



# Assessing the impact of anthropogenic activities on the Mediterranean endemics in Egypt

Heba Bedair, Kamal Shaltout, Ahmed Sharaf El-Din, Ragab El-Fahhar & Marwa Halmy

Botany Department, Faculty of Science, Tanta University, Egypt

E-mail: [heba.taha@science.edu.eg](mailto:heba.taha@science.edu.eg) or [heba.taha57@yahoo.com](mailto:heba.taha57@yahoo.com)

Mobile: +201022067227



## Abstract

The Mediterranean Basin is a biodiversity hotspot and one of the most important areas on earth for endemic plants. However, it is now subject to rapid anthropogenic changes. Indeed, precise data on the distribution and conservation status of plants and habitats within many Mediterranean countries -including Egypt- are frequently insufficient, out of date or absent. Consequently, the present study aims to provide a documented database of the Mediterranean endemics in Egypt, their floristic characteristics and conservation status. Data were collected from different herbaria, field visits and literature. The checklist was arranged alphabetically according to Angiosperm Phylogeny Group (APG) IV system. The evaluation process was based on IUCN Red List Categories and Criteria Version 3.1. In present study 102 plant taxa belonging to 26 families were recorded, including 57 confined to the western Mediterranean, 12 to the eastern Mediterranean and only one to the Deltaic Mediterranean (*Echinops taeckholmianus*) region of Egypt. The most represented families were Asteraceae, Fabaceae and Asparagaceae. Therophytes (47 taxa) were the most represented life form, while ballochores (36 taxa) are the most represented dispersal type. March-April was the peak time for the flourishing and flowering of the majority of the species. Small geographic range - limited habitat - non abundant plants were the most represented rarity forms (98 taxa). Habitat loss due land use changes, particularly the establishment of tourist villages, especially along the Western Mediterranean coast, was revealed as the crucial threat to the Mediterranean endemics in Egypt. Three taxa were evaluated as extinct, while 55 taxa as threatened with extinction; 31 taxa as critically endangered, 17 taxa as endangered and 7 taxa as vulnerable. In addition, 9 taxa were recognized as near threatened, 23 taxa as least concern and 15 taxa were recorded as data deficient. The outcomes from the current study can help guide efforts towards prioritizing Mediterranean endemics in Egypt in future conservation actions.

## Methods

Data were collected from different herbaria, field visits and literature. The checklist was arranged alphabetically according to Angiosperm Phylogeny Group (APG) IV system. The evaluation process was based on IUCN Red List Categories and Criteria Version 3.1. In the present study, we depend on the criterion B which is concerned with geographic range in the form of both B1 (extent of occurrence: EOO) and B2 (area of occupancy: AOO). Calculations of both AOO and EOO and assessment process was carried out using the GeoCAT software.

The available information and data such as: main habitats, coordinates, uses and threats for taxa were recorded through visiting different locations. Other information was collected from the herbaria of Tanta University (TANE), Cairo University (CAI), Agricultural Research Center (CAIM), Desert Research Center (CAIH), National Research Centre (CAIRC) and herbarium of Alexandria University (ALEX).

## Results

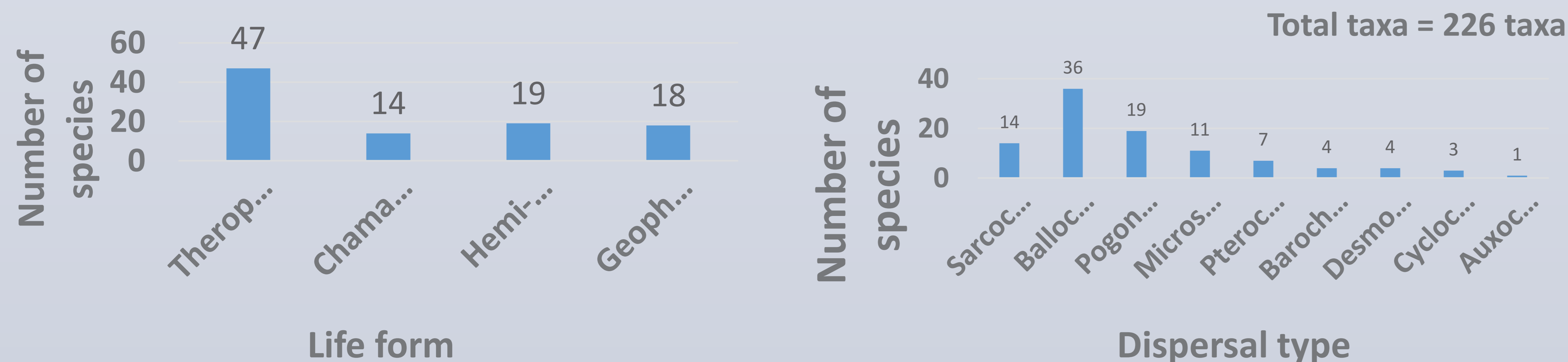


Fig. 1. Life forms of the Mediterranean endemics in the Egypt.

Fig. 2. Dispersal type spectrum of the Mediterranean endemics in the Egypt.

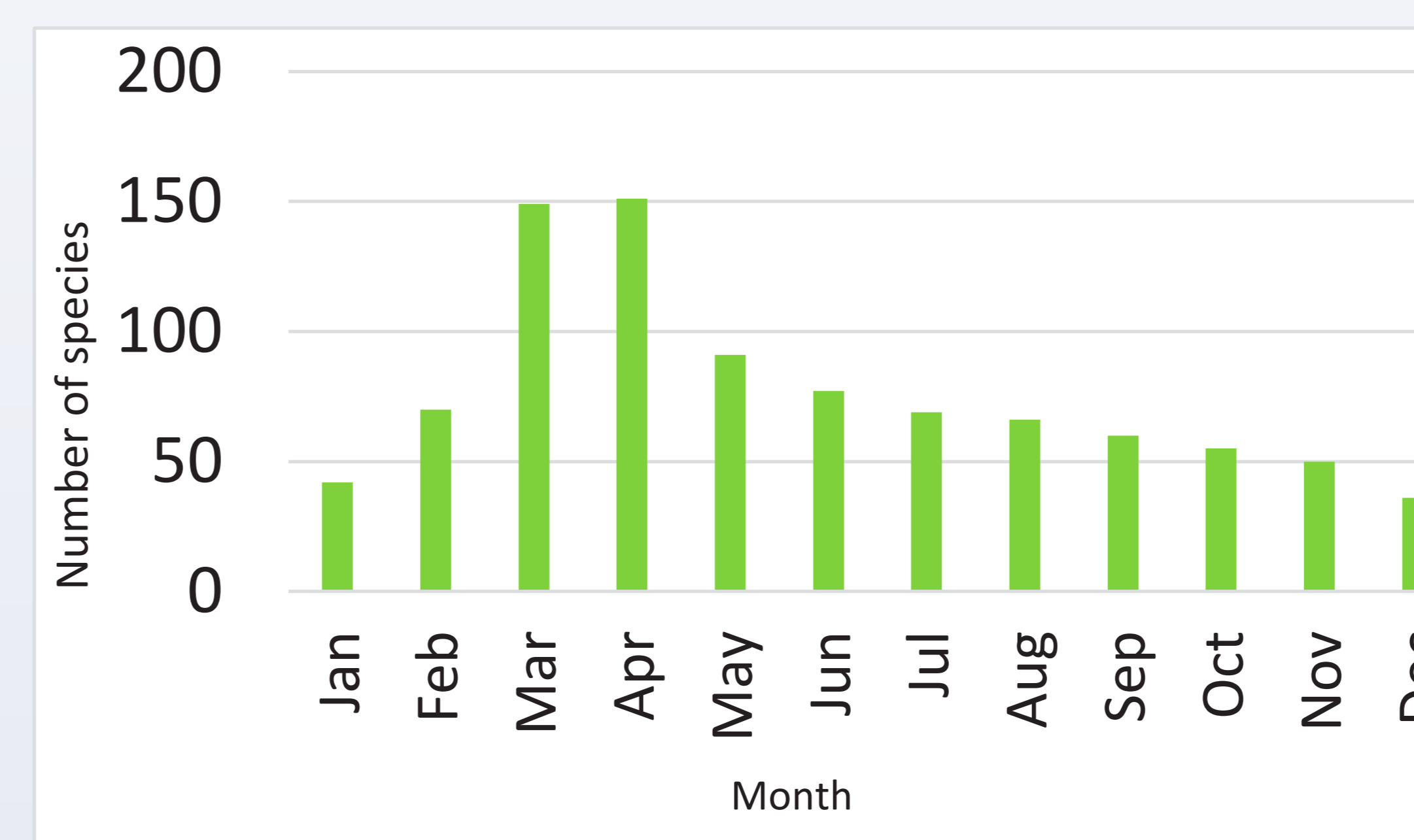


Fig. 3. Flowering activity of the recorded Mediterranean endemics in Egypt.

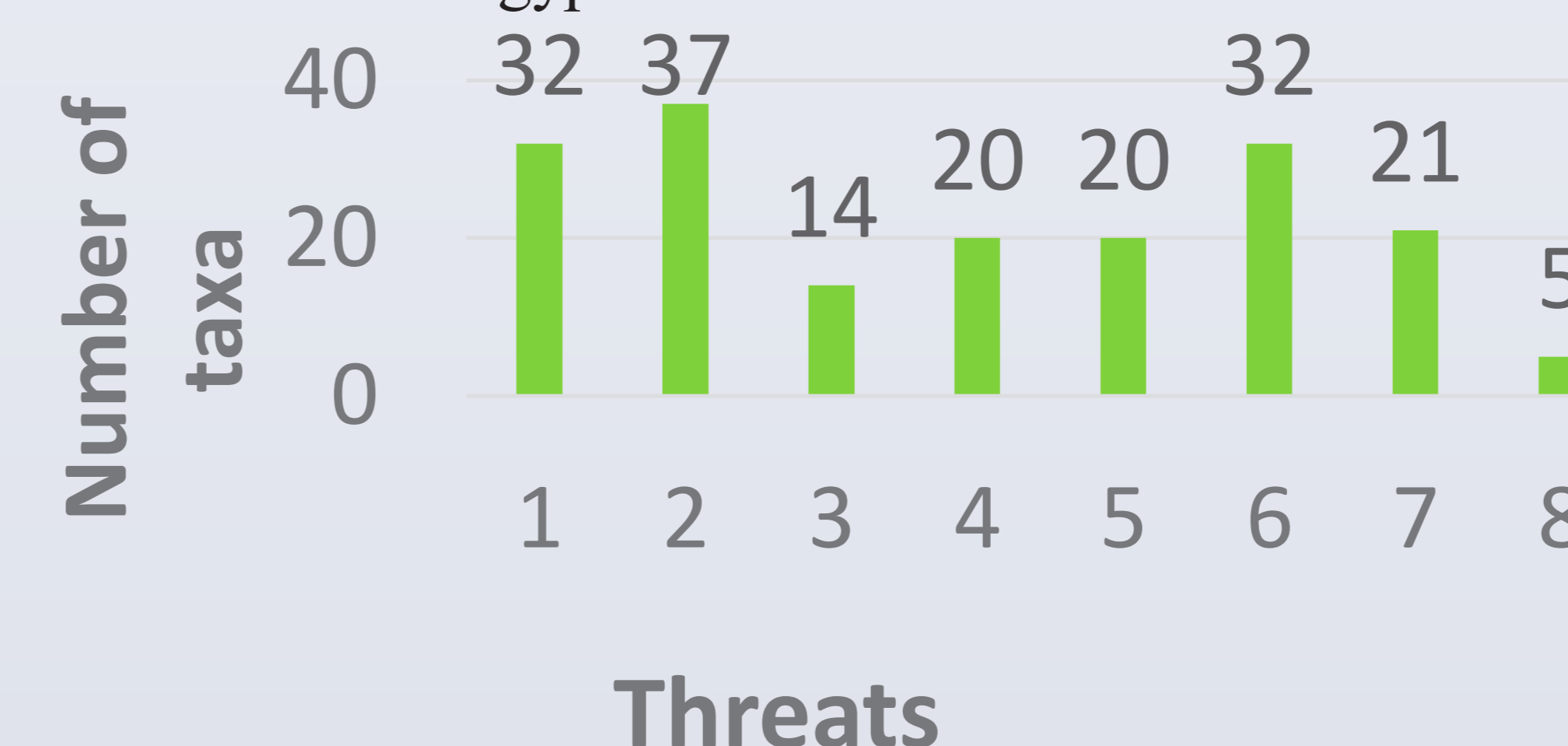


Fig. 5. Arrangement of the threats of the Mediterranean endemics in the Egyptian flora. Threat groups are coded as: 1- over-collecting and over cutting, 2- habitat loss, 3- browsing and over-grazing, 4- clearance for agriculture, 5- mining and quarrying, 6- disturbance by cars or trampling, 7- urbanization and tourism, 8- climatic changes and environmental conditions

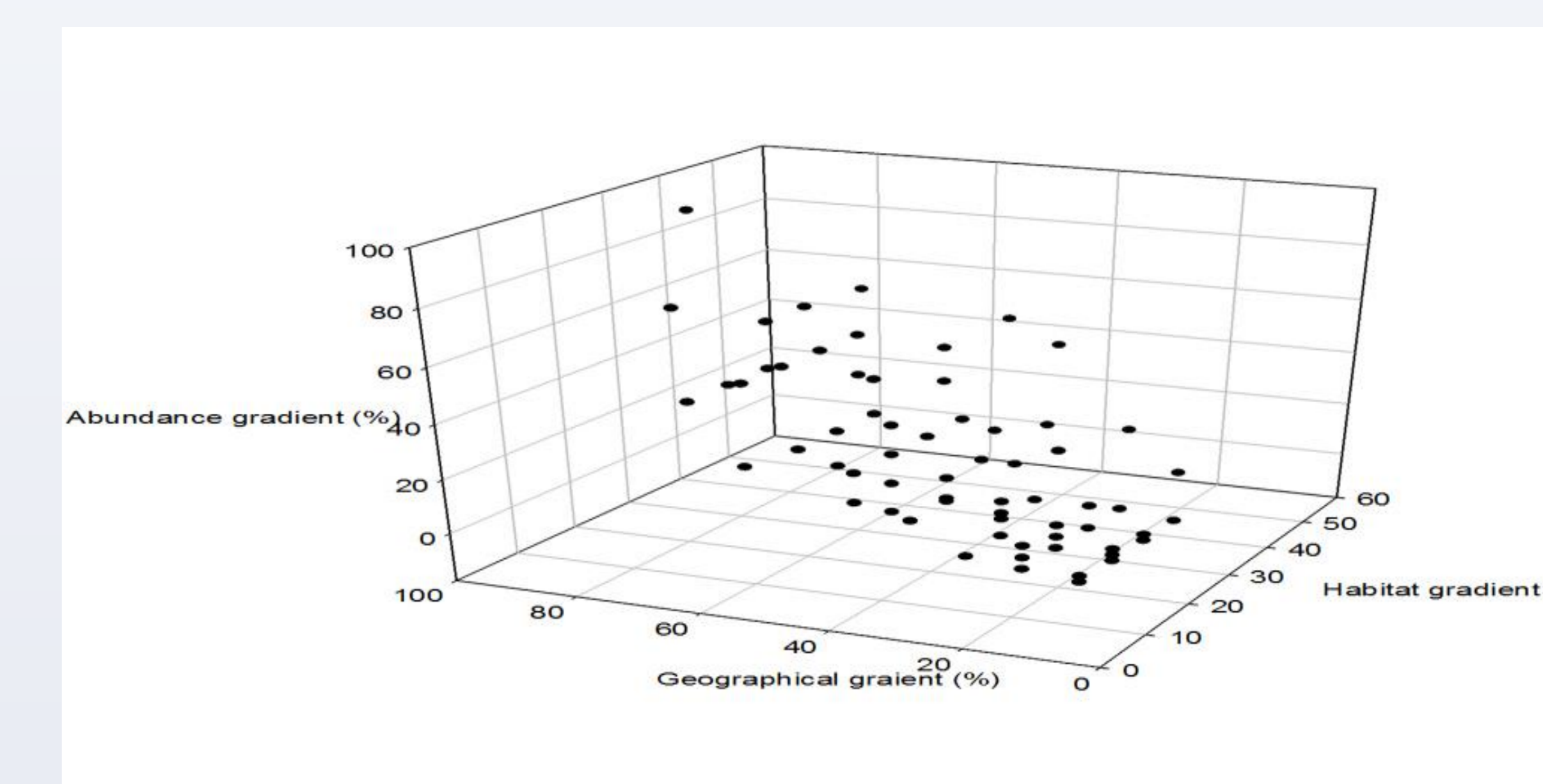


Fig. 4. Three dimensional scatter plot of the recorded Mediterranean endemics in the Egyptian flora along habitat, geographical and abundance gradients.

## Conclusions

- There were 102 plant taxa recorded in this study.
- Asteraceae, Fabaceae and Asparagaceae were the most represented families.
- Therophytes occupied the highest percentage of Mediterranean endemics.
- The Ballochores and the Pogonochores were the most represented dispersal types.
- SNN (small geographic range\_ narrow habitat\_ non abundant plants) was the most represented rarity form.
- All taxa were exposed to at least one aspect of threats. Habitat loss due land use changes, particularly the establishment of tourist villages was the most represented one.
- About 50 % of the Mediterranean endemics in Egypt are under threat of extinction; 31 taxa are critically endangered, 17 taxa are endangered and 7 taxa are vulnerable.
- The most threatened families are Asteraceae and Fabaceae.

## References

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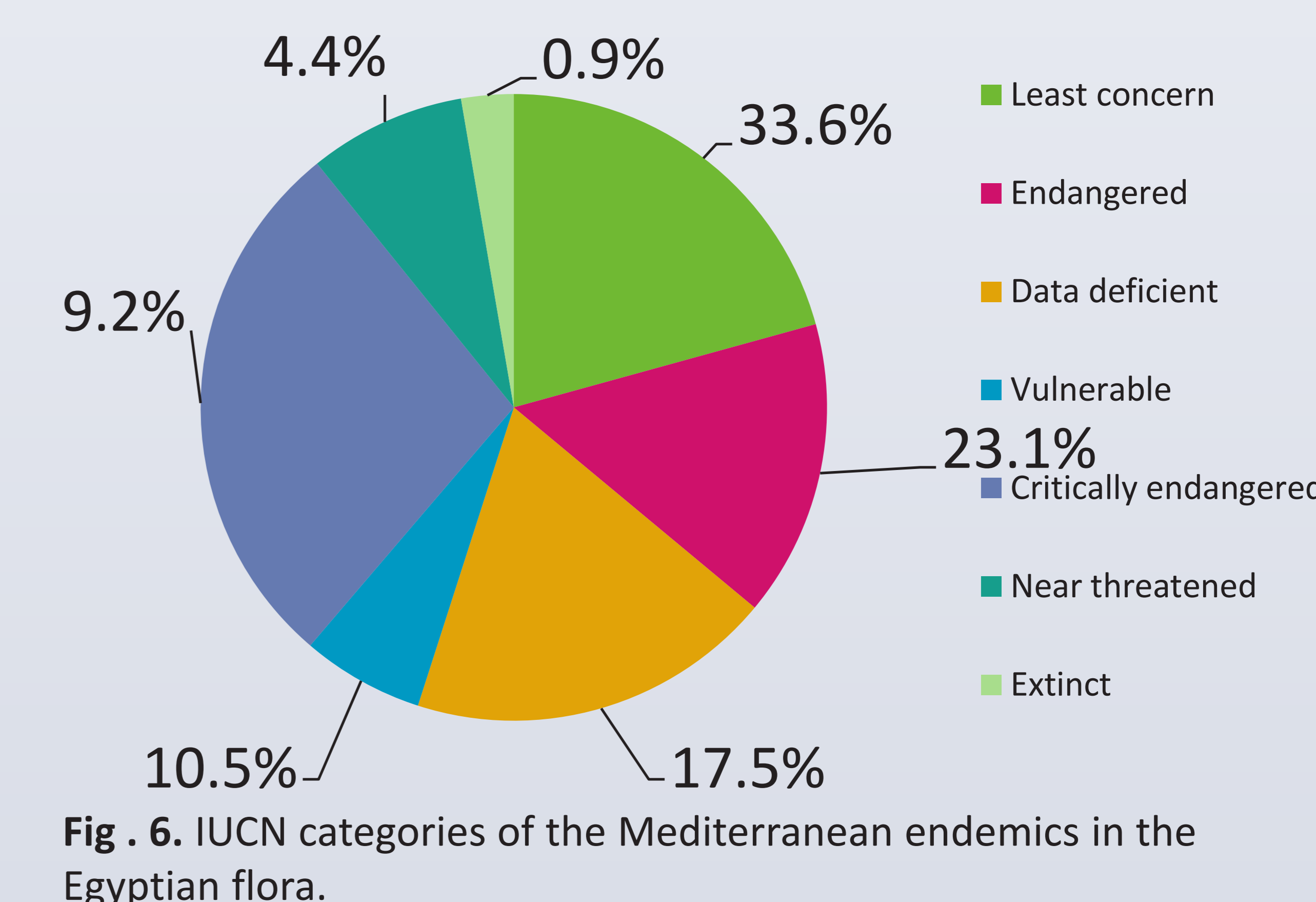


Fig. 6. IUCN categories of the Mediterranean endemics in the Egyptian flora.