NATURE-BASED TOURISM IN THE KARST GORGES OF THE SOUTHERN CARPATHIANS

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Les principales activités de pleine nature pratiquées dans les gorges karstiques des Carpates Méridionales. En ce qui concerne le relief karstique de Roumanie, les Carpates Méridionales ne sont pas un exemple typique, parce qu'elles sont éclipsées par d'autres groupes de montagnes mieux douées de massifs calcaires. Cependant, l'analyse des gorges karstiques de ces montagnes met en évidence un grand nombre de géomorphosites au potentiel attractif important. A partir de ce potentiel touristique, dans cette étude nous décrivons les principales activités de pleine nature pratiquées dans les gorges des Carpates Méridionales: escalade, canyoning, randonnée, VTT (vélo tout terrain), spéléo-tourisme. Nous avons également remarqué les multiples possibilités qu'offrent certaines de ces gorges pour le géotourisme (actuellement sous-développé dans la région étudiée).

1. INTRODUCTION

The touristic role of geomorphosites has been widely covered in the international literature, with several authors approaching the relationship between such landforms and tourism, while other scientists developed specific assessment methods that facilitate comparisons between different sites or ease the identification of most representative resources (Pralong, 2005; Pereira and Pereira, 2009; Reynard *et al.*, 2011; Gordon, 2018 etc.). Many more recent studies have been applied to valleys, gorges and canyons, proving the important touristic role that such sites can have (Božić and Tomić, 2015; Dollma, 2018; Chrobak *et al.*, 2020; Obradović and Stojanović, 2021; Tomic *et al.*, 2021 etc.).

The role that karst gorges play among tourism resources in Romania is undisputed and has been signaled in many general tourism studies (Cocean, 2010; Comănescu *et al.*, 2010; Ielenicz and Comănescu, 2009 etc.) while also analyzed in detail in some other studies (Cocean, 1988; Cocean, 2013; 2014; Cocean and Cocean, 2017). Their importance as a tourism resource is ensured by their specific landscape and intriguing morphologic features that tourists find appealing: the narrow profile, steep slopes, cave entrances, arches, towers and pillars, waterfalls, rapids and plunge pools etc. The number and scale of interesting elements are directly proportional to the potential for tourism development; and so is the length of the engaging sector – not necessarily of the whole gorge sector, when the latter lacks in enticing features (Cocean, 2013).

Gorges offer the ideal setup for practicing various forms of nature-based tourism, from different active outdoor activities practiced by certain categories of tourists, like canyoning, climbing and mountain biking, to hiking over different distances or levels of difficulty. The interesting genesis and evolution of karst gorges have left expressive traces in some cases, especially in the context of the karstic capture scenario, which renders them perfect observation places and didactic destinations, thus important resources for geotourism. The caves and pits found in the slopes of gorges add to their geotouristic value, while also contributing as essential resources for the development of speleotourism. Besides, in many gorges of the region, nature-based tourism intersects and completes other types of tourism, especially cultural and ecumenical tourism, developed due to various well-known monasteries located in the nearby areas.

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The most important tourism resources of the Southern Carpathians are the natural assets: the mountain landscape at high altitudes (the highest in Romania), the suitable conditions for the development of winter sports, well represented in the eastern unit, and the glacial landscape in the higher parts of the mountains. However, our hypothesis is that even if outshined by these other resources, karst gorges still spark relevant tourist flows, thus supporting tourism development in the region.

In theoretical studies, the Southern Carpathians are mostly recognized for their altitude, massiveness and glacial landscape, while the presence of important karst features is still acknowledged (Mihăilescu, 1963; Pop, 2000; Cocean, 2010; Ielenicz and Oprea, 2011; Bălteanu *et al.*, 2012 etc.). While there are numerous studies focusing on the glacial landscape and processes, karst in the Southern Carpathians has not been a frequent subject of research. Even among the valleys of the Southern Carpathians, the transversal valleys (*e.g.*, Olt, Prahova, Jiu) or the Cerna Valley had been more frequently singled out (studies such as those of Orghidan, 1969 or Badea *et al.*, 1981 etc.). Karst gorges did not (and still do not) benefit from the same attention from researchers, although many such sites are mentioned in geomorphologic or geographic studies (Pop, 2000; Posea, 2005; Murătoreanu, 2009; Constantinescu, 2009; Ielenicz and Oprea, 2011 etc.). Some of the karst gorges in the area are however presented in Grigore's study focusing on gorges in Romania (1989), as well as in different studies analyzing geomorphosites in certain parts of the Southern Carpathians (*e.g.*, Albă, 2016) while other gorges appear in various studies due to the caves located in their perimeter, that have long been studied by speleologists and geologists (*e.g.*, Oltețului Gorge or Galbenului Gorge).

Thus, due to the fact that karst gorges are often overlooked or only briefly mentioned in the analyses regarding the tourism potential of the Southern Carpathians, our study has the following main objectives: 1. Create a general image of the potential that karst gorges in the Southern Carpathians have; 2. Present the main types of leisure activities that are already undertaken within the perimeters of such sites.

2. STUDY AREA

The Southern Carpathians (Fig. 1) extend over approximately 14,000 km² (Pop, 2000), between the Timiș–Cerna Corridor in the west and the Prahova Valley – Cerbului Valley – Bârsa Groșetului and Sinca in the east (*Geografia României*, III, 1987). They are east-west oriented, over approximately 250 km, while the north-south distribution varies, stretching as far as 70 km in length (Geografia României, III, 1987).

Karst landscape is not considered representative for these mountains, and indeed the spatial distribution of limestones is not that impressive in this region. Bleahu *et al.* (1976) note that limestone areas in the Southern Carpathians cover 1,597 km². However, the authors include Banat and Poiana Ruscă mountains in the Southern Carpathians, as they have quite extended limestone areas: Banat Mountains have 807 km² of karst areas (Olaru, 1996), while Poiana Ruscă Mountains have about 113 km² in the eastern part, and around 250 km² in the western part (Bandrabur and Bandrabur, 2010). This means that the Southern Carpathians from between the Prahova Valley and the Timiș–Cerna Corridor would only encompass approximately 427 km² of karst areas.

Crystalline schists are the dominant rocks in the Southern Carpathians, with limestone only occupying just above 3% of the total area (one may remark that Bleahu *et al.*, 1976, indicate a percentage of 5,8%, but one must keep in mind the inclusion of Banat and Poiana Ruscă mountains in that estimation). To be put into perspective, in no way do they stand a comparison with Banat Mountains or Apuseni Mountains, where the percentage is 7,8% (Cocean, 2000). Limestone is mostly present in the western and eastern extremities, but one may also notice that the situation for the different mountain groups is much more nuanced. In Bucegi Mountains, the main karst areas are located in the Ialomița Basin, the Piatra Craiului Massif, in the west of Leaota Mountains and the Bran–Rucăr Corridor (Pop, 2000). In Făgăraș Mountains, limestone has less extended areas, while in

the Parâng sector, the most expansive karst areas are located in the south-west of Șureanu Mountains, the south-east of Căpățânii Mountains (with the particular landscape of Vânturarița–Buila), the south of Parâng Mountains and smaller areas of Latoriței Mountains. In Retezat–Godeanu, karst is more widespread, especially in the Cernei Basin, Mehedinți Mountains (a particular example of which being Domogled Ridge) and the south of Vâlcan Mountains.

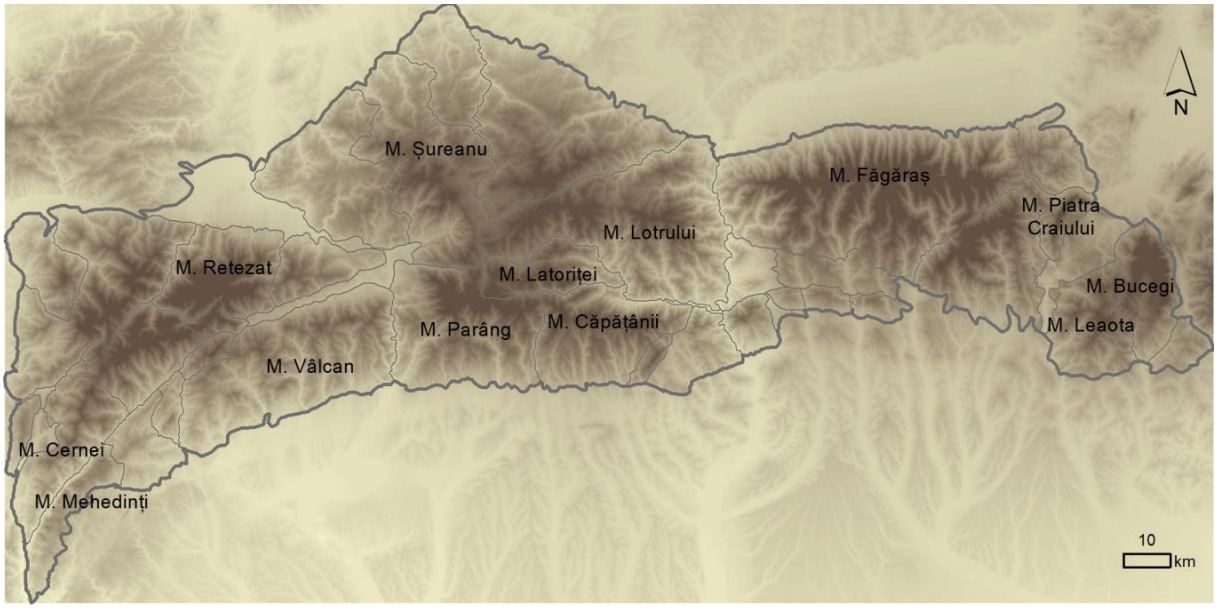

Fig. 1 – The Southern Carpathians. A delimitation of the study area
(Map source: personal production using data from http://geo-spatial.org/vechi/download/romania-seturi-vectoriale, using the mountain unit limits according to Posea and Badea, 1984).

Naturally, the same differences among the distinct mountain sectors apply to the spatial presence of gorges. Bucegi and Retezat–Godeanu mountains stand out, followed by Parâng Mountains. There are however three main areas where more gorges are clustered: the Dâmbovița Basin (Dâmbovicioarei, Brusturetului, Cheile Mici ale Dâmboviței, Orății, Cheile Mari ale Dâmboviței, Cheița and Ghimbavului gorges), the Ialomița Basin (Ursilor, Peșterii, Horoabei, Coteanu, Tătarului, Zănoaga Mică, Zănoaga, Orzei, Brăteiului and Răteiului gorges) and the Cernei Basin (Corcoaia, Șaua Padinei, Jelărăului, Feregari and Săliștei gorges).

3. MATERIALS AND METHODS

This research is primarily based on a thorough review of scientific content regarding the geomorphology of the Southern Carpathians, karst landscape in Romania and tourism development in the Southern Carpathians. Several official data bases were consulted, such as data from the Ministry of Economy, Entrepreneurship and Tourism or the Ministry of Environment, Water and Forests, management plans for national or natural parks in the area (Piatra Craiului, Domogled – Valea Cernei and Bucegi), as well as other non-formal, online resources for the assessment of climbing sectors and trails, and several webpages of outdoor and speleological associations, and tourism promoters, in order to assess the advertising of gorges in the region in what adventure tourism is concerned. Tourist maps issued by national/natural parks authorities were also consulted, as well as the "Munții noștri" collection of touristic maps.

We have tried to put each analyzed form of nature-based tourism into the context of the whole mountain group in order to understand just how relevant karst gorges actually are to the overall tourist phenomenon in the region.

4. RESULTS AND DISCUSSION

4.1. Main engaging features of karst gorges in the Southern Carpathians

There are over 50 gorges in the Southern Carpathians, many of them having important inviting features. Their lengths are limited by the karst area in which they are located. Hence, we may notice a wide variety of gorges, from the ones stretching over just 100–300 m: Corcoaia, Bănița, Buții, to gorges that span around 1 to 2 km: Brusturetului, Crivadia, Oltețului, Țăsnei, Prisăcinei, Bistriței, Cheița, Cheile Mici ale Dâmboviței etc., gorges that range between 3 and 5 km in length (*e.g.*, Prăpăstiile Zărneștilor or Crovului) or even longer gorges, the longest one being Sohodol Gorge, for which Bleahu *et al.* (1976) indicate a length of 12 km between Luncile Contului and Runcu Village.

All studied gorges have the typical narrow profile, that in some cases can get as narrow as 5 m (the lower part of Oltețului Gorge, Bănița Gorge (Fig. 2A), the median part of Buții Gorge (Fig 2B), Corcoaia Gorge, Râmnuței Canyon, Bobot Canyon etc.). The slopes can even be as close as 1.5 m in Crivadia Gorge (Fig. 2C).

Fig. 2 – Profiles and slopes in the gorges of the Southern Carpathians (A. Bănița Gorge, B. Buții Gorge, C. Crivadia Gorge).

While for most gorges the side slopes are the most impressive due to their relative height, up to 150 m in Buții Gorge, Dâmbovicioarei Gorge, Cheile Mici ale Dâmboviței, Țăsnei Gorge or Taia Gorge, only to name a few, for others, it is their particular shape and overhanging sectors that are most impressive, such as for Bănița Gorge and Corcoaia Gorge. The effect of the general features of these last two gorges created a lot of visibility for the two geomorphosites, rendering them among the most promoted in the region (the easy access definitely helps in making them widely accessible for tourists).

Towers and pillars on the high parts of the slopes add a distinctive note to the landscape of other gorges: Prăpăstiile Zărneștilor, Dâmboviței, Bistriței etc. Cave entrances increase the alluring factor of some gorges (Oltețului, Dâmbovicioarei, Sohodolului, Cheile Mici ale Dâmboviței, Bistriței, Buții,

Scorota etc.), as do the swallets (*e.g.*, swallets form Pecinișcăi or Țăsnei gorges). The small canyons in Cernei Basin, Crivadia Gorge and Valea lui Stan Canyon have eye-catching waterfalls (however, most of the canyons in Cerna Basin can be dry during summertime), while other gorges have polished marmites and pools (Buții, Corcoaiei etc.).

4.2. Main leisure activities performed in the karst gorges of the Southern Carpathians

Due to their particular landscape and tourism potential, gorges are places where fairly active forms of tourism are performed, some characteristic to gorges and canyons alone, and others based on several different tourist resources.

4.2.1. Canyoning can only be practiced along gorges and canyons that have a series of vertical descents, waterfalls, rapids, plunge pools and slides. Thus, it is of no surprise that only few gorges can accommodate this activity in the Southern Carpathians. Țăsnei gorge, Drăstănic, Bobot and Râmnuța canyons in Cerna Basin are the most important ones. These canyons, with some rappelling points reaching 25–30m, are well-known on a national level, also being used as locations for the National Canyoning School, between 2017–2020. They also have the added advantage of being located very close to one another; therefore, tourists have the option of more activities, hence a longer stay in the area. Other canyons worth mentioning are Valea Mării in Retezat Mountains, Jgheabului Canyon in Șureanu Mountains and Orății Canyon in Bucegi Mountains.

Canyoning does not involve great numbers of tourists, as it is practiced by technically trained and experienced mountaineers (or with the assistance of a specialized team). Additionally, there is also a matter of generally good health and fitness level, since most canyons do need a trek uphill to get to the entering point and do not have intermediate exit points, and the entire activity can take up to 8 hours.

Canyoning has its seasonality, especially in what assisted tours offered by private companies are concerned. We have analyzed the offer of seven such companies working in the area and we have found that the canyoning offer refers mainly to the May–October period for dry canyons and to the July–September segment for canyons with a lot of water (such as Valea Mării in Retezat). For individual teams of experienced mountaineers, the season can begin earlier or end later; still, winter and early spring are not suitable time frames for this activity.

4.2.2. Speleotourism. The most important aspect of speleotourism practiced within the perimeter of the gorges of the Southern Carpathians is centered mainly on the five most important show caves in the region: Muierilor Cave (A-class cave, with B sectors, as classified by Order No. 604/2005), Polovragi Cave (B-class cave with A and C sectors – the touristic sector), Ialomiței Cave (B-class cave with a C-class touristic sector), Liliecilor Cave in Bistriței Gorge (B-class) and Dâmbovicioara Cave (C-class cave). Easily accessible by car or, in the case of Ialomiței cave, by the Buşteni–Babele–Peştera cable car as well, and presenting arrangements for easy and safe passage, these caves attract hundreds of thousands of tourists every year.

Polovragi Cave (Fig. 3A,B), in Olteţului Gorge is the longest cave among the four, with 10,793 m long, followed by Muierilor Cave, in Galbenului Gorge, more than 8 km long, Ialomiței Cave 1,130 m long, Dâmbovicioara cave, 555 m long, and Liliecilor cave, 250 m long. However, the sectors that can be visited by the public are much shorter: 800 m in Polovragi Cave, 573 m in Muierilor Cave, 480 m in Ialomiței Cave, and 200 m in Dâmbovicioara Cave. Aside from Dâmbovicioara and Liliecilor caves, which are rather modest in terms of detail morphology, speleothems are present in all of these show caves, although in the case of Ialomița and Polovragi caves, they have been damaged. These caves did not lack in cultural assets either, starting with the little monastery at the entrance of Ialomiței cave and the two chapels built at the entrance of and inside Liliecilor cave, and moving forward with the different artifacts and paleontological assets of Muierilor Cave.

Fig. 3 – Polovragi Cave. Entrance (A) and detail morphology (B).

These caves were among the first in Romania to be included in the tourism phenomenon. For example, Muierilor Cave had its electric network and arrangements set up as early as 1963. However, the need for "a radical redevelopment" has been pointed out by scientists (Constantin *et al.*, 2021) due to the high number of visitors and the vulnerability of this speleosite. The same authors point out the need to open another exit for the tourist flow in Polovragi Cave, in order to achieve a boost in tourist circulation (currently, visitors enter and then exit the cave on the same route). However, such projects of redevelopment are not yet in the cards for most sites. Still, a project targeting the restoration of the touristic path began in 2014 in Ialomiței Cave, with it reopening to the public in July, 2015. Since then, it has had high numbers of visitors; in 2018 there were 87,766 visitors, 125,984 visitors in 2019 and 109,540 visitors in 2020 (data received from the "Curtea Domnească" National Museum Complex in Târgoviște). Muierilor Cave has around 100,000 visitors/year, Polovragi cave around 30,000 visitors/ year (Constantin *et al.*, 2021) and Dâmbovicioara Cave around 20,000 (data retrieved from the Piatra Craiului National Park website).

One may note that all the important show caves in the Southern Carpathians are located within the perimeter of gorges; only Bolii show cave in Sebeș Mountains is not situated on the slopes of a gorge, but in the vicinity of Bănița Gorge. The cave is 455 m long, has basic arrangements and sometimes holds concerts or other cultural events.

The second aspect of speleotourism practiced in gorges is the exploration of caves that have not been arranged for tourism. This may refer to the small caves near the hiking paths in gorges, most of them of small dimensions, where tourists can briefly observe more of a preview of the endokarst, as well as more secluded caves, with a more difficult access that does require speleological skills.

The Southern Carpathians are home to various caves representative for the Romanian karst, which are included in the A-class, such as Pagodelor, Izverna, Cioclovina, Peștera din Valea Stânii, Bârzoni, Epuran etc., as well as some developed pits, like Avenul de sub Colții Grindului. In the perimeter of the analyzed gorges (alongside the show caves mentioned before) there are a few notable caves in terms of development and complexity, among which: Șura Mare Cave in Sebeș Mountains (A-class cave over 11 km long) and Rătei Cave (B-class cave over 7 km long). The rest of the caves located within the perimeter of karst valleys are mostly more modest speleosites.

There are also some gorges that stand out due to the higher numbers of caves they contain, located in areas where the degree of endokarstic activity had been more intense: Dâmbovicioarei, Cheile Mari ale Dâmboviței, Cheița, Galbenului, Oltețului, Scorotei or Sohodol gorges.

4.2.3. Climbing requires tourists with a certain physical fitness and technical background; it is performed on the steep slopes of mountainous areas, gorges being just one among the favorable locations.

The mountains in the Southern Carpathians with the highest numbers of climbing routes, in general, on limestones and other rocks (schists, granites, gneisses) are: Bucegi (762 routes, among which more than half are clustered in just two climbing areas: Sinaia and Coștila), Piatra Craiului (475), Vâlcan (302), Parâng (193), Căpățânii (168), Făgăraș (125) and Retezat (98), while the other mountains have fewer climbing sectors (all the data regarding the routes were retrieved off of ClimbRomania, a website and data base for active climbers).

Gorges serve as important areas for climbing, with some valleys that gather high numbers of routes standing out, such as Galbenului Gorge, which has 177 routes grouped into 13 sectors. Its most impressive sector is the A Zone – Peretele Peșterii, reaching up to 100 m high and containing 48 routes. Galbenului Gorge is closely followed by Sohodol Gorge, with 153 routes, many of them grouped in the area of the geomorphological feature called "Nările" (direct translation – *The nostrils*). Two other gorges have over 110 routes: Feregari in Cerna Basin and Prăpăstiile Zărneștilor in the Piatra Craiului Massif. Cheii (96 routes), Balomir (72 routes), Folea and Bistriței (57 routes each), Jiu de Vest (49 routes), Crovului (45 routes), Dâmbovicioarei and Brusturetului gorges (with a total of 60 routes) are also worth mentioning.

4.2.4. Hiking. Due to their attractive morphological features, gorges provide both challenging passages and a sense of adventure for tourists, as well as beautiful background scenery for segments of longer distance hikes – many gorges in the area are also entry points of trails leading to the higher parts of the mountains (Scorota Gorge, Buții Gorge, Prăpăstiile Zărneștilor Gorge etc.).

According to data provided by the Ministry of Economy, Entrepreneurship and Tourism, (http://turism.gov.ro/web/autorizare-turism/) there are 306 homologated mountain trails in the Southern Carpathians. The fascination for the high altitudes of these mountains is unmistakable, with most routes heading towards the most important summits of Romania. The highest numbers of hiking routes are cumulated in the following mountains: Făgăraș (68), Bucegi (56), Piatra Craiului (41), Căpățânii and Retezat (30 each), and Mehedinți (23). The other massifs in the analyzed region appear to have a more modest number of such trails.

Among these, less than 50 trails pass through the perimeter of karst gorges, which represents roughly around 16% of the homologated mountain tracks in the area. The highest concentrations of hiking tracks that include the passing by or the stopover at karst gorges are present in the Piatra Craiului Massif (11 trails in the Prăpăstiile Zărneștilor area and Dâmbovița Basin), Mehedinți Mountains (10 trails around Băile Herculane resort, passing through the nearby gorges– Feregari, Jelărău, Pecinișcăi and Șaua Padinei) and Bucegi Mountains (8 trails around Ialomița basin).

Trails have various levels of difficulty, influenced by the particular morphology of each gorge, thus being suitable for different types of tourists. The most accessible trails, for all categories of tourists, pass through gorges with an existing road near the river-bed (Prăpăstiile Zărneștilor – Fig. 4A, Dâmbovicioarei – Fig. 4B, Cheile Mici ale Dâmbovitei, Brusturetului, Tătarului, Taia, Galbenului, Oltețului etc.). However, while the circulation of motor vehicles is not restricted, the downside is that cars, motorcycles, cyclists, pedestrians, all use the same road, which are perhaps narrowed down further by little boutiques placed along the road, all this creating a less than idyllic image of the site (*e.g.*, Dâmbovicioarei Gorge). Another category of accessible gorges are the very short ones, with low-difficulty level trails, like Corcoaia Gorge (Fig. 4C). More demanding trails cross other gorges (Buții, Scorotei, Zănoagei etc.), some of them with higher, significant elevation gains and losses (*e.g.*, Țăsnei –Fig. 4D or Tâmnei).

Only 19 of the 51 analyzed gorges in the Southern Carpathians have homologated hiking trails within their perimeter (some of them having several trails reaching their entrance, different routes in the slopes or along the water); however, of the remaining 32, many are still popular hiking areas. There are many gorges that do have a walking path, and even, in some cases, orientation signs (mostly

placed by locals or different outdoor associations) or basic supporting arrangements (cables, ladders etc.), and which are popular among tourists (Cheile Mari ale Dâmboviței, Ghimbavului, Cheița, Răteiului gorges etc.), while many of them are wilder and require crossing through deeper water that can be up to 1.3 m deep, in Crivadiei Gorge, for example, or even climbing on certain sectors (Orzei or Horoabei gorges). In the absence of marked trails, hiking in such gorges is not recommended for inexperienced tourists; and no hiking route inside gorges is recommended in the absence of basic mountain wear. Finally, there are gorges that do not have homologated mountain trails, but where an access road (more or less modernized) does exist, that can also be used by tourists for a nice walk (Sohodolului, Scocului, Roșiei etc.).

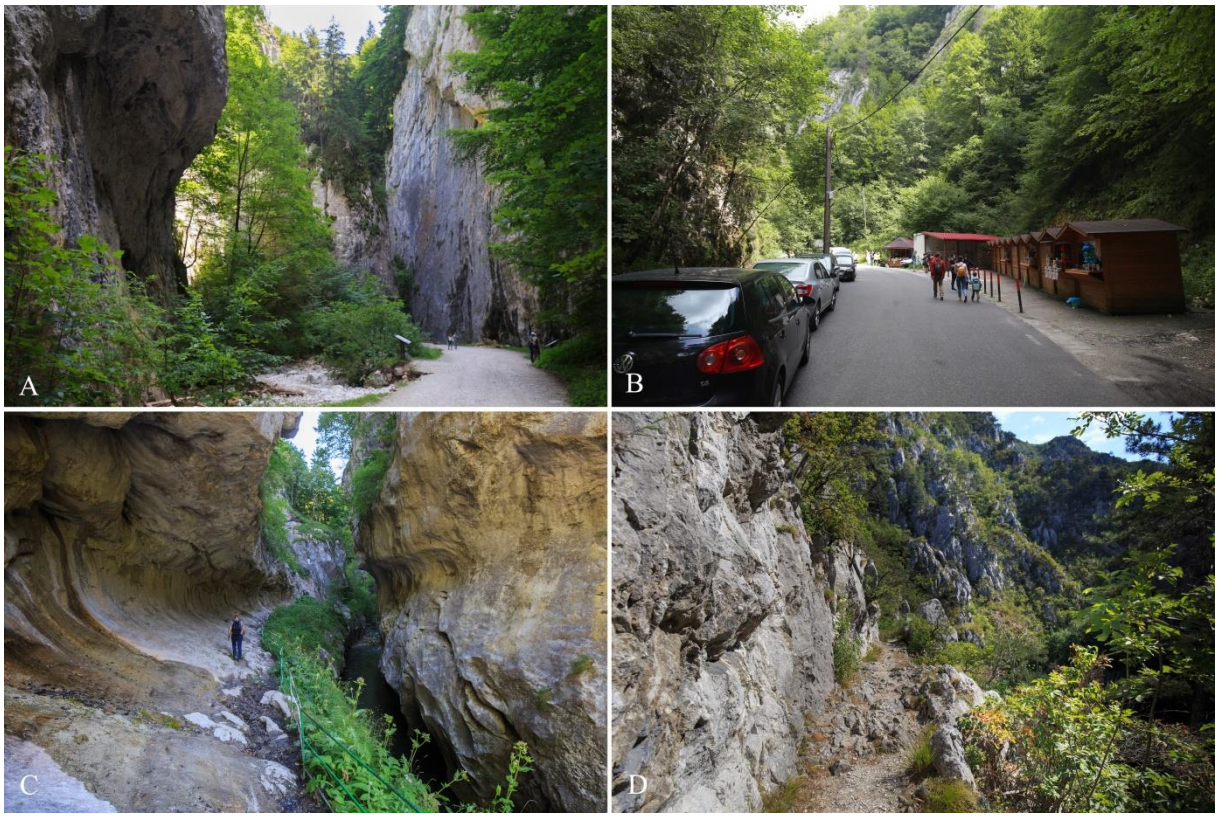

Fig. 4 – Access in gorges: along roads closed for public circulation with motor vehicles (A. Prăpăstiile Zărneștilor Gorge), along roads opened for vehicles (B. Dâmbovicioarei Gorge) and along the slopes (C. Corcoaia Gorge and D. Țăsnei Gorge).

Hiking has its typical seasonality; many trails in the perimeter of gorges are accessible all year round but there are, however, many that are not recommended in winter, especially those that require tourists to pass through water, or climb certain sectors, and especially not for inexperienced tourists. Moreover, in periods of heavy rainfall gorge sectors can be dangerous throughout all seasons, due to the high risk of flash floods (the latest such event taking place in July 2021, when there was serious damage, including to the access road, due to a flashflood in Tătarului and Zănoaga gorges).

Gorges are often visited by travelers involved in other types of tourism. Tourists that visit Polovragi Monastery most often also go for a walk in Oltețului Gorge or visit Polovragi Cave. The same goes for visitors of Bistrița Monastery near Bistrița Gorge and Ialomița Monastery near Peșterii Gorge. For this type of tourists, gorges are merely an additional sight to see; they appreciate an easy access through the gorge, especially since many of them may not even have mountain wear.

4.2.5. Cycling and mountain biking. In many cases, gorges can be a perfect place for mountain biking. We are, of course, referring to those gorges where a road or a dirt road exists, or at least a rather accessible path. Mountain biking usually implies longer distances than hiking, so most gorges constitute merely a stage of the biking track, and not necessarily the destination. For example, passing through Prăpăstiile Zărneștilor, the cycling track continues towards Curmătura Cabin, or through Pisicii Gorge, on Vlădușca Valley, towards Poiana Vlădușca and "La table" area. Here, the track intersects another mountain biking route coming from the Brusturet Gorge, passing by Poiana din Grind (thus, we may note that the segment of the track passing through gorges is rather modest). These are among the clearly signaled and accessible cycling routes in the eastern sector of the mountains. However, for the rest of the units in the Southern Carpathians, information and promotion is scarce and hence, this activity attracts only real connoisseurs, leaving a lot of room for improvement.

4.2.6. Geotourism consists of the observation of geomorphosites, while also having access to information about their geologic and geomorphologic features. Gorges have several assets that are solid bases for the development of geotourism. Firstly, they can provide an understanding to the way water carves its way into limestone (resulting in epigenetic, antecedent, of peripheral subsidence or karstic caption gorges) and the way it models the microforms one can find in the valley (natural bridges, arches, towers, marmites etc.). In the case where a gorge also contains caves, the whole scenario is even more captivating; while visiting Polovragi Cave, tourists should receive information about how the cave was once an underground meander of the Olteț River, and thus get a more detailed picture of the succession and complexity of different evolution phenomena.

The vicinity of Olteț and Galbenului gorges, carved in the same limestone ridge, gives the opportunity of establishing a geotouristic route, which would provide two examples of iconic gorges, in very different evolutionary instances. The landscape is very different among the two, especially when comparing the narrowness of the base sector of Olteț Gorge to the rather wide profile of Galbenului Gorge. The two caves, Muierii and Polovragi, are also good opportunities to provide more understanding of the karst landscape.

Sohodol gorge is another favorable location for the development of geotourism. The complex genesis of this sector, involving both surface evolution and karstic capture has left many clues and traces along the valley. The five swallets, where water continues the underground carving of limestone, together with the many caves (Gârla Vacii, Pârleazului, Izbucului Muschiat, Laptelui etc.) located in the perimeter add to the complexity of the area and subsequently, to the potential for geotourism development. Explanatory panels are now placed near the most important features, like the "Nările" formations, underground meanders of the river, but there is room for improvement in the quality of information and the esthetics of the panels. The presence of an access road, accessible to all types of tourists is an advantage that Sohodol and Olteț gorges have, because one must keep in mind that geotourists are not necessarily looking for a demanding hike during their outing.

There are many other examples of gorges that are valuable geotourism resources, such as Pecinișcăi Gorge, another great didactic site, with a shorter trail leading to the Pecinișcăi swallet after passing through the dry valley downstream, or the Corcoaia Gorge where the erosion levels are displayed in a very illustrative way. All the information regarding these forms and processes ought to be revealed via information panels strategically placed; but until now, we have only observed the presence of satisfactory detailed information panels in Sohodol Gorge and Prăpăstiile Zărneștilor areas. Thus, we may estimate that there is a vast potential for the development of geotourism around these geomorphosites, but that there are only sparse, rudimental arrangements.

5. CONCLUSIONS

The Southern Carpathians have a more solid offer in terms of karst landscape than can be perceived at first glance. There are many types of gorges in terms of morphologic features and enticing offer for different outdoor leisure activities. A wide range of activities and types of tourism is already performed in many of the analyzed gorges but much can still be improved. In the absence of a coherent strategy, these sites of great potential stand only to lose in visibility. The first steps to be taken should fall in the care of researchers, and a detailed inventory and assessment of these valuable geomorphosites should be completed. That data base should be made available to authorities and used in the planning strategies regarding tourism development in the different counties involved, as well as for the whole mountain area, that has much to offer alongside its ski resorts, high altitude trails and picturesque glacial landscape.

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