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Contribution to the study of the flora of Vouraikos gorge (Peloponnesos, Greece)

Abstract

Koutsopoulos, P. & Sarlis, G.: Contribution to the study of the flora of Vouraikos gorge (Peloponnesos, Greece). — Fl. Medit. 12: 299-314. 2002. — ISSN 1120-4052.

This study deals with the flora and certain ecological factors of Vouraikos gorge district. Our floristic records in the area reach the number of 275 species and 19 subspecies, a total of 290 taxa, which belong to 214 genera and 58 families. The richest in members families are the Asteraceae with 37 species and 4 subspecies (a total of 41 taxa), the Fabaceae with 34 species and 5 subspecies (a total of 39 taxa), the Lamiaceae with 21 species and the Poaceae with 18 species and 2 subspecies (a total of 20 taxa). Also, *Asperula arcadiensis*, *Aurinia moreana*, *Colchicum peloponnesiacum* and *Peucedanum achaicum* are local endemic taxa of Peloponnesos. Finally, *Silene conglomeratica* is a rare species, endemic to the Vouraikos gorge area.

Introduction

Vouraikos river is situated in the northern part of Peloponnesos (S Greece, Fig. 1). The river springs between mount Chelmos (2338 m) and mount Erymanthos (2221 m) and flows into the Corinthian gulf, near the town of Diakopto. The most interesting part of the river is the one between Kalavryta and Diakopto villages, which is known as the gorge of Vouraikos. The length of the gorge is c. 22 km and its altitude ranges between 0 and 1200 m (Fig. 2).

There are two reasons for which this particular gorge is amongst the most well-known gorges in Greece: on one hand it is deep and narrow at most of its part and on the other hand the presence of the rack railway which crosses the gorge over iron bridges and through tunnels and links Diakopto with Kalavryta. The passing of the gorge on foot over the rail track is safe and consists part of the European path E4 (Fig. 3, 4).

There are also two interesting rivers near Vouraikos, i.e. Kerynitis and Selinountas. The area close to the delta of these three rivers is a coastal plane where orange trees, olive trees and grapes are cultivated. One important city, the ancient Eliki was placed in this area, but was sunk into the sea in 373 A.D. due to an enormous earthquake.

In the gorge, c. 12 km southwards Diakopto and at an altitude of 620 m lies the small

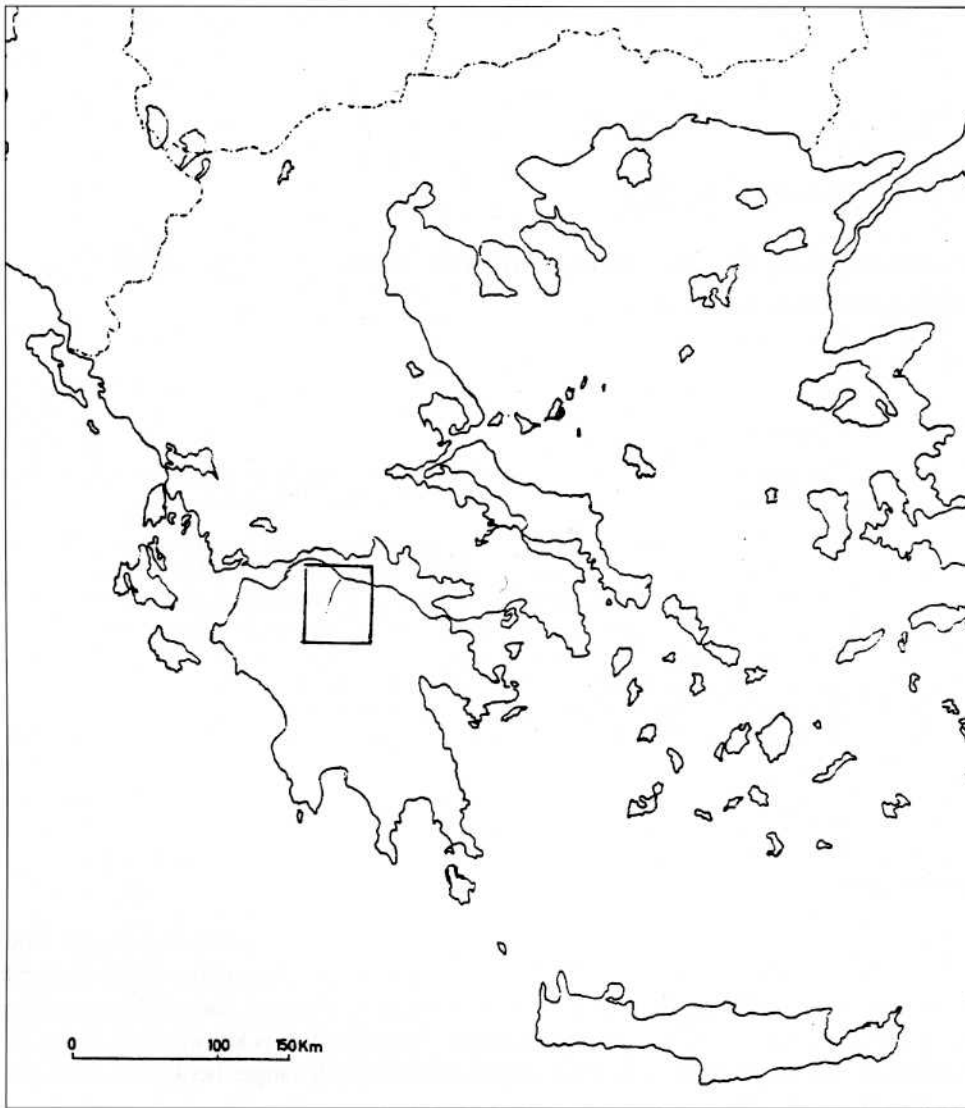


Fig. 1. The position of Vouraikos river district in Greece.

village of Zachlorou. The historic monastery of Mega Spilaion is built above Zachlorou, at an altitude of 924 m, situated in a cavity at the base of a big and precipitous rock.

Materials and methods

Our collections of plant specimens were made over the years 1999-2001, during continuous visits, especially during flowering season. Species were identified at the Institute of Systematic Botany of the Agricultural University of Athens.

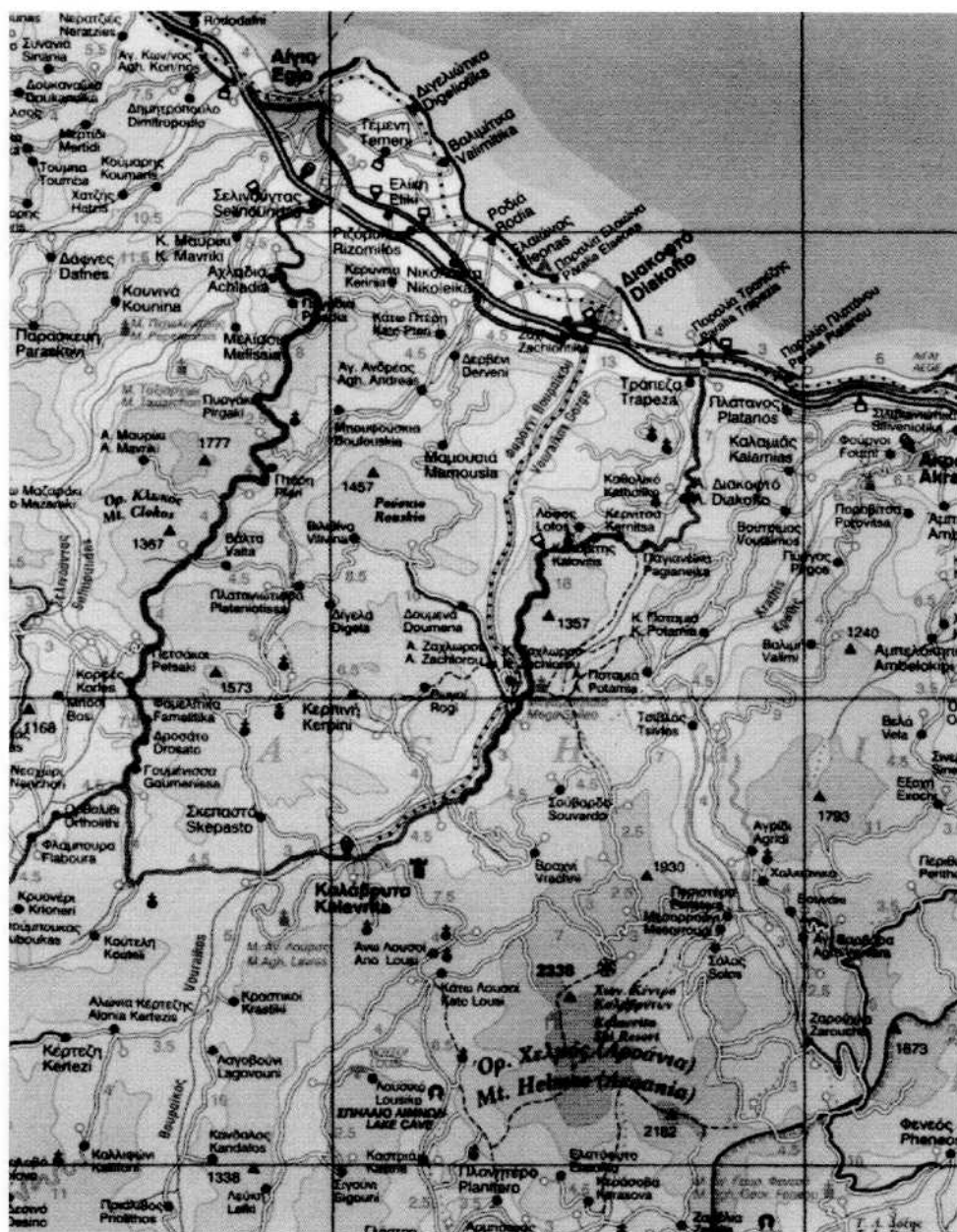


Fig. 2. Map of Vouraikos gorge in the eastern part of Achaia county.

For the determination of specimens and nomenclature the following works were used: Diapoulis (1939-1949), Greuter & al. (1984-1989), Kavvadas (1956-1964), Polunin (1980), Strid (1986-1991), Strid & Tan (1991) and Tutin & al. (1964-1980).



Fig. 3. The deep and narrow gorge of Vouraikos river.



Fig. 4. The rack railway which crosses the gorge over iron brigdes.

Ecological conditions

The geological formations that participate in the structure of the walls of the gorge are generally various sorts of limestone of the Paleocene period as well as Quaternary conglomerates. Limestone occupies the narrowest and most impressive part of the gorge, which extends between the fifth and eleventh kilometer southwards Diakopto. The presence of conglomerates in a continuous zone that covers much of remaining of the gorge and also the areas west of the gorge from Kalavryta to the ends of the Corinthian Gulf indicates that the area was covered by the sea at the end of the Tertiary period.

The climate of Vouraikos gorge, according to the Koeppen taxonomy, can be classified in the Csa type or in the "Mediterranean climate type", which is characterized by its semi-warm climate with an arid period during summer (Sc) and warm summer (a). From a bi-climatic point of view (Emberger, 1967; Mavrommatis, 1980) the Kalavryta district (upper end of the gorge) belongs in the humid Mediterranean Zone (mean annual temperature 13.3 °C, total annual precipitation 996.4 mm), while the Egio district (near the end of the gorge) belongs in the sub-humid Mediterranean Zone (mean annual temperature 18.3 °C, total annual precipitation 665.0 mm) (Fig. 5, 6).

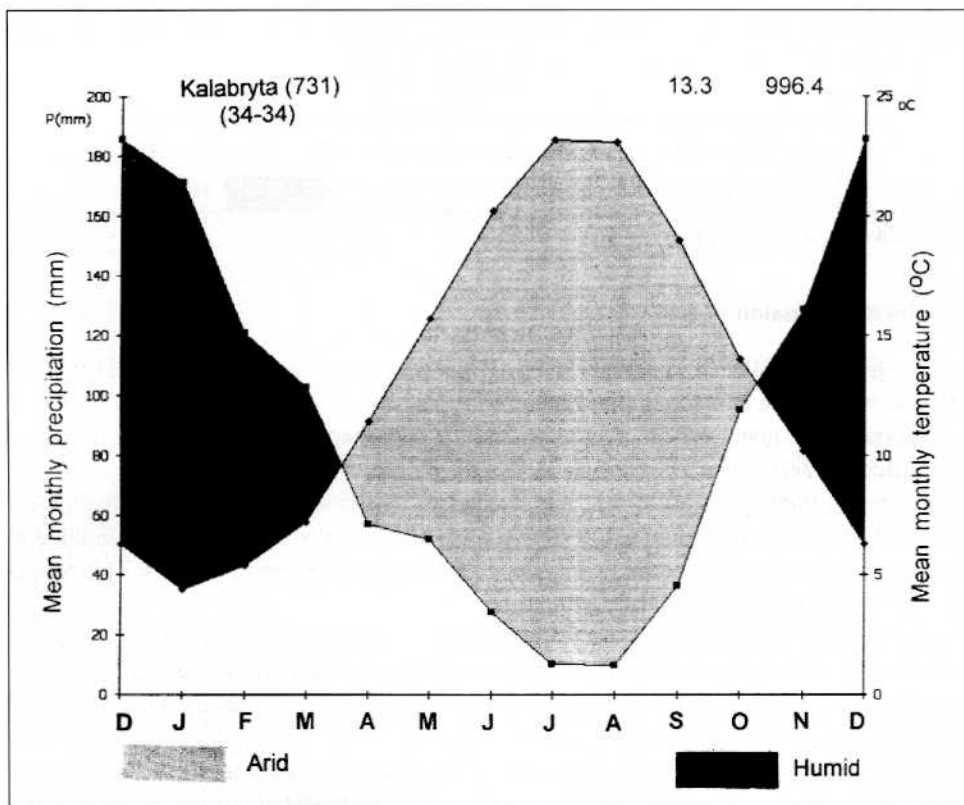


Fig. 5. Climatic diagram of Kalavryta weather station.

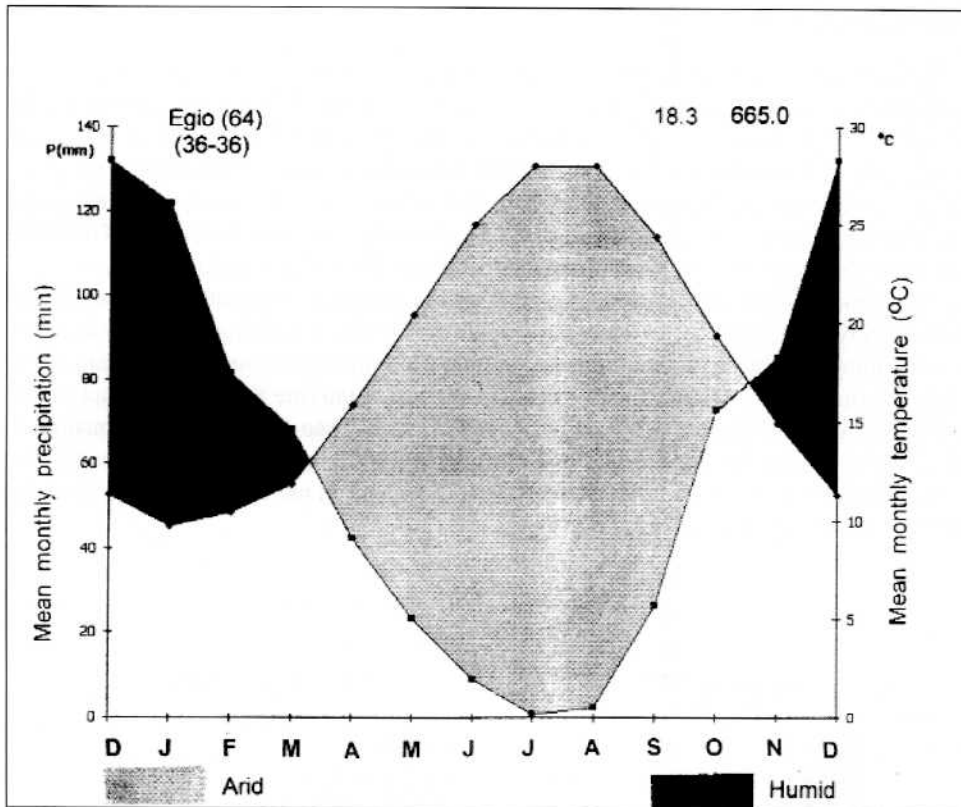


Fig. 6. Climatic diagram of Egio weather station.

Results & discussion

The diversity of the flora of Vouraikos gorge is summarized in Table 1 and the presentation of the flora is made in the Appendix.

The particular geomorphologic conditions, the soil, the climate and grazing pressures have affected the flora and vegetation of the gorge.

In general, the vegetation of the gorge is sparse. This is due to the fact that the largest part of the whole area is stony and rocky on one hand, but also to the intensive grazing at that parts of the gorge that border Diakopto, Zachlorou and Kalavryta villages. This resulted in the degradation of the bushy vegetation.

The largest proportion of the species in the flora of Vouraikos gorge are therophyta and low-shrubby xerophytes (phrygana). This is mostly due to the stony soil which keeps low amounts of humidity and also to the dry and warm climate, which prevails for a long period each year.

The vegetation of the northern part of the gorge, which extends up to the eighth kilometer south of Diakopto, belongs to the inferior zone of the Mediterranean conifers and the sclerophyllous broad-leaved shrubs and is characterized by the presence of *Pinus*

Table 1. Systematic units and taxa of the flora of Vouraikos gorge.

Systematic Units	Families	Genera	Species	Subspecies	Taxa	Percentage
Pteridophyta	4	4	4	-	4	1.4
Gymnospermae	2	3	3	-	3	1.0
Dicotyledones	46	170	224	18	242	83.5
Monocotyledones	6	37	40	1	41	14.1
Total	58	214	271	19	290	100.00

halepensis in association with *Arbutus andrachne*, *Cercis siliquastrum*, *Phillyrea latifolia*, *Pistacia lentiscus* and *P. terebinthus*. Various phrygana have penetrated this vegetation type, mainly *Ballota acetabulosa*, *Cistus creticus*, *Hypericum empetrifolium*, *Micromeria juliana*, *Phlomis fruticosa*, *Salvia fruticosa*, *Teucrium flavum* and *Coridothymus capitatus*.

Southwards this above-mentioned vegetation type a forest of *Quercus ilex* has been formed. Next to that and from Zachlorou to Kalavryta at the eastern part of the gorge a forest of *Abies cephalonica* can be observed. At the western part we meet a few individuals of *Abies* together with sparse bushes, mainly of *Quercus coccifera* and *Juniperus oxycedrus*.

The banks of the river are dominated by *Platanus orientalis*, especially in humid, cool and shadowy places. At the southern part of the gorge there are extensive and thick clusters of *Platanus orientalis* under which various herbaceous species grow, such as *Arum italicum*, *Ranunculus neapolitanus*, *R. repens*, *Symphytum bulbosum* and *Urtica dioica*. Moreover, the presence of *Nerium oleander* is prominent along the river near Diakopto.

Some of the endemic to Peloponnesos plant species are also met in the gorge of Vouraikos. These are *Asperula arcadiensis*, *Aurinia moreana*, *Colchicum peloponnesiacum*, *Peucedanum achaicum* and *Silene congesta* subsp. *moreana*. *Achillea umbellata* subsp. *monocephala*, once considered a local endemic taxon of Vouraikos gorge, has now been assigned to the variation of the polymorphic *A. umbellata* without any special taxonomic status (Tzanoudakis & Iatrou 1981; Dimopoulos & Georgiadis 1992; Iatrou 1992).

Finally, a number of species that are met mainly or exclusively on the rocks of the gorge are worth mentioning:

Achillea umbellata, *Adiantum capillus-veneris*, *Asperula arcadiensis*, *Atractylis gummifera*, *Aubrieta deltoidea*, *Aurinia moreana*, *A. saxatilis* subsp. *orientalis*, *Bupleurum fruticosum*, *Campanula versicolor*, *Centaurea raphanina* subsp. *mixta*, *Centranthus ruber*, *Cephalaria ambrosioides*, *Ceterach officinarum*, *Fibigia eriocarpa*, *Inula verbascifolia* s.l., *Lamium garganicum*, *Leontodon crispus*, *Odontites linkii* subsp. *linkii*, *Onosma frutescens*, *Phagnalon graecum*, *Pteroccephalus perennis* subsp. *perennis*, *Ptilostemon chamaepeuce*, *Salvia ringens*, *Scrophularia heterophylla*, *Sedum album*, *S. laconicum*, *S. ochroleucum*, *Silene congesta* subsp. *moreana*, *S. italica*, *S. vulgaris*, *Stachys parolinii*, *Thymus atticus*, *Umbilicus horizontalis*.

References

- Diapoulis, Ch. 1939-1949: The Greek Flora. Vol. **A**, **B₁**, **B₂**. — Athens (in Greek).
 Dimopoulos, D. & Georgiadis, Th. 1992: Floristic and phytogeographical analysis of Mount Killini (NE Peloponnesos, Greece). — *Phyton* (Horn) **32**(2): 283-305.

