

The Interreg ADRION Adriaticaves Project – Sustainable Management and Tourist Promotion of Natural and Archaeological Heritage in the Territory Managed by the Authority for Parks Management and Biodiversity – Romagna (Italy)

Proiectul Interreg ADRION Adriaticaves – gestionarea durabilă și promovarea turistică a patrimoniului natural și arheologic pe teritoriul gestionat de Autoritatea pentru Gestionarea Parcurilor și Biodiversitate – Romagna (Italia)

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Abstract

The Adriaticaves project was born in the framework of the Interreg Project ADRION, which is a European transnational program investing in the promotion of cultural exchange, environmental sustainability and natural and cultural heritage protection in the Adriatic-Ionian Region. Seven partners are part of this project: the Majella National Park (Italy, lead partner), the Authority for Parks Management and Biodiversity – Romagna (Italy), Velebit Nature Park (Croatia), the Cantonal Public Institution for Protected Natural Areas (Bosnia and Herzegovina), Lipa Cave (Montenegro), the City of Čačak (Serbia) and the Shkodra Regional Council (Albania).

Adriaticaves is about karsts environment conservation through the promotion of sustainable tourism and the diffusion of “good practices” of cave management. Caves are fascinating and extremely delicate environments. Far from the surface, they appear like a “world apart” with their own fragile ecosystem. Their scientific importance is enormous from both a biological and a geological point of view. However, these environments are extremely fragile and any artificial modification introduced in their delicate equilibrium can seriously threaten and destroy these important heritages. This means that cave frequentation can seriously undermine the conservation of these natural environments. However, it is important to let people visit these places, allowing them to explore, discover their beauties and understanding their importance and their fragility. Indeed, opening a cave to the public can be a powerful tool for cave conservation, raising awareness towards these environments among the wide public, contributing to a correct scientific divulgation while improving knowledge and respect towards these environments. Adriaticaves project is focused in this direction: creating a network of caves, which have in common a series of best practices allowing for a sustainable management of these environments to promote a more sustainable tourism.

Keywords: cave conservation, sustainable tourism, show caves, speleology, science and tourism, Interreg Project

Introduction

Caves can be considered natural voids in the Earth's crust which can be potentially explored by humans. Cave formation can occur in any kind of rock and depends on several geological processes (e.g. wind, volcanism, tectonics, ice, water...) which are used for cave classification. However the most common factor leading to cave formation involves water action in soluble rocks like limestone, gypsum or halite or even in poorly soluble rocks such as quartzites (WRAY, SAURO, 2017).

Despite their geological origin, caves are relatively low energy environments characterised by permanent dark, rather stable temperatures and low availability of organic matter. However, they are strongly connected with the external environment and any environmental modification occurring at the surface is transferred to this underground world. These conditions altogether make cave environments particularly interesting for almost any scientific field. An example is provided by palaeoenvironment and palaeoclimate studies, which find excellent archives of information about past climate changes in cave speleothems (e.g. FAIRCHILD and BAKER, 2012), or by mineralogy, since in the cave environment unique conditions can be found, leading to the precipitation of rare mineral phases (e.g. HILL and FORTI, 1997). In addition, the importance of caves as karst aquifers must not be forgotten, providing huge quantities of pure fresh water and the deep interest hydrogeologists have in studying and preserving these environments. At the same time, biologists are deeply interested in these environments as well, since their unique environmental conditions lead to interesting adaptation strategies of the species inhabiting this underground world (e.g. CULVER and PIPAN, 2019). In recent times special attention has been given to bacterial colonies developing in caves, whose study can have strong impact for medical research but also for the understanding of the origin of life on our planet (BARTON and NORTHUP, 2007). Given the characteristics of stability and the "conservation" properties of these environments, caves can also be a source of information about past cultures, since they were often used as shelters or for ritual purposes. Thus, archaeologists and anthropologists as well find these places particularly interesting for the huge amount of information they can provide.

It is thus clear that cave environments can potentially provide huge amounts of information regarding several aspects of our past, while representing an actual ecosystem. However, caves can appear also as mysterious and amazing places able to attract cavers, explorers and tourists, thus assuming an economic value for local communities.

The characteristics described above, which are responsible for the huge interest in caves coming from different fields, make this habitat extremely fragile and sensitive to any introduced modification, especially the ones related to the

impact of human activities. Surface water and groundwater pollution, illegal dumping, vandalism, illegal animal trade and uncontrolled frequentation can seriously threaten cave environments, causing a huge loss in both the biological and geological heritage. But, even if it might seem contrasting with what exposed above, in some situations opening a cave to tourists can be a great opportunity for cave conservation. A conscious delineation of cave paths using proper materials, the training of cave guides about both scientific features and fragilities of the chosen cave, the control of people's access in terms of both maximum number and seasonal opening are all factors which can help a correct scientific divulgation among the public, thus raising awareness towards these poorly known environments.

The Adriaticaves Project is focused on this topic: the creation of a network of caves opened to the public adopting a sustainable approach for cave management. This project was born in the frame of the wider Interreg Project ADRION, which is a transnational program aiming to the promotion of cultural exchange, environmental sustainability and natural and cultural heritage conservation, involving countries of the Adriatic-Ionian Region. The Adriaticaves project started in 2018 and will be concluded in December 2020. It involves partners from both sides of the Adriatic Sea characterised by both environmental and cultural values but at different conservation status. The main objective of this project is to jointly raise the level of conservation of both natural (Natura 2000 sites) and cultural heritage and to identify sustainable development strategies, including major marketing operations, through the exchange of "best practices" of cave management and frequentation.

Materials and Methods

Seven partners are involved in the Adriaticaves Project (Figure 1): the Majella National Park (Abruzzo, Italy; project lead partner), the Authority for Parks Management and Biodiversity – Romagna (Emilia-Romagna, Italy), the Velebit Nature Reserve (Croatia), the City of Cačak District (Serbia), the Cantonal Public Institution for Protected Natural Areas (Bosnia and Herzegovina), the Shkodra Regional Council (Albania) and Lipa Cave (Montenegro).

Each partner has included in the project one or more caves located in its own territory. Both wild caves opened for tourist caving tours and show caves fully or partially equipped for tourist visits are part of the project.

In particular, considering the Authority for Parks Management and Biodiversity – Romagna, three caves formed in Messinian Gypsum outcrops have been included in the project (Figure 2): Tanaccia cave (a wild cave opened to the public for guided caving tourist visits); Re Tiberio Cave (a wild cave which has been equipped to be a show cave only for the first 60 m from the main

entrance, opened to the public for both guided tourists and guided caving tour visits) and Onferno Cave (a partially equipped show cave opened to the public for both guided tourists and guided caving tour visits).

The project is organized in 6 Work Packages (WP), each representing a main subject including several activities. Each partner is involved in each activity but some partners are actually responsible for the coordination of the different WPs.

The Project Work Packages are organised as follows:

- WP0: Preparation;
- WP1: Management (partner in charge: Majella National Park);
- WP2: Tourism Development and Sustainable Management Strategy (partner in charge: Authority for Parks Management and Biodiversity – Romagna);
- WP3: Cave Conservation through Natural and Cultural Heritage Protection (partner in charge: Authority for Parks Management and Biodiversity – Romagna);
- WP4: Pilot Projects (partner in charge: City of Cačak);
- WP5: Communication (partner in charge: Shkodra Regional Council).

WP2 and WP3 include several activities coordinated by the Authority for Parks Management and Biodiversity – Romagna through both its internal staff and collaboration with the University of Bologna (Biological, Geological and Environmental Sciences department).

WP2 is mainly focused on the production of informative material related to the project and the creation of a network of “speleo-guides” among the project partners. A “speleo-guide” is actually thought as an already trained caving guide from a technical point of view, further trained on biological, geological, archaeological and cave conservation issues. A specific training focused on these topics has been organised for all the partner’s caving guides involved in the Adriaticaves project. The definition of a more sustainable approach to cave frequentation and cave management will be valued on the market through the realization of local tour packages involving local travel agencies and taking into account the cave conservation strategies adopted and developed during this project.

WP3 is deeply connected with the previous WP and contains activities mainly focused on cave conservation through the development of specific monitoring strategies for each project cave, the set up of a monitoring system and the redaction of an Action Plan for habitat 8310 (*"Caves not open to the public"*), containing indications of the actions to be taken to protect and restore cave habitats. Cave monitoring (cave air CO₂, temperature, relative humidity, radon emission together with the reporting of rare faunal species (such as bats) frequenting these sites and/or rare plants located close to the cave entrances) will be performed during the whole duration of this project, in order to have enough data to understand basic cave dynamics and identify the best approach for the tourist visits according to the specific cave (e.g. number of people, areas of the cave that should not be visited, seasonality of cave visit according to the eventual presence of hibernating bats or breeding/nursery sites).

The actions planned in the Action Plan are then financed through the WP4 Pilot Projects, where each partner is given funds to improve the conservation status of both their wild caves and the ones opened to the public, together with actions related to the increasing of tourism sustainability in these environments (e.g. replacement of old halogen lamps with led lights and re-setting of show cave illumination systems to prevent the development of lampenflora, removal of material not suitable for cave environments in show caves, like wood...). In the territory managed by the Authority for Parks Management and Biodiversity – Romagna, archaeological researches aiming to improve the existing knowledge of local cave frequentation during the protohistory period and the preservation of cultural heritage, together with the realisation of some interventions to protect a *"lapis specularis"* Roman quarry and the replacement of an old illumination system with led lights in a local site are all actions planned and funded by Adriaticaves pilot projects.

WP5 is finally dedicated to communication of the defined sustainable approach with public activities, stakeholders and wide public.

Results and Discussion

The main expected result of this project represents the creation of a sort of quality brand "Adriaticaves" identifying all caves opened to the public (both wild and show caves) adopting "best practices" of cave management.

The main output of this project will be the realisation of a "Chart of Caves", a document containing all the existing guidelines on cave frequentation, further implemented during the project, and indication of what has to be done in order to manage these environments in a sustainable way. This document will have to be signed by all the project partners in order to be identified by the quality brand "Adriaticaves". At the moment this quality brand is restricted to the project partners but it is meant to be the starting point for its adoption at a European

international level, as a qualified and widely accepted brand of sustainable tourism in cave environments.

Minor, but not less important results are represented by the creation of a network linking together the “speleo-guides” of the project, trained to guide tourists in caves while providing correct scientific information, aware of the fragility of the environment they are working in, associated with the promotion of a more sustainable and slow tourism involving karst areas through the realisation of local tour packages gathered in a catalogue linking and promoting all project partners. At the local level we aim through this project to better understand cave dynamics through the monitoring system, in order to better manage a sustainable frequentation of our sites. In addition we are planning some intervention and archaeological investigation in order to improve the tourist offer linked to our karst areas, always giving the priority to environmental sustainability and protection of local heritage.

Conclusions

Caves are fascinating and mysterious sites that have always attracted the people's curiosity. They are also extremely delicate ecosystems presenting unique features from both a geological and biological point of view and represent excellent natural laboratories for scientific research. However they are extremely fragile environments whose exploitation in terms of tourism attractions and/ or mere exploration can actually lead to their complete destruction. The ADRION-Adriaticcaves project is a European Union Interreg project aiming to promote a sustainable management of caves through the realisation of several actions leading to the creation of a sort of quality brand.

A sustainable approach not only helps in cave habitat conservation, but also can have strong impact on the economy and development of local communities, aiming to raise awareness towards environment conservation. This will also increase the number of tourists sensitive to nature protection issues, allowing for the maintenance over the long term time scale of the local natural heritage. This project is also thought as a sort of starting point to promote and spread “best practices” of cave conservation of both show caves and wild caves visited through tourist caving tours at an international level through the creation of the quality brand “Adriaticcaves”.

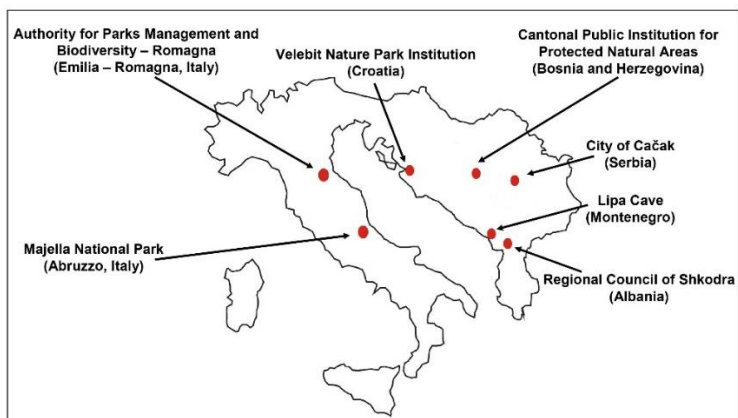


Figure 1. ADRION-Adriaticaves project partners
 Fig. 1. Partenerii proiectului ADRION-Adriaticaves

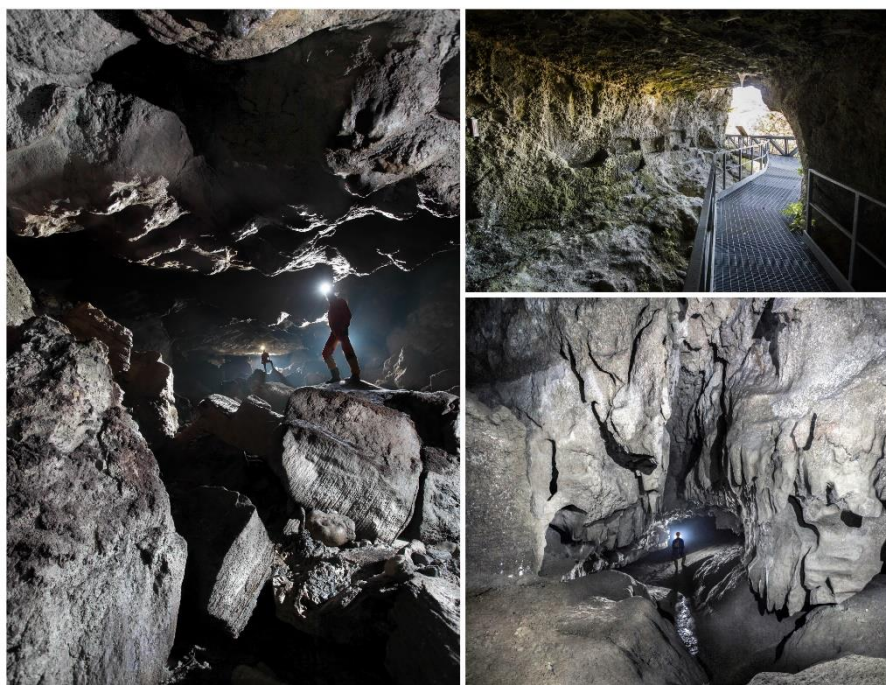


Figure 2. **Left:** Onferno Cave (Gemmano, RN); Photo by Francesco Grazioli
Upper right: Re Tiberio Cave (Borgo Rivola, RA); Photo by Piero Lucci
Lower right: Tanaccia Cave (Brisighella, RA); Photo by Piero Lucci
 Fig. 2. **Stânga:** Peștera Onferno; **dreapta sus:** Peștera Re Tiberio;
dreapta jos: Peștera Tanaccia

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