the SNAMOPEQ Laboratory, FPT, USMBA; c. Herbarium sample; d. Peeled bulbs in SNAMOPEQ Laboratory. Photos are taken in March 2018 in Taza, Morocco (Geographical coordinates: N 34°13'56.0" W 3°59'50.4", Altitude 421 m).

Table 1. Sociodemographic characteristics of respondents (n = 100) in the Province of Taza - Morocco.

Characteristics	Frequency
Gender	
Male	100
Female	0
Educational level	
Illiterate	23
Primary school	38
Secondary school	39
Age	
17-39	77
Over 40	23

In this regard, our study showed that the quantity of the plant harvested varies according to age; a young person can harvest up to 100 kilograms per week, given the physical effort of harvesting, and this quantity also varies according to the wholesalers and vendors of the plant in the souks. Wholesalers or "Jemmala" buy the plant in the souks and douars and trade it through intermediaries from Taza, towards mainly the city of Oued Zem which is located in the center of Morocco, roughly 300 km from the place of origin. In Oued Zem, small-scale factories carry out the cleaning of the residues of soil and sand that surround the bulbs, the sorting of the bulbs that are going to be peeled, and the separation of the bulb from the stem, and finally the packaging for export abroad, mainly to Italy.

The standardization of the price has been done by converting the price in dirham for one kilogram to Euro (€) according to international standards (www.xe.com). The unit price of *L. comosa* was estimated at 7 MAD per kg (0.697 €/kg) for vendors and 10 MAD per kg (0.91 €/kg) for wholesalers. According to the surveys, the evolution of the market depends on the rate of annual precipitation; if the rate of precipitation is higher, so the production of the plant also is higher, consequentially the price selling of *L. comosa* bulbs decrease.

According to Table **2**, the total profit varies from 413 MAD / 38 € per collected quantity/week to 2860.5 MAD / 263.16 € per selling quantity/week for vendors and wholesalers respectively.

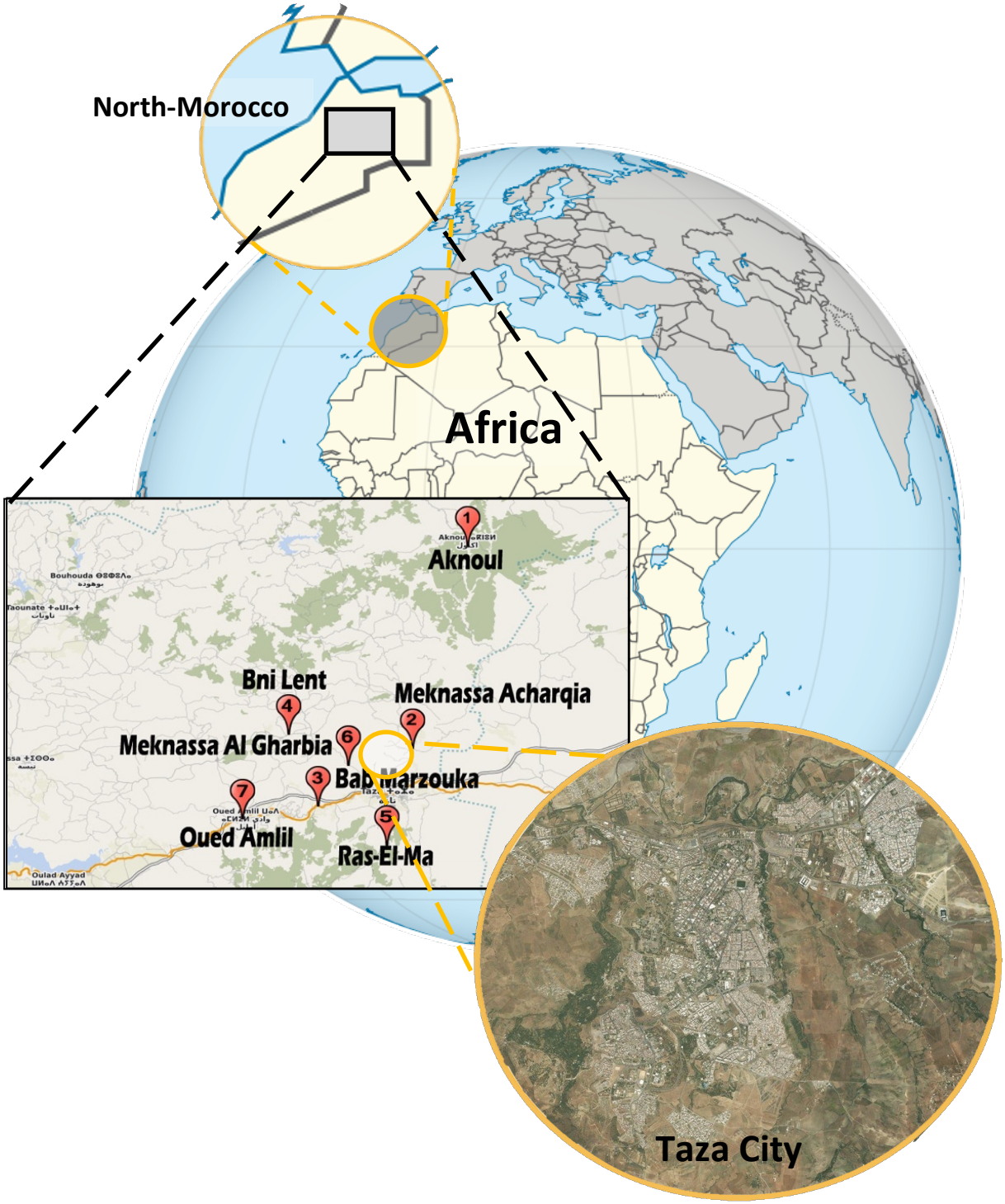

Figure 2. Geographic representation of the area study and map depicting the municipalities of the survey in the Province of Taza – Morocco (Basemap source).

Table 2. Socio-economic data of *Leopoldia comosa* bulbs in the Province of Taza - Morocco.

Economic value	**Vendors (Collectors)**	**Wholesalers**
Average quantity sold per week in kg	59	953.5
Selling price per kg	7 MAD / 0.64 €	10 MAD / 0.92 €
Cost price per kg	0	7 MAD
Cost price per week	0	953.5 kg * 7 MAD = 6674.5 MAD/ 614.05 €
Total profit per week	59 kg * 7 MAD = 413 MAD / 38 €	(953.5*10) - (953.5*7) 2860.5 MAD / 263.16 €

- Kg: Kilogram; MAD: Moroccan dirham; €: Euro.
- Values in the table are expressed by calculating the average for each parameter.

Ethnobotanical Data of Leopoldia comosa bulbs

The abundant trade of *L. comosa* in the local markets of the Province of Taza prompted us to research the medicinal value of this plant-based on a questionnaire which includes information on the part of the plant used, the method of preparation, and the diseases treated.

All respondents (n=100) reported the economic value of *L. comosa* (100%). 33% of the population surveyed revealed the therapeutic effect in addition to the economic value of the plant and 10% mentioned that the gel of *L. comosa* bulbs is used in sticking.

The part of the plant used is the bulb in the form of poultice and infusion to treat dermatological affections and digestive disorders respectively.

24% of the population uses the plant to treat dermatological affection and 13% for digestive disorders.

Discussion

Socio-economic and Ethnobotanical Data of *Leopoldia comosa* bulbs

The results of the present study highlight the socio-economic value and ascribed medicinal properties of the plant in Morocco. The results of the surveys reveal that *L. comosa* bulb is used to treat dermatological affections and digestive tract disorders. These results are in agreement with Pieroni *et al.* (2002) which reported that *L. comosa* bulb is used in Italy in the treatment of gastronomic problems. Casoria *et al.* (1999) reported that *L. comosa* bulb has a diuretic and astringent effect, and also a veterinary use as a revulsive if bulbs are mixed with pepper.

The subsistence economy in the study area is associated, among other things, with the exploitation of wild plants such as *Origanum* spp, *Ziziphus* spp, and *Capparis spinosa* L., whose selling prices vary from 14.4 MAD/kg, 17 MAD/kg and 14.8 MAD/kg respectively (Khabbach *et al.* 2012), and *Chamaerops humilis* L. var. *argentea* André which is an important source of revenue through the sale of the palm heart (43.22 €/week/exploiter), and marketing of artisanal products (Doum baskets: 6.2 €/week/maker). (Lachkar *et al.* 2020), and *L. comosa* are species that constitute an important source of income for rural families in the study area. Commercialization of some products of local phytodiversity is often limited to the harvest period, i.e. the growing season.

L. comosa is a spontaneous plant in the region of Taza, harvested from January to May each year. During this period, Large quantities ranging from 500 kg to 3000 kg of fresh *L. comosa* bulb are offered on sale every week in the souks. The study carried out by Bonasia and his collaborators in Italy concurs with the information we found and which indicated that the import of *L. comosa* has increased particularly from Morocco and Tunisia due to the intensive use of bulbs in Italy (Bonasia *et al.* 2012).

The average quantity of the plant purchased in Morocco in the study area by wholesalers each week is about 953.5 kg of fresh bulbs. Therefore, this quantity constitutes a total profit of 2860.5 MAD / 263.16 €.

Among the information we gathered during our investigation is that the plant is intended for export and more specifically to Italy, as it is included in their diet after pre-treatment and preparation in factories in Oued Zem city (Morocco). This result explains what we found in the work published by Casoria *et al.* (1999) that the food use of bulbs has a long history that can be traced back to the Egyptians, Greeks, and other Mediterranean peoples.

According to our survey, we can say that *L. comosa* is an important source of income for vendors and also for wholesalers and that the profit varies from 7

MAD / 0.64 € per kg of fresh bulb to 3 MAD / 0.27 € per kg of fresh bulb for vendors and wholesalers respectively. Compared to another study conducted in the same study area, Lachkar *et al.* (2020) showed that *Chamaerops humilis* L. var. *argentea* André is an important source of income for the population of the Province of Taza through the sale of the palm heart (43.22 €/week/exploiter), and the marketing of artisanal products (Doum baskets: 6.2 €/week/maker).

Although, women are active storekeepers, street and market vendors and play an important role in commerce around the world. In our study, women are not allowed to participate in the marketing of *L. comosa*, this can be explained by the traditional customs in the study area, where women are much more involved in domestic chores and where women probably prefer to work in women's associations or cooperatives, which are also channels and means of marketing the plant's bulbs, rather than going directly to the souks.

It is important to notify that in the municipalities "Oued Amlil" and "Bni Lent" small quantities of *L. comosa* are offered for sale in the souks, even if in these two municipalities the plant is very abundant, because the harvest period coincides with the olive harvesting season and the population of these communes is not yet conscious of the economic value of the *L. comosa* bulbs and prefers to harvest the olives even though their price (4 MAD/Kg / 0.398 €/Kg) is lower than that of *L. comosa* bulbs (7 MAD/Kg / 0.697 €/Kg) and also because the plant requires special experience during harvesting to ensure that the bulbs are not damaged and a great deal of physical effort.

Conclusions

These studies, undertaken for the first time in Morocco, allowed us to document and describe the socio-economic value and the ethnobotanical data of *Leopoldia comosa* L., a spontaneous plant of the Taza region which is characterized by a high production of this plant. The survey conducted among vendors and wholesalers of the plant allowed us to draw several conclusions: all respondents (n=100) are looking for *Leopoldia comosa* for a monetary purpose; 33% of the population surveyed raised the medicinal value of the plant, and that the bulb of *L. comosa* is used in the treatment of dermatological affections and digestive disorders. Indeed, *L. comosa* is an important source of income for vendors and also for wholesalers and its profit varies from 7 MAD / 0.64 € per kg of fresh bulb to 3 MAD / 0.27 € per kg of fresh bulb for vendors and wholesalers respectively. Wholesalers buy the plant in the souks and trade it through intermediaries from Taza, towards mainly the city of Oued Zem which is located in the center of Morocco, roughly 300 km from the place of origin (Morocco) where there are points of export abroad, especially to Italy.

This study highlights the economic importance of *L. comosa* as a medicinal plant and food for export to Italy as it is included in their diet.

Our results of the socio-economic and ethnobotanical surveys of the plant are encouraged and we are continuing to analyze the composition of the plant and explore its other biological and pharmacological properties.

Declarations

List of abbreviations: Not applicable.
Ethics approval and consent to participate: All respondents were well informed of the objectives of the study, have been well informed, the confidentiality of their participation, and the data provided and the right to refuse to participate and withdraw at any time.
Consent for publication: Not applicable.
Availability of data and materials: The data was not deposited in public repositories.
Conflicts of interest: There is no conflict of interest.
Funding sources: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
Author's contributions: MB: Performed experimental studies and field studies, data collection and analysis and manuscript preparation. **FL:** Designed the experiments, consistent guidance, analyzed the data, manuscript preparation and review and edited the final version and submitted it for publication. **NL:** Contributed to experimental and field studies. **AK:** Contributed to botanical studies. **AZ:** Contributed to data analysis. **HT:** Designed the experiments, provided consistent guidance and manuscript preparation and review. All authors read, approved and reviewed the manuscript.

Acknowledgements

The authors are extremely thankful to the local informants of the study area for their co-operation and knowledge sharing. Our sincere appreciation goes to all the people who helped us during the research work.

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Basemap source: https://www.cleanpng.com/png-globe-earth-world-rwanda-map-yellow-globe-5580809/preview.html

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Appendix 1

Questionnaire form
Record number: …

▪ Date.....
▪ City / Village / Douar.....
▪ Altitude.....
▪ Author…….....

_____

I- Informant or Interviewee:

1▪ Age: .....
2▪ Gender: Male □ Female □
3▪ Marital Status: Single □ Married □
4▪ Ethnicity…….
5▪ Level of education: Illiterates □ Primary □ Secondary □ Academic □
6▪ Profession: Herbalist □ Cultivator □ Tradipraticians □ Nomad □ Others □……...

_____

II- Vegetable species and/or Plant:

7▪ Vernacular names: .....
8▪ Scientific name: .....
9▪ Type of plant:
Wild □ Cultivated □
10▪ Harvest season: .....
11▪ Place of harvest:
□ Watercourses □ Mountain □ Pond
□ Lakes □ Others …….

_____

III- Medicinal aspect:

12▪ Plant uses:
□ Therapeutic □ Cosmetic
□ Human food □ Fence
□ Firewood □ Animal feed
□ Others: …….....
13▪ Used part: Stem □ Flowers □ Fruit □ Seed □ Bark □ Rhizome □ Bulb □ Leaves □ whole plant □ Other combinations □: ….....
……..
14▪ Form of employment:
Tisane □ Powder □ Essential oils □ Oily oils □ Extract (tincture, solution, capsule) □ Others □
...……...
15▪ Mode of preparation:

Infusion □ Decoction □ Maceration □ Poultice □ Kneading □ Softening □ Others □
.....……...….
……..
16▪ Mode of administration: Oral □ Massage □ Rinsing □ Brushing □ Others □
……..
17▪ Dose used:
Pinch □ Handle □ Spoon □
Others□
.....
18▪ Plants and/or other substances:
□ None □ Yes
If Yes, which ones?
Notes on preparation:
……..……
…….....
19▪ Type of disease:
▪ Dermatological affections □ ▪ Digestive tract disorders □
▪ Respiratory affections □ ▪ Gland disorders □
▪ Diseases of the cardiovascular system □ ▪ Gastro-intestinal tract annexes □
▪ Genitourinary affections □ ▪ Neurological Affections □
▪Others…….…….……
20▪ Toxicity:
……..
……..

***IV- Socio-economic data of Leopoldia comosa* L.**

21. Number or quantity of the plant harvested per day or per week:
……..
22. Number or quantity of the plant deplaned per year:
……..
23. Raw material selling price per kg:
……..
24. Types of customers:
……..
……..
25. Request by customers:
Large □ Medium □ Low □ Others:
…..……..
……..
26. Types of employees:
Men □ Women □ Children □ Indigenous □ Others□……
27. Number of employees in each house: ……
……..
28. Direct Employment:

Full-time □ Part-time □ Other □…….…….

29. Working period:

……..

30. Number or quantity of the plant sold per year:

……..

31. Total income per week: …… ……

32. Cost price: ……

……..

33. Types of marketing:

Associations/cooperatives □ Intermediaries □ Souks □ Other □ ……..

34. Market evolution:

……..

……..

……..

35. Obstacles that you encounter:

……..……

……..……

…….…….

36. Supplementary information:

……

……

……

……

Appendix 2 / Annexe 2

Fiche questionnaire
Numéro de fiche:……

▪ Date.....
▪ Ville/Village/Douar.....
▪ Altitude.....
▪ Auteur……....

I- Informateur ou Interviewé :

1▪ Age : .....
2▪ Sexe : Masculin □ Féminin □
3▪ Situation familiale : Célibataire □ Marié □
4▪ Ethnie……..
5▪ Niveau scolaire : Néant □ Primaire □ Secondaire □ Universitaire □
6▪ Profession : Herboriste □ Cultivateur □ Tradipraticien □ Nomade □ Autres □…….

II- Espèce végétale et/ou Plante :

7▪ Noms vernaculaires :
.....
8▪ Nom scientifique :
.....
9▪ Type de plante :
Sauvage □ Cultivée □
10▪ Saison de la récolte : .....
11▪ Lieu de récolte :
□ Cours d'eau □ Montagne □ Mare
□ Lacs □ Autres : ……

III- Aspect médicinale :

12▪ Usages de la plante :
□ Thérapeutique □ Cosmétique
□ Alimentation humaine □ Clôture
□ Bois de chauffe □ Alimentation des animaux
□ Autres :……..
13▪ Partie utilisée : Tige □ Fleurs Fruits □ Graine □ Écorce □ Rhizome □ Bulbe □ Feuilles □ Plante entière □ Autres combinaisons □ :
.....
14▪ Forme d'emploi :
Tisane □ Poudre □ Huiles essentielles □ Huiles grasses □ Extrait (teinture, solution, gélule) □ Autres □ …….
15▪ Mode de préparation :

Infusion □ Décoction □ Macération □ Cataplasme □ Pétrissage □ Ramollissement □ Autre □…….
……..
16▪ Mode d'administration : Oral □ Massage □ Rinçage □ Badigeonnage □ Autres □
……..……
……..

17▪ Dose utilisée :
Pincée □ poignée □ Cuillerée □
Autres :
.....
18▪ Plantes et/ou autres matières :
□ Aucune □ Oui
Si Oui, lesquelles ?
Notes sur la préparation :
……..
……..
19▪ Type de maladie :
▪ Affections dermatologiques □ ▪ Affections des tubes digestifs □
▪ Affections respiratoires □ ▪ Affections des glandes □
▪ Affections cardio-vasculaires □ ▪ Annexes du tube digestif □
▪ Affections génito-urinaires □ ▪ Affections neurologiques □
▪Autres :……..
20▪ Toxicité :
……..
……..

***IV- Données socio-économique de Leopoldia comosa* L.**

21. Nombre ou quantité de la plante récoltée par jour ou par semaine :
……
22. Nombre ou quantité de la plante déplantée par an :
…….
23. Prix de vente de la matière première par kg :
……
24. Types de clients :
……
……
25. Demande par les clients :
Fort □ Moyenne □ faible □
Autres……..
……..…
26. Types d'employés :
Hommes □ Femmes □ Enfants □ Indigènes □ Autres □……
27. Nombres d'employés dans chaque maison :…….

……..
28. Emploi direct :
Temps plein □ Temps partiel □ Autres □……..
29. Période de travail :
……..
30. Nombre ou quantité de la plante vendues par an :
……..
31. Revenu total par semaine :……
32. Prix de revient :……
……..

33. Types de commercialisation :
Associations/coopératives □ Intermédiaires □ Souks □ Autres □……
34. Evolution de marché :
……
……
…….3
5. Obstacles que vous rencontrez :
…….....
……
…….
36. Informations supplémentaires :
……
……
……
……

Appendix 3 / ملحق 3

ورقة الاستبيان

رقم الإستمارة.....

▪ التاريخ .....
▪ المدينة / القرية / الدوار .....
▪ الارتفاع .....
▪ الباحث .....

I. المخبر أو المقابل:

1▪ العمر: .....
2▪ الجنس: ذكر □ انثى □
3▪ الحالة العائلية: عازب □ متزوج □
4▪ العرق .....
5 المستوى التعليمي: بدون □ ابتدائي □ ثانوي □ جامعي □
6▪ المهنة: معالج بالأعشاب □ مزارع □ معالج تقليدي □ رحال □ اخرى □ .....

II. النوع النباتي و/ أو النبتة:

7▪ الأسماء العامية:
.....
8▪ الاسم العلمي:
.....
9▪ نوع النبتة:
برية □ مزروعة □
10▪ موسم الحصاد:
.....
11▪ مكان الحصاد:
□ مجرى مائي □ جبل □ بحيرة
□ بركة او مستنقع □ آخر: .....

III. الجانب الطبي:

12▪ استخدامات النبتة:
□ طبية □ تجميلية
□ تغذية بشرية □ تسييج او سياج
□ الحطب □ أعلاف حيوانية
□ أخرى:
.....
13▪ الجزء المستخدم: جذع □ زهور□ ثمار □ بذور□ لحاء □ جذمور □ بصلة النبتة □ أوراق □ النبتة كاملة □
تركيبات أخرى □: ....
14▪ شكل او طريقة الاستعمال:
شاي الأعشاب □ بودرة او مسحوق □ زيوت عطرية □ زيوت دهنية □ مستخلص (صبغة، محلول، كبسولة) □ أخر
.....
15▪ طريقة التحضير:
المغلي □ المنقوع في ماء ساخن □ المنقوع في ماء بارد □ كمادة □ عجين □ تليين □ أخرى
.....
.....

16▪ طريقة الاستعمال: عن طريق الفم □ تدليك □ شطف □ تفريش □ أخرى □
.....
.....
17▪ الجرعة المستخدمة:
قرصة □ مقبض □ ملعقة □
أخرى:.....

18▪ نبتة و/ أو مواد أخرى:
لا شيء □ نعم □
إذا كان الأمر نعم، أذكرها؟
ملاحظات حول التحضير:
.....
.....
19▪ نوع المرض:
▪ أمراض جلدية □ ▪ اضطرابات في الجهاز الهضمي □
▪ اضطرابات الجهاز التنفسي □ ▪ اضطرابات الغدد □
▪ اضطرابات القلب والأوعية الدموية □ ▪ اضطرابات ملحقات الجهاز الهضمي □
▪ اضطرابات الجهاز البولي والتناسلي □ ▪ الاضطرابات العصبية □
▪ أخر:
.....
20▪ تسمم:
.....
.....

IV. المعطيات السوسيو- اقتصادية لـ *Leopoldia comosa* L.

21-عدد أو كمية النبتة المحصودة في اليوم أو الأسبوع:
.....
22-عدد أو كمية النباتات المنقولة في السنة:
.....
23. سعر بيع المادة الخام بالكيلو جرام:
.....
24. أنواع الزبناء:
.....
.....
25. طلب الزبناء:
قوي □ متوسط □ ضعيف □ أخر
.....
.....
26. أنواع المستخدمين:
رجال □ نساء □ أطفال □ السكان الأصليون □ أخرى □
.....
27. عدد المستخدمين في كل بيت:
.....
28-عمل او شغل مباشر:
دوام كامل □ دوام جزئي □ أخر □
.....
29- فترة العمل:
.....
30. عدد أو كمية النبتة المباعين سنويًا:
.....

31. إجمالي الدخل في الأسبوع:
.....
32. سعر التكلفة:
.....
.....
33. أنواع التسويق:
جمعيات / تعاونيات □ وسطاء □ أسواق □ أخرى □
.....
34. تطور السوق:
.....
.....
35. العقبات التي توجهونها:
.....
.....
.....
36- معلومات إضافية:
.....
.....
.....
.....