

VASCULAR PLANT DIVERSITY AS A VALUABLE TOOL FOR THE ECOLOGICAL AND CULTURAL PROJECTION OF THE NATIONAL PARKS IN GREECE

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Abstract

National Parks are natural areas that usually possess high ecological and cultural value. Their intact landscapes, the representativeness of their natural ecosystems and the high diversity of their biota give them outstanding ecological, aesthetic, cultural, educational and scientific values. They have high conservation value and attract numerous visitors aiming to experience nature. A recent project co-funded by the European Union and the Greek National Funds is *AdVENT: Augmented Visitor Experience in National Parks*, started in 2018 and has a 3-year duration. The AdVENT project aims to develop innovative applications to enhance visitors touring experience in protected areas of particular environmental interest and natural beauty, as well as the production of rich and technologically advanced multimedia content for their promotion, to highlight their natural wealth as a remarkable and attractive touristic product. More specifically, the project focuses on the mountain complex of the Region of Central Greece, which includes the National Parks of Oiti and Parnassos. Both areas host a remarkably diverse flora and fauna, while Mt Parnassos is considered as a hotspot of plant species diversity and endemism. Important archaeological sites like Delphi, major ski centers and popular hiking trails are combined with remarkable natural fir forests and other mountain habitat types and a rich endemic flora. It is noteworthy, that AdVENT project will create: a) a vascular plant database of the National Parks of Oiti and Parnassos, available to the scientific community and the general public, which is expected to promote research in the relevant fields of botany, ecology etc., b) an integrated Augmented Reality (AR) mobile application for enhancing the visitors touring experience and c) the development of cutting-edge technology for the visual identification of vascular plant species.

Keywords: *Vascular plants, Application, Augmented Reality, National Parks, Natura 2000.*

Introduction

Mediterranean Basin is characterized by high geomorphological and climatic heterogeneity and has been acknowledged as one of the 18 biodiversity hotspots worldwide (Blondel & Aronson, 1999). Mediterranean mountains host an especially high plant diversity and endemism, rendering them an ideal stage for biodiversity and biogeographical studies. The flora of the Mediterranean Basin includes approximately 25,000 species or nearly 30,000 species and subspecies (Médail, 2008), a fact that renders it the richest among regions hosting Mediterranean ecosystems.

Greece, located at the crossroad of three continents, namely Europe, Asia and Africa, is an important component of the Mediterranean Basin hotspot (Sainz Ollero, Moreno Saiz 2002; Martín-Brano et al. 2010). The largest part of Greece is characterized by a typical Mediterranean climate with mild, humid winters and hot, dry summers although differences

can be found regionally or locally due to the diversity of its topography (Hobbs et al., 1995). It is noteworthy, Greece hosts a large variety of Mediterranean habitats included in the reference list of the Natura 2000 initiative with an outstanding biodiversity, which is well protected within the boundaries of Greece's National Parks. National Parks are natural areas that usually possess high ecological, aesthetic, cultural, educational and scientific values. They host a high conservation value and attract numerous visitors aiming to experience nature. The vascular flora of Greece comprises 5758 species and 1970 subspecies (native and naturalized), representing 6620 taxa, belonging to 1073 genera and 185 families (Dimopoulos et al. 2013, 2016). The endemic vascular flora of Greece includes 1459 taxa (22% of the total number of taxa in Greece), corresponding to 1,274 endemic species (22.1% of the total number of Greek species) and 450 endemic subspecies (22.8% of the total number of Greek subspecies) (Dimopoulos et al. 2013, 2016). In order to achieve an increased direct and vicarious experience of nature for visitors in Oiti and Parnassos National Parks, a recent project co-funded by the European Union and the Greek National Funds AdVENT (*Augmented Visitor Experience in National Parks*) started in 2018 and has a 3-year duration. The AdVENT partnership includes: a) the inDigital SA, Greece (Coordinator), b) Institute of Mediterranean and Forest Ecosystems, Hellenic Agricultural Organization "DEMETER", Greece, c) Research and Innovation Information Technologies "ATHENA", Greece and d) Organization for Sterea Ellas Greece.

Project area

The project focuses on the mountain complex of central Sterea Ellas, which includes the National Parks of Oiti (Fig. 1) and Parnassos (Fig. 2). These National Parks, include remarkable natural and cultural richness, such as hiking trails, dense fir forests, endemic and rare plant species, landscapes of special natural beauty, historical and archaeological sites, as well as popular tourist destinations (Delphi and Parnassos ski center).

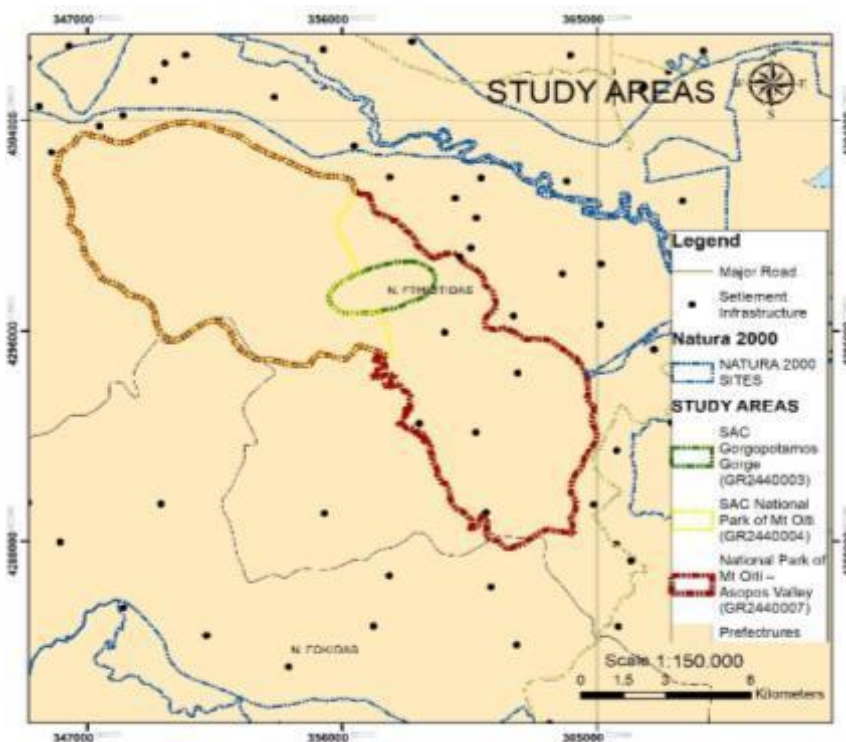


Figure 1. Oiti National Park (QGIS 3.6).

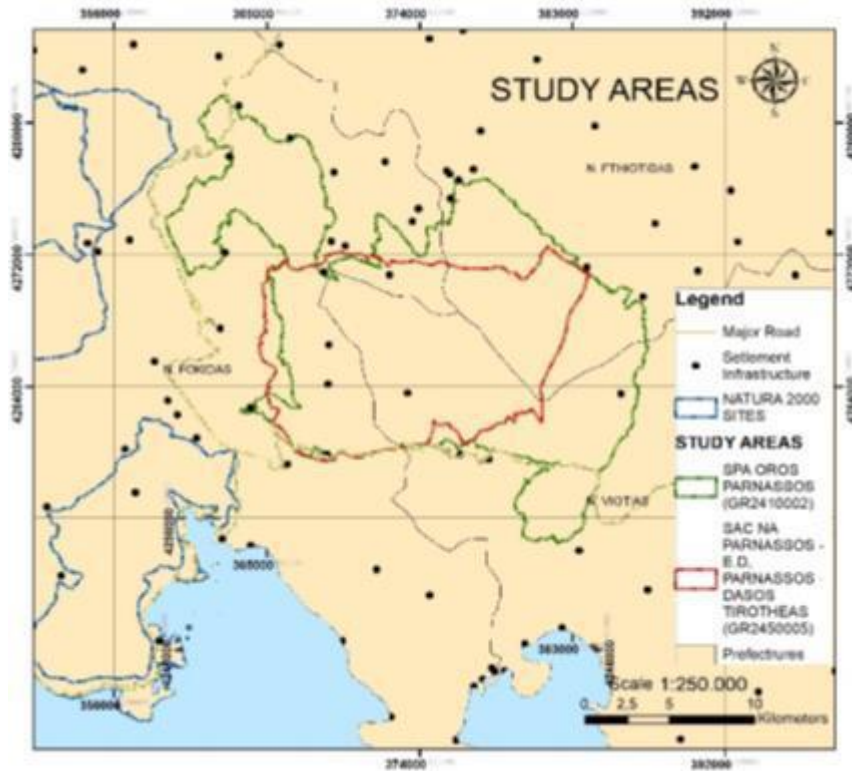


Figure 2. Parnassos National Park (QGIS 3.6).

Project objectives

National Parks of Oiti and Parnassos host a remarkably diverse flora, fauna and landscapes, while Mt Parnassos is considered as a hotspot of plant species diversity and endemism.

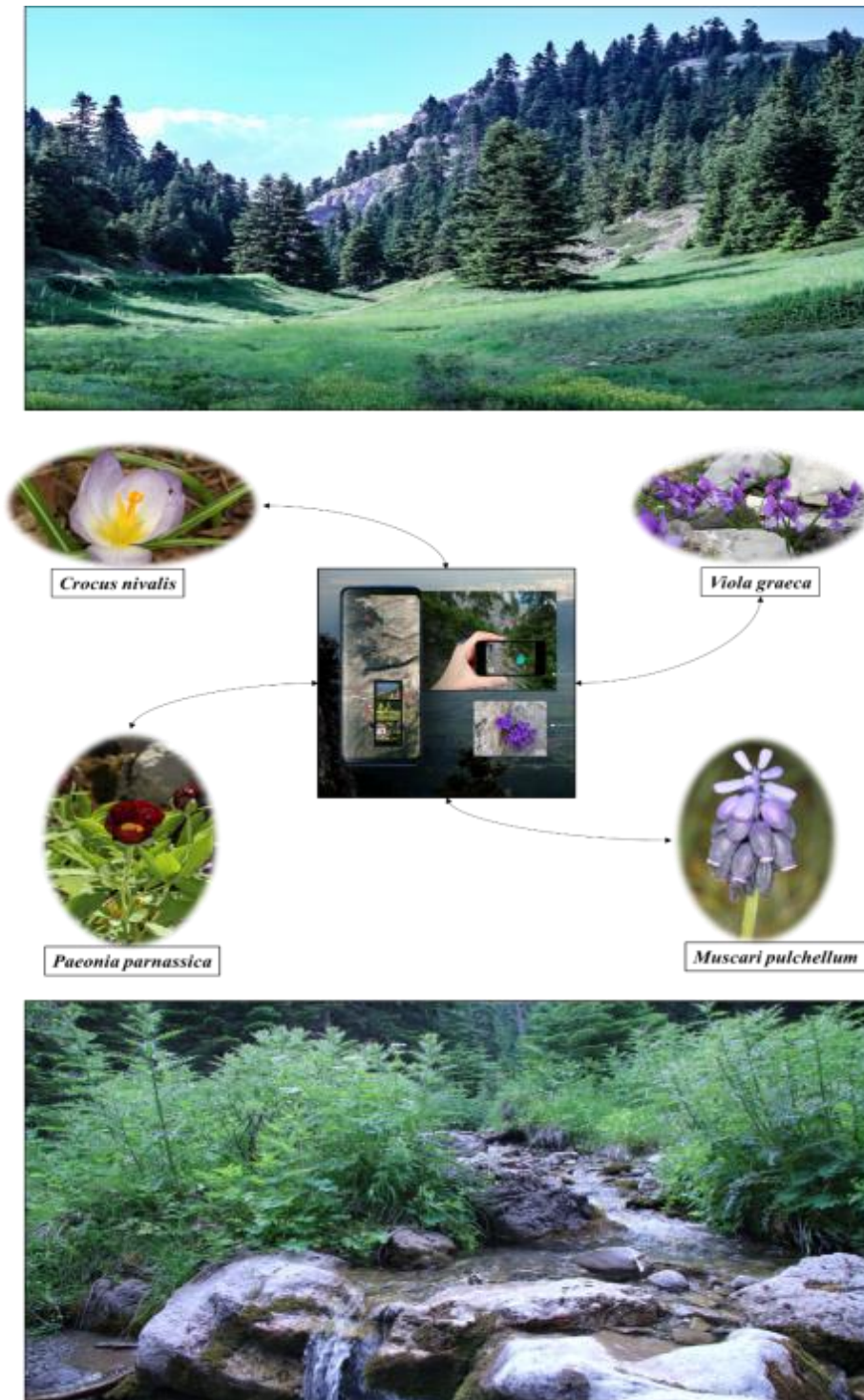


Figure 3. Visual identification of vascular plant species.

Mt Oiti, also known as the mountain of flowers and of legendary hero Hercules, is a mountain of unique beauty, with vast fir forests, rare as well as impressive plant species, rich fauna and abundant waters, which most of the times flow abruptly, through steep and beautiful gorges. It is the fifth highest mountain in Central Greece and its highest peak is Pyrgos (2.152 m) (Management Body of Oiti National Park, Sperchios Valley and Maliakos Gulf, 2019).

Also, Mt. Parnassos consists of spectacular cliffs and rocky areas. It mainly consists of hard limestones (76.6%), which forms particularly impressive karsts; some formations, such as the

Sinkhole of Lilaia and the Corycian Cave, are especially famous. Last but not least, Parnassos is a place of enormous cultural - historical heritage, i.e. the Sanctuary of Apollo and the Oracle of Delphi. In addition, the great cultural - historical value of the area is enhanced by the ancient and modern monuments, as well as the rich history of the region (Management Body of Parnassos National Park, 2019).

The main objectives of AdVENT project are the development of: a) a vascular plant database of Oiti and Parnassos National Parks, available to the scientific community and the general public, which is expected to promote research in the relevant fields of botany, ecology etc., b) an integrated Augmented Reality (AR) mobile application for enhancing the visitors touring experience and c) a cutting-edge technology for the visual identification of vascular plant species (Fig. 3). In addition, AdVENT aims to promote, enrich, and therefore enhance the visibility and competitiveness of the local tourism product.

Expected results

The first system of plant species identification in Greece is expected to be developed during AdVENT project. A cognitive database for the plant species of Oiti and Parnassos National Parks will also be created. This basis is going to be available not only to the scientific community, but also to the public and will contribute to knowledge enhancement of the relevant fields (botany, ecology etc.). The project will upscale and promote the applied research on the 3D digital illustration of natural areas at multiple spatial scales. Also, the sharing of the know-how between the enterprises and the research institutes will undoubtedly increase their competitiveness.

This project will unfold and provide innovative technological implementations suitable to underline the environmental wealth, natural beauty and cultural background of these specific mountainous areas. Creating thus, an attractive, modern touristic product with direct positive results and developmental possibilities for the local and also regional economy and society. In a way, the project will "equip" the local touristic product with a tool, which enriches the interaction of visitors with the natural environment, enhancing their overall experience. The idea of interacting and understanding the local culture of a place is very common among eco tourists who support the local economy preferring and advertising local produce and services.

Acknowledgments

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