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# Biological parameters and endemism in the flora of Peloponnisos (Greece)

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## Introduction

Range-size rarity in vascular plants, also known as endemism or restricted distribution, is an important phenomenon with direct implications in understanding and refining evolution, phytogeography and conservation. In this work, we attempt to study endemism in the flora of Peloponnisos and correlate it with biological parameters and habitat types.

Peloponnisos, also known as the Peloponnese (Figs 1-2) is a phytogeographical region that comprises the southernmost part of the Greek mainland and some adjacent islands. It covers an area of approximately 22,140 km$^2$. The highest peak on Mt. Taigetos reaches 2,407 m.

## Materials & Methods

We used extensive bibliographic sources, herbarium specimens and the botanical databases maintained in ATH and ATHU herbaria to estimate plant richness in Peloponnisos. Widespread taxa are those not confined to Greece, the opposite of endemics. Range restricted taxa are those spread within a lineal distance of c. 500 km. Local endemics are taxa with a very narrow distribution, usually within a c. 50 km radius.

Habitat types are following the Vascular Plants of Greece Checklist. The diaspore may be a seed (including single-seeded fruits such as achenes or caryopsis) or a fruit. Fruit type is classified as dry or fleshy. Annual seed production may be rare or none, few (1-50), medium (50-500) or many (> 500). Dispersal modes are explained when applied.

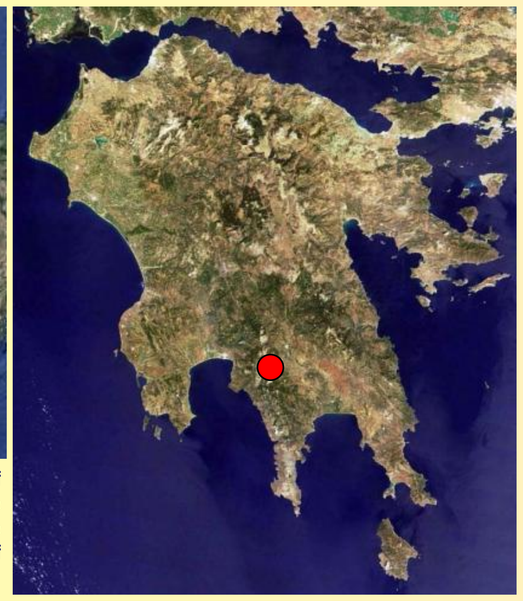
## Results & Discussion

Peloponnisos houses 3,257 vascular plant taxa (species and subspecies), which constitute almost half of the Greek flora. Of them, 483 taxa are Greek endemics, including 4 endemic genera: *Hymenonema* (Fig. 9), *Laserocarpum* (in press), *Thamnosciadium* (Fig. 10) and *Phitosia*. Even more taxa (525) are range restricted. Seventy-six species and subspecies are very narrowly distributed, sometimes on one mountain only.

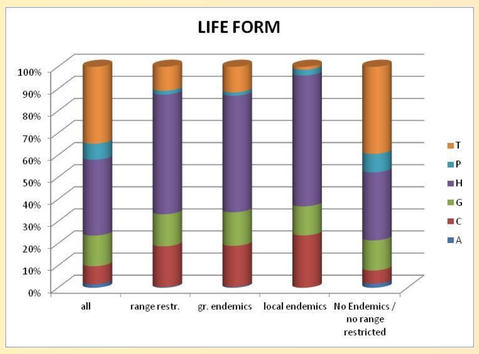
Therophytes (1,116) and hemicryptophytes (1,101) predominate in the total flora of Peloponnisos. However, among taxa with restricted distribution of any category, the number of therophytes drops dramatically: there are about 55 endemic therophytes and just 1 local endemic one (Figs. 3-5). Likewise, local endemic phanerophytes are only a few and less than 20 local chamephytes (C) are found in the area.

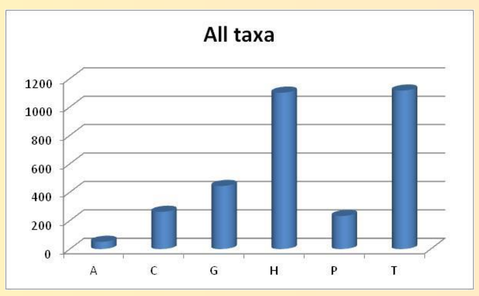
Most Greek endemics, range restricted taxa and narrow endemics are found in rocky, calcareous habitats and cliffs (136, 141 and 30 taxa, respectively). Ravines, rock faces and cliffs often act as refugia for the local endemic flora. Dry, phryganic formations are also rich in endemics, followed by the grasslands at the lowland or at subalpine areas (Figs. 6-8). Ruderal and aquatic habitats have a negligible contribution to endemism.

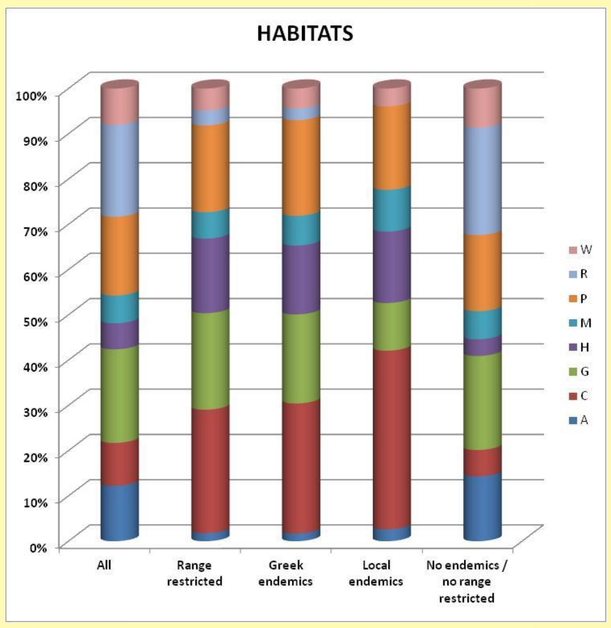
With respect to fruit characters and dispersal modes, fleshy fruits are rare in the flora of Peloponnisos. Diaspores are dispersed as seeds or single-seeded fruits, a trend even more pronounced in the endemic flora. Total seed production per year does not seem to vary significantly among the various categories of taxa with restricted distribution (Figs. 11-13). A preliminary investigation of dispersal syndromes showed that within specialized genera the percentage of endemicity may vary considerably. The number of endemic taxa in 3 unrelated, myrmecochorus genera may vary from very few to almost half the total (Figs. 14-15).

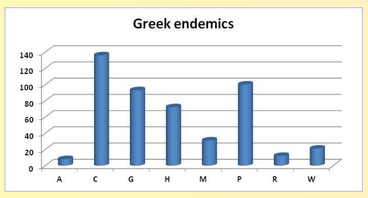



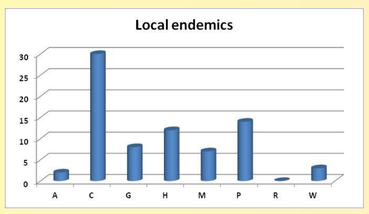
**Figures 1-2.** The phytogeographical region of Peloponnisos (red square) covers the southernmost part of the Greek mainland. The area is mountainous and the highest peak of Mt. Taigetos reaches 2,407 m a.s.l. (red dot).



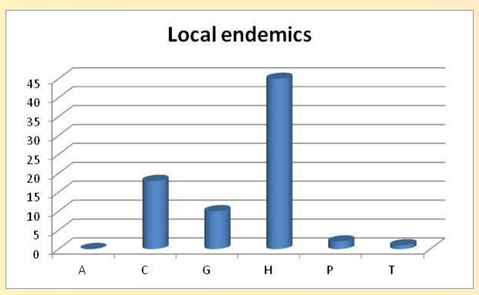



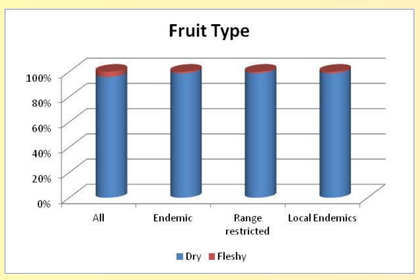



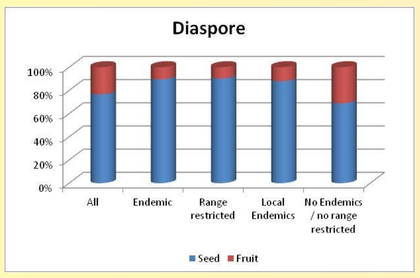

**Figures 6-8.** The rocky habitats and cliffs (C), the dry phryganic formations (P) and the grasslands at the lowland or at subalpine areas (H, P) have the highest percentage of local and Greek endemics in Peloponnisos. Ruderal (R) and aquatic (A) habitats the lowest.

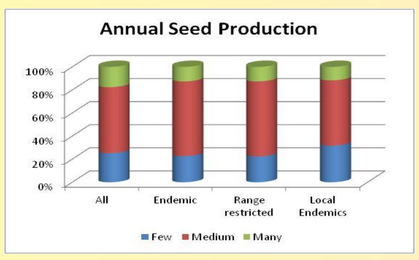



**Figures 3-5.** While therophytes (T) constitute an important percentage in the flora of the area, similar to that of hemicryptophytes (H), their contribution drops dramatically in the endemic and local endemic categories. Likewise, local endemic phanerophytes are very few and less than 20 local chamephytes (C) are found in the area.

**Figure 9.** The genus *Hymenonema* (Asteraceae) consists of two species, both endemic to Greece. *H. laconicum* (photo) is an impressive plant distributed in phrygana and scrub formations of south-east Peloponnisos, usually at an altitude lower than 1,000 m. It flowers in late spring to early summer.




**Figures 11-13.** Fleshy fruits are rare in the flora of Peloponnisos and ever rarer in its endemic flora. Most plants disperse seeds and no fruits: this tendency is even more pronounced among members of the endemic flora. Annual seed production does not show significant variation between local and widespread species.

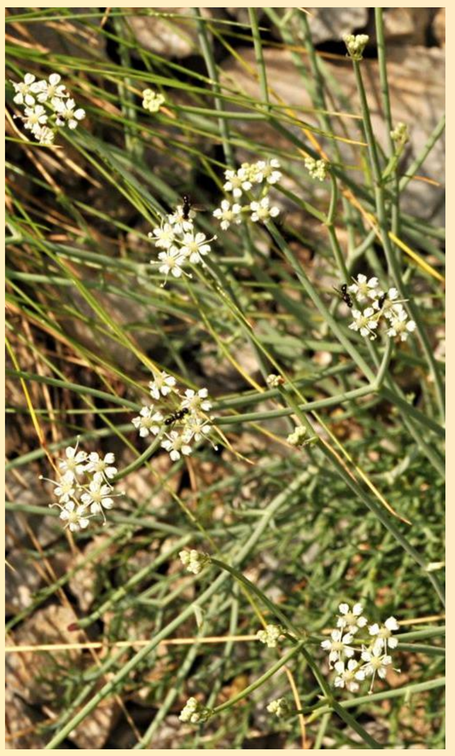
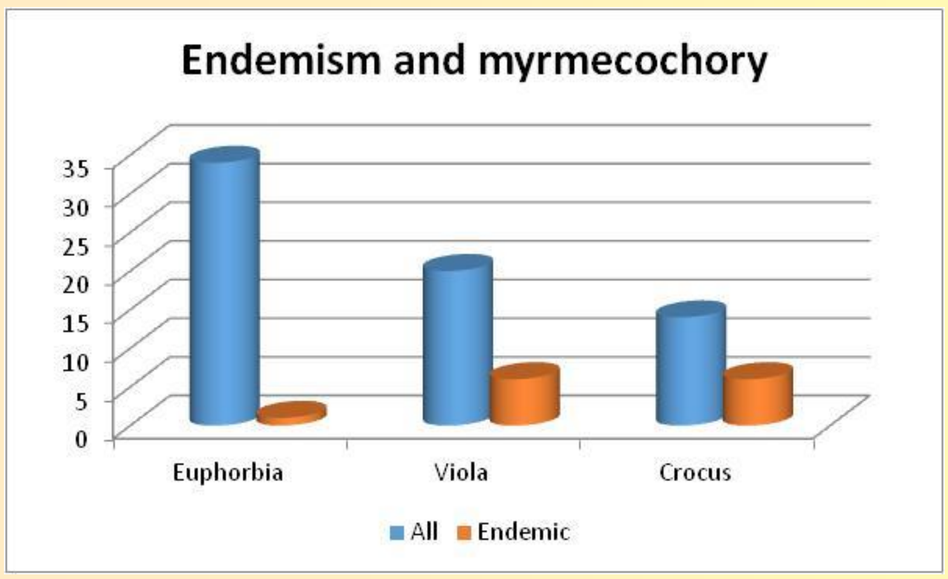


**Figure 10.** *Thamnosciadium* (Apiaceae) is a monotypic genus endemic to Greece (Peloponnisos and Sterea Ellas). It forms scarce populations on the mountains of north Peloponnisos, usually above 1,500 m. It flowers in summer.




**Figures 14-15.** Seeds with an elaiosome such as those of *Euphorbia* (right part) are usually dispersed by ants (myrmecochory). The percentage of endemicity in the myrmecochorous genera *Euphorbia*, *Viola* and *Crocus* of Peloponnisos varies significantly from 3% (*Euphorbia*) to almost 43% in *Crocus*.

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