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Floristic Diversity and Taxonomic Composition of Mount Allahoum, Souk Ahras, Northeastern Algeria

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ABSTRACT: Floristic inventories provide essential baseline information for documenting biodiversity, assessing ecosystem value, and supporting conservation planning. Mountain ecosystems are particularly important because their environmental heterogeneity can support diverse plant communities over relatively short spatial distances. This study was conducted on Mount Allahoum, the highest mountain in Souk Ahras Province, northeastern Algeria, to provide the first comprehensive assessment of its flora and its organization along an elevational gradient. Field surveys were conducted over three consecutive years (2023–2025), covering all seasons and the main habitats and elevations of the mountain. A total of 130 plant species belonging to 49 families were recorded. For the standardized elevational analysis, the mountain was divided into 15 successive 20-m elevation belts between 800 and 1100 m a.s.l. Species richness was highest at 840–860 m, where 48 species and 28 families were recorded, and declined markedly with increasing elevation. Species richness showed a strong negative relationship with elevation (Spearman's $\rho = -0.913$, $p < 0.001$; linear model $R^2 = 0.834$). Floristic dissimilarity among adjacent elevation belts was particularly pronounced between 880 and 980 m, indicating substantial changes in species composition along the elevational gradient. Jaccard-based non-metric multidimensional scaling (NMDS) provided a good two-dimensional representation of floristic dissimilarity among the elevation belts (stress = 0.063), revealing a clear compositional pattern along the elevational gradient, while distance-based permutation analysis confirmed a significant association between elevation and floristic composition ($R^2 = 0.319$, $p = 0.0001$). These results demonstrate pronounced elevational structuring of the flora and highlight the importance of the lower–middle elevations, particularly the 840–860 m belt, as a zone of high floristic richness, while the 880–980 m interval represents a major compositional

transition. This first comprehensive assessment establishes a detailed botanical baseline for Mount Allahoum and provides essential information for future biodiversity monitoring, ecological research, and conservation planning. Given its floristic richness and elevational differentiation, the study also provides an evidence base for considering Mount Allahoum for future protected-area designation, while supporting carefully managed nature-based activities that maintain ecosystem integrity.

INTRODUCTION

Floristic inventories are fundamental to botanical research because they provide baseline information on plant species richness, taxonomic composition, and distribution. Beyond documenting the flora of a given area, such inventories provide the basis for evaluating patterns of plant diversity, identifying areas of particular botanical interest, and supporting biodiversity monitoring and conservation planning. Recent floristic studies continue to demonstrate the value of detailed local inventories for characterizing plant diversity and identifying rare, endemic, and conservation-relevant taxa in poorly documented areas [1,2].

The Mediterranean Basin is widely recognized as a major center of plant diversity and endemism, resulting from its complex biogeographical history and pronounced environmental heterogeneity [3,4]. Its flora has developed under a combination of climatic variability, complex topography, and long-term ecological and human influences. These characteristics have contributed to the formation of distinct floristic assemblages and areas of high conservation value. At the same time, Mediterranean plant diversity is increasingly exposed to environmental and anthropogenic pressures, making accurate documentation of floristic diversity an important component of biodiversity assessment and conservation planning [3,4].

North Africa forms an important part of the Mediterranean floristic region and contains a highly heterogeneous flora associated with contrasting environmental conditions. Algeria, in particular, encompasses a broad geographical and environmental gradient, reflected in substantial variation in plant composition among regions. Recent floristic assessments in Algeria have continued to document considerable local plant diversity, including rare and endemic taxa, while emphasizing the importance of detailed inventories for improving knowledge of the country's botanical heritage and identifying areas of conservation interest [1,2]. In northeastern Algeria, recent work has likewise highlighted the floristic value of local biodiversity-rich areas and the need to identify priority areas for conservation [5].

Mountain ecosystems provide particularly suitable settings for examining the spatial organization of plant diversity. Elevation is associated with changes in environmental conditions that can influence both the number of species occurring at different elevations and the composition of plant assemblages. However, species richness does not follow a single universal pattern along elevational gradients; recent studies in Mediterranean mountains have documented different richness patterns, indicating that elevational responses vary among mountain systems and geographical contexts [4,6,7]. Examining species richness together with changes in floristic composition can therefore provide a more complete understanding of how plant diversity is structured along mountain gradients.

The study of elevational patterns is also important from a conservation perspective. Differences in species composition between elevation zones may reveal areas of high richness as well as zones where substantial species replacement occurs. Recent research has shown that changes in plant composition along elevation gradients can be strongly associated with species turnover, demonstrating that different elevation zones may contribute distinct components to overall mountain diversity [8]. Such patterns can help identify ecologically important sections of a mountain and provide a more detailed basis for biodiversity monitoring and conservation planning. In Mediterranean mountain systems, where topographic complexity can generate substantial variation in plant diversity over relatively short distances, documenting these patterns is particularly relevant [6,7].

In eastern Algeria, and particularly in the region of Souk Ahras, several mountain landscapes remain insufficiently documented from a detailed floristic perspective. Recent studies from northeastern Algeria have demonstrated the high floristic value of local areas and emphasized the importance of identifying sites of particular conservation interest [5]. Nevertheless, floristic information remains unevenly distributed among mountainous areas of the region. Detailed floristic

studies in such areas are therefore necessary to improve knowledge of local plant diversity and provide a reliable scientific basis for ecological assessment and future conservation initiatives.

Mount Allahoum, located in the northwestern part of Heddada Municipality in Souk Ahras Province, represents one of these insufficiently documented mountain areas. Reaching approximately 1100 m above sea level, it is the highest mountain in the province. Its elevational and topographic variation provides an appropriate natural setting for examining the distribution of plant diversity along an elevation gradient. However, comprehensive information on the flora of Mount Allahoum and on the changes in species richness and floristic composition across its elevation remains limited. Establishing a detailed botanical inventory and examining the organization of plant diversity along the mountain are therefore necessary to improve knowledge of its biological value.

The present study was designed to address this gap by combining a comprehensive floristic inventory of Mount Allahoum with an analysis of plant diversity along its elevational gradient. Particular attention was given to species richness across successive elevation belts, the relationship between species richness and elevation, and changes in floristic composition and species replacement between elevation belts. By documenting both the overall flora and its elevational organization, the study provides a more detailed characterization of the botanical diversity of Mount Allahoum.

The present study aimed to provide the first comprehensive assessment of the flora of Mount Allahoum and to determine how plant diversity and floristic composition vary along its elevational gradient. Specifically, the study sought to:

document and characterize the plant flora of Mount Allahoum and its taxonomic diversity;

- quantify patterns of species richness across successive 20-m elevation belts between 800 and 1100 m a.s.l.;
- determine the relationship between elevation and plant species richness;
- assess changes in floristic composition and species replacement among successive elevation belts and determine the extent to which elevation is associated with these compositional changes; and
- highlight the floristic diversity and ecological value of Mount Allahoum and provide a scientific basis to support future conservation and protection measures for the mountain.

MATERIAL AND METHODS

Study area:

The study was conducted on Mount Allahoum, located in the northwestern part of Heddada Municipality, Souk Ahras Province, eastern Algeria, at 36°11'38.38" N and 8°13'06.29" E. The mountain is situated near the Algerian–Tunisian border and reaches an elevation of approximately 1100 m above sea level, making it the highest mountain in the region. The study area encompasses the geographical limits of Mount Allahoum, including its lower and higher elevations and the associated variation in slope and topography. The terrain comprises low-lying areas, valley channels, and natural depressions, producing a heterogeneous topographic setting across the mountain. The elevational gradient extends from the lower parts of the mountain toward its highest elevations and was considered in the present floristic assessment.

The location and geographical setting of Mount Allahoum within Heddada Municipality and Souk Ahras Province are shown in Figure 1.

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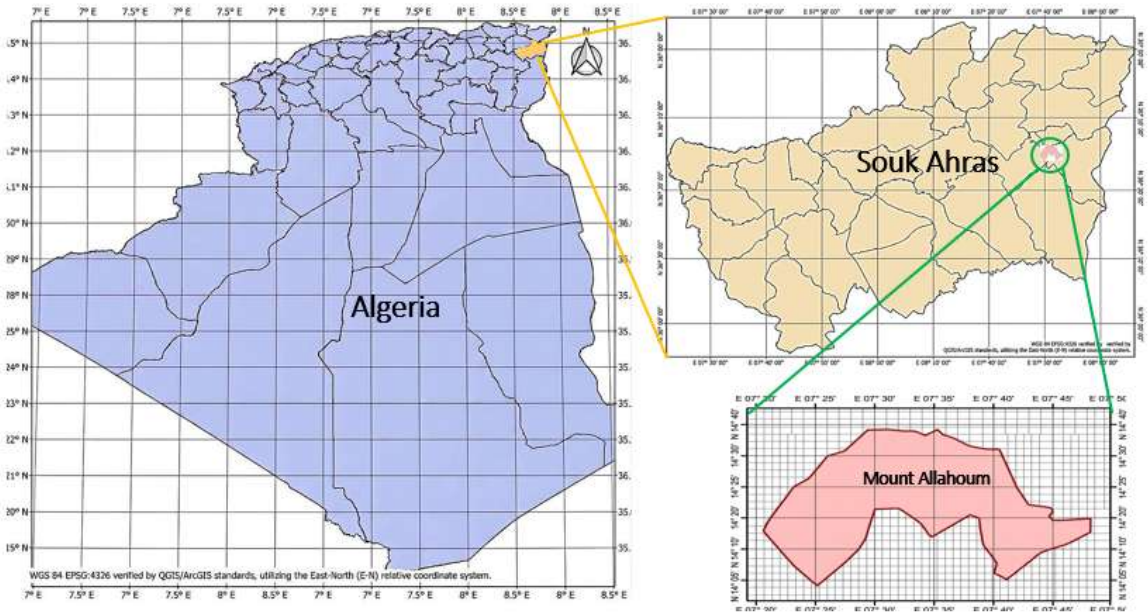


Figure 1. Geographical location of Mount Allahoum in Heddada Municipality, Souk Ahras Province, Algeria.

Floristic survey and field sampling

Field surveys were conducted on Mount Allahoum over three consecutive years, from 2023 to 2025, covering all seasons and the full geographical extent of the study area. Field visits were conducted at approximately 15-day intervals to document seasonal variation in plant occurrence and to maximize the detection of species with different phenological periods.

For the standardized elevational assessment, the 800–1100 m range was divided into 15 successive elevation belts, each 20 m wide, extending from 800–820 m to 1080–1100 m above sea level. Within each elevation belt, field surveys were conducted using a systematic zigzag search designed to cover the belt as extensively as possible. The survey path was adapted to the local topography, allowing the researchers to move across different sections of each belt and document all observable plant species. This approach enabled the coverage of heterogeneous microtopographic conditions within each belt, including variations in slope, terrain, vegetation density, and accessibility.

The use of fixed quadrats or other spatially restricted sampling units was not considered appropriate for the present floristic inventory because of the pronounced spatial heterogeneity of the mountain terrain. Substantial variation in ground conditions, slope, topographic configuration, and vegetation density occurred both among and within elevation belts. Under these conditions, fixed sampling units could restrict the surveyed area and increase the likelihood of overlooking species occurring in localized or discontinuous microsites. The zigzag approach therefore provided broader spatial coverage within each 20-m elevation belt and was more suitable for documenting species occurrence across the heterogeneous terrain of Mount Allahoum (Figure 2).

During each survey, all observed plant species were recorded and identified in the field whenever possible, while the geographic position and elevation of observations were documented using a GPS device. Multiple observations of the same species at different elevations were retained to characterize its elevational distribution rather than reducing the species to a single elevation record. Species that could not be confidently identified in the field were examined subsequently using collected material and relevant taxonomic references. Scientific names were checked against current taxonomic sources to ensure consistency in nomenclature.

Species recorded below 800 m within the geographical boundaries of Mount Allahoum were retained as part of the overall floristic inventory but were excluded from the standardized elevational analysis. The survey was designed to document species occurrence and distribution rather than to estimate abundance, density, frequency, biomass, or percentage cover. The resulting occurrence records formed the basis for the comprehensive floristic inventory and the subsequent analyses of species richness and floristic composition along the elevational gradient.

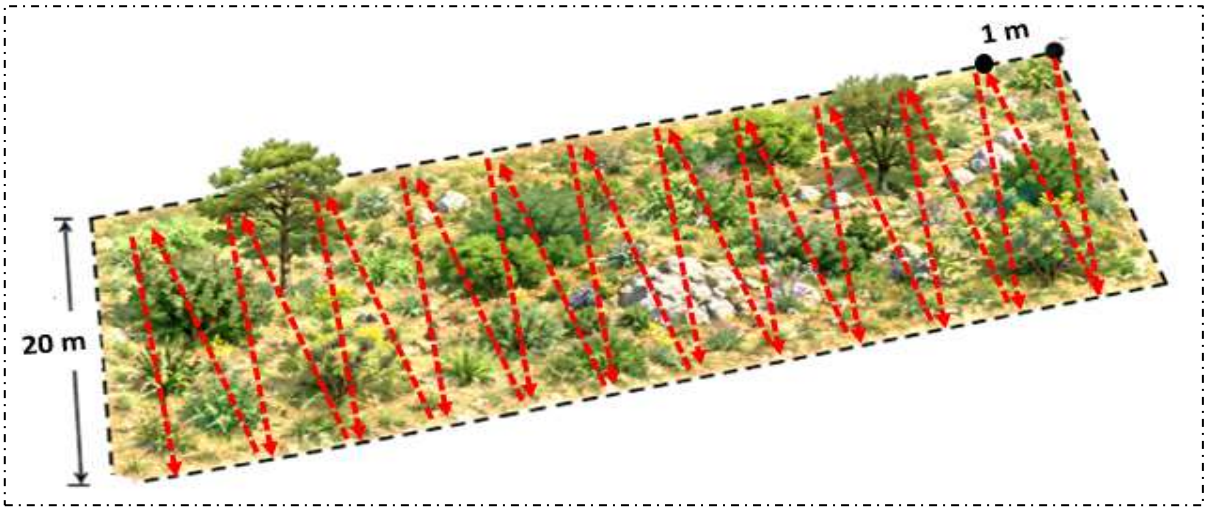


Figure 2: Detailed survey method within each elevation belt.

Floristic diversity and species richness

The floristic inventory was compiled from all plant occurrence records obtained during the field surveys. For each recorded species, the scientific name and family were determined and verified using current taxonomic references. The total number of species and families was calculated for the complete floristic inventory of Mount Allahoum.

For the standardized elevational analysis, species richness was calculated separately for each 20-m elevation belt as the number of distinct plant species recorded within that belt. Family richness was likewise calculated as the number of distinct plant families represented in each belt. Species occurrence data were organized as a presence–absence matrix, in which each species was coded as present (1) or absent (0) in each elevation belt. This binary approach was selected because the objective of the study was to characterize floristic composition, species richness, and species distribution along the elevational gradient rather than to quantify population size.

Quantitative estimates of the number of individuals of each species were not attempted because the extensive geographical area of Mount Allahoum, combined with substantial variation in topography, slope, terrain, vegetation density, and the spatial distribution of plant populations, makes a complete and reliable enumeration of individuals impractical using the present survey design. Such estimates would require a dedicated quantitative sampling design based on standardized sampling units and sufficient spatial replication. Future studies could therefore complement the present floristic inventory with quantitative assessments of population abundance, density, frequency, or percentage cover for selected species or habitats using an appropriate standardized sampling framework.

For richness calculations, repeated records of the same species within a given elevation belt were treated as a single presence record, whereas occurrences recorded in different elevation belts were retained to represent the species' distribution along the gradient. Species recorded below 800 m within the geographical limits of Mount Allahoum were retained in the complete floristic inventory but were excluded from the standardized elevational analyses.

Relationship between Plant Species Richness and Elevation

To examine variation in plant species richness along the elevational gradient of Mount Allahoum, species richness was calculated for each elevation belt as the total number of distinct plant species recorded within that belt. Elevation was considered the explanatory variable, whereas species richness was treated as the response variable. The resulting values were used to assess the pattern of species richness across the elevational gradient.

The strength and direction of the association between elevation and species richness were evaluated using Spearman's rank correlation coefficient (ρ), a non-parametric measure suitable for assessing monotonic relationships between the two variables. A simple linear regression model was additionally fitted to quantify the linear trend in species richness with

increasing elevation and to estimate the proportion of variation in species richness associated with elevation using the coefficient of determination (R^2).

The regression analysis was used as a complementary approach to the correlation analysis, allowing the elevational trend in species richness to be quantitatively described. Statistical significance was assessed at the 0.05 probability level. All statistical analyses, regression modelling, and graphical representations were performed using R statistical software.

Floristic Composition and Beta Diversity

Floristic composition was characterized using a presence–absence matrix of the plant species recorded across the 15 elevation belts. The distribution of species among the belts was examined to identify changes in floristic composition along the elevational gradient and differences in species assemblages among elevations.

Beta diversity was assessed using the Jaccard dissimilarity index based on the presence–absence data. Jaccard dissimilarity was used to quantify differences in species composition between pairs of elevation belts, with higher values indicating greater differences in floristic composition. The resulting dissimilarity matrix was used to characterize compositional variation among the elevation belts.

To visualize the relationships among the elevation belts based on their floristic composition, a non-metric multidimensional scaling (NMDS) ordination was performed using the Jaccard dissimilarity matrix. The NMDS ordination was used to represent similarities and differences in species composition among the elevation belts in a reduced-dimensional space. The quality of the ordination was assessed using the stress value.

The relationship between floristic dissimilarity and elevation was further examined using a distance-based analysis. This analysis was used to assess whether differences in floristic composition among the elevation belts were associated with their position along the elevational gradient.

All analyses of floristic composition and beta diversity, including calculation of the Jaccard dissimilarity matrix, NMDS ordination, and the distance-based analysis, were performed using R statistical software.

RESULTS AND DISCUSSION

Floristic Diversity and Species Richness

The floristic inventory of Mount Allahoum recorded a total of 130 plant species belonging to 49 families (Supplementary Table 1.), highlighting the taxonomic diversity of this mountain ecosystem. The recorded flora included families with markedly different levels of species representation. *Asteraceae* was the most species-rich family, comprising 29 species (22.31% of the total inventory), followed by *Fabaceae* with 10 species (7.69%) and *Rosaceae* with seven species (5.38%). *Apiaceae*, *Boraginaceae*, *Lamiaceae*, and *Ranunculaceae* were each represented by five species, while *Asparagaceae* comprised four species. *Cistaceae*, *Convolvulaceae*, *Malvaceae*, *Papaveraceae*, *Plantaginaceae*, and *Poaceae* each contributed three species, The remaining families were represented by one or two species (Figure.3).

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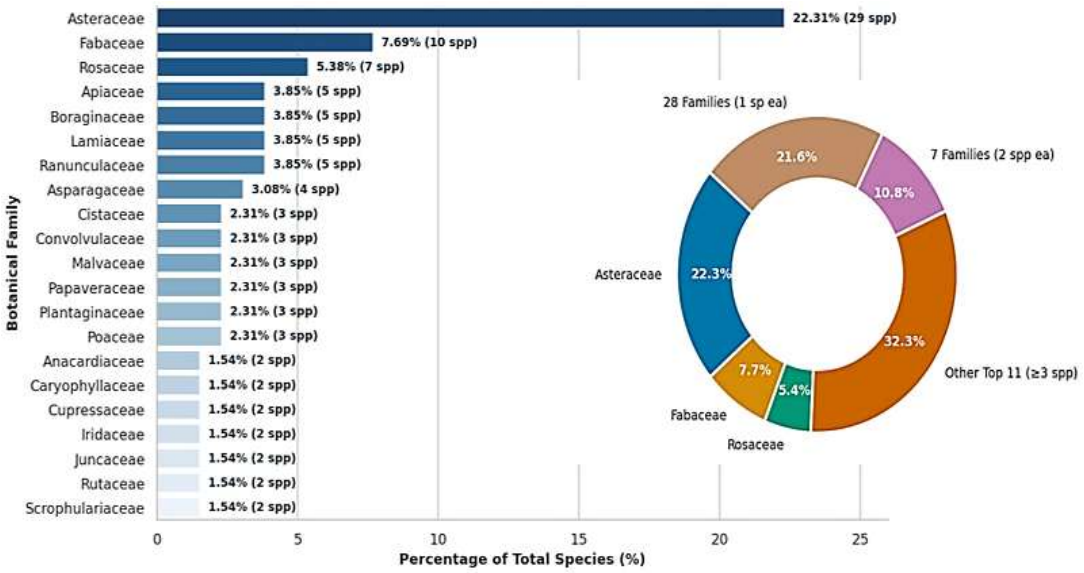


Figure 3. Top 21 plant families by proportion of total species.

This distribution indicates that the flora of Mount Allahoum is characterized by a pronounced contribution from a limited number of species-rich families, particularly *Asteraceae*, alongside a considerable number of less-represented families.

The predominance of *Asteraceae* is consistent with findings from several floristic studies conducted in different Algerian ecosystems. In Tiaret Mountains, Algeria, *Asteraceae* was the most species-rich family, with 23 species representing 18.3% of the recorded flora [9]. Similarly, SAIDI AND KEIFA [1] reported that *Asteraceae* accounted for 16% of the species recorded in Mimouna Forest in northwestern Algeria. In the steppe vegetation of Djelfa, this family represented 29% of the recorded species, making it the dominant family in that study [10]. *Asteraceae* was also among the leading families identified in Bissa Forest, Chlef [11]. Although these studies differ in their geographical settings, habitats, and survey methods, they collectively indicate that *Asteraceae* frequently makes a substantial contribution to the floristic composition of Algerian natural ecosystems. Its representation of 22.31% of the flora recorded on Mount Allahoum therefore reflects a pattern also observed in other parts of the country.

Several biological and ecological characteristics may help explain the frequent prominence of *Asteraceae* in floristic inventories. It is one of the largest plant families and encompasses a broad range of growth forms and ecological strategies. Its members occur in diverse environments, including open grasslands, shrublands, forest margins, semi-arid habitats, and mountain landscapes. This ecological breadth may allow different species to occupy contrasting habitats and respond differently to local environmental conditions. Furthermore, the pappus, which occurs in many members of the family, can facilitate wind dispersal and may contribute to the colonization of suitable sites. The representation of annual and perennial species within the family may also support its occurrence under Mediterranean conditions characterized by seasonal variation in temperature and water availability. These characteristics provide plausible explanations for the high number of *Asteraceae* species recorded on Mount Allahoum. However, because the present study did not directly investigate functional traits, dispersal mechanisms, or species-specific environmental responses, these explanations should be considered potential contributing factors rather than demonstrated causes of the family's predominance.

The representation of *Fabaceae* and *Rosaceae* among the other relatively species-rich families further contributes to the taxonomic breadth of the recorded flora. The presence of numerous families with lower species counts also demonstrates that the mountain's botanical diversity is not restricted to the dominant groups. Rather, the inventory encompasses a broad range of taxonomic lineages, providing a useful baseline for future botanical investigations and biodiversity monitoring. Nevertheless, the number of recorded species should be interpreted in the context of the study's objectives and survey approach: the inventory documents species occurrence across the study area, but it does not measure population abundance or vegetation cover.

Overall, the recording of 130 species from 49 families establishes an important baseline for understanding the floristic diversity of Mount Allahoum, an area for which comprehensive botanical documentation has been limited. The identification of *Asteraceae* as the leading family, together with the representation of numerous other families, provides an initial picture of the mountain's taxonomic structure. These findings can support future comparisons with other Algerian mountain ecosystems and help guide further investigations into species distributions, ecological requirements, and conservation priorities.

Relationship between Plant Species Richness and Elevation

In our study, plant species richness varied considerably along the elevational gradient of Mount Allahoum, with a clear overall decline toward the summit. Among the 15 successive 20-m elevation belts examined between 800 and 1100 m a.s.l., the highest richness was recorded at 840–860 m, where 48 species belonging to 28 families were identified. The adjacent belts also supported relatively high richness, with 43 species at 820–840 m and 40 species at 800–820 m. Above 860 m, however, the number of recorded species decreased markedly, reaching 22 species at 880–900 m, 18 at 900–920 m, and only six at 960–980 m. At higher elevations, richness remained particularly low, with only one species recorded in each belt from 980–1000 m to 1060–1080 m, followed by two species in the uppermost belt (1080–1100 m). These findings indicate that most of the recorded species were concentrated in the lower and lower-middle parts of the studied mountain gradient (Figure.4).

Field observations also revealed a noticeable change in the vegetation along the slope: as elevation increased, Aleppo pine (*Pinus halepensis*) became increasingly dominant, particularly in the upper parts of the mountain. This pattern is an important feature of the vegetation observed on Mount Allahoum. The increasing prominence of this tree toward the summit coincided with a substantial reduction in the number of other plant species recorded at higher elevations. However, because our survey was based on species presence and absence rather than quantitative measurements of vegetation cover or abundance, this observation should be understood as a field-based description of vegetation structure, not as a measured statistical relationship between Aleppo pine dominance and species richness. Further vegetation surveys would be needed to determine how the distribution and cover of this tree are associated with the occurrence of other plant species.

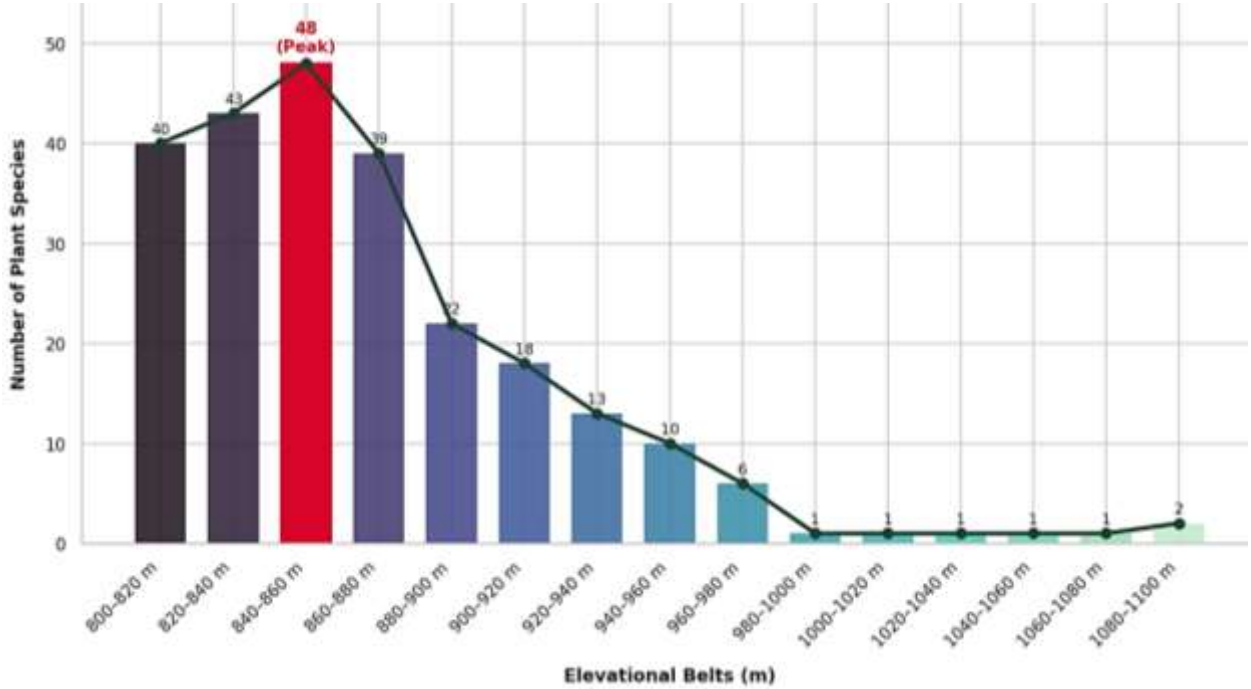


Figure 4. Variation in plant species richness along the elevational gradient of Mount Allahoum (800–1100 m a.s.l.).

The statistical analyses supported the overall decline in species richness with increasing elevation. Spearman's rank correlation showed a strong negative relationship between elevation and species richness ($\varrho = -0.913$, $p < 0.001$), while the linear model explained 83.4% of the observed variation in richness ($R^2 = 0.834$). Together, these results demonstrate a pronounced elevational pattern in the number of recorded species. Nevertheless, the maximum richness at 840–860 m shows that the

richest belt was not the lowest one surveyed, but a slightly higher belt within the lower-middle part of the mountain. This suggests that species richness was concentrated within a particular elevational range rather than declining uniformly from the lowest elevation upward.

Our findings can be compared with previous studies of Mediterranean mountain ecosystems, although the patterns reported in the literature are not always identical. AYKURT et *al.* [3] highlighted the importance of elevation and topographic complexity in shaping plant diversity in a Mediterranean mountain refuge. DI MUSCIANO et *al.* [4] reported a hump-shaped pattern of plant species richness along an elevational gradient in a Mediterranean island system, while Abd EL-GHANI and AL BORKI [6] also documented a hump-shaped pattern in the Mediterranean mountain ecosystem of *Al-Jabal Al-Akhdar*, Libya, with the highest richness at intermediate elevations. In contrast, our results for Mount Allahoum showed a concentration of species in the lower-middle elevation range, followed by a sustained decline toward the summit. These differences indicate that plant species richness does not follow a single universal pattern across Mediterranean mountains and that its distribution may vary according to the characteristics of each study area.

The increasingly prominent presence of *Pinus halepensis* toward the upper elevations provides an additional descriptive element for understanding the vegetation pattern observed in our study. The upper part of Mount Allahoum was characterized by fewer recorded plant species and a greater prominence of this tree in the vegetation. Nevertheless, the available data do not establish whether the increasing dominance of *Pinus halepensis* contributed to the decline in species richness or whether both patterns reflect other environmental or habitat-related differences along the mountain slope. Elevation, vegetation structure, and habitat conditions may vary together, and their individual effects cannot be distinguished without additional measurements. Therefore, explanations involving temperature, soil properties, moisture availability, or competition should remain hypotheses until these factors are investigated directly.

Overall, our results provide a valuable baseline for understanding the elevational distribution of the flora of Mount Allahoum. The concentration of species between 800 and 880 m, particularly the peak at 840–860 m, identifies this part of the studied gradient as an important area for documenting the mountain's floristic diversity. At the same time, the low richness recorded near the summit, together with the increasing prominence of *Pinus halepensis*, highlights the importance of considering changes in vegetation structure as well as changes in species numbers when describing mountain ecosystems. These findings provide a basis for future studies examining the relationship between elevation, vegetation composition, and habitat conditions, and can contribute to the development of conservation priorities for the flora of Mount Allahoum.

Floristic Composition and Beta Diversity

The analysis of beta diversity provided further insight into the floristic organization of Mount Allahoum by examining differences in species composition among elevation belts. Jaccard dissimilarity revealed compositional differences between belts, with the strongest differences between adjacent belts occurring within the 880–980 m range. This result highlights variation in the identity of recorded species across the mountain and complements the overall species inventory.

The NMDS ordination provided a visual representation of these compositional relationships, with a stress value of 0.063. In addition, the distance-based analysis identified a significant association between elevation and floristic composition (R^2 = 0.319, p = 0.0001). Together, these analyses show that the species assemblages recorded on Mount Allahoum differed in composition along the elevational gradient. However, the present analyses do not separate species replacement from species loss, and further partitioning would be needed to determine the relative contribution of each component to beta diversity.

CONCLUSION

This study provides the first comprehensive floristic assessment of Mount Allahoum, in Souk Ahras Province, eastern Algeria, documenting 130 plant species belonging to 49 families. The findings revealed a clear decline in species richness across the surveyed elevation gradient, with the highest richness recorded between 840 and 860 m a.s.l. Floristic composition also varied among elevation belts, demonstrating that the mountain supports distinct plant assemblages across its elevational range.

Beyond documenting the local flora, this study establishes an essential botanical baseline for a mountain area whose plant diversity has received limited scientific attention. The resulting inventory and analysis of elevational patterns provide a foundation for future floristic surveys, long-term biodiversity monitoring, and more detailed ecological investigations. Further

research incorporating environmental variables, habitat characteristics, and repeated surveys would help clarify the factors shaping plant distribution and compositional variation. These findings can also inform evidence-based conservation planning and support the sustainable management of the mountain's natural heritage, including carefully managed nature-based tourism. Overall, this study highlights the scientific and conservation value of Mount Allahoum and provides a reference for future assessments of its botanical diversity.

Supplementary Material:

Supplementary Table 1*. Complete checklist of the plant species recorded on Mount Allahoum, northeastern Algeria.*

No.	Species Name	Family Name [12-19]
1	*Anacyclus clavatus*	*Asteraceae*
2	*Anacyclus pyrethrum*	*Asteraceae*
3	*Artemisia herba-alba Asso*	*Asteraceae*
4	*Atractylis gummifera*	*Asteraceae*
5	*Calendula arvensis*	*Asteraceae*
6	*Carduus litigiosus*	*Asteraceae*
7	*Catananche lutea*	*Asteraceae*
8	*Centaurea solstitialis*	*Asteraceae*
9	*Cichorium intybus*	*Asteraceae*
10	*Cirsium palustre*	*Asteraceae*
11	*Cynara cardunculus*	*Asteraceae*
12	*Dittrichia viscosa*	*Asteraceae*
13	*Echinops ritro*	*Asteraceae*
14	*Glebionis coronaria*	*Asteraceae*
15	*Helminthotheca echioides*	*Asteraceae*
16	*Lapsana communis*	*Asteraceae*
17	*Matricaria chamomilla*	*Asteraceae*
18	*Onopordum acanthium*	*Asteraceae*
19	*Pallenis spinosa (L.) Cass.*	*Asteraceae*
20	*Rhaponticum coniferum*	*Asteraceae*
21	*Rhaponticum acaule*	*Asteraceae*
22	*Santolina chamaecyparissus*	*Asteraceae*
23	*Scolymus hispanicus*	*Asteraceae*
24	*Scolymus maculatus*	*Asteraceae*
25	*Scorzonera undulata*	*Asteraceae*

26	*Silybum marianum*	*Asteraceae*
27	*Sonchus oleraceus*	*Asteraceae*
28	*Taraxacum officinale F.H.Wigg.*	*Asteraceae*
29	*Urospermum dalechampii*	*Asteraceae*
30	*Anthyllis tetraphylla*	*Fabaceae*
31	*Calicotome spinosa*	*Fabaceae*
32	*Cytisus scoparius*	*Fabaceae*
33	*Cytisus spinosus*	*Fabaceae*
34	*Lotus corniculatus*	*Fabaceae*
35	*Medicago arabica*	*Fabaceae*
36	*Medicago orbicularis*	*Fabaceae*
37	*Medicago sativa*	*Fabaceae*
38	*Trifolium pratense*	*Fabaceae*
39	*Trifolium rubens*	*Fabaceae*
40	*Crataegus azarolus*	*Rosaceae*
41	*Crataegus laevigata*	*Rosaceae*
42	*Crataegus monogyna*	*Rosaceae*
43	*Cydonia oblonga*	*Rosaceae*
44	*Prunus amygdalus*	*Rosaceae*
45	*Pyrus pyraster*	*Rosaceae*
46	*Rosa canina*	*Rosaceae*
47	*Daucus carota*	*Apiaceae*
48	*Eryngium campestre*	*Apiaceae*
49	*Ferula communis L.*	*Apiaceae*
50	*Pituranthos chloranthus*	*Apiaceae*
51	*Scandix pecten-veneris*	*Apiaceae*
52	*Alkanna tinctoria subsp. tinctoria*	*Boraginaceae*
53	*Anchusa arvensis*	*Boraginaceae*
54	*Borago officinalis*	*Boraginaceae*
55	*Echium vulgare*	*Boraginaceae*
56	*Pulmonaria officinalis*	*Boraginaceae*
57	*Ajuga iva*	*Lamiaceae*
58	*Marrubium vulgare*	*Lamiaceae*

59	*Salvia rosmarinus Spenn.*	*Lamiaceae*
60	*Teucrium polium*	*Lamiaceae*
61	*Thymus vulgaris*	*Lamiaceae*
62	*Adonis aestivalis*	*Ranunculaceae*
63	*Adonis annua*	*Ranunculaceae*
64	*Nigella arvensis*	*Ranunculaceae*
65	*Ranunculus arvensis L.*	*Ranunculaceae*
66	*Ranunculus repens L.*	*Ranunculaceae*
67	*Asparagus acutifolius L.*	*Asparagaceae*
68	*Drimia maritima*	*Asparagaceae*
69	*Muscari comosum (L.) Mill.*	*Asparagaceae*
70	*Ornithogalum umbellatum*	*Asparagaceae*
71	*Cistus creticus L.*	*Cistaceae*
72	*Cistus monspeliensis L.*	*Cistaceae*
73	*Cistus salvifolius*	*Cistaceae*
74	*Convolvulus arvensis*	*Convolvulaceae*
75	*Convolvulus cneorum*	*Convolvulaceae*
76	*Convolvulus tricolor*	*Convolvulaceae*
77	*Malva arborea*	*Malvaceae*
78	*Malva sylvestris*	*Malvaceae*
79	*Malva neglecta*	*Malvaceae*
80	*Papaver hybridum*	*Papaveraceae*
81	*Papaver rhoeas*	*Papaveraceae*
82	*Roemeria hybrida (L.) DC*	*Papaveraceae*
83	*Globularia alypum L.*	*Plantaginaceae*
84	*Plantago albicans*	*Plantaginaceae*
85	*Plantago lanceolata*	*Plantaginaceae*
86	*Avena sativa*	*Poaceae*
87	*Phalaris canariensis*	*Poaceae*
88	*Stipa tenacissima*	*Poaceae*
89	*Pistacia atlantica*	*Anacardiaceae*
90	*Pistacia lentiscus*	*Anacardiaceae*
91	*Dianthus carthusianorum*	*Caryophyllaceae*

92	*Paronychia kurdica*	*Caryophyllaceae*
93	*Juniperus oxycedrus*	*Cupressaceae*
94	*Juniperus phoenicea*	*Cupressaceae*
95	*Gladiolus communis*	*Iridaceae*
96	*Moraea sisyrinchium*	*Iridaceae*
97	*Juncus effusus*	*Juncaceae*
98	*Juncus inflexus*	*Juncaceae*
99	*Ruta graveolens*	*Rutaceae*
100	*Ruta montana*	*Rutaceae*
101	*Verbascum sinuatum*	*Scrophulariaceae*
102	*Verbascum thapsus*	*Scrophulariaceae*
103	*Chenopodium album*	*Amaranthaceae*
104	*Acis nicaeensis*	*Amaryllidaceae*
105	*Nerium oleander*	*Apocynaceae*
106	*Hedera helix*	*Araliaceae*
107	*Asphodelus albus*	*Asphodelaceae*
108	*Capsella bursa-pastoris*	*Brassicaceae*
109	*Opuntia ficus-indica (L.) Mill.*	*Cactaceae*
110	*Lomelosia porphyroneura*	*Caprifoliaceae*
111	*Ecballium elaterium*	*Cucurbitaceae*
112	*Scirpus sylvaticus*	*Cyperaceae*
113	*Ephedra alata*	*Ephedraceae*
114	*Euphorbia helioscopia*	*Euphorbiaceae*
115	*Quercus ilex*	*Fagaceae*
116	*Geranium robertianum*	*Geraniaceae*
117	*Ficus carica*	*Moraceae*
118	*Peganum harmala*	*Nitrariaceae*
119	*Olea europaea*	*Oleaceae*
120	*Oxalis acetosella*	*Oxalidaceae*
121	*Pinus halepensis*	*Pinaceae*
122	*Portulaca oleracea*	*Portulacaceae*
123	*Anagallis arvensis*	*Primulaceae*
124	*Reseda alba*	*Resedaceae*

125	*Ziziphus lotus (L.) Lam.*	*Rhamnaceae*
126	*Galium aparine*	*Rubiaceae*
127	*Mandragora officinarum*	*Solanaceae*
128	*Tamarix articulata*	*Tamaricaceae*
129	*Thymelaea hirsuta (L.) Endl.*	*Thymelaeaceae*
130	*Urtica dioica*	*Urticaceae*

REFERENCES:

[1] SAIDI, A., & KEIFA, A. (2024). Floristic diversity of the Mimouna Forest (north-western Algeria). Biodiversity: Research and Conservation, 73, 13–22.

[2] TAVILLA, G., & LANFRANCO, S. (2025). Assessing plant species diversity in Maltese rocky cliffs using Hill numbers and its implications for conservation. Frontiers in Conservation Science, 6.

[3] AYKURT, C., ÖZKAN, K., GÜLBEN, M., ŞENTÜRK, Ö., BERBEROĞLU, E., TÜRKAN, S., ÖZ, Z., GÖKTÜRK, R. S., AKGÜL, H., GÜNAYDIN, S., & GÖRGÖZ, M. M. (2025). Patterns of functional diversity, species diversity, and endemicity driven by elevation and topographic complexity in a Mediterranean mountain refuge. Ecology and Evolution, 15.

[4] DI MUSCIANO, M., CALVIA, G., RUGGERO, A., FARRIS, E., RICCI, L., FRATTAROLI, A. R., & BAGELLA, S. (2024). Elevational patterns of plant species richness and phylogenetic diversity in a Mediterranean island. Perspectives in Plant Ecology, Evolution and Systematics, 65.

[5] HAMEL, T., HIDALGO TRIANA, N., MEDDAD-HAMZA, A., BOULEMTAFES, A., SOUILAH, N., DE BÉLAIR, G., & SALVO TIERRA, Á. E. (2023). Analysis of taxonomic distinctness and priority conservation areas as a basis for heritage enhancement of floristic diversity: the case of the 'hotspot' of the islands of Numidia (North-eastern Algeria). Mediterranean Botany, 44.

[6] ABD EL-GHANI, M., & AL BORKI, A. E.-N. (2024). How elevation and soil properties affect plant distribution patterns and species diversity in the Mediterranean mountain ecosystem of Al-Jabal Al-Akhdar, Libya. Journal of Mountain Science, 21(11).

[7] FOREMNIK, K., HÉDL, R., ZIĘBA, A., SZWAGRZYK, J., SURMACZ, B., & PIELECH, R. (2026). Century-long trends in plant diversity of temperate mountain vegetation are modulated along elevation gradient. Journal of Ecology, 114.

[8] RAMOS, C. S., LOETTI, M. V., & FILLOY, J. (2024). Understanding processes underlying cross-taxon congruence in species composition along elevational gradients. Scientific Reports, 14.

[9] BELGACEM, N., OKKACHA, H., BENCHOHRA, M., & MIARA, M. D. (2020). Floristic diversity of the Tagdempt region, Tiaret Mountains, Algeria. Acta Ecologica Sinica, 289.

[10] HABIB, N., REGAGBA, Z., MIARA, M. D., AIT HAMMOU, M., & SNOREK, J. (2020). Floristic diversity of steppe vegetation in the region of Djelfa, North-West Algeria. Acta Botanica Malacitana, 45.

[11] ZEMMAR, N., M'HAMMEDI BOUZINA, M., ABABOU, A., & HEDIDI, D. (2020). Analysis of the floristic diversity in a southern Mediterranean ecosystem: Case of Bissa forest, Chlef (Algeria). Botanica Complutensis, 44.

[12] HENSEL, W. 2008. Les indispensables nature de lachaux, 350 plantes médicinales, Edit Delachaux et Niestlé, Paris , France, 21, 25, 30, 31- 33, 47, 64, 67, 71, 73, 83, 85, 86, 88, 97, 101, 102, 117, 124, 130, 137, 140, 142, 148, 163, 169, 193, 200, 208, 223 et 230.

[13] COUPLAN , F ., & DOUX Y. 2007. Les guides du naturalistes, Reconnaitre facilement les plantes, Edit Delachaux et Niestlé, Paris , France, 45, 53, 54, 56, 67, 68, 95, 99, 157, 174, 175, 177, 218, 234, 241.

[14] YBERT, E., & DELESALLE-FEAT, T. 2001. Encyclopedia of Médicinal Plants (2nd Edition), Edit LAROUSSE, 128, 141, 189, 211, 244, 264.

[15] BAYER, E., BUTTLER, K-P., FINKENZLLER, X., & GRAU, J. 2005. Guide de la flore méditerranéenne, Edit Delachaux et Niestlé, Paris , France, 30, 36, 44, 52, 70, 76, 110, 115, 142, 168, 206, 216, 218, 222, 226, 230, 248, 254, 256, 262.

[16] WILAYA D'ALGER, MAIRIE DE PARIS AVEC LE SOUTIEN DU MINISTERE DES AFFAIRES ETRANGERES ET EUROPEENNES DE LA REPUBLIQUE FRANÇAISE. 2012. Guide illustré de la flore algérienne, 44, 50, 70.

[17] ARAB CENTER FOR THE STUDIES OF ARID ZONES AND DRY LANDS (ACSAD). 2012. اطلس النباتات الطبية والعطرية في الوطن العربي (Atlas of Medicinal and Aromatic Plants in the Arab World), Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD), Damascus, Syria, 202, 211, 260, 278, 358, 376, 436, 451, 476, 486, 495, 496, 514.

[18] FLETCHER, N. 2005. Fleurs sauvage, Edit LAROUSSE, 37, 96, 124, 181, 197, 265.

[19] CENTRE REGIONAL DE LA PROPRIETE FORESTIERE DE BRETAGNE (CRPF). 2009. Guide des plantes indicatrices des milieux forestiers bretons, Edit CRPF, 139.