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Lilium Candidum L. (Liliaceae), a New Exotic Species Reported in the Jbel Sidi Ali El Jawzi (Prerif, Morocco)

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ABSTRACT

The genus *Lilium* comprises 119 taxa, primarily native to temperate and alpine regions of the Northern Hemisphere, extending to the northern Philippines. In this study, we report the first occurrence of *Lilium candidum* L. in Morocco, specifically in the jbel Sidi Ali El Jawzi area, within the territorial commune of Asjen, Ouezzane Province (Pre-Rif region). During a botanical survey conducted in May 2022, a population of *L. candidum* was identified, marking its first recorded presence in the country. Morphological characteristics were analyzed and compared with existing descriptions in the literature to confirm species identification. The species was found in a humid microclimate with calcareous soils, suggesting specific ecological requirements that facilitated its establishment. This unexpected discovery raises several questions regarding its biogeographical history, potential introduction pathways, and adaptation mechanisms in the Moroccan environment. Given its limited distribution and ecological specificity, its conservation status should be carefully evaluated, as human activities, habitat disturbance, and climate change may pose significant threats. Further studies, including genetic analyses and ecological monitoring, are needed to determine its origin, assess population stability, and establish conservation strategies. The presence of *L. candidum* in the Pre-Rif region expands the known distribution of

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the species and highlights the importance of continuous botanical exploration in North Africa, particularly in understudied mountainous ecosystems.

Keywords: *Lilium Candidum* L.; Liliaceae; Exotic Flora; Pre-Rif; Morocco

1. Introduction

Phyto-geographically, the Pre-Rif region belongs to North Atlantic Morocco (Man) and corresponds to the Man-1 division. Historically, with the exception of the work of[1], very few floristic studies have been conducted in this region, particularly its southern margin. To the north-west of the town of Ouezzane, the group of roughly parallel ranges, generally oriented south-north, separating the low western hills and the mountains of the western extension of the massif d'Izarène , is no exception. To overcome this shortcoming, several botanical and floristic surveys were carried out to update the flora of this region[2–4]. Indeed, the region's flora is not entirely indigenous. To meet the needs of medicine, food, fodder, ornamentation, or any other purpose, the local population has voluntarily or involuntarily introduced many non-native plant species. While some of these are known, others are new and thrive in unusual locations. For example, during a botanical inventory in the territorial commune of Asjen in the province of Ouezzane (Man-1, **Figure 1**), and more specifically at jbel Sidi Ali El Jawzi, we collected a Liliaceae unknown in Morocco. Based on its broad, shiny, long basal leaves, very long leafy stems and cluster of pure-white flowers, the species has been assigned to the genus *Lilium* L. This genus, which is the type genus of the family Liliaceae, comprises of around 110 to 119 taxa, distributed mainly in cold and temperate regions of the Northern Hemisphere, including East Asia, Europe and North America[5–9]. Southwestern Asia-China and the Himalayas are considered the center of diversity (with about 70 species) for this genus[10, 11]. A consultation of the relevant botanical literature identified our speciesas *L. candidum*.[12–19]. This species has never been reported before from Morocco[1, 20–22]. Thus, *L. candidum* collected from the Ouezzane region represents the first record of this genus and species in Morocco. In this work, we present *L. candidum* as a new exotic and occasional species introduced to Morocco.

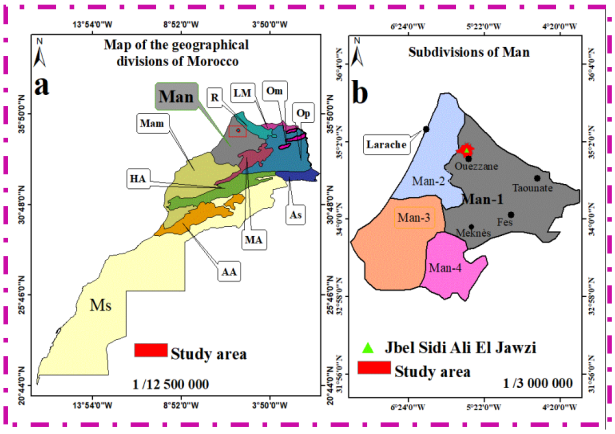


Figure 1. Location of the study area in the map of the geographical division of Morocco: (**a**) Phytogeographic divisions of Morocco; (**b**) subdivisions of North Atlantic Morocco. (Source: Chriqui modified from[23]).

Note: **As**: Saharan Atlas; **AA**: Anti Atlas; **HA**: High Atlas; **MA**: Middle Atlas; **Mam**: Middle Atlantic Morocco; **Man**: North Atlantic Morocco; **Ms**: Morocco Saharan; **Op**: Eastern Morocco plateaus; **Om**: Mountains of eastern Morocco; **LM**: Mediterranean coastline; and **R**: Rif.

A bibliographical study of the worldwide distribution of *L. candidum* has shown it to be native to Lebanon[13, 14] and western and southern Greece[24]. In the New Flora of Lebanon, *L. candidum* is noted as the only species of the *Lilium* genus to occur spontaneously in Lebanon[14]. This species is also found in Palestine, in the Carmel massif. It is subspontaneous in the Mediterranean region. The species has always been collected from the wild and cultivated in gardens, a process that has facilitated its naturalization throughout the Mediterranean basin[14, 24, 25], leading to some confusion as to its precise natural origin. POWO reported that *L. candidum* is native to S. North Macedonia, SW. Türkiye and Lebanon (e.g., Eastern Aegean Islands, Greece, Lebanon-Syria, Palestine, Turkey, Yugoslavia), and is considered an introduced or naturalized plant in several countries and continents[26] (**Figure 2**).

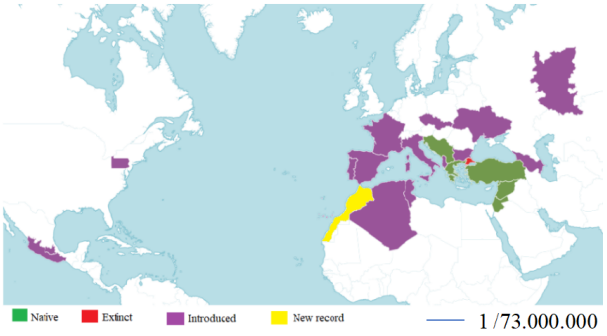
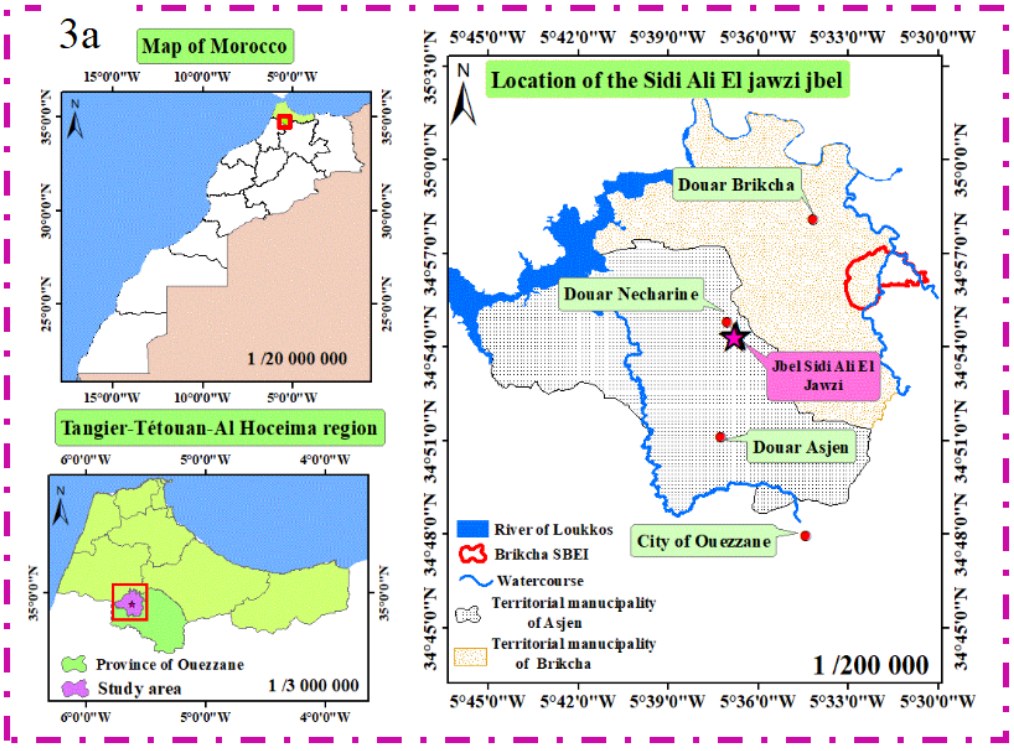


Figure 2. General ranges of *Lilium candidum* [26].

In the Mediterranean region, *L. candidum* has been cultivated for ornamental purposes and naturalized in Mediterranean gardens: Greece, Yugoslavia (Albania, Corsica, France, Italy, Sardinia, Sicily), and S. W. Asia [16]. It is cultivated and subplanted in the Iberian Peninsula, eastern Andalusia, France, Italy, Corsica and Belgium [12, 15, 17, 19, 27, 28]. A study reported that *L. candidum* is exotic in the Iberian Peninsula and archaeophytic or native in Sicily and Sardinia and is absolutely spontaneous in the hills of Ogliastra and Barbagia [29]. In North Africa, it is reported as cultivated, ornamental and sometimes naturalized in four countries: Madeira, the Canary Islands, Algeria and Tunisia [13].

2. Presentation of Jbel Sidi Ali El Jawzi

Located around 23 km north of the town of Ouezzane, jbel Sidi Ali El Jawzi (**Figure 3a,b**) rises to 517 m, with geographical coordinates 34°54′20″ N; 5°36′44″ W and a general SE-NW orientation. It is the first and highest mountain from west to east, where *Arbutus unedo* L., *Erica arborea* L., *Phillyrea latifolia* L. and *Quercus coccifera* L. thrive. Despite the degradation of almost all its vegetation, a few plants of each of these species remain today. As a result, it is the starting point for the emergence of trees from the southern rim of the Mediterranean basin. Its shape is anticlinal, with a relatively wet north-facing slope and a relatively steep, dry south-facing slope. Like the other mountains in this region, it has long remained intact, but over the last four decades it has undergone heavy anthropization and advanced degradation, mainly as a result of land clearing, which has impacted its integrity. As a result, the forest area has been severely reduced and signs of degradation are clearly visible.



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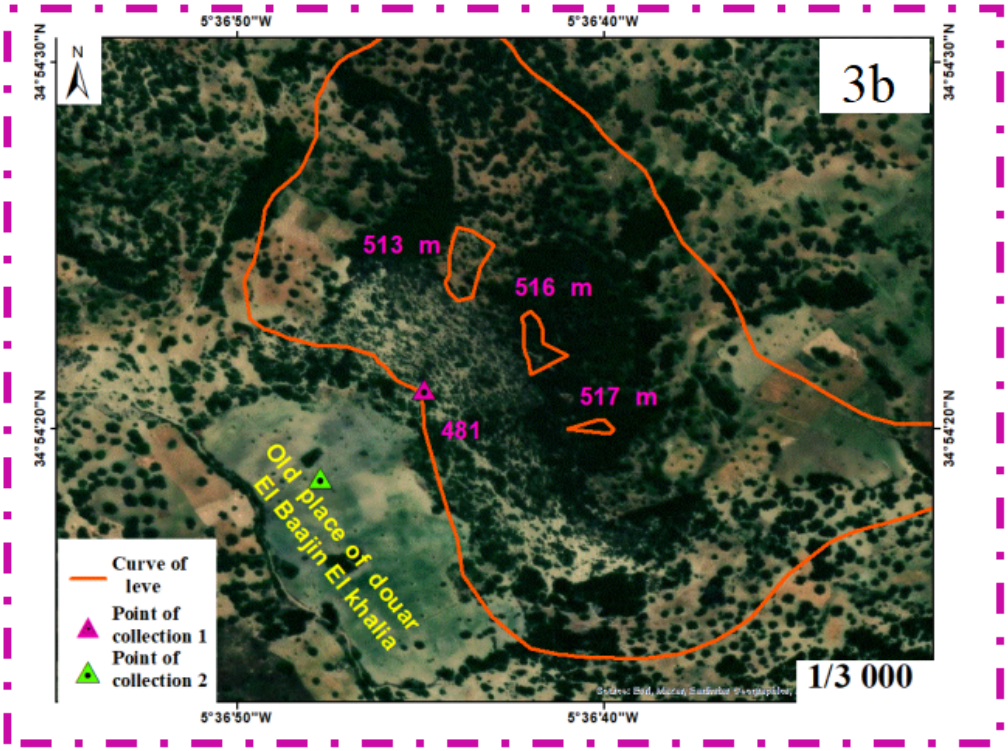

Figure 3. (**a**) Location of jbel Sidi Ali El Jawzi; (**b**) The two collection points of Lilium candidum.

Today, spontaneous vegetation remains only on the southern slope (**Figure 4**) and in a small strip to the north-west, where the four species mentioned above are making their appearance. Around a famous permanent water source named Ain Talaqa and in a strategic location, a historic douar named Al Baajin El Khalia was built. Unfortunately, today, a dishonest man, after clearing the vegetation, illegally seized the said water source. Among the inhabitants of this douar, some were renowned for being professional practitioners of traditional medicine. At the end of the 19th century, and for unknown reasons, the inhabitants emigrated to an unprecedented destination. Today, Sadly, the buildings they left behind were demolished, and traces of their lives were lost. All that remains is their cemetery and the rubble of their homes, collected by those who swindled the land.

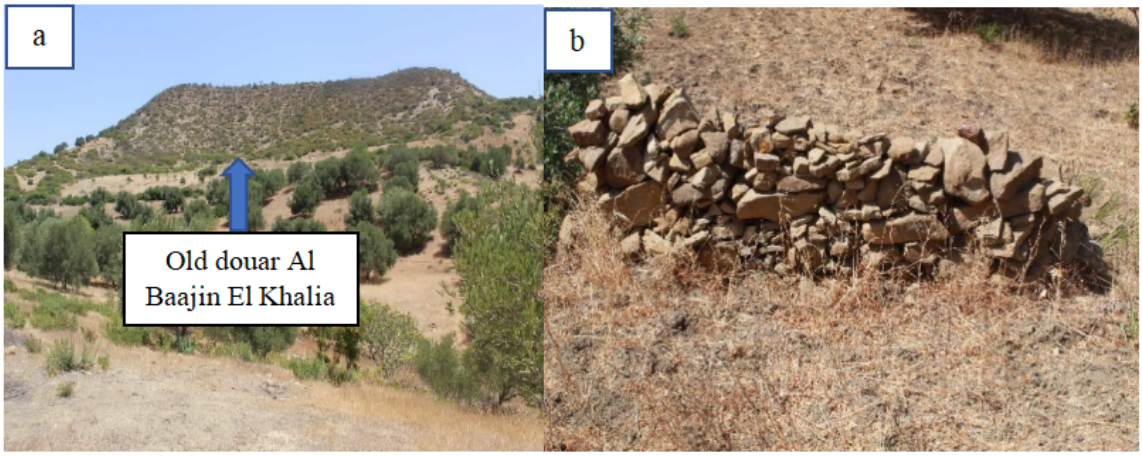

Figure 4. (**a**): General view of jbel Sidi Ali El Jawzi; (**b**): Stones gathered in piles from old houses in the field where the *L. candidum* was discovered (Source: Chriqui, August 2023).

3. Materials and Methods

As part of an inventory of the vascular flora to the west of the Izarène massif, and on the occasion of a prospecting and sampling campaign at jbel Sidi Ali El Jawzi, in May 2022, authors came across *L. candidum*. Its large, pure-white, fragrant flowers and shiny green stem leaves make it easy to spot in the natural landscape. In full bloom, once examined, two of them were identified in the same place and photographed. They grow under the shade of a woody formation of *Pistacia lentiscus* L., *Phillyrea latifolia* L. and *Olea europaea* L. One specimen was collected while the others were left in their habitat (Matorral). The collected specimen was used for species identification and the bulb was grown in vitro for further study. The identification was confirmed at the Rabat Scientific Institute. We also consulted the images of typical herbarium specimens published in various databases (PlantList, IPNI, Jstore, SEINet, Reflora-Virtual Herbarium and WFO). We have also consulted digital images of the type specimen kept at the Linné Herbarium (LINN) along with the protologue described by Linné and available online. The same applies to images of cultivated specimens held in other herbaria.

During our fieldwork, we recorded the data associated with *L. candidum*, their geographical coordinates, ecology and habitats. The reference specimen was preserved in the National Herbarium of the Rabat Scientific Institute (RAB).

4. Results

During a customary morning floristic inventory campaign carried out on 13/05/2022 at jbel Sidi Ali El Jawzi, we discovered *L. candidum* for the first time in Morocco in an area of around 20 m^2 at 481 m altitude and at coordinates 34°54′20″ N, 5°36′44″ W. The population observed was very small and consists of five plants including three individuals in full bloom and two individuals in the vegetative phase. Another flowering individual was found in a cereal field distant from the first collection point by a distance of 100 meters. This one is exposed to the sun and located near a pile of building stones from the ancient buildings of the Al Baajin El Khalia douar remnant. This zone, with a relief of less than 517 m, is dominated by an Oleo-Lentiscetum plant formation and is home to a very important flora rich in heritage species: *Campanula dichotoma* L., *Centaurium erythraea* Rafn., *Cynara humilis* L., *Cytisus striatus* (Hill) Rothm., *Delphinium cossonianum* Batt., *Fumaria ouezzanensis* Pugsley., *Linum setaceum* Brot., *Lonicera implexa* Aiton, *Genista clavata* Poiret, *Lotus arenarius* Brot., *Malva hispanica* L., *Mucizonia hispida* subsp. *hispida* Batt. & Trabut, *Nepeta apuleii* Uria., *Origanum compactum* Benth., *Pallenis spinosa* subsp. *maroccana* (Aurich & Podlech) Greuter, *Spergularia purpurea* (Pers.) G. Don f., *Silene ibosii* Emb. & Maire, *Scrophularia canina* L., *Teucrium barbarum* Jahandiez & Maire and *Teucrium spinosum* L.

According to locals, *L. candidum* attracts a great deal of attention because of its large, purely white, showy and strongly scented flowers. However, excessive harvesting of the flowers before the plant bears fruit prevents seeds from being produced and dispersed. In addition, the heavy anthropic and abusive exploitation of the jbel Sidi Ali El Jawzi matorral (Deforestation and overgrazing) makes the multiplication of this species more difficult. With this in mind, we cultivated the bulb of the collected specimen in vitro in order to establish further studies (e.g., in vitro propagation, phylogeny and phytochemistry).

After growing this species at home for two successive years, monitoring its phenology revealed the full completion of its life cycle. Although the species manages to produce fruits (seed capsules) (**Figure 5**), despite repeated seed cultivation, no germination was recorded.

Figure 5. Home-grown seeds.

Since the discovery of *L. candidum*, the collection site and surrounding area have been carefully and regularly surveyed during the vegetative and flowering periods to check for other individuals. A few individuals were observed scattered along the edge of the matorral with a good appearance. However, the various intense anthropic activities carried out

on its habitat could jeopardize its survival.

The specimen collected is preserved in the National Herbarium of the Rabat Scientific Institute (RAB), Mohammed V University, Rabat, under the code (RAB 113734). The name used is that accepted in the WFO and IPNI databases.

4.1. Morphological Description

Monoecious, perennial plant with a naked bulb made up of numerous interlocking, fleshy scales. Basal leaves grouped in a rosette, oblanceolate, with 3 parallel veins, 15–20 cm long and 1–4 cm wide. Stem leaves alternate; lower ones lanceolate and large, 10–24 × 1.7–2.5 cm; upper ones bracteate and small, 4–5 × 0.7–0.8–1.2 cm. Stem erect, sturdy, almost 60–80 cm long, densely foliate on the lower 30 cm, loosely foliate to the top. Inflorescence in loose clusters of 3–6 large, highly fragrant, funnel-shaped, actinomorphic hermaphrodite flowers. Spreading upright pedicels shorter than the flower. White tepals 4.5–6 × 1–1.7 cm, curved at the apex and more or less obtuse. Six stamens 4 cm long, shorter than the perianth, with white, filiform threads 2.8 cm long; anthers linear, dorsifixed, introrse, dark yellow, 0.7 cm long. Style clavate at apex, green, 4.2 cm long (**Figure 6a–d**). Three-lobed capitate stigma, 3 mm long. Capsule oblong, separated by deep, wide grooves. Numerous flattened seeds (**Figure 6**).

Figure 6. *Lilium candidum* L.: Different parts of the plant showing decreasing leaf size.

4.2. Flowering and Fruiting

L. candidum flowering varies from country to country, depending on climatic factors and the status of the plant (cultivated or spontaneous), but generally takes place in May-July. At the end of our botanical surveys, we found that *L. candidum* flowers between May 7th and June 7th. Fruiting takes place at the end of June and in the first week of August. After this, the plant dries out and remains dormant as a bulb during the warmer months.

4.3. Specimens Examined

Jbel Sidi Ali El Jawzi, territorial commune of Asjen, province of Ouezzane; 34°54′20″ N, 5°36′44″ W; edge of a matorral and wheat field on soil: calco-marl and black clay;

altitude: 481 m; collected by A. Chriqui and determined by M. Ibn Tattou and O. Benkhnigue (**Figure 7**).

Figure 7. Herbarium exsiccata (RAB 113734) of *Lilium candidum* L. collected in the Ouezzane region.

We observed individuals of *L. candidum* in two locations: in a wheat field and at the edge of the open, degraded matorral of jbel Sidi Ali El Jawzi, Asjen region, Ouezzane Province. In this area, which corresponds to an ecosystem rich in terms of biodiversity, *L. candidum* was found in association with other species (*Centaurium erythraea* Rafn, *Cleonia lusitanica* L., *Emex spinosa* (L.) Campd., *Geranium molle* L., *Lonicera implexa* Aiton, *Lysimachia arvensis* (L.) U., Manns & Anderb, *Origanum compactum* Benth., *Pallenis spinosa* (L.) Cass, *Sinapis alba* L., *Teucrium barbarum* Jahand. & Maire, *Teucrium fruticans* L. and *Vicia sativa* L.) (**Figure 8**).

In its cultivated state, the Institut National de la Recherche Agronomique (INRA) mentioned *L. candidum* in their brochure on ornamental plants at the Jardin d'Essais Botaniques in Rabat (Morocco). To confirm its presence, we visited the garden (12/27/2022). The garden managers confirmed that most of the bulbous plants imported for planting in the garden come from the Netherlands, including *L. candidum*. Unfortunately, however, during our visit we found no *L. candidum* plants in the bulb collection plot (Jardin d'Andalousie). We therefore had to wait until the flowering period before deciding whether *L. candidum* was present. According to our second visit on 9 th March 2023, we found a 25 cm *Lilium* plant in its young state. On 17 th May 2023, we found *Lilium* sp. in full bloom, but with morphological and olfactory characteristics different from those of *L. candidum* (e.g., petal color and size, leaf shape and size, flower scent) (**Figure 9**).

Figure 8. Photo of *Lilium candidum* L.: (**a**) soft wheat field; (**b**) whole plant with scaled bulb. Source: Photos taken by A. Chriqui on 13 May 2022.

Figure 9. Photos of *Lilium* sp. grown in the Rabat botanical trials garden. (**a**) photo taken on: 09/03/2023. (**b**) and (**c**) photos taken on 17/05/2023. Source: Photos taken by O. Benkhnigue

4.4. Ecology

Lilium candidum, harvested from the Ouezzane region (Morocco), occupies a variety of habitats, including open matorrals based on *Pistacia lentiscus*, *Olea europaea*, and *Phillyrea latifolia* < 7 m tall, and cultivated fields. The climate of this harvesting area is on the border between sub-humid and semi-arid, characterized by a dry summer with temperatures ranging from 26 °C to 44 °C and a cold to mild winter with temperatures ranging from 8 °C to 1 °C and precipitation oscillating between 700 mm and 900 mm per year.

4.5. Medicinal and Ritual Use

L. candidum, commonly known as white lily or Madonna lily, is an ancient bulbous plant with deliciously fragrant flowers well known in folk medicine. Ethnopharmacological research conducted in the province of Lucca, Italy, demonstrated the use of its bulbs as an antiviral agent to treat shingles, and of its bulbs and flowers to treat skin and joint diseases[30]. *L. candidum* extract is well known in traditional medicine for the treatment of burns, ulcers, inflammation, and wound healing[31].

Today in modern Medicine, *L. candidum* is used commercially for medicinal and ornamental purposes, as well as in perfumery[32]. Several saponins have been isolated from the ethanolic extract of *L. candidum* bulbs and flowers[33]. Numerous biologically active substances have been isolated from an ethanolic extract of *L. candidum* flowers and bulbs. Its antifungal, anticancer, and antiviral properties are proven respectively by[34]. In their work[35] showed that the methanolic extract of its flowers contains active ingredients with hepatoprotective potential. The results of a study conducted by[36] confirmed that the extract of *L. candidum* has anti-ulcer pharmacological activity thanks to one or more secondary metabolites it contains.

5. Discussion

Lilium candidum was first published in 1753 by Linnaeus in the first edition of his "Species Plantarum", based on material from Palestine and Syria. The species' natural range extends from southern North Macedonia to southwest Turkey[26]. This bulbous geophyte, which grows mainly in temperate biomes, is naturalized in the Mediterranean region, and it is difficult to affirm that it is not spontaneous when found outside cultivation[12]. In Morocco, the Liliaceae family is represented by 3 genera and 19 species: *Fritillaria macrocarpa* Coss. Ex Batt., *F. oranensis* Pomel, *F. lusitanica* Wikstrom; *Gagea bohemica* (Zauschn.) Shult. and Schult. f., *G. cossoniana* Pascher, *G. dubia* A. Terracc, *G. durieui* Parl. ex Batt. & Trab, *G. elliptica* (A. Terracc.) Prain, *G. fibrosa* (Desf.) Schult. & Schult. f., *G. foliosa* (J. Presl and C. Presl)

Schult. & Schult. f., *G. granatelli* (Parl.) Parl, *G. lacaitae* A. Terracc., *G. liotardii* (Sternb.) Schult. & Schult. f., *G. nevadensis* Boiss, *G. pratensis* (Pers.) Dumort, *G. villosa* (M. Bieb.) Sweet, *G. subtrigona* J.-M. Tison, *G. moniliformis* J. M. Tison; *Tulipa sylvestris* L.[22]. Thus, the genus *Gagea* is represented by 15 species, *Fritillaria* (3 species), and *Tulipa* (one species). The discovery of *L. candidum* in the Ouezzane region brings the number of genera to 4 and the number of species to 20.

The voluntary or involuntary introduction of plant species into the study area is not a recent phenomenon. It goes back several centuries and began as soon as the first settlers arrived. These exotic species are medicinal, edible, ornamental and fodder plants, and are scattered throughout the study area. Anyone visiting the area could easily spot in the agricultural fields or douars commonly known species such as *Agave* sp., *Eucalyptus* sp., *Myoporum laetum* G. Forst. *Opuntia ficus-indica* (L.) Mill, *Prunus armeniaca* L., *Punica granatum* L., and *Ricinus communis* L. In reality, these are exotic species from Europe, Asia, America and even Oceania, intentionally or unintentionally introduced by the local population. Indeed, the spontaneous flora of the region has not been spared the incursion of exotic species. Comparing the 471 species listed in the two studies by[3, 4] carried out in this region with the IPNI online database, we note the presence of several naturalized exotic species (*Arundo donax* L., *Ficus carica* L., *Solanum linnaeanum* Hepper & P.-M. L. Jaeger, *Vinca major* L., *Vitis vinifera* L.) mixed with native species. Without human intervention, they have managed to reproduce spontaneously in their new area. That said, the discovery of such an exotic species would not be surprising.

Due to human activities, one of the exotic species that has remained confined is *L. candidum*. Its introduction could be explained by two possible pathways: one appears intentional, and the other accidental. Due to overexploitation and destruction of its habitats, and its limited seed production in the wild, *L. candidum* is considered an endangered species in several countries. In Europe, *L. candidum* is listed in the European Red List of Threatened Species (NT: species close to the threshold of threatened species or which could be threatened if specific conservation measures were not taken)[37]. In Turkey, *L. candidum* is included in the Vulnerable (VU) category according to the Turkish Red Book of Plants. As it is listed by CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), it is illegal to harm or transport the plant without authorization[38].

Firstly, oral information gathered from elderly inhabitants of douars around the collection site of *L. candidum* indicates that some residents of Douar Al Baajin El Khalia were renowned for practicing traditional medicine. They possessed a long medical tradition and expertise in the use of medicinal plants. Historically, along with individuals from Douar Necharine who held ancestral medical knowledge, they benefited from the geographic isolation and dense vegetation rich in aromatic and medicinal plants to develop their ethnomedical knowledge[39]. In the 19th century, traditional medicine based on aromatic and medicinal plants was an integral part of the culture in this region, providing treatment for various diseases. To prepare remedies, practitioners sought species thriving in other regions. Based on this evidence, it can be proposed that *L. candidum* was intentionally introduced for phytotherapeutic purposes or possibly as an ornamental plant due to its decorative appeal.

Considering the presence of *L. candidum* in Algeria and the free movement of populations between Morocco and Algeria before the colonial era, it is highly probable that it reached the territorial commune of Asjen from that country. This hypothesis is strongly supported by the presence of the geophyte *Dracunculus* sp. in a family's garden in Douar El Ghara, located about 10 km from jbel Sidi Ali El Jawzi. Since its introduction, it has been cultivated in an isolated area adjacent to the household. According to[2], considering it as heritage from the past and having an emotional attachment to it, generations of this family have preserved this exotic species, whose bulbs were reportedly gifted long ago by a nobleman passing through the region to their ancestor. The nobleman presented it as a plant with anti-venom properties and repellent activity against snakes and intoxication.

In the last century, the remoteness of medical centers, the lack of adequate road and health infrastructure, and the high cost of anti-venom therapy meant that residents of this region relied on the dried leaves of *Dracunculus* sp. to prevent and treat snake and scorpion envenomation. This approach is supported by various studies in different regions that have reported the use of *L. candidum* in traditional and modern medicine[40–43]. It is widely used in the perfume industry and as an ornamental plant[16, 17, 27]. Moreover, this

plant holds significant ritual value in Christianity as a symbol of purity. Thus, the diversity of its uses gives this plant a high commercial potential [44].

Secondly, the location of the first collection point, very close to an agricultural area, suggests that *L. candidum* might have originated from seeds recently and accidentally introduced into cultivated fields along with wheat seeds imported from other countries, particularly northern temperate regions (e.g., Russia, Ukraine). In this case, the seeds could have been transported by wind, animals, or humans during agricultural activities. This introduction pathway is supported by the list of accompanying plants. The trade of seeds is a significant vector for crossing borders. Therefore, it could currently be considered as escaped from cultivation. Moreover, the second collection conducted within a wheat field and the farmer's statement about purchasing wheat seeds from the market are two tangible pieces of evidence further supporting the accidental introduction of the species. In revenge, the introduction of *L. candidum* into Morocco aligns with similar cases in several other countries where this species has also been introduced [15–17, 19].

The conservation of *L. candidum* is primarily linked to the preservation of its habitat against deforestation, which seriously threatens its extinction. Given its multiple virtues, the implementation of new technical, technological and biotechnological innovations that are effective alternatives to natural reproduction are necessary. Thus, these vegetative propagation techniques would be a promising solution to ensure its sustainability.

6. Conclusions

The unexpected discovery of a *Lilium candidum* xenophyte, collected for the first time in the territorial commune of Asjen (Pre-Rif), has enriched the exotic flora introduced into Morocco. On the one hand, this discovery should encourage scientists to multiply their fieldwork and botanical explorations in the Pre-Rif in order to discover new species and enrich Morocco's exotic flora. On the other hand, strict protective measures should be taken without delay to conserve the remaining vegetation of jbel Sidi Ali El Jawzi, without which it would be threatened with extinction in the years to come.

Author Contributions

Conceptualization, O.B.; methodology, O.B.; formal analysis, A.C.; investigation, A.C.; resources, O.B.; data curation, A.C.; writing—original draft preparation, A.C.; writing—review and editing, O.B., S.B., Y.M. and I.E.-K.; supervision, D.H.; project administration, D.H.; validation, O.B., M.S.T. and D.H. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Conflicts of Interest

The authors declare no conflict of interest.

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