

**THE COMPLEX STUDY OF THE BIODIVERSITY OF THE RARE, ENDEMIC AND
VULNERABLE VEGETAL SPECIES FROM BĂIȚA-CRĂCIUNEȘTI QUARRY.
THREATS AND CONSERVATION MEASURES**



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ABSTRACT

Băița Craciunesti Quarry is situated on the territory of 3 localities: Pestera, Ormindea and Craciunesti, which belong to the locality of Baita, Hunedoara County, about 27 km North from Deva. This project aimed to identify and monitor rare endemical endangered and jeopardized plant species of Natura 2000 plant communities and habitats that lived in the quarry and nearby, since it is placed close to the contact limit of the protected area ROSCI0110- Baita Hills. In terms of flora a number 360 taxons have been identified, which shows the floristic richness of the area and a low human impact regarding the activity of a mining quarry. Both in the area and nearby the quarry a number of rare, endemic, endangered and vulnerable species have been identified. In terms of phytocenology we have identified and analyzed a number of 38 plant communities. Some of them are mentioned for the first time in this area. Several types of habitats have been identified and their conservation status has been noted. The permanency of grasslands and forest ecosystems across quarry has been observed and analyzed. These ecosystems should be viewed as dynamic ecosystems.

During this period we have also carried out an environment rehabilitation action on a small pit quarry area, an area where the excavation finished. So an area of 100 m² has been chosen where a well chosen reforestation scheme has been implemented so that the experiment be a success. In order to carry out properly this experiment we have taken into consideration the type of genuine vegetation in the area in order to avoid habitats fragmentation.

During this project we tried to achieve the development of some informing and awareness activities on the mining activity taking place in Baita-Craciunesti quarry, on the biodiversity potential found in this quarry and the necessary actions that are to be taken in order to keep the biodiversity preservation status existing in this mining pit, carried out together with the students from the Agro-Forest Association, University of Craiova. An important action was undertaken on the occasion of World Environment Day, on June 5th, 2014, a partnership event with Vaideni City Hall. During the conference not only Quarry life 2014 project and aspects of the mining activity in Baita-Craciunesti quarry were presented, but also aspects and results on Quarry life competition in 2012, along with other papers on topics of ecological rehabilitation

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INTRODUCTION

In Romania practical concerns for ecological ingrowths, based on deep and long-term fundamental research on biodiversity, environmental protection and sustainable use of natural and anthropogenic resource heritage were important objectives of the research institutes and higher education colleges, in the last three decades, synchronized on an European and global level. (D. Malschi D, 2010).

Mining activity was known and practised worldwide since ancient times. Human impact exerted in a mining career on biodiversity is smaller or greater and it depends on many factors. Mining environment issues require a systematic approach and sustainable environmental management techniques must be applied correctly in the mining areas around the world. It is that strategic principles and elements for ensuring sustainable development in a mining career were set. For a good ecological rehabilitation in a mining quarry we need first to know the biodiversity existing in that area in all its complexity, including the sub-layer on which it grows. For a good ecological ingrowths in Baita-Craciunesti mining quarry, or any other mining quarry, it is necessary as V. Cistea recommended (1993) to take into consideration the mediogene and control functions of phytocoenoses which ensure ecological ingrowths through: humane relief set, pedogenesis control and soil protection, microclimate control, fluid control, reducing runoff, depth erosion (landslides, ravines, basins), alleviation etc. The study and knowledge about the vegetation and cormoflora biodiversity in Baita-Craciunesti area, whose vegetating cover goes through profound changes due to anthrozoogen factors existing in that area, answer to a necessity of great interest

1.1. OBJECTIVES

Considering the importance and prevalence of the flora, vegetation and Natura 2000 habitats in this area it is necessary:

- 1) inventorying and distribution of rare, vulnerable and endemic species in the Băița-Crăciunești Quarry as well as the neighboring areas;
- 2) evaluation and monitoring of the rare, vulnerable and endemic species of flora in the Băița-Crăciunești Quarry as well as the neighboring areas;
- 3) to identify the plant communities in the Băița-Crăciunești Quarry as well as the neighboring areas;
- 4) to identify the habitats Natura 2000 in the Băița-Crăciunești Quarry as well as the neighboring areas;
- 5) soil studies;
- 6) description of the current status of the conservation of species, plant communities and habitats in which develop and as well as the neighboring areas;

- 7) finding solutions for the restoration of habitats by maintaining structural diversity (both vertical and horizontal); ecological experiment rehabilitation achievement by setting up a small area of holms, a genuine species for this area;
- 8) promoting sustainable use of the resources of the Băița-Crăciunesti Quarry, making sure to maintain the favourable conservation status of species and habitats;
- 9) finding solutions for the creation and maintenance of a landscape layout and even recreation;
- 10) informing and awareness actions on the activities of Băița-Crăciuneti mining Quarry, the biodiversity potential existing here and necessary actions that are to be implemented in order to preserve the biodiversity status encountered in this mining pit, made together with the students from the Agro-Forest Association, University of Craiova.

1.2. SITE DESCRIPTION

The topic field of this project is part of the Ore Mountains, placed between Deva-Ormindea and Ampoi corridor, between Mures Valley and Brad basin (Annex 1, Fig. 1). This area is very important in terms of geo-botany, fauna and landscape. Researched area is located on the contact line of the west crest of the protected area ROSCI0110- Baita hills, highly important area which nestles a number of species and habitats Nature 2000, most of these being found in the area of Baita-Crăciunesti Quarry (Annex 1, fig. 2, 3, 4, 5).

1.3. METHODS

The conspectus of the flora in the Băița-Crăciunești Quarry has been elaborated on the basis of personal researches undertaken since April-August 2014, as well as the little bibliographical information regarding this field. In order to identify the flora species and the inter-taxa, we looked into: *Romanian Flora*, vol. I-XII (1952-1976); *Flora Europaea*, vol. I-V (1964-1980); *Flora Italica*, vol. I-II, by P. Zangheri (1976); *The Romania illustrated Flora – Pteridophyta et Spermatophyta*, by V. Ciocârlan (2000); *Alpina Flora*, Vol.I, II, III by D. Aeschimann et al. (2004). Regarding the nomenclature, we chose the nomenclature solutions which are considered correct, in accordance with The International Code of Botanical Nomenclature (Melbourne, 2011). For the study of the vegetal carpet in the Băița-Crăciunești Quarry, we have used methods of phytosociologic research characteristic to the Central European phytosociologic School, which was based on the principles and methods elaborated by J. Braun-Blanquet (1926) and adapted by A. Borza (1934) to the particularities of our country's vegetation. The associations were identified and distinguished according to the characteristic, edifying, dominant and differential species. The name of the vegetal association was given taking into account the regulations stated by the Phytosociological Nomenclature Code (2012). The size of the sample areas was established according to the type of vegetation: 25-100 m² for meadows, 1-4 m² for rocky regions, 25-100 m² for underwoods, 400 m² -1000 m² for forests. The quantitative assessment of the participation of every species to the vegetal association was performed with the help of the abundance-dominance index, according to the Braun-Blanquet scale. We have noted also the constancy of the species (K). The plant communities were analyzed and characterized from the chorologic, ecologic point of view and according to the aspect of the floristic composition and physiognomy, syndinamically. The synthetic tables of the described vegetal associations contain information referring to: number of surveys, altitude (m.s.m), exposure, inclination (in grades), the completion of the crowning (where it is the case), vegetation level of covering (%) and the analyzed surface (m²). The vertical arrangement of the phytosociological tables was done according to the coenotaxonomic criterion. In order to get the bioform spectrum, we have used the Diemont method (after V.Cristea et al. 2004). The quantitative assessment of the participation of every species to the vegetal association was performed with the help of the abundance-dominance index, according to the Braun-Blanquet scale. We have noted the constancy of the species (K) in the case of the associations characterized on the basis of minimum 5 surveys. We gave a special attention to the calculation of the quantitative index *Bray-Curtis* and to performing the dendograms, by using the Group-Average method (UPGMA) in the program SYN-TAX 2000 (for the associations with minimum 10 surveys). In order to identify the habitats, we looked into: *Natura 2000 in Romania Habitat fact sheets* (2008); *Habitats from Romania* by Donița N. & al. (2005); *Manual interpretation of Natura 2000 Habitats in Romania* by D. Gaftă & O. Mountford- coord. (2008); and *Interpretation Manual of European Union Habitats - EUR27* (European Commission. DG Environment. Nature and biodiversity, 2007).

1.4. RESULTS

1.4.1. Research on the flora in the Băița-Crăciunești Quarry and neighboring areas

In the investigated area, inventory and monitoring research was carried out on plant species, plant communities and Nature 2000 habitats.

The flora found in the perimeter of the Băița Crăciunești Quarry, an integral part of Metaliferi Mountains, is particularly rich and interesting. A series of endemic, rare, vulnerable and endangered species were found in this area. Such a rich flora is due first of all to the relief, climate, altitude, lithological and

geological structure conditions and, not in the last place, the position of the researched territory which is part of the Continental Bio-Geographical Region.

Some species of lichens, bryophytes and macromycetes from the Thalophyta group were identified in Băița-Crăciunești Quarry and the surrounding forests. The bryophyte species were identified in spruce forests and in forests where there is a mix of beech and coniferous trees, which occupy quite large areas of this territory.

Although, we paid particular attention to the cormoflora in this region, given the very short work time assigned to this project, we were also able to identify, due to field trips, a number of species from Thalophyta group. From the Thalophyta group found in Baita-Crăciunestii quarry area and nearby there were identified several species of lichens, bryophytes and macromycetes, some of them participating in the physiognomy and floristic composition of plant associations and implicitly in Natura 2000 habitats. An example is the macromycete *Coprinus lagopus* participating in the species procession of *Sedo hispanici-Poetum nemoralis* Pop et Hodisan 1985 plant communities. *Talophyta* species list is presented in Annex 2. Regarding the cormoflora found in the research area a number of 360 taxons have been catalogued, which shows a very high floristic richness, given the human impact on a mining career (Species ordered list- Annex 2). In the investigated area numerous species of rare, endangered, vulnerable or endemical cormophytes vegetate. Most of these species are included in the list of Natura 2000 cormophytes species. These species are to be found both in Crăciunești Baita quarry area and surrounding areas (Annex 2, 3). Among the rare endemical plant species discovered in the quarry we should mention: *Iris aphylla* ssp. *hungarica* (Cod Natura 2000-4097), *Athamanta turbith* (L.) ssp. *hungarica* (Borbaș) Tutin (rare, endemic, carpatic), *Dictamnus albus* (rare), *Koeleria macrantha* (Lebed.) Schultes ssp. *transilvanica* (Schur) Nyarady (rare, endemic, carpatic), *Dianthus spiculifolius* (endemic, carpatic), *Platanthera bifolia*, *Neottia nidus-avis*, *Listera ovata*, *Orchis tridentata*, *Centaurea atropurpurea* (rare, dacic element), *Thymus pulcherimus* (rare, carpatic specie), *Th. comosus* Heuffel ex Griseb. (endemic, carpatic) *Fritillaria orientalis* Adams (*F. montana* Hoppe; *F. tenella* Bieb.), *Silene nutans* ssp. *dubia* (endemic, carpatic), *Rosa Jundzillii* Bess. (Annex 3).

Dictamnus albus is a particularly interesting species rarely found in our country. Population research has showed that it forms stable populations, its preservation status being quite good. The same thing can be said for: *Dianthus spiculifolius* and *Centaurea atropurpurea*.

A number of species of orchids have been also discovered in the research area, both in forest and grassland habitats. Some of them are rare and of very special scientific importance. Population studies have revealed that it forms very stable populations, its preservation status being a really good one.

The predominance of thermophyte species was noticed in the researched area. This is due to the mild climate, the geographical position, the almost low altitude and last but not least to the calcareous under layers.

1.4.1.1. Considerations about the vegetation of the Băița-Crăciunești Quarry and neighboring areas

Following field research conducted in Baita-Crăciunești quarry and neighbouring, the presence of an extremely interesting vegetation cover was discovered, characterized by a very large biodiversity, with a quite good state of preservation due to the influence of anthropo-zoogen factors in this area.

Woody vegetation is represented by forest and shrub vegetation particularly specific to the limestone sub-layer. The main forest plant associations found here are: *Bromo sterilis-Robinietum* (Pocs 1954) (Anexa 4, tabel 1, fig. 1), *Balloto nigrae-Ailanthesetum altissimae* Sirbu & Oprea 2010) (Annex 4, table 2, fig. 2), *Quercetum petraeae-cerris* Soo (1957) 1969, *Corylo-Tilietum cordatae* Vida 1959, *Lathyrо hallersteinii-Carpinetum* Coldea 1975 (Syn. *Quercetum pataeae-Carpinetum* auct. transsilv.) (Annex 4, table 3, fig. 3) *Carpino-Fagetum* Paucă 1941, *Populo-Betuletum pendulae* Coldea 1972 (Syn. *Junipero-Betuletum albae* Soó ex Borza et Boșcaiu 1965), *Genisto tinctoriae-Quercetum petraeae* Klika 1939.

The association *Bromo sterilis-Robinietum pseudacaciae* (Pocs 1954) Soó 1964 (syn. *Robinietum pseudacaciae* (Arvat 1939) Balasz 1942; *Agropyro-Robinietum pseudacaciae* Szabó 1971) (Annex 4, table 1, fig. 1) is very widespread around the quarry. Even if the vegetal association is enlightened by an invasive plant, in this respect the association being present in the area is a benefit. This has a very important role against erosion, rearranging and fixing the soil through the invasive and characteristic species- *Robinia pseudo-accacia*.

The plant community is very prevailed in the whole area and has a huge stability. A complex study regarding the phisionomy and floristical composition was accomplished as well as calculating the Bray-Curtis quantity index and making the dendrogram for this plant community using the Group-Average UPGMA from the SYN-TAX programme - for plant communities with minimum 10 relevées. From the dendrogram analysis one can notice that this is formed by 2 clusters, the first having a higher stability from the quantity point of view, in which the relevées are grouped 1, 2, 6, 5, 4, 8, 9, 10.

These relevées were performed close to the quarry of the closed exploits, in the neighbouring of the area where we realised the experiment of establishing the brush.

This proves the great stability of the present photocenosis. The second cluster groups only two relevées, 3 and 7, and were done very close to the digging area, exactly on the brim of the quarry access road, the quantity stability of the photocenosis being very reduced.

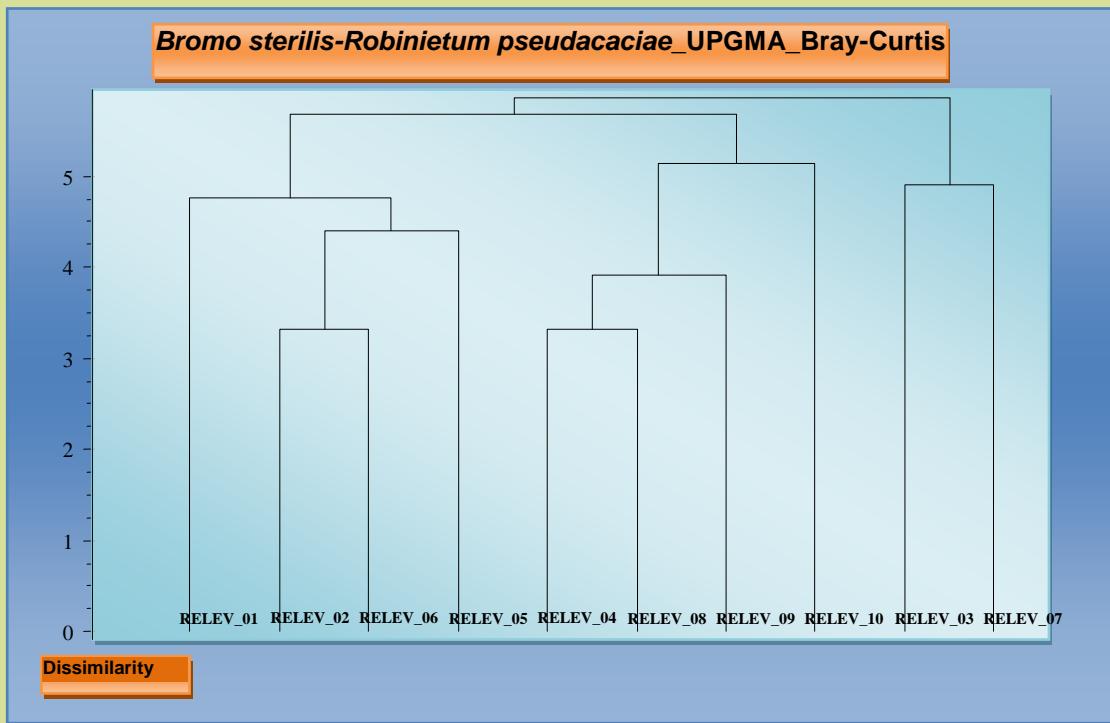


Fig.1. The dendrogram of plant community *Bromo sterilis-Robinetum* (Pócs 1954) Soó

Populo-Betuletum Pendulae Coldea 1972 (Syn. *Junipero-Betuletum albae* Soó ex Borza et Boșcaiu 1965) appear on the degraded land of the quarry and help soil restore, being an intermediary association, a succession phase to genuine forest vegetation.

Along Căinelului Valley meadow plant communities are to be found: *Stellario nemori-Alnetum glutinosae* (Kärstner 1938) Lohm. 1957, *Salicetum purpureae* (Soó 1934 a.n.) Wendelbg.-Zelinky 1952. (Annex 4, fig. 9).

Shrubs vegetation (Annex 5, fig. 1) is well represented. It is represented by the following plant communities: *Pruno spinosae-Crategetum* (Soó 1927) Hueck 1931, *Coryletum avellanae* Soó (Annex 5, table 1), *Syringo-Fraxinetum orni* Borza 1958 em. Resmerită 1972 (syn.: *Syringeto-Fraxinetum orni coryletosum columnae* Borza 1958) (Annex 5, table 2, fig. 1), *Euonymo-Sambucetum nigrae* Moor 1967.

The most important is *Syringo-Fraxinetum Orni* Borza 1958 em. Resmerita 1972 specific to the cliffs in the area. This plnt community is characterized by a great biodiversity and the presence of thermophilic species baring a particular scientific importance, becoming a part in building the priority habitat 40A0* [Subcontinental peri-Pannonic scrub] CLAS. PAL.: 31.8B12p, 31.8B13, 31.8B14, 31.8B3p.

Herbaceous vegetation is the vegetation of grasslands, ruderal vegetation and saxicole vegetation, weeds vegetation and ruderal vegetation (present around households, buildings, shelters, warehouses, along the roads and trails or quarry trash pit).

Grasslands are widespread crop formation; the largest areas are filled with *Festuca rubra*, *F. valesiaca*, *F. pratensis*, *Poa pratensis*, *Sesleria rigida* (Annex 6) etc. In the floristic composition of these meadows, numerous endemic and rare species are a component part, especially orchids.

Among plant communities the most common are: *Festuco rubrae-Agrostetum capillaris* Csürös-Káptalan 1964 (Syn. *Festucetum rubrae-Agrostietum capillaris* Horv. 1951; *Festuco rubrae-Cynosuretum* auct. roman., *Festucetum rubrae et Agrostis capillaris* auct. roman.) (Annex 6, Table 1, fig. 1, 2), *Festucetum pratensis* Soó (1938) 1955, 1969.) (Annex 6, fig. 3), *Poëtum pratensis* Răvărău et al 1956 (Syn. *Trifolio-Poëtum pratensis* (Răvărău et al. 1956) Resmerită 1958) (Annex 6, Table 2), *Medicagini minimae-Festucetum valesiacae* Wagner 1941.) (Annex 6, Table 3, fig. 4), *Festucetum valesiaco-rupicolae* Csürös et Kovács 1962, *Seslerietum rigidae* Zólyomi 1939, *Sedo hispanici-Poëtum nemoralis* (Annex 6, fig. 5).

Stipetum pulcherrimae Soó Association 1942 was quoted by Pop and Hodisan from the quarry surrounding area but it has not been found. Nevertheless, this may be a consequence of the fact that there was little time available for the whole research project. This association is very important, it builds a primary habitat - 62C0 * Ponto-Sarmatian steppes [Ponto-Sarmatic Steppes] CLAS. PAL.: 34.92 and further studies would be necessary in order to identify and establish the preservation status.

Saxicole vegetation is well represented in this area: *Asplenietum trichomano-rutae murariae* Tx. 1937 (Syn.: *Tortulo-Asplenietum* Tüxen 1937) (Annex 7, fig. 1, 2); *Asplenio trichomanes-Poëtum nemoralis* Boșcaiu; *Asplenio-Ceterachetum* Vives 1964. Many rare endemic species specific to the limestone sub-layer are a component part of the floristic composition. (Annex 7, fig. 5, 6.).

Ruderal vegetation is well developed in this area, thus indicating a high human impact, but which is to some unimportant extent the mining result in the area. Ruderalisation is caused by livestock, irrational grazing, tourism, mining during the communism in Craciunesti Wharfs area (quarry bordering area) and other local factors.

Among the ruderal plant associations identified in the quarry area and surroundings there are the following plant associations: *Hordeetum murini* Libbert 1932 em. Pass. 1964, *Cardarietum (Lepidietum) drabae* Timár 1950, *Agropyro repentis-Convolvuletum arvensis* Felföldy (1942) 1943 (Syn. *Agropyretum repentis* Felföldy 1942), *Sambucetum ebuli* (Kaiser 1926) Felföldy 1942 (Annex 8, table 1), *Tussilaginetum farfarae* Oberd. 1949 (Syn. *Poo-Tussilaginetum* Tx. 1931), *Urticetum dioicae* Steffen 1931, *Malvetum neglectae* Aichinger 1933 em Pass. 1966, *Digitario-Portulacetum* (Felföldy 1942) Timár et Bodrogk. (1953) 1955 (Syn. *Convolvulo-Portulacetum* Ubrizsy 1949, 1950), *Polygonetum avicularis* Gams 1927 (Syn. *Schlerochloo-Polygonetum avicularis* (Gams 1927) Soó 1940).

Human impact in the area is evident by the presence even in the quarry area but not only of some invasive or colonizing species, two of them forming very stable and difficult to fight plant communities. Phytocenoses of these plant communities were identified and analyzed in Baita-Crăciunești quarry.

These are: *Clinopodio vulgaris-Pteridietum aquilinii* Dihoru 1975 (Annex 8, table 2) (Syn. Ass. *Pteridietum aquilinum* Raclaru 1967 p.p., Ass. *Pteridium aquilinum* Serbanescu 1957) and *Balloto nigrae-Ailanthesum altissimae* Sirbu & Oprea 2010

Tall-herb vegetation is quite well represented in the quarry, the limestone sub-layer having an important role in the phytocenoses development. Lush weeds appear in some shaded and humid areas of the quarry: *Petasitetum albae* Dihoru 1975, *Scirpetum silvatici* Schwick. 1944, *Rumici obtusifolii-Urticetum dioicae* Kornaš 1968 (Syn. *Urtica dioica-Rumex obtusifolius* Anghel et al. 1965).

14.1.2. Natura 2000 habitats found in Băita-Crăciunești Quarry and the neighbouring

In the research area there were identified several types of habitats and their conservation status was observed. Grassland and forest ecosystems stability across quarry has been watched. These ecosystems should be viewed as dynamic ecosystems.

Forest habitats

Several types of forest habitats have been identified in the quarry and its neighbouring.

One important habitat in this area is the habitat 91M0 - Pannonic-Balkanic turkey oak-sessile oak forests; CLAS. PAL.: 41.76. Characteristic species and dominante for the 91M0 habitat: *Quercus petraea* Q. *dalechampii*, *Q. polycarpa*, *Q. cerris*, *Q. frainetto*, *Acer tataricum*, *Tilia tomentosa*, *Ligustrum vulgare*, *Euonymus europaeus*, *Festuca heterophylla*, *Carex montana*, *Poa nemoralis*, *Potentilla alba*, *Potentilla micrantha*, *Tanacetum corymbosum*, *Campanula persicifolia*, *Digitalis grandiflora*, *Vicia cassubica*, *Viscaria vulgaris*, *Lychnis coronaria*, *Achillea distans*, *Silene nutans*, *Hieracium sabaudum*, *Galium schultesii*, *Lathyrus niger*, *Peucedanum oreoselinum*, *Helleborus odorus*, *Asperula taurina*, *Luzula forsteri*, *Brachypodium sylvaticum*, *Crocus flavus*, *Carex praecox*.

Another important forest habitat is habitat 91Y0 - Dacian oak-hornbeam forests; CLAS. PAL.: 41.2C. Characteristic species and dominante: *Carpinus betulus*, *Quercus robur*, *Quercus petraea*, *Quercus dalechampii*, *Quercus cerris*, *Quercus frainetto*, *Tilia tomentosa*, *Pyrus pyraster*, *Fraxinus excelsior*, *Carex brevicollis*, *Dentaria quinquefolia*, *Carpesium cernuum*, *Crataegus pentagyna*, *Melampyrum bihariense*, *Ornithogalum flavescens*, *Scutellaria altissima*.

On the on the hillside of this area well develop good the habitats: 9180* - *Tilio-Acerion* forests of slopes, screes and ravines; CLAS. PAL.: 41.4 and 9130 - *Asperulo-Fagetum* beech forests; CLAS. PAL.: 41.13.

Phytocoenoses illustrating habitat 91E0 * are to be found in the Căinelului Valley. Name of the habitat is Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*); CLAS. PAL.: 44.3, 44.2 și 44. Characteristic species: *Alnus glutinosa*, *Alnus incana*, *Fraxinus excelsior*; *Populus nigra*, *Salix alba*, *S. fragilis*; *Ulmus glabra*; herbaceous layer – *Angelica sylvestris*, *Cardamine amara*, *C. pratensis*, *Carex acutiformis*, *C. pendula*, *C. remota*, *C. strigosa*, *C. sylvatica*, *Cirsium oleraceum*, *Equisetum telmateia*, *Equisetum spp.*, *Filipendula ulmaria*, *Geranium sylvaticum*, *Geum rivale*, *Lycopus europaeus*, *Lysimachia nemorum*, *Rumex sanguineus*, *Stellaria nemorum*, *Urtica dioica*.

Rock habitats

The most important habitat identified in this area is – 8210 Calcareous rocky slopes with chasmophytic vegetation; CLAS. PAL.: 62.1.

Characteristic species and dominante: *Ceterach officinarum*, *Asplenium ruta-muraria*, *Thymus pulcherrimus* s.a.

Grassland habitats

The most important grassland habitat is 6520 - Mountain hay meadows; CLAS. PAL.: 38.31. Characteristic species: *Trisetum flavescens*, *Heracleum sphondylium*, *Viola cornuta*, *Astrantia major*, *Carum carvi*, *Crepis mollis*, *Polygonum bistorta*, *Silene dioica*, *S. vulgaris*, *Campanula glomerata*, *Salvia pratensis*, *Anthoxanthum odoratum*, *Geranium phaeum*, *G. sylvaticum*, *Narcissus poëticus*, *Malva moschata*, *Trollius europaeus*, *Pimpinella major*, *Muscari botryoides*, *Lilium bulbiferum*, *Thlaspi caeruleascens*, *Viola tricolor* subsp. *subalpina*, *Phyteuma orbiculare*, *Primula elatior*, *Chaerophyllum hirsutum*, *Alchemilla* spp., *Cirsium heterophyllum*.

The habitat **6440** -Alluvial meadows of river valleys of the *Cnidion dubii*; CLAS. PAL.: 37. is well represented. Characteristic species and dominant: *Cnidium dubium* (*C. venosum*), *Viola persicifolia*, *Scutellaria hastifolia*, *Allium angulosum*, *Gratifolia officinalis*, *Carex praecox*, *Juncus atratus*, *Lythrum virgatum*.

Another important grassland habitat is habitat 6240* - Sub-pannonic steppic grasslands; CLAS. PAL.: 34.315. Characteristic species and dominant: *Festuca valesiaca*, *Allium flavum*, *Gagea pusilla*, *Teucrium chamaedrys*, *Medicago minima*, *Helianthemum canum*, *Poa badensis*, *Scorzonera austriaca*, *Potentilla arenaria*, *Seseli hippomarathrum*, *Alyssum alyssoides*, *Artemisia austriaca*, *Chrysopogon gryllus*, *Iris humilis* subsp. *arenaria*, *Carex humilis*, *Festuca rupicola*, *Stipa capillata*, *S. joannis*, *Botriochloa ischaemum*.

Tall-herb habitats

This category includes habitat **6430** - Hydrophilous tall-herb fringe communities of plains and of the montane to alpine levels; CLAS. PAL.: 37.7 și 37.8; RO habitat type code: R3701, 3702, 3703, 3706, 3707, 3708, R3714. Hydrophilous weeds in this habitat grow in shady places with high humidity of the montane level on colluvium alluvial soils. This habitat is particularly found in the neighboring areas of Băita-Crăciuneni Quarry and in the neighboring. Characteristic and dominant species: *Glechoma hederacea*, *Epilobium hirsutum*, *Senecio fluiatilis*, *Filipendula ulmaria*, *Angelica archangelica*, *Petasites hybridus*, *Cirsium oleraceum*, *Chaerophyllum hirsutum*, *Aegopodium podagraria*, *Alliaria petiolata*, *Geranium robertianum*, *Silene dioica*, *Lamium album*, *Lysimachia punctata*, *Lythrum salicaria*, *Crepis paludosa*. The widest spread vegetal communities in this area are: *Scirpetum sylvatici* Ralski 1931 em. Schwich 1944 and *Petasitetum albae* Dihoru 1975. Specii caracteristice și dominante: *Glechoma hederacea*, *Epilobium hirsutum*, *Senecio fluiatilis*, *Filipendula ulmaria*, *Angelica archangelica*, *Petasites hybridus*, *Cirsium oleraceum*, *Chaerophyllum hirsutum*, *Aegopodium podagraria*, *Alliaria petiolata*, *Geranium robertianum*, *Silene dioica*, *Lamium album*, *Lysimachia punctata*, *Lythrum salicaria*, *Crepis paludosa*.

Shrubs habitats

Habitat 40A0 * from this category is to be found in the researched area. Name of the habitat-Subcontinental peri-Pannonic scrub; CLAS. PAL.: 31.8B12p, 31.8B13, 31.8B14, 31.8B3p. Characteristic and dominant species: *Cornus mas*, *Crataegus monogyna*, *Acer tataricum*, *Teucrium chamaedrys*, *Peucedanum cervaria*, *Salvia austriaca*, *Chrysanthemum corymbosum*, *Vincetoxicum hirundinaria*, *Waldsteinia geoides*, *Syringa vulgaris*, *Euonymus verrucosus*, *Viburnum lantana*, *Spiraea chamaedryfolia*, *S. crenata*, *Fraxinus ornus*, *Asplenium ruta-muraria*, *Ceterach officinarum* s.a.

1.5. DISCUSSIONS

1.5.1. Aspects of environmental rehabilitation and preservation measures in Baita-Craciunesti quarry

Thus, we have chosen an area of 100 m² in the area where the excavation ended where we have implemented a very well chosen reforestation scheme so that the experiment be a success. (Table No. 1). The planting distance was set at 2 x 1 m.

We used as a basic species *Quercus petrea*, a genuine species forming a plant community right next to the wooded area. In addition to this species we've also used mix species having the role to support the other ones. 50 seedlings were necessary compared to 4/1 meaning a number of 40 of *Quercus petraea* and 10 mixed species. Mixing species were: *Acer pseudoplatanus*, *Tilia argentea*, *Cerasus avium*.

During this period we have also carried out an action of ecological rehabilitation of a small quarry area, where the excavation didn't exist anymore.

Thus an area of 100 m² was chosen, where a well thought reforestation scheme was implemented so that the experiment be a success. (Annex 9, fig. 1-11). For carrying out this experiment we took into account the type of native vegetation in the area, in order to avoid habitats fragmentation. Soil analyses were made and they indicate the fact that it has a good trophicity. Employees from CarpatCement Chiscadaga also took part in the event. In order that the experiment be a success we involved Simeria Forest rangers, as well. They helped us to plant. In the end, it was concluded that the experiment was a success, all trees took root, they had a very good development and in this moment they are very vigorous, this indicating the fact that the ecological rehabilitation in the area can be done successfully, the soil is not depleted in nutrients and all necessary conditions asked by a rehabilitation are met, if a scheme of proper reforestation is made as such.

Table 1

1	2	3	4	5	6	7	8	9	10
Go	Go	Go	Go	Go	Go	Go	Go	Go	Go
Go	Go	Go	Go	Go	Go	Go	Go	Go	Go
Go	Go	Go	Go	Go	Go	X-Te	X-Ci	X-Te	Go
Go	Go	Go	Go	Go	Go	X-Ci	X-Te	X-Pa	Go
Go	Go	Go	Go	Go	X- Pa	X-Te	X-Pa	X-Pa	Go

Legend:Go- *Quercus patraea*

1-10 no. rows

X – mixing species

S=100 m²Pa – *Acer pseudoplatanus*Ci – *Cerasus avium*Te – *Tilia tomentosa*

Also, in the quarry, we have found a very large land area given back when the mining actions in the area finished (Annex 9) where ecological rehabilitation can be achieved successfully by creating some grasslands. Thus, we must first consider biotope factors restoration by mechanical works, organic fertilization with green fertilizer, manure from the nearby fold (there is a cattle stable close to the quarry) and only if there is the case by chemical fertilization. The most important thing is that the soil used to prepare the ground be overburden soil from the quarry (which has already been done), bringing grass rooted ground with the soil as well, this favouring a good and natural establishment and development of that type of meadow. It is best that the plots (50-100 m²) be naturally seeded using the grass cuttings, that have reached maturity (not raw) from the meadow of this kind existing in the surrounding areas of Baita-Craciunesti quarry, given the fact that in this area we have found important areas of natural grasslands, which are in a very good state of preservation. The most appropriate meadow for ecological rehabilitation in this area is *Festucetum rubrae-Agrostietum capillaris* Csürös-Káptalan 1964 (Syn. *Festucetum rubrae-Agrostietum capillaris* Horvat. 1951). In the case when we want a rehabilitation of this type of meadow by seeding, which is very fast, is in compliance with the type of vegetation in the area, does not fragmentize the habitat, the natural vegetation of grasslands is quickly regenerated, is a widely used method in our country; the seeds can be easily purchased from the Institute of Grasslands Cultivation, Brasov and we can use the following sowing scheme: *Festuca rubra* 35, *Agrostis capillaris* 20, *Anthoxanthum odoratum* 15, *Phleum pratense* 15, *Trifolium pratense* 10, *Lotus corniculatus* 3 and *Achillea millefolium* 2. The species used for the sowing scheme should be genuine species. (Annex 9).

Regarding **preservation measures** the following aspects must be sought: the structure and functioning of the habitat types in the quarry, their preservation on a long-term, the possibility to keep them in the future and if the conditions of each habitat are favourable. A good collaboration with Simeria Forest Department is needed, the ones responsible for the administration of the forests existing nearby the quarry. Thus, it is necessary that standing crop management be properly made in order to ensure the achievement of the following works: hygiene cuts, cleaning, preservation, reconstruction, thinning, and releases. Tree regeneration should be made naturally taking into account the preservation of genetic diversity. Furthermore, it is compulsory to control the exploitation and exclusive application of intense proper and correct silvicultural treatments. Regarding invasive plants, their presence should be avoided as much as possible into the area and for the already existing species it is necessary that their populations be kept under control if there is no possibility of rooting them out. Taking into consideration the tourism potential of the area where the quarry is placed, a necessary training of the visitors is required as well as developing behaviour in the spirit of natural heritage preservation, in the context of local and regional sustainable development (tourists must comply with the rules of natural heritage conservation, this involving the monitoring of tourism activities that generate garbage as such).

Grazing, given the fact that it characterizes this area, even in the quarry area, must also comply with the imposed requirements for biodiversity heritage conservation.

1.5.2. Soil studies necessary for the environment rehabilitation

After field visits were paid, soil samples were taken precisely from the area where the ecological rehabilitation was achieved. Soil analyzes were carried out in the Laboratory of Soil Science, University of Craiova. According to the results of the performed analyses, it is estimated that the analyzed soil has a slightly alkaline reaction, humus supply condition is medium, phosphorus supply condition is poor and potassium supply condition is good (Table 2). Generally speaking, this type of soil has a medium to poor productive potential and it can be improved by organic and inorganic fertilizer treatment. We however recommend the usage of natural fertilizers from the sheepfolds in the area. Following the results of the soil analysis we can notice that this soil is favourable to brush establishment which should follow the reforestation scheme which we've made and implemented and which led to very good results.

Table 2 – The results of soil sample analyses

pH	Nt, %	Humus, %	IN(N index)	P, ppm	K, ppm
7,87	0,1114	2,23	2,2	14,75	200

1.5.3. Propositions for sustainable development of this area. Taking into consideration the location of the mining quarry in a particularly beautiful area of our country with a very large landscape range, with a very interesting and rich biodiversity, we believe that we can achieve sustainable quarry rehabilitation, paying particular attention to tourism, recreational areas execution. Partnerships with the universities can be signed in this area, as well as in any other mining quarry, by creating some research centres based on the main goal of ecological rehabilitation of mining quarries, centres created to support researchers and students, especially for those belonging to faculties as environmental engineering, ecology, geology. I believe that such centres are highly important and necessary; the students being given the possibility to do their internship in these places; the cost being a minimal one for both parties.

1.5.4. Awareness and informing actions on mining quarries and their environment rehabilitation

During this project we tried to achieve the development of some informing and awareness activities on the mining activity taking place in Baita-Craciunesti quarry, on the biodiversity potential found in this quarry and the necessary actions that are to be taken in order to keep the biodiversity preservation status existing in this mining pit, carried out together with the students from the Agro-Forest Association, University of Craiova. An important action was undertaken on the occasion of World Environment Day, on June 5th, 2014, a partnership event with Vaideni City Hall. During the conference not only Quarry life 2014 project and aspects of the mining activity in Baita-Craciunesti quarry were presented, but also aspects and results on Quarry life competition in 2012, along with other papers on topics of ecological rehabilitation (Annex 9, fig. 12-13).

CONCLUSIONS

Biodiversity preservation in a mining quarry is essential regardless of where it takes place. Regarding the biodiversity existing in Baita-Craciunesti quarry, we can say that it is of particular interest in potential, variety, in the presence of many rare endangered jeopardized and endemic species or Nature 2000. Nature 2000 habitats are of the most diverse ones, here being the place where scrub and forest, grasslands and rocky, tall herbs and even ruderal habitats meet. Given the scientific, landscape, economic and social importance of this area we think that its rehabilitation is a must, therefore establishing preservation measures.

Regarding the study of flora and vegetation biodiversity in the research area, complex studies were carried out as such, which should relate exclusively to Baita-Craciunești quarry; the only flora and vegetation work being written by I. Pop and I. Hodisan in 1964. Thus, our results especially on the flora, vegetation and habitats are the fruit of our personal research this summer. However, these studies can only be considered at the beginning, given the short time and the fact that we have studied only a single growing season as well as the biodiversity complexity existing here and of the phenomena that happen.

Also, given the importance and necessity of biodiversity preservation in such an area, ecological actions can be performed where pupils and students can be invited to take part; students and pupils from the faculties of agriculture and forestry as well as ecology volunteers. In order to be successful, the ecological rehabilitation of a mining quarry and biodiversity preservation is necessary that it uses the best ingrowths methods of herbaceous and woody plant communities and not last of the landscape.

For a good ecological ingrowths in Baita-Cräciunesti mining quarry, or any other mining quarry, it is necessary as V. Cistea recommended (1993) to take into consideration the mediogene and control functions of phytocoenoses which ensure ecological ingrowths through: humane relief set, pedogenesis control and soil protection, microclimate control, fluid control, reducing runoff, depth erosion (landslides, ravines, basins), alleviation etc.

ANNEX 1

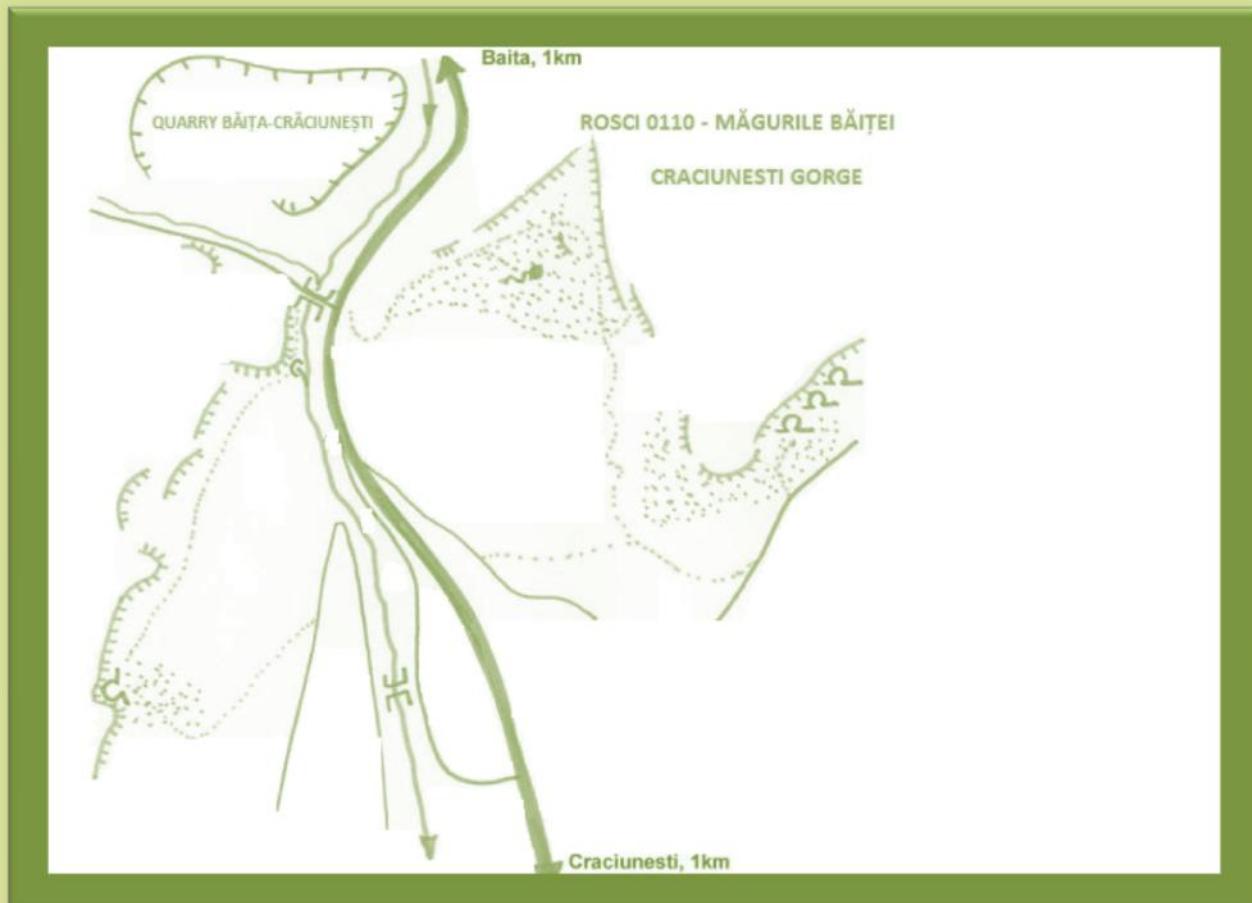


Fig. 1.

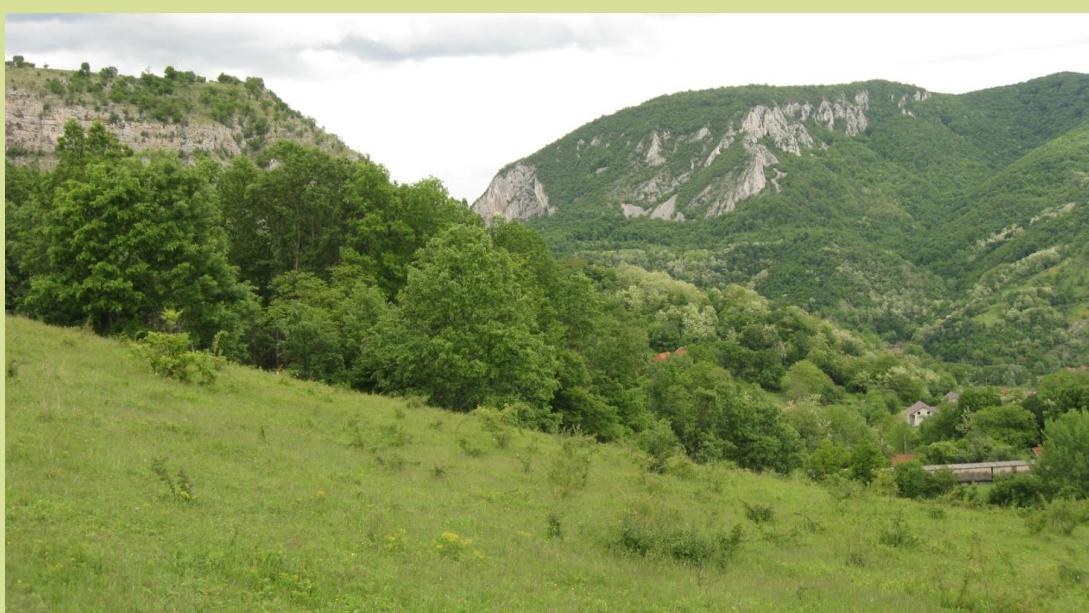


Fig. 2. Aspect from Băița-Crăciunești Quarry (Foto M. Niculescu)



Fig. 3. Aspect from Băița-Crăciunești Quarry - the level of exploitation (Foto M. Niculescu)



Fig. 4. The Băița-Crăciunești Quarry - the level of exploitation (Foto M. Niculescu)



Fig. 5. The richness vegetation in the Băița-Crăciunești Quarry

The road to Quarry (Foto M. Niculescu)

ANNEX 2

LIST OF SPECIES OF FLORA IN BĂIȚA-CRĂCIUNEȘTI QUARRY AND NEIGHBORING AREAS (foto Annex 3)

MACROMYCETES

Aleuria aurantia (Pers. ex Fr.) Fuck (syn. *Peziza aurantia* (Fers.) Fr)
Amanita rubescens (Pers.) Quél. (Annex 3, fig. 4)
Armillaria mellea (Vahl.) Quélet Tr.
Auricularia auricula –*judae* L.ex Fr. (Syn *Auricularia auricula* Hook.) Underw; *Hirneala auricula* –*judae* Bull. ex. St. An.)
Auricularia mesenterica Pers. (Annex 3, fig. 5)
Bovista nigrescens Pers.
Calvatia utriformis(Annex 3, fig. 6)
Coprinus lagopus (Annex 3, fig. 9)
Craterellus cornucopioides (L. ex Fr.) Pers. (Annex 3, fig. 8)
Daedalea quercina L. ex. Fr. (Syn. *Trametes quercina*)
Ganoderma applanatum (Pers. Ex Wallr.) Pat. (Syn. *Fomes applanatus* (Pers.) Gill.)
G. lucidum (Leyss.) Karst (Annex 3, fig. 7)
Fomes fomentarius (L. ex Fr.) Gill
Fistulina hepatica Schaeff. ex. Fr.
Lactarius piperatus (Scop.) S.F.Gray
Lycoperdon perlatum Pers.(Syn. *L. gemmatum* Batsch)
L. pyriforme Pers.(Syn *L.gregarium* Vel; *L.saccatum* Pers)
Marasmius oreades (Bolt. ex Fr.) Fr.
Panus rufus Fr.
Pitoporus betulinus (Bull. ex. Fr.) Karst.
Pseudotrometes gibbosa (Pers.) Bond. et Sing.
Russula virescens (Schff. Ex Zant.)Fr.
Schizophyllum commune Fr. (Syn. *S. alneum* (L.) Schroet.)
Stereum hirsutum (Willd: ex.Fr) S.F. Gray
Tremella mesenterica Retz. ex Hook (Annex 3, fig.3)
Trametes hirsuta (Wulf.ex. Fr.) Pil (Syn. *Coriolus hirsutus*) (Wulf ex.Fr.) Quél.
T. versicolor (L.ex.Fr.) Fr.(Syn *Corynolus versicolor* (L. ex Fr.) Quél.
Xylaria hypoxylon (L. ex.Fr.) Grev.
X. polymorpha (Scop.) Grev.

BRYOPHYTA (Annex 3, fig. 1,2)

Hylocomium splendens (Hedw.) W. P. Schimp.
Pleurozium schreiberi (Brid) Mitt.
Leucobryum glaucum (L. ap. Hedw.) Schimp.
Climacium dendroides (L. ap. Hedw.) Webwe et Mohr.
Ctenidium molluscum (Hedw.) Mitt.
Hypnum cupressiforme Hedw.
Cratoneurus filicinum (Hedw.) Spruce.
Tortula muralis (Hedw.) Gartn., Meyer and Schreb.
Ptilium crista-castrensis (L. ap. Hedw.) De Not.
Plagiomnium undulatum (Hedw.) T. J. Kop.
Bryum argenteum Hedw.

PTERIDOPHYTA

1. *Asplenium ruta-muraria* L.
2. *A. trichomanes* L.
3. *Cystopteris fragilis* (L.)
4. *Ceterach officinarum* Willd.
5. *Dryopteris filix-mas* (L.) Schott
6. *Equisetum aevense* L.
7. *E. telmateia* Ehrh. (*E. maximum* Lam.)
8. *Polypodium vulgare* L, G, Cp(Bor)
9. *Pteridium aquilinum* (L.) Kuhn

SPERMATOPHYTA

10. *Acer campestre* L.
11. *A. platanoides* L.
12. *A. pseudoplatanus* L.
13. *Achillea crithmifolia* Waldst. et Kit.
14. *A. collina* J.Becker.
15. *Agrimonia eupatoria* L.
16. *Agrostis capillaris* L. (*Agrostis tenuis* Sibth.)
17. *A. stolonifera* L. (*Agrostis alba* auct.)
18. *Aegopodium podagraria* L
19. *Ailanthus altissima* (Miller) Swingle
20. *Allium flavum* L.
21. *A. ursinum* L.
22. *Alnus glutinosa* (L.) Gaertn
23. *Alopecurus pratensis* L.
24. *Anthoxanthum odoratum* L.
25. *Alyssum alyssoides* (L.) Nath. (*A. calycinum* L.)
26. *Anchusa officinalis* L.
27. *Anemone nemorosa* L.
28. *A. ranunculoides* L.
29. *Anthemis tinctoria* L.
30. *A. austriaca* Jacq.
31. *A. arvensis* L.
32. *Anthyllis vulneraria* L.
33. *Aposeris foetida* (L.)Less.
34. *Artemesia agrimonoides* (L.) DC.
35. *Arenaria serpyllifolia* L.
36. *Aristolochia clematitis* L.
37. *Astragalus glycyphyllos* L.
38. *Arctium lappa* L.
39. *Asperula taurina* L.
40. *Athamantha turbith* (L.) Brot. ssp. *hungarica* (Borbas) Tutin.
41. *Betula pendula* Roth (*B. verrucosa* Ehrh.)
42. *Botriochloa ischaemum* (L.) Keng.
43. *Brachypodium pinnatum* (L.) Beauv
44. *B. sylvaticum* (Huds.) Beauv.
45. *Briza media* L.
46. *Bromus arvensis* L.
47. *B. sterilis* L.
48. *B. tectorum* L.

49. *Calamagrostis epigeios* (L.) Roth
 50. *Caltha palustris* L.
 51. *Campanula patula* L.ssp. *patula*
 52. *C. persicifolia* L.
 53. *C. persicifolia* L. var. *dasyarpa*
 54. *C. rapunculoides* L.
 55. *C. sibirica* L.
 56. *C. trachelium* L.
 57. *Calystegia sepium* (L.) R.Br.
 58. *Capsella bursa –pastoris* (L.) Medicus
 59. *Cardaria draba* (L.) Desv. (*Lepidium draba* L.)
 60. *Cardamine amara* L.
 61. *C. pratensis* L.
 62. *Cardaminopsis arenosa* (L.) Hayek
 63. *Carex brizoides* L.
 64. *C. caryophyllea* Latourr.
 65. *Carex distans* L.
 66. *C. humilis* Leysser
 67. *C. pilosa* Scop.
 68. *Carlina vulgaris* L.
 69. *Carpinus betulus* L.
 70. *Centaurea atropurpurea* Waldts. et Kit.
 71. *C. atropurpurea* Waldts. et Kit. var. *crassifolia* Pop et Hodışan
 72. *C. atropurpurea* Waldts. et Kit. f. *integrifolia*
 73. *Centaurea biebersteinii* DC. (*Centaurea micranthos* S. G. Gmelin ex Hayek)
 74. *Centaurea cyanus* L.
 75. *C. phrygia* L.
 76. *C. tauscheri* A. Kerner (? *C. arenaria* x *C. micranthos*)
 77. *Ceterach officinarum* Willd.
 78. *Chamaecytisus hirsutus* (L.) Link (*Cytisus hirsutus* L. ssp. *hirsutus*, *Cytisus leucotrichus* Schur)
 79. *C. albus* (Hacq.) Rothm.
 80. *Cynoglossum officinale* L.
 81. *Chelidonium majus* L.
 82. *Cnidium silaifolium* (Jacq.) Simk.
 83. *Cleistogene serotina* (L.) Keng
 84. *Colchicum autumnale* L.
 85. *Conium maculatum* L.
 86. *Cornus sanguinea* L.
 87. *Corylus avellana* L.
 88. *Crataegus monogyna* Jacq.
 90. *Cruciata laevipes* Opiz (*Galium cruciata* (L.) Scop.)
 91. *Cynosurus cristatus* L.
 92. *Cytisus nigricans* L. (*Lembotropis nigricans* (L.) Griseb.
 93. *Dactylis glomerata* L.
 94. *Dactyloriza maculata* (L.) Soó (*Orchis maculata* L.)
 95. *D. incarnata* (L.) Soó
 96. *Dentaria bulbifera* L.(*Cardamine bulbifera* (L.) Cr.)
 97. *D. glandulosa* W. et K.(*Cardamine glanduligera* Schw.)
 98. *Descurainia sophia* (L.) Webb (*Sisymbrium sophia* L.)
 99. *Dianthus carthusianorum* L.
 100. *D. spiculifolius* Schur.

101. *Dictamnus albus* L.
 102. *Digitalis grandiflora* Miller
 103. *Dispactus fullonum* L.
 104. *Dorycnium herbaceum* Vill.
 105. *Elymus caninus* (L.) L. (*Agropyron caninum* (L.) Beauv.)
 106. *E. hispidus* (Opiz) Melderis (*Agropyron intermedium* (Host) Beauv.)
 107. *E. repens* (L.) Beauv.
 108. *Epilobium collinum* C.C. Gmel.
 109. *Epipactis helleborine* (L.) Cr.
 110. *Erysimum virgatum* Roth.
 111. *Erodium cicutarium* (L.) L'Heritier
 112. *Euonymus europaea* L.
 113. *E. latifolium* Mill.
 114. *E. verrucosa* Scop.
 115. *Euphorbia amygdaloides* L.
 116. *E. cyparissias* L.
 117. *E. epithymoides* L.
 118. *Ferulago sylvatica* (Besser) Reichenb
 119. *Festuca gigantea* (L.) Vill.
 120. *F. heterophylla* Lam.
 121. *F. pratensis* Huds
 122. *F. rubra* L.
 123. *F. rupicola* Heuff.
 124. *F. valesiaca* Scheicher
 125. *Fragaria vesca* L.
 126. *Fraxinus excelsior* L.
 127. *F. ormus* L.
 128. *Gagea arvensis* (Pers.) Dumort.
 129. *G. lutea* (L.) Ker.Gawler.
 130. *Galanthus nivalis* L.
 131. *Galium album* Mill. (*G. erectum* Hudson)
 132. *Galium glaucum* L. (*Asperula glauca* (L.) Besser).
 133. *G. mollugo* L.
 134. *G. odoratum* (L.) Scop. (*Asperula odorata* L.)
 135. *G. schultesii* Vest
 136. *G. verum* L.
 137. *Genista ovata* Waldst.et Kit (*G.tinctoria* L. subsp. *ovata* (Waldst. et Kit.) Arcangeli)
 138. *Genistella sagittalis* L. (*Genista sagittalis* L.; *Chamaespartium sagittale* (L.) P. Gibbs)
 139. *Geranium columbinum* L.
 140. *G. phaeum* L.
 141. *G. pratense* L.
 142. *G. robertianum* L.
 143. *G. rotundifolium* L.
 144. *Gypsophyla muralis* L
 145. *Gentiana cruciata* L.
 146. *Gratiola officinalis* L.
 147. *Hedera helix* L.
 148. *Helianthemum nummularium* subsp.*obscurum* (Čelak.) Holub (*H. hirsutum* (Thuill.)
 Mérty
 149. *Helleborus odorus* Waldst. et Kit.
 150. *Hepatica nobilis* Schreber
 151. *Hieracium bauhini* Besser

152. *H. pilosella* L.
 153. *H. transsylvanicum* Heuffel (*H. rotundatum* auct.non Kit.)
 154. *H. umbellatum* L.(*H. laurinum* Arvet-Touvet)
 155. *Holcus lanatus* L.
 156. *Hypericum elegans* Stephan
 157. *H. hirsutum* L.
 158. *Hypericum maculatum* Crantz.
 159. *H. perforatum* L.
 160. *Humulus lupulus* L.
 161. *Isatis praecox* Kit. ex Tratt.
 162. *I. tinctoria* L.
 163. *Iris aphylla* L. ssp. *hungarica* Waldst. et Kit.
 164. *Jurinea mollis* – (L.) Reichenb.
 165. *Juncus bufonius* L.
 166. *J. effusus* L.
 167. *Knautia arvensis* (L.) Coul.
 168. *K. dipsacifolia* Kreutzer (*K. sylvatica* (L.) Duby nom. ambig.)
 169. *Koeleria macrantha* (Ledeb.) Schultes (*K. cristata* (L.) Pers. p.p.; *K. gracilis* Pers. no. Illegit.)
 170. *Kohlrauschia prolifera* (L.) Kunth (*Tunica prolifera* (L.) Scop.)
 171. *Lactuca serriola* L.
 172. *Lathyrus hallsteinii* Baumg.
 173. *Lathyrus niger* (L.) Bernh.
 174. *L. nissolia* L.
 175. *L. pratensis* L.
 176. *L. sylvestris* L.
 177. *L. tuberosus* L.
 178. *L. venetus* (Miller) Wohlf.
 179. *L. vernus* (L.) Bernh.
 180. *Leucanthemum vulgare* Lam. (*Chrysanthemum leucanthemum* L.)
 181. *Ligustrum vulgare* L.
 182. *Lilium martagon* L.
 183. *Listera ovata* (L.) R.Br.
 184. *Lithospermum purpureo-caeruleum* L.
 185. *Lotus corniculatus* L.
 186. *Lychnis coronaria* (L.) Desr.
 187. *L. flos-cuculi* L. Greut. Et Burd.
 188. *L. viscaria* L.
 189. *Luzula campestris* (L.) DC.
 190. *L. luzuloides* (Lam.) Dandy et Wilmott
 191. *Lytrum salicaria* L.
 192. *Lysimachia nummularia* L.
 193. *Medicago lupulina* L.
 194. *M. minima* (L.) L.
 195. *Melampyrum arvense* L.
 196. *Melampyrum bihariense* A. Kemer.
 197. *Melica ciliata* L.
 198. *Melica nutans* L.
 199. *M. uniflora* Retz.
 200. *Melilotus albus* Medicus
 201. *M. officinalis* (L.) Pall.
 202. *Melissa officinalis* L.

203. *Moehringia muscosa* L.
204. *Minuartia setacea* (Thuill.) Hayek
205. *Muscari comosum* (L.) Mill.
206. *Myosotis alpestris* F.W.Schmidt.
207. *M. arvensis* Hill.
208. *M. sylvatica* (Ehrh.) Hoffm.
209. *Neottia nidus-avis* (L.) L.C.M.Rich.
210. *Nepeta cataria* L.
211. *Orchis coriophora* L.
212. *O. tridentata* Scop.
213. *O. ustulata* L.
214. *Origanum vulgare* L.
215. *Orlaya grandiflora* (L.) Hoffm.
216. *Platanthera bifolia* (L.) L.C.M.Rich.
217. *Piptatherum virescens* (Trin.). Boiss. (*Oryzopsis virescens* (Trin.) G. Beck)
218. *Papaver dubium* L.
219. *P. dubium* L. ssp. *dubium*
220. *Peucedanum oreoselinum* (L.) Moench
221. *Petasites albus* (L.) Gaertn.
222. *Phleum pratense* L.
223. *Plantago media* L.
224. *Poa annua* L.
225. *P. nemoralis* L.
226. *P. pratensis* L.
227. *P. rehmannii* (A.et G.) Woloszczak
228. *Populus tremula* L.
229. *Polygonatum latifolium* (Jacq.) Desf.
230. *P. odoratum* (Mill.) Druce
231. *Polygala comosa* Schkuhr
232. *Potentilla anserina* L.
233. *P. argentea* L.
234. *P. chrysanthra* Trev.
235. *P. cinerea* Chaix (*Potentilla arenaria* Borkh.)
236 *Potentilla erecta* (L.) Räusch.
237. *P. micrantha* Ramond ex DC.
238. *P. patula* W. et K.
239. *P. thuringiaca* Bernh. ex Link.
240. *Primula veris* subsp. *columnae* (Ten.) Marie et. Petitmengin
241. *P. elatior* (L.) L.
242. *Prunella laciniata* (L.) L.
243. *P. vulgaris* L.
244. *P. grandiflora* (L.) Sholler.
242. *Pulmonaria officinalis* L.
243. *Pyrus pyraster* (L.) Buurgsd.
244. *Quercus cerris* L.
245. *Quercus dalechampii* Ten.
246. *Quercus frainetto* Ten.
247. *Q. petraea* (Matt.) Liebl.
248. *Ranunculus acris* L.
249. *R. auricomus* L.
250. *R. arvenensis* L.
251. *R. bulbosus* L.

252. *R. cassubicus* L.
 253. *R. ficaria* L.
 254. *R. repens* L.
 255. *Rhamnus cathartica* L.
 256. *Rhinanthus minor* L.
 257. *R. rumelicus* Velen.
 258. *Robinia pseudocacia* L.
 259. *Rorippa austriaca* (Cr.)Bess.
 260. *R. sylvestris* (L.) Bess.
 261. *Rosa canina* L.
 262. *R. gallica* L.
 263. *Rosa Jundzillii* Bess.
 264. *R. pimpinellifolia* L.
 265. *Rubus caesius* L.
 266. *R. hirtus* W. et K.
 267. *R. fruticosus* L. (*R. plicatus* Weihe et Nees)
 268. *Salix alba* L.
 269. *S. fragilis* L.
 270. *S. purpurea* L.
 271. *Sambucus ebulus* L.
 272. *S. nigra* L.
 273. *Salvia glutinosa* L.
 274. *S. nemorosa* L.
 275. *S. pratensis* L.
 276. *S. verticillata* L.
 277. *Sanguisorba minor* Scop.
 278. *Saponaria officinalis* L.
 279. *Scilla bifolia* L.
 280. *Scirpus sylvaticus* L.
 281. *Scrophularia nodosa* L.
 282. *S. heterophylla* Willd. subs. *laciniata* (Waldst.et Kit.) Marie et Petitmengin (*S. laciniata* Wadst.et Kit.; *S. lasiocaulis* Schur)
 283. *Securigera varia* (L.) Lassen (*Coronilla varia* L.)
 284. *Sedum acre* L.
 285. *S. annuum* L.
 286. *S. hispanicum* L.
 287. *Sedum maximum* (L.) Hoffm. (*Sedum telephium* L. ssp. *maximum* (L.)
 288. *S. hispanicum* L.
 289. *Senecio vernalis* Waldst.et Kit
 290. *S. vulgaris* L.
 291. *Seseli osseum* Crantz em. Simonkai (*S. devenyense* Simonkai; *S. elatum* L. subsp. *Osseum* (Crantz) P. W. Ball)
 292. *Sesleria rigida* Heuffel
 293. *Silene alba* (Mill) E. H. L. Krause
 294. *S. italica* subsp. *nemoralis* (Waldst. et Kit.) Nyman
 295. *S. nutans* subsp.*dubia* (Herbich) Zapal – endemic
 296. *Stachys germanica* L.
 297. *S. recta* L.
 298. *S. sylvatica* L.
 299. *Stellaria graminea* L.
 300. *S. holostea* L.
 301. *S. media* (L.) Vill.

302. *Sorbus aucuparia* L.
 303. *Sorbus torminalis* (L.) Crantz.
 304. *Stipa pulcherrima* C.Koch
 305. *Symphytum officinale* L.
 306. *Symphytum tuberosum*. L.
 307. *Syringa vulgaris* L.
 308. *Tamus communis* L.
 309. *Teucrium chamaedrys* L.
 310. *T. montanum* L.
 311. *Thlaspi arvense* L.
 312. *T. perfoliatum* L.
 313. *Thymus comosus* Heuff. (Syn. *Th. nummularius* Auct., non M. B.)
 314. *Th. glabrescens* Willd.
 315. *Th. pulcherimus* Schur (Syn. *Th. carpaticus* Čel.)
 316. *Thymus pulegioides* L.
 317. *Tilia cordata* Mill.
 318. *T. platyphyllos* Scop.
 319. *T. tomentosa* Moench
 320. *Tragopogon dubius* Scop.
 321. *Trifolium alpestre* L.
 322. *T. aureum* Pollich (*Trifolium strepens* Cr.)
 323. *T. campestre* Schreb.
 324. *T. medium* L.
 325. *T. montanum* L.
 326. *T. pratense* L.
 327. *T. repens* L.
 328. *T. striatum* L.
 329. *Tusilago farfara* L.
 330. *Valeriana officinalis* L.
 331. *Valerianella locusta* (L.) Laterrade
 332. *V. dentata* (L.) Pollich
 333. *Verbascum glabratum* Friv.
 334. *V. nigrum* L.
 335. *V. phlomoides* L.
 336. *Veronica arvensis* L.
 337. *Veronica austriaca* L.
 338. *V. chamaedrys* L.
 339. *V. hederifolia* L.
 340. *Veronica officinalis* L.
 341. *Veronica prostata* L
 342. *Veronica spicata* L.
 343. *Veronica teucrium* L.
 344. *Viburnum opulus* L.
 345. *Vicia angustifolia* L.
 346. *V. cracca* L.
 347. *Vicia hirsuta* (L.) S. F. Gray
 348. *V. sativa* L.
 349. *V. sepium* L.
 350. *V. grandiflora* Scop.
 351. *Vincetoxicum hirundinaria* Medicus (*Cynanchum vincetoxicum* (L.) Pers.)
 352. *Viola arvensis* Murray
 353. *V. canina* L.

- 354. *V. colina* Besser.,
- 355. *V. hirta* L.
- 356. *V. joói* Janka
- 357. *V. mirabilis* L.
- 358. *V. reichenbachiana* Jord. (*V. sylvestris* Lam.)
- 359. *V. saxatilis* Schmidt (*Viola bielziana* Schur)
- 360. *Xeranthemum cylindraceum* Sibth. Et Sm. (*X. foetidum* auct. Non Moench)

CORMOPHYTES SPECIES IN ANNEX II TO COUNCIL DIRECTIVE 92/43/CEE

4097 *Iris aphylla* L. ssp. *hungarica* Waldst. et Kit.

ORCHID SPECIES IN BĂIȚA-CRĂCIUNESTI QUARRY

Dactyloriza maculata (L.) Soó (*Orchis maculata* L.)

D. incarnata (L.) Soó

Epipactis helleborine (L.) Cr.

Listera ovata (L.) R.Br.

Neottia nidus-avis (L.) L.C.M.Rich.

Orchis coriophora L.

O. tridentata Scop.

O. ustulata L.

Platanthera bifolia (L.) L.C.M.Rich.

ANNEX 3



Fig. 1. Bryocoenoza in the Băița-Crăciunești Quarry
(Foto M. Niculescu)



Fig. 2. Bryocoenoza (Foto M. Niculescu)



Fig. 3. *Tremella mesenterica* Retz. ex Hook (Foto M. Niculescu)



Fig. 4. *Amanita rubescens* (Pers.) Quél. (Foto M. Niculescu)



Fig. 5. *Auricularia mesenterica* Pers. (Foto M. Niculescu)



Fig. 6. *Calvatia utriformis* (Foto M. Niculescu)

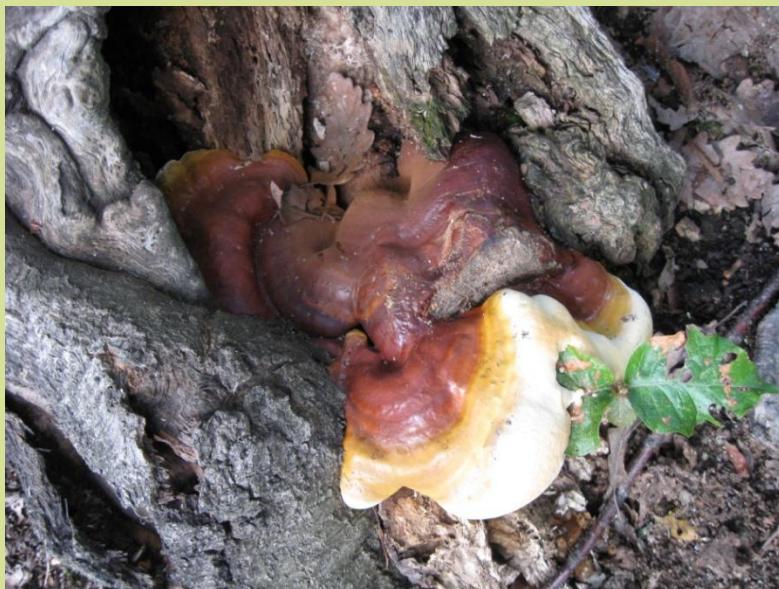


Fig. 7. *Ganoderma lucidum* (Leyss.) Karst (Foto M. Niculescu)



Fig. 8. *Craterellus cornucopioides* (L. ex Fr.) Pers. (Foto M. Niculescu)



Fig. 9. *Coprinus lagopus* (Foto M. Niculescu)



Fig. 10. *Papaver dubium* L. ssp. *dubium* (Foto M. Niculescu)



Fig. 11. *Dictamnus albus* L. (Foto M. Niculescu)



Fig. 12. *Chamaecytisus albus* (Hacq.) Rothm. (Foto M. Niculescu)



Fig. 13. *Thymus pulcherimus* Schur (Syn. *Th. carpaticus* Čel.) (Foto M. Niculescu)



Fig. 14. *Galium album* Mill. (Foto M. Niculescu)



Fig. 15. *Epipactis helleborine* (L.) Cr. (Foto M. Niculescu)



Fig. 16. *Erysimum virgatum* Roth. (Foto M. Niculescu)



Fig. 17. *Euphorbia epithymoides* L. (Foto M. Niculescu)



Fig. 18. *Rosa Jundzillii* Bess. (Foto M. Niculescu)



Fig. 19. *Dactylorhiza incarnata* (L.) Sóó (Foto M. Niculescu)



Fig. 20. *Campanula persicifolia* L. (Foto M. Niculescu)



Fig. 21. *Centaurea atropurpurea* Waldts. et Kit (Foto M. Niculescu)



Fig. 22. *Athamantha turbith* (L.) Brot. ssp. *hungarica* (Borbas) Tutin. (Foto M. Niculescu)



Fig. 23. *Hepatica nobilis* Schreber (Foto M. Niculescu)



Fig. 24. *Papaver dubium* L. (Foto M. Niculescu)



Fig. 25. *Neottia nidus-avis* (L.) L.C.M.Rich. (Foto M. Niculescu)



Fig. 26. *Moehringia muscosa* L. (Foto M. Niculescu)



Fig. 27. *Piptatherum virescens* (Trin.) Boiss. (Oryzopsis virescens (Trin.) G. Beck)
(Foto M. Niculescu)



Fig. 28. *Campanula sibirica* L. (Foto M. Niculescu)



Fig. 29. *Dianthus carthusianorum* L. (and [*Euphydryas aurinia*, Natura 2000 Code -1065 — Fluture auriu](#)) (Foto M. Niculescu)

ANNEX 4

Table 1. Ass. *Bromo sterilis-Robinietum* (Pócs 1954) Soó

No. of relevée	1	2	3	4	5	6	7	8	9	10	K, Medium coverage (%)
Altitude(m)	470	470	490	407	407	475	490	460	475	475	
Surface(m ²)	400	400	400	400	400	400	400	400	400	400	
Aspect	SV	SV	-	V	-	E	-	SV	V	V	
Slope (degrees)	10	10	-	10	-	5	-	10	7	15	
Coverage (%)	Tree layer	70	70	60	60	70	70	70	80	70	
	Herbaceous layer	70	70	50	75	65	65	50	70	70	
Char. ass.											
<i>Robinia pseudoacacia</i>	4	4	3-4	3-4	4	4	4	4	4-5	4	V, 61,25
<i>Bromus sterilis</i>	1-2	1-2	1-2	1	+1	1	+1	1	1	1	V, 6,42
Prunetalia et Prunion spinosae											
<i>Prunus spinosa</i>	+	-	+	-	+	-	+	-	+	-	III, 0,25
<i>Crataegus monogyna</i>	-	+	+	+	-	+	+	+	-	+	I, 0,35
<i>Euonymus europaeus</i>	+	+	+	-	-	-	+	-	+	-	III, 0,25
<i>Rosa canina</i>	+	+	-	+	-	-	-	+	-	-	II, 0,20
<i>Cornus sanguinea</i>	+	-	+	-	+	-	+	+	+	-	III, 0,30
<i>Euonymus verrucosa</i>	+	+	+	+	-	-	+	-	+	-	III, 0,30
<i>Humulus lupulus</i>	1	1	+	1	+	+	+	+	1	+	V, 2,30
<i>Geum urbanum</i>	+	+	+	+	+	+	+	+	+	+	V, 1,00
<i>Sambucus nigra</i>	+	+	-	+	-	-	-	+	-	-	II, 0,20
Fagetalia et Querco-Fagetea											
<i>Brachypodium sylvaticum</i>	+1	1	+	+1	1	1	+	+	+	1	V, 3,20
<i>Rubus caesius</i>	+	+	-	+1	+	+	-	+	+	+	I, 0,62
<i>Mercurialis perennis</i>	1	-	-	-	+	+	+	+	+	-	III, 0,75
<i>Circaea lutetiana</i>	+	-	-	+	+	+	-	+	+	-	III, 0,30
<i>Galium odoratum</i>	-	-	+	+	-	-	-	+	+	+	III, 0,25
<i>Asperula taurina</i>	+1	-	1	1	1	-	1	+1	+1	1	V, 3,32
<i>Helleborus odorus</i>	+	+	-	+1	+	+	+	-	+1	+	IV, 0,85
<i>Scilla bifolia</i>	+1	+1	+	+	+	+	-	-	-	+	I, 0,80
<i>Arum maculatum</i>	+	+	+	+	+	+	-	+	+	+	I, 0,45
<i>Prunella vulgaris</i>	+	-	+	+	-	-	+	+	-	-	III, 0,25
<i>Ranunculus ficaria</i>	2	1	1	2	+1	1	1-2	2	2	2	V, 11,65
<i>Campanula rapunculoides</i>	-	+	+	-	-	+	+	-	-	+	III, 0,25
<i>Lapsana communis</i>	-	-	+	+	-	-	+	+	+	+	III, 0,30
<i>Viola odorata</i>	+	+	+	+	+	-	+	+	+	-	I, 0,40
<i>Poa nemoralis</i>	-	-	-	+	-	-	-	+	+	+	II, 0,20
Variae Syntaxa											
<i>Urtica dioica</i>	1	1	+	+	+1	+	+	1	1	+1	V, 2,75
<i>Alliaria petiolata</i>	+	+	+	-	+	+	+	-	-	+	I, 0,35
<i>Glechoma hederacea</i>	1	1	1	1	1	1	1	1	+	1	V, 4,55
<i>Physalis alkekengi</i>	+	+	-	+	-	+	-	+	+	+	III, 0,35
<i>Ballota nigra</i>	+	+	1	+	+	+	1	+	+1	+	V, 1,60
<i>Asparagus officinalis</i>	+	+	-	+	+	+	-	+	+	-	I, 0,35
<i>Galium aparine</i>	1	+1	+1	1	+	+	+	+	1	+1	V, 2,55
<i>Chelidonium majus</i>	+	+	-	+	+	+	-	+	+	-	IV, 0,35
<i>Hypericum perforatum</i>	+	-	+	-	+	-	+	-	-	-	II, 0,20
<i>Viola hirta</i>	+	+	+	+	+	+	+	+	-	-	IV, 0,40
<i>Anthryscus sylvestris</i>	+	-	-	-	-	-	-	-	-	-	I, 0,05
<i>Acer campestre</i>	-	+	-	-	-	-	-	-	-	-	I, 0,05
<i>Ligustrum vulgare</i>	-	-	+	-	-	-	-	-	-	-	I, 0,05
<i>Equisetum arvense</i>	-	+	-	-	-	-	-	-	-	-	I, 0,05
<i>Veronica chamaedrys</i>	-	+	-	-	-	-	-	-	-	-	I, 0,05
<i>Conium maculatum</i>	+	-	-	-	-	-	-	-	-	-	I, 0,05

Place and data of relevés: Băița-Crăciunești Quarry, 17.V.2014

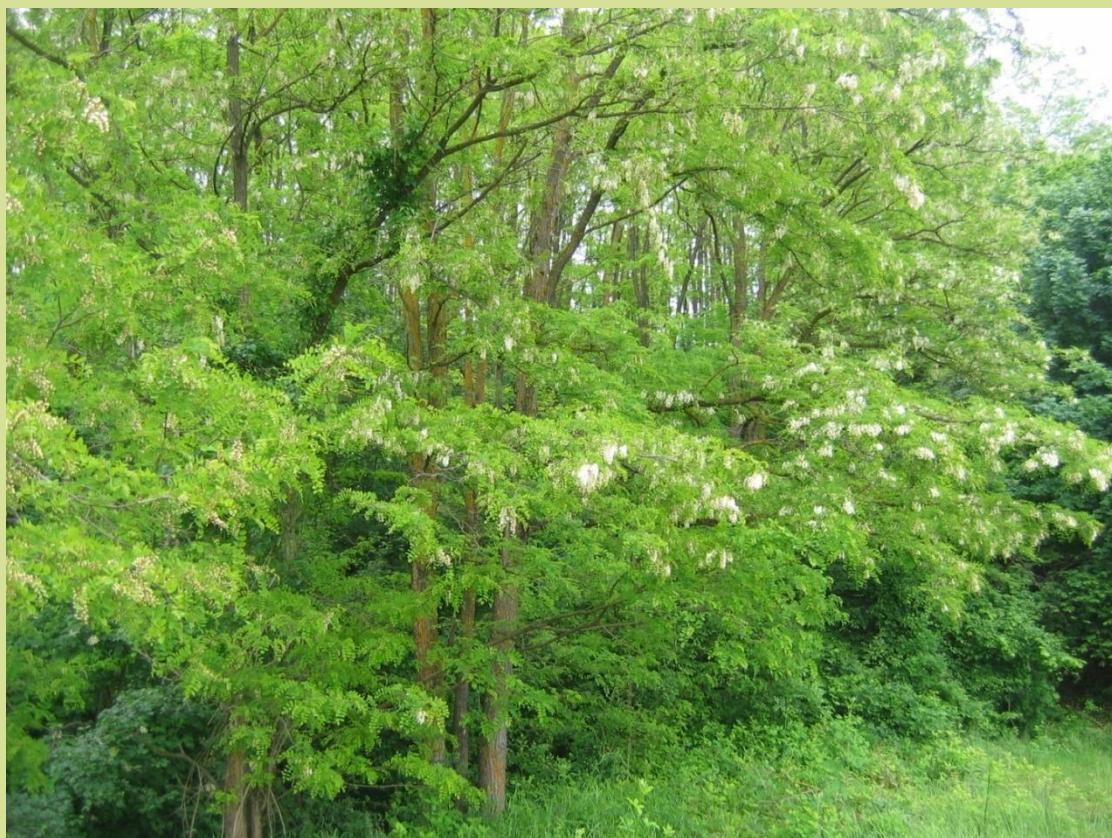


Fig. 1. Ass. *Bromo sterilis-Robinietum* (Pócs 1954) Soó (Foto M. Niculescu)

Table 2- Ass. *Balloto nigrae- Ailanthesetum altissimae* Sirbu & Oprea 2010

L.f.	Phyt.el.	No.of relevée	1	2	3	4	5	6	7	8	9	10	K
		Altitude(m)	48	480	407	407	475	475	480	480	490	490	
		Surface(m ²)	40	400	400	400	400	400	400	400	400	400	
		Aspect	0	-	-	SV	SV	S	SV	V	NV	SV	-
		Slope (degrees)	-	-	5	7	7	5	7	10	5	-	
		Coverage (%)	Tree layer	70	80	80	80	80	80	80	70	80	
			Herbaceous layer	40	40	40	30	30	30	30	40	30	
Char. ass.													
MPh	Alien:E.As	<i>Ailanthus altissima</i>	4	5	5	5	5	5	5	5	4	5	V
MPh.	Alien:E.As	<i>Ailanthus altissima</i> (juv.)	2	2	2	1	1	1	1	2	2	1	V
H	C Eur	<i>Ballota nigra</i>	2	2	2	1	1	1	1	1	2	1	V
Chelidonio-Robinieta & Robinietea													
H	Cosm	<i>Urtica dioica</i> subs. <i>dioica</i>	1	+	1	1	1	+	1	1	1	1	V
T	Circ	<i>Gallium aparine</i>	+	+	+	+	+	+	+	+	+	+	V
MPh	Alien:N Am	<i>Robinia pseudoacacia</i>	1	1	1	+	+	+	+	+	1	+	V
H	Eua	<i>Chelidonium majus</i>	+	+	+	+	+	+	+	+	+	+	V
MPh	Alien:N Am	<i>Gleditsia triacanthos</i>	-	+	+	-	-	-	-	-	-	-	I
T	Pont-Medit	<i>Anthriscus cerefolium</i> subsp. <i>trichosperma</i>	-	+	-	-	+	-	+	-	+	+	II
Galio-Urticetea													
H	Eua	<i>Sambucus ebulus</i>	+	-	-	+	+	+	-	+	+	-	IV
H	Circ	<i>Geum urbanum</i>	-	-	+	+	-	-	+	+	+	+	III
H	Eua	<i>Glechoma hederacea</i>	+1	1	1	1	1	1	1	+1	+1	1	V
Ht	Eua	<i>Silene alba</i>	-	+	+	-	+	+	+	-	+	+	IV
H	Eua	<i>Humulus lupus</i>	-	+	+	-	+	+	+	-	+	+	IV
T	Circ	<i>Polygonum dumetorum</i>	-	+	-	+	+	+	+	-	-	-	III
H	Eua	<i>Saponaria officinalis</i>	+	-	+	+	-	-	+	+	-	-	III
Artemisieta													
G	Circ	<i>Elymus repens</i> subsp. <i>repens</i>	-	+	-	-	+	+	+	-	+	+	III
H	Eua	<i>Artemisia absinthium</i>	-	+	+	-	-	-	-	-	-	-	I
H	Circ	<i>Artemisia vulgaris</i>	-	+	-	-	+	-	+	-	+	-	III
Ht	Eua	<i>Conium maculatum</i>	+	+	-	-	+	+	-	-	-	+	III
Ht	Eua	<i>Arctium lappa</i>	+	+	+	+	+	+	+	+	+	+	V
G	Eua-Medit	<i>Cardaria draba</i>	+	-	-	-	+	+	-	-	-	+	II

H	Eua	<i>Tanacetum vulgare</i>	-	+	-	-	+	+	+	-	+	+	+	III
H	Eua	<i>Leonurus cardiaca</i>	-	+	-	-	+	+	+	-	+	+	+	III
Ht	Eua	<i>Cirsium vulgare</i>	+	+	+	+	+	+	+	+	+	+	+	V
Ht	Eua	<i>Melilotus officinalis</i>	+	+	+	+	+	+	+	+	+	+	+	V
Ht	Eua	<i>Berteroa incana</i>	+	+	+	+	+	+	+	+	+	+	+	V
Ht	Alien: N Am	<i>Erigeron annuus subsp. annuus</i>	+	+	+	+	+	+	+	+	+	+	+	V
Stellarietea mediae														
T	Cosm	<i>Chenopodium album</i>	-	-	-	-	-	+	-	+	+	+	+	II
T	Alien: N Am	<i>Conyza canadensis</i>	+	+	+	+	+	+	+	+	+	+	+	V
T	Cosm	<i>Polygonum aviculare</i>	+	-	+	-	-	-	+	-	-	-	-	II
T	Alien: N Am	<i>Ambrosia artemisiifolia</i>	+	+	-	+	+	+	-	-	-	-	-	III
T	Cosm	<i>Capsella bursa pastoris</i>	+	+	+	+	+	+	+	+	+	+	+	V
T	Eua	<i>Hordeum murinum</i>	+	-	-	+	+	-	-	-	-	-	-	II
Festuco - Brometea														
H	Eua	<i>Hypericum perforatum</i>	+	-	-	+	+	+	-	-	-	-	-	II
H	Pont –	<i>Salvia nemorosa</i>	+	-	-	+	+	-	-	-	-	-	-	II
Molinio - Arrhenatheretea														
H	Medit	<i>Dactylis glomerata subsp. glomerata</i>	+	+	+	+	+	+	+	+	+	+	+	V
H	Eua	<i>Vicia cracca</i>	+	+	+	+	+	+	+	+	+	+	+	V
H	Eua	<i>Achillea millefolium</i>	+	+	+	+	+	+	+	+	+	+	+	V
H	Cosm	<i>Lolium perenne</i>	+	+	+	+	+	+	+	+	+	+	+	V
H	Cosm	<i>Poa pratensis</i>	+	+	+	+	+	+	+	+	+	+	+	V
Rhamno – Prunetea														
nPh	Eur	<i>Prunus spinosa</i>	+	-	+	-	-	+	+	-	+	+	+	III
nPh	C Eur	<i>Clementis vitalba</i>	-	-	+	-	+	-	-	-	+	+	+	II
nPh	Eur	<i>Rosa canina</i>	+	+	+	+	+	+	+	+	+	+	+	V
Variae syntaxa														
H	Eua	<i>Agrimonia eupatoria</i>	+	+	+	+	+	+	+	+	+	+	+	V
H	Eua	<i>Galium mollugo</i>	+	-	-	-	+	+	-	-	-	-	+	II
H	Circ	<i>Clinopodium vulgare</i>	+	+	+	+	+	+	+	+	+	+	+	V
G	Cosm	<i>Convolvulus arvensis</i>	+	-	+	-	+	-	+	+	+	+	-	III
H	CEur	<i>Coronilla varia</i>	+	-	-	-	+	+	-	-	-	-	+	II
G	Cosm	<i>Pteridium aquilinum</i>	+	-	-	-	+	+	-	-	-	-	+	II

Place and data of relevés: Băița-Crăciunești Quarry, 18.V.2014



Fig. 2. Ass. *Balloto nigrae- Ailanthesetum altissimae* Sirbu & Oprea 2010
(*Ailanthus altissima* (juv.) (Foto M. Niculescu))

Ass. *Lathyro hallersteinii-Carpinetum* Coldea 1975 (Syn. *Quercetum pataeae-Carpinetum* auct. transsilv.)

Table 3

No. of relevée	1	2	3	4	5	6	K
Altitude m.o.s. (x 10 m)	46	47	47	45	46	46	
Exposure	V	SV	V	SV	SV	SV	
Inclination (in grades)	10	20	10	25	20	20	
Canopy	0,8	0,8	0,8	0,7	0,7	0,7	
Coverage of herbaceous layer (%)	30	30	40	30	40	60	
Sampling surface (m ²)	400	400	400	400	400	400	
Char. ass.							
<i>Quercus petraea</i>	3	2	3	2	4	3	V
<i>Quercus petraea</i> (reg.)	-	+	-	+	1	+	V
<i>Carpinus betulus</i>	2	4	2	4	4	2	V
<i>Carpinus betulus</i> (reg.)	+	1	+	1	1	+	V
<i>Lathyrus hallersteinii</i>	+1	+	+	+	+	1	V
Lathyro hallersteinii-Carpinenion							
<i>Prunus avium</i>	+	+	+	+	-	-	IV
<i>Dactylis glomerata</i>	-	-	-	-	+	+	I
<i>Malus sylvestris</i>	-	-	-	-	-	+	I
<i>Galium schultesii</i>	+	+	+	+	+	+	V
Fagetalia							
<i>Fagus sylvatica</i>	+	-	+	+	+	-	III
<i>Tilia cordata</i>	+	+	+	+	+	+	V
<i>Helleborus odorus</i>	+	+	+	+	+	+	V
<i>Anemone nemorosa</i>	1	+	1	+	+	1	V
<i>Pulmonaria officinalis</i>	-	+	-	+	+	+	IV
<i>Carex sylvatica</i>	+	+	+	+	+	+	V
<i>Lathyrus vernus</i>	+	-	+	+	+	-	III
<i>Dentaria bulbifera</i>	+	+	+	+	+	+	V
<i>Galium odoratum</i>	+	+	+	+	+	+	V
<i>Mercurialis perennis</i>	+	-	+	+	+	-	III
<i>Euphorbia amygdaloides</i>	+	+	+	+	+	+	V
<i>Anemone ranunculoides</i>	+	+	+	+	+	+	V
<i>Rosa canina</i>	-	+	-	+	-	+	III
<i>Aremonia agrimonoides</i>	+	+	+	+	+	+	V
Querco-Fagetea							
<i>Acer campestre</i>	+	+	+	+	-	+	V
<i>Acer platanoides</i>	+	-	+	-	+	+	IV
<i>Corylus avellana</i>	+	+	+	+	-	+	IV
<i>Crataegus monogyna</i>	-	+	-	+	+	+	IV
<i>Ligustrum vulgare</i>	+	-	+	-	+	-	III
<i>Poa nemoralis</i>	-	+	-	+	+	+	IV
<i>Viola odorata</i>	+	+	+	+	+	-	IV
<i>Brachypodium sylvaticum</i>	+	+	+	+	+	+	V
<i>Euonymus europaeus</i>	+	-	+	-	+	+	IV
<i>Scilla bifolia</i>	+	+	+	+	-	-	IV
<i>Arum maculatum</i>	+	+	+	+	+	+	V
<i>Lapssana communis</i>	-	-	-	-	+	+	II
Variae Syntaxa							
<i>Lamium maculatum</i>	-	-	-	-	+	-	I
<i>Alliaria petiolata</i>	+	+	+	+	+	+	+
<i>Geranium robertianum</i>	-	+	-	+	-	-	II
<i>Frangula alnus</i>	+	+	+	+	-	+	V
<i>Sambucus nigra</i>	-	-	-	-	+	-	I
<i>Veronica chamaedrys</i>	+	+	+	+	-	+	V
<i>Geum urbanum</i>	+	-	+	-	+	+	IV

Place and data of relevés: Băița-Crăciunești Quarry, 18.V.2014

Ass. *Stellario nemori-Alnetum glutinosae* (Kärstner 1938) Lohm. 1957

Table 4

No. of relevée	1	2	3	4	5	K
Altitude m.o.s. (x 10 m)	43	43	43	43	43	
Canopy	0,6	0,6	0,7	0,7	0,6	
Coverage of herbaceous layer (%)	65	80	80	70	90	
Sampling surface (m ²)	400	400	400	400	400	
Char. ass.						
<i>Alnus glutinosa</i>	4	4	4	4	4	V
<i>Stellaria nemorum</i>	+	1	1	+	+	V
Alno – Ulmion						
<i>Festuca gigantea</i>	-	+	+	+	+	V
<i>Ranunculus repens</i>	1	1	1	1	1	V
<i>Carex remota</i>	+	+	+	-	-	III
<i>Lysimachia nummularia</i>	1	1	1	1	1	V
<i>Fraxinus excelsior</i>	-	-	-	-	+	II
<i>Geranium phaeum</i>	-	-	-	+	-	II
<i>Circaeaa lutetiana</i>	+	+	+	-	-	IV
Fagetalia						
<i>Anemone ranunculoides</i>	+	+	+	-	+	IV
<i>Corydalis solida</i>	+	+	+	+	+	V
<i>Salvia glutinosa</i>	+	+	+	+	+	V
<i>Luzula luzuloides</i>	+	-	+	-	-	II
<i>Euphorbia amygdaloides</i>	+	+	+	+	+	V
<i>Anemone nemorosa</i>	+	+	+	+	+	V
<i>Dentaria glandulosa</i>	+	+	+	-	-	IV
<i>Athyrium filix-femina</i>	+	+	+	+	+	V
<i>Isopyrum thalictroides</i>	+	+	+	+	+	V
Querco – Fagetea						
<i>Geum urbanum</i>	+	+	+	-	-	III
<i>Ligustrum vulgare</i>	-	-	+	+	+	III
<i>Fragaria vesca</i>	+	+	+	+	+	V
<i>Ranunculus ficaria</i>	+	+	+	+	-	IV
<i>Scilla bifolia</i>	+	+	-	+	-	IV
<i>Rubus caesius</i>	+	-	+	+	-	III
<i>Polygonatum latifolium</i>	-	-	-	-	+	III
<i>Brachypodium sylvaticum</i>	+	+	-	+	+	IV
<i>Dryopteris filix-mas</i>	+	+	+	-	-	III
<i>Clematis vitalba</i>	-	-	-	+	+	II
<i>Corylus avellana</i>	-	-	+	+	-	II
Galio – Urticetea						
<i>Aegopodium podagraria</i>	1	1	1	1	1	V
<i>Galium aparine</i>	-	-	-	+	+	II
<i>Lapsana communis</i>	+	+	-	+	-	III
<i>Geranium robertianum</i>	-	+	+	+	+	IV
Molinio-Arrhenatheretea						
<i>Agrostis stolonifera</i>	+	+	+	-	-	III
<i>Taraxacum officinale</i>	+	+	-	-	-	II
<i>Poa pratensis</i>	1	1	1	1	1	V
Variae Syntaxa						
<i>Alliaria petiolata</i>	1	1	1	1	1	V
<i>Lamium maculatum</i>	1	1	1	1	1	V
<i>Sambucus nigra</i>	1	1	1	1	1	V
<i>Mycelis muralis</i>	+	+	+	+	+	V
<i>Geranium robertianum</i>	+	+	+	-	+	IV
<i>Urtica dioica</i>	1	1	1	1	1	V
<i>Glechoma hederacea</i>	1	1	1	1	1	V
<i>Tussilago farfara</i>	+	-	-	+	+	III
<i>Mentha longifolia</i>	+	+	-	-	+	III
<i>Rorippa sylvestris</i>	+	+	-	-	+	III

Place and data of relevés: Căinelului Valley, 18.V.2014



Fig. 3. Ass. *Lathyrus hallsteinii*-*Carpinetum* Coldea 1975
(Foto M. Niculescu)

ANNEX 5

HEATH VEGETATION

Ass. *Coryletum avallanae* Soó 1927

Table 1

No. of relevée	1	2	3	4	5	K
Altitude m.o.s. (x 10 m)	45	45	42	46	67	
Exposure	SE	SV	SV	V	V	
Inclination (in grades)	7	5	10	10	7	
Coverage of herbaceous layer (%)	0,6	0,7	0,6	0,6	0,7	
Sampling surface (m ²)	30	45	45	40	35	
Char. ass.						
<i>Corylus avellana</i>	4	4	3-4	3-4	4	V
Prunetalia et Prunion spinosae						
<i>Geum urbanum</i>	+	+	+	+	+	V
<i>Sambucus nigra</i>	+	+	+	-	-	III
Fagetalia et Fagion						
<i>Fagus sylvatica</i>	+	+	+	+	+	V
<i>Helleborus purpurascens</i>	+	+	+	+	+	V
<i>Epilobium montanum</i>	+	+	+	+	-	IV
<i>Dryopteris filix-mas</i>	+	+	+	+	-	IV
<i>Anemone ranunculoides</i>	+	+	+	+	+	V
<i>Euphorbia amygdaloides</i>	-	+	+	-	+	III
<i>Luzula luzuloides</i>	+	+	+	+	+	V
<i>Rubus hirtus</i>	+	+	+	+	+	V
Querco - Fagetea						
<i>Brachypodium sylvaticum</i>	+	+	-	+	+	IV
<i>Poa nemoralis</i>	+	+	+	+	+	V
<i>Athyrium filix-femina</i>	+	+	+	+	+	V
Variae Syntaxa						
<i>Ranunculus repens</i>	+	-	+	+	-	III
<i>Geranium robertianum</i>	+	+	+	+	-	IV
<i>Glechoma hederacea</i>	-	+	+	+	+	V
<i>Mycelis muralis</i>	+	+	+	+	-	V
<i>Urtica dioica</i>	+	+	-	+	-	III
<i>Stellaria nemorum</i>	+	-	+	-	-	II

Place and data of relevés: Băița-Crăciunești Quarry, 15.V.2014

Ass. *Syringo-Fraxinetum orni* Borza 1958 em. Resmeriță 1972

Table 2

No. of relevée	1	2	3	4	5	K
Altitude m.o.s. (x 10 m)	48	48	49	49	50	
Exposure	SV	V	V	SE	SE	
Inclination (in grades)	25	30	30	40	40	
Coverage of herbaceous layer (%)	0,6	0,6	0,6	0,6	0,6	
Sampling surface (m ²)	40	40	35	35	35	
Char. ass.						
<i>Syringa vulgaris</i>	+	+	+	+	+	V
<i>Fraxinus ornus</i>	4	4	4	4	4	V
Cotinetalia						
<i>Tilia tomentosa</i>	+	+	-	+	+	V
<i>Quercus daleschampii</i>	+	-	-	-	-	II
<i>Helleborus odorus</i>	+	-	-	-	+	II
<i>Melitis melissophyllum</i>	-	-	+	+	-	II
Quercetea pubescenti petraeae						
<i>Cornus mas</i>	+	+	-	-	-	I
<i>Lithospermum purpureo-caeruleum</i>	+	+	-	+	+	V

<i>Rosa canina</i>	+	-	-	-	-	-	II
<i>Cytisus nigricans</i>	+	+	-	+	+	+	V
<i>Cynancum vincetoxicum</i>	+	+	-	-	-	-	IV
<i>Clematis vitalba</i>	+	-	+	-	-	-	III
<i>Scutellaria altissima</i>	+	-	-	-	-	-	I
<i>Euonymus verrucosus</i>	1	+	+	+	-	-	V
<i>Silene nutans</i>	+	+	-	-	-	-	II
Querco-Fagetea							
<i>Geranium robertianum</i>	+	-	+	-	-	-	II
<i>Crataegus monogyna</i>	+	-	-	-	-	-	II
<i>Acer campestre</i>	+	-	+	+	-	-	III
<i>Geum urbanum</i>	+	+	-	-	-	-	II
<i>Brachypodium sylvaticum</i>	+	+	+	-	-	-	III
<i>Polygonatum odoratum</i>	-	-	+	+	-	-	II
<i>Digitalis grandiflorum</i>	+	-	-	-	-	-	I
<i>Staphylea pinnata</i>	+	-	+	-	-	-	II
<i>Sorbus torminalis</i>	-	-	-	-	-	-	II
<i>Corylus avellana</i>	+	-	+	-	-	-	II
<i>Viburnum lantana</i>	-	+	+	+	-	-	II
<i>Sedum maximum</i>	-	+	-	-	-	-	I
<i>Carpinus betulus</i>	-	-	+	-	-	+	II
<i>Oryzopsis virescens</i>	+	+	+	+	+	+	V
<i>Euonymus europaea</i>	+	-	-	+	-	-	II
<i>Campanula persicifolia</i>	+	-	+	-	-	-	II
<i>Campanula rapunculus</i>	+	-	+	-	-	-	II
Fagetalia							
<i>Fagus sylvatica</i>	+	-	+	-	-	-	II
<i>Mycelis muralis</i>	+	-	+	-	-	+	III
<i>Euphorbia amygdaloides</i>	+	-	+	+	-	-	III
<i>Lapsana communis</i>	+	+	+	-	-	-	III
<i>Hedera helix</i>	+	+1	+1	+	+	+	V
<i>Tamus communis</i>	+	+	+	-	-	-	III
<i>Aremonia agrimonoides</i>	+	-	+	-	-	-	II
<i>Salvia glutinosa</i>	+	-	-	-	-	-	I
<i>Cornus sanguinea</i>	+	+	+	+	+	+	IV
<i>Polygonatum multiflorum</i>	+	+	-	-	-	-	II
Variae Syntaxa							
<i>Asplenium trichomanes</i>	+	+	+	-	-	-	III
<i>Poa nemoralis</i>	-	-	+	-	-	+	III
<i>Asplenium ruta-muraria</i>	-	-	+	-	-	+	II
<i>Galium molugo</i>	-	-	+	-	-	-	I
<i>Glechoma hederacea</i>	+	-	+	-	-	-	II
<i>Sambucus nigra</i>	+	-	-	+	-	-	II
<i>Ceterach officinarum</i>	-	+	+	-	-	+	III
<i>Athamanta turbita subsp. <i>hungarica</i></i>	-	+	+	-	-	+	III
<i>Galium album</i>	-	+	+	+	-	-	III
<i>Diverse specii de briofite</i>	1	1	1	1	1	1	V

Place and data of relevés: Băița-Crăciunești Quarry, 19.V.2014



Fig. 1. *Fraxinus ornus* in Băița-Crăciunești Quarry (Foto M. Niculescu)

ANNEX 6

Ass. *Festucetum rubrae-Agrostietum capillaris* Csürös-Káptalan 1964

Table 1

No. of relevée	1	2	3	4	5	K
Altitude m.o.s. (x 10 m)	43	43	45	47	48	
Exposure	-	10	10	10	5	
Inclination (in grades)	-	SV	S	V	SV	
Coverage of herbaceous layer (%)	100	100	100	100	100	
Sampling surface (m ²)	100	100	100	100	100	
Char. ass.						
<i>Festuca rubra</i>	4	3	3	3-4	3	V
<i>Agrostis capillaris</i>	2	1	1	1	1	V
Molinio-Arrhenatheratae						
<i>Briza media</i>	+	+	-	+	+	IV
<i>Anthoxanthum odoratum</i>	-	+	+	+	+	IV
<i>Bromus mollis</i>	+	-	+	-	-	III
<i>Holcus lanatus</i>	+	-	+	-	-	III
<i>Thymus pulegioides</i>	-	+	+	+	+	V
<i>Genistella sagittalis</i>	3	3	+	+	+	V
<i>Poa pratensis</i>	+	+	+	-	+	IV
<i>Trifolium pratense</i>	+	+	-	+	+	IV
<i>Trifolium montanum</i>	-	+	+	+	+	IV
<i>Trifolium repens</i>	+	+	+	-	-	III
<i>Vicia cracca</i>	-	+	+	-	+	III
<i>Medicago lupulina</i>	+	-	+	+	-	III
<i>Colchicum autumnale</i>	+	+	3	3	+	V
<i>Ranunculus acris</i>	-	+	+	-	-	II
<i>Dactylis glomerata</i>	+	+	+	+	+	V
<i>Cerastium fontanum</i>	-	+	+	+	+	IV
<i>Stellaria graminea</i>	+	-	+	-	+	III
<i>Phleum pratense</i>	+	-	+	+	-	III
<i>Betonica officinalis</i>	-	+	+	+	+	IV
<i>Luzula campestris</i>	+	+	+	+	+	V
<i>Ononis arvensis</i>	+	+	-	-	-	II
<i>Polygala vulgaris</i>	+	+	+	+	+	V
<i>Lychinis flos-cuculi</i>	-	+	+	-	+	III
<i>Rumex acetosa</i>	-	-	+	-	-	I
<i>Rhinanthus minor</i>	+	-	+	-	-	II
<i>Achillea millefolium</i>	+	+	+	-	+	IV
<i>Leontodon autumnalis</i>	+	+	-	+	+	IV
<i>Lathyrus pratensis</i>	-	-	+	+	-	II
<i>Centaurea phrygia</i>	+	+	+	+	+	V
<i>Centaurea jacea</i>	-	+	+	-	-	II
<i>Plantago lanceolata</i>	-	+	+	-	+	III
<i>Leucanthemum vulgare</i>	-	+	+	+	+	IV
<i>Ranunculus repens</i>	+	-	-	-	+	II
Arrhenatheretalia						
<i>Cynosurus cristatus</i>	-	+	+	+	+	IV
<i>Rhinanthus rumelicus</i>	-	+	+	+	+	IV
<i>Veronica chamaedrys</i>	-	+	-	-	+	II
<i>Trifolium dubium</i>	-	+	+	+	+	IV
<i>Arrhenatherum elatius</i>	+	+	-	+	-	III
<i>Viola tricolor</i>	-	-	+	-	+	II
<i>Campanula patula</i> ssp. <i>patula</i>	-	+	+	+	+	IV
Festuco-Brometea						
<i>Carex caryophyllea</i>	+	+	+	+	+	IV
<i>Medicago falcata</i>	-	+	+	-	-	II
<i>Galium verum</i>	+	+	+	+	+	V
<i>Galium mollugo</i>	-	-	+	-	-	I
<i>Lotus corniculatus</i>	+	+	+	-	-	III
<i>Dianthus carthusianorum</i>	+	+	-	-	+	III
<i>Fragaria viridis</i>	+	-	+	-	+	III
<i>Pimpinella saxifraga</i>	+	-	+	-	+	III
<i>Potentilla argentea</i>	+	-	-	+	-	II
<i>Peucedanum oreoselinum</i>	-	+	-	-	+	II
<i>Centaurea micranthos</i>	-	+	-	+	-	II

<i>Helianthemum nummularium</i>	-	-	+	+	-	II
<i>Gentiana cruciata</i>	-	-	+	+	-	II
<i>Filipendula hexapetala</i>	-	+	+	-	-	II
Variae Syntaxa						
<i>Rorippa sylvestris</i>	-	-	+	+	+	III
<i>Lychnис viscaria</i>	-	-	+	-	+	II
<i>Prunella vulgaris</i>	+	-	+	+	+	IV
<i>Brioite diverse specii</i>	+	+	+	+	+	V

Place and data of relevés: *Băița-Crăciunești Quarry, 15.V.2014*



Fig. 1. Abundance of the *Genistella sagittalis* in the *Festucetum rubrae-Agrostietum capillaris* Csürös-Káptalan 1964 plant community (Foto M. Niculescu)



Fig. 2. Abundance of the *Colchicum autumnale* in the *Festucetum rubrae-Agrostietum capillaris* Csürös-Káptalan 1964 plant community (Foto M. Niculescu)



Fig. 3. *Festucetum pratensis* Soó (1938) 1955, 1969) plant community
in Băița-Crăciunești Quarry (Foto M. Niculescu)

Ass. Poëtum pratensis Răvărău et al 1956

(Syn. *Trifolio-Poëtum pratensis* (Răvărău et al. 1956) Resmeriță 1958)

Table 2

No. of relevée	1	2	3	4	5	K
Altitude m.o.s. (x 10 m)	45	45	46	47	47	
Exposure	V	-	-	SV	NV	
Inclination (in grades)	10	-	-	5	7	
Coverage of herbaceous layer (%)	90	95	95	100	100	
Sampling surface (m ²)	100	30	50	100	100	
Char. ass.						
<i>Poa pratensis</i>	4	4	4	4	4	V
Molinietalia et Molino-Arrhenatheretea						
<i>Alopecurus pratensis</i>	+	+	-	1	-	III
<i>Agrostis stolonifera</i>	+	1	+	+	1	V
<i>Cirsium caum</i>	+	-	+	-	+	III
<i>Briza media</i>	+	+	+	+	+	V
<i>Anthoxanthum odoratum</i>	-	+	+	+	-	III
<i>Holcus lanatus</i>	+	+	+	+	+	V
<i>Festuca pratensis</i>	+	+	+	+	+	V
<i>Trifolium pratense</i>	1	1	+	+	+	V
<i>Trifolium repens</i>	+	+	+	+	+	V
<i>Vicia cracca</i>	+	-	+	+	-	III
<i>Medicago lupulina</i>	-	+	+	+	-	III
<i>Ranunculus acris</i>	+	+	+	+	+	V
<i>Dactylis glomerata</i>	+	+	+	+	+	V
<i>Cerastium glomeratum</i>	-	+	+	+	-	III
<i>Stellaria graminea</i>	+	+	+	+	+	V
<i>Taraxacum officinale</i>	+	-	+	+	+	IV
<i>Luzula campestris</i>	-	+	+	+	-	III
<i>Lychnis flos-cuculi</i>	+	+	+	-	+	IV
<i>Achillea millefolium</i>	-	-	+	+	+	IV
<i>Leontodon autumnalis</i>	-	+	+	+	+	IV
<i>Plantago lanceolata</i>	-	-	+	+	+	IV
<i>Leucanthemum vulgare</i>	+	+	+	+	-	IV
<i>Ranunculus repens</i>	1	1	1	+	1	V

Arrhenatheretalia						
<i>Agrostis capillaris</i>	-	+	+	1	+	IV
<i>Veronica chamaedrys</i>	+	-	+	+	-	III
<i>Cynosurus cristatus</i>	-	+	+	+	-	III
<i>Rhinanthus rumelicus</i>	-	+	+	-	-	II
<i>Arrhenatherum elatius</i>	+	+	+	-	-	III
<i>Festuca rubra</i>	-	+	+	-	+	III
<i>Campanula patula ssp. patula</i>	+	+	-	+	+	IV
Festuco-Brometea						
<i>Galium verum</i>	+	+	+	-	-	III
<i>Filipendula vulgaris</i>	+	+	+	-	-	III
<i>Lotus corniculatus</i>	-	+	+	+	-	III
<i>Sanguisorba minor</i>	+	-	+	-	-	II
<i>Coronilla varia</i>	-	+	+	-	+	III
<i>Salvia pratensis</i>	+	+	-	+	-	III
<i>Dianthus carthusianorum</i>	-	+	+	-	+	III
<i>Fragaria viridis</i>	-	+	-	-	+	II
<i>Thymus pulegioides</i>	+	+	+	+	+	V
<i>Potentilla argentea</i>	+	+	+	+	+	V
Variae Syntaxa						
<i>Vicia sativa</i>	-	+	+	-	-	II
<i>Rorippa sylvestris</i>	-	-	+	-	+	II
<i>Lychnis viscaria</i>	+	-	+	-	-	II
<i>Cirsium arvense</i>	+	-	+	+	+	IV
<i>Potentilla reptans</i>	+	+	+	-	+	V
<i>Prunella vulgaris</i>	+	+	+	+	+	V
<i>Rumex crispus</i>	+	-	+	+	+	IV
<i>Gentiana cruciata</i>	+	+	-	-	-	II
<i>Salvia verticillata</i>	+	-	+	-	-	II
<i>Bromus arvensis</i>	+	-	+	+	-	III
<i>Elymus repens</i>	+	-	+	+	+	IV
<i>Valerianella locustris</i>	+	+	-	-	-	II
<i>Briony diverse specii</i>	+	+	+	+	+	V

Place and data of relevés: Băița-Crăciunești Quarry, 15.V.2014

Ass. *Medicagini minima-Festucetum valesiacae* Wagner 1941

Table 3

No. of relevée	1	2	3	4	5	K
Altitude m.o.s. (x 10 m)	1	2	3	4	5	
Exposure	45	45	46	47	47	
Inclination (in grades)	SV	-	V	SV	V	
Coverage of herbaceous layer (%)	10	-	10	5	7	
Sampling surface (m ²)	100	95	95	100	100	
Char. ass.						
<i>Festuca valesiaca</i>	4-5	5	5	5	5	V
<i>Medicago minima</i>	-	+	+	+	-	III
Molinietalia et Molinio-Arrhenatheretalia						
<i>Briza media</i>	-	+	1	+	+	III
<i>Poa pratensis</i>	-	-	+	-	+	II
<i>Trifolium campestre</i>	+	1	-	+	1	IV
<i>Alopecurus pratensis</i>	-	+	-	+	-	II
<i>Vicia tetrasperma</i>	+	+	+	+	+	V
<i>Trifolium repens</i>	+	+	+	+	+	V
<i>Rumex acetosa</i>	+	+	+	+	+	V
<i>Achillea millefolium</i>	+	+	+	+	+	V
<i>Leucanthemum vulgare</i>	+	+	-	+	-	III
Arrhenatheretalia						
<i>Cynosurus cristatus</i>	-	+	-	+	+	III
<i>Rhinanthus rumelicus</i>	+	+	+	+	+	V
<i>Campanula patula ssp. patula</i>	+	+	+	+	+	V
<i>Vicia cracca</i>	+	+	+	+	+	V
Festuco-Brometea						

<i>Carex caryophyllea</i>	+	+	+	+	+	V
<i>Medicago falcata</i>	+	+	+	+	+	V
<i>Galium verum</i>	+	+	+	+	+	V
<i>Danthonia provincialis</i>	-	+	-	+	-	II
<i>Potentilla argentea</i>	+	+	-	+	+	IV
<i>Prunella laciniata</i>	-	+	-	+	-	II
<i>Hypericum perforatum</i>	-	+	-	+	-	II
<i>Ornithogalum umbellatum</i>	-	+	-	+	-	II
<i>Gagea arvensis</i>	+	+	-	+	+	IV
<i>Crepis setosa</i>	-	+	-	+	-	II
<i>Rumex crispus</i>	+	+	+	+	+	V
<i>Euphorbia cyparissias</i>	-	+	-	+	-	II
<i>Ranunculus sardous</i>	+	+	+	+	+	V
<i>Rorippa austriaca</i>	-	-	1	1	1	III
<i>Draba verna</i>	-	+	1	-	+	III
<i>Rosa gallica</i>	+	+	-	+	+	IV
Variae Syntaxa						
<i>Vicia tetrasperma</i>	+	+	+	-	-	III
<i>Lychnis viscaria</i>	-	+	-	+	-	II
<i>Cirsium arvense</i>	+	+	+	+	+	V
<i>Sisymbrium officinale</i>	-	+	-	+	-	II
<i>Chenopodium album</i>	-	+	-	+	-	II
<i>Solanum nigrum</i>	-	+	-	+	-	II
<i>Hyoscyamus niger</i>	-	+	-	+	-	II
<i>Urtica dioica</i>	+	+	-	+	+	IV
<i>Thlaspi arvense</i>	+	+	-	+	-	III

Place and data of relevés: Băița-Crăciunești Quarry, 16.V.2014



Fig. 4. Ass. *Medicagini minimae-Festucetum valesiacae* Wagner 1941
(Foto M. Niculescu)



Fig. 5. **Pant community of *Sedum hispanicum*** (Foto M. Niculescu)

ANNEX 7

Ass. *Asplenietum trichomano-rutae murariae* Tx. 1937 (Syn.: *Tortulo-Asplenietum* Tüxen 1937)

Table 1

No. of relevée	1	2	3	4	5	K
Altitude m.o.s. (x 10 m)	48	47	48	47	48	
Exposure	V	SV	V	N	NE	
Inclination (in grades)	60	50	80	70	50	
Coverage of herbaceous layer (%)	60	50	50	60	60	
Sampling surface (m ²)	2	2	2	2	2	
Char. ass.						
<i>Asplenium ruta-muraria</i>	2	2	12	2	2	V
<i>Asplenium trichomanes</i>	1	1	2	1	1	V
Cystopteridion et Potentilletalia						
<i>Moehringia muscosa</i>	+	+	2	1	1	V
Asplenietea rupestris						
<i>Sedum maximum</i>	-	+	+	-	+	III
<i>Polypodium vulgare</i>	+	+	+	+	+	V
<i>Poa nemoralis</i>	+	+	+	+	+	V
<i>Sedum annuum</i>	+	+	+	-	-	III
Seslerietalia						
<i>Sesleria rigida</i>	+	+	+	+	+	V
<i>Thymus pulcherrimus</i>	+	+	-	-	+	III
Variae Syntaxa						
<i>Athamantha turbith</i> ssp. <i>hungarica</i>	+	+	+	+	+	V
<i>Hieracium umbellatum</i>	+	+	-	-	-	II
<i>Sedum acre</i>	+	+	+	-	+	IV
<i>Brioite diverse specii</i>	1	1	1	1	1	V
<i>Terucium chamaedrys</i>	+	+	+	+	+	V
<i>Campanula sibirica</i>	+	+	-	-	+	III
<i>Campanula persicifolia</i>	+	+	+	+	+	V
<i>Viola saxatilis</i>	-	+	-	-	+	II
<i>Centarurea atropurpurea</i>	+	+	-	-	+	III
<i>Bryophyta</i>	1	2	1	1	2	II

Place and data of relevés: Băița-Crăciunești Quarry, 18.V.2014



Fig. 1. Ass. *Asplenietum trichomano-rutae murariae* Tx. 1937(Foto M. Niculescu)



Fig. 2. *Asplenium trichomanes* (Foto M. Niculescu)

ANNEX 8

RUDERAL VEGETATION

Ass. *Sambucetum ebuli* (Kraiser 1926) Felföldy 1942

Table 1

No. of relevée	1	2	3	4
Altitude m.o.s. (x 10 m)	55	55	58	58
Exposure	-	V	SV	S
Inclination (in grades)	-	7	5	10
Coverage of herbaceous layer (%)	100	95	100	100
Sampling surface (m ²)	100	50	50	100
Char. ass.				
<i>Sambucus ebulus</i>	5	5	5	5
Chenopodieta				
<i>Solanum nigrum</i>	-	+	-	+
<i>Sonchus arvensis</i>	+	-	+	-
<i>Malva sylvestris</i>	-	+	+	-
<i>Artemisia vulgaris</i>	-	-	-	+
<i>Cirsium vulgare</i>	-	-	-	+
Calystegion sepium				
<i>Calystegia sepium</i>	+	+	+	-
<i>Rubus caesius</i>	+	+	-	-
<i>Eupatorium cannabinum</i>	+	+	+	+
Artemisieta				
<i>Ballota nigra</i>	-	+	+	-
<i>Rumex obtusifolius</i>	-	+	+	-
<i>Leonurus cardiaca</i>	+	+	-	-
<i>Urtica dioica</i>	-	1	+	+
<i>Tanacetum vulgare</i>	-	+	+	+
Festuco-Brometea				
<i>Galium verum</i>	+	+	+	-
<i>Lotus corniculatus</i>	-	+	-	+
<i>Fragaria viridis</i>	+	-	+	+
<i>Ajuga genevensis</i>	-	+	+	+
Molinio-Arrhenatheretea				
<i>Trifolium pratense</i>	+	+	+	-
<i>Vicia cracca</i>	+	+	+	+
<i>Poa pratensis</i>	-	+	+	+
<i>Medicago lupulina</i>	+	-	+	+
<i>Achillea millefolium</i>	+	+	-	+
Variae Syntaxa				
<i>Lycopus europaeus</i>	+	+	+	-
<i>Geum urbanum</i>	+	+	-	+
<i>Glechoma hederacea</i>	+	+	-	+
<i>Agrimonia eupatoria</i>	-	+	-	-
<i>Rosa canina</i>	-	+	+	-

Place and data of relevés: Băița-Crăciunești Quarry, 18.V.2014

Ass. *Clinopodium vulgaris-Pteridietum aquilinii* Dihoru 1975 (Syn. Ass. *Pteridietum aquilinum* Raclaru 1967 p.p., Ass. *Pteridium aquilinum* Ţerbănescu 1957)

Table 2

No. of relevée	1	2	3	4	5	K
Altitude m.o.s. (x 10 m)	46	46	48	48	48	
Exposure	SV	V	V	-	-	
Inclination (in grades)	5	7	10	-	-	
Coverage of herbaceous layer (%)	95	100	100	95	100	
Sampling surface (m ²)	200	100	200	100	200	
Char. ass.						
<i>Pteridium aquilinum</i>	5	5	5	5	5	V
<i>Clinopodium vulgare</i>	+	-	+	+	-	III
Molinio-Arrhenatheretea						
<i>Trifolium repens</i>	+	-	+	-	-	II
<i>Poa pratensis</i>	+	-	+	-	-	II
<i>Medicago lupulina</i>	-	+	+	-	+	III
<i>Achillea millefolium</i>	-	+	-	+	-	II
<i>Ranunculus repens</i>	+	-	+	+	+	IV
<i>Trifolium pratense</i>	+	+	-	-	+	III
<i>Potentilla reptans</i>	+	+	+	+	+	V
<i>Stellaria graminea</i>	+	+	+	+	+	V
<i>Thymus pulegioides</i>	+	+	+	+	+	V
<i>Prunella vulgaris</i>	-	+	+	+	+	IV
<i>Leucanthemum vulgare</i>	+	-	+	+	-	III
<i>Agrostis capillaris</i>	+	+	+	+	+	V
<i>Vicia cracca</i>	+	+	+	+	+	V
<i>Viola tricolor</i>	+	+	+	-	+	IV
Fesuco-Brometea						
<i>Lotus corniculatus</i>	-	+	+	+	-	III
<i>Teucrium chamaedrys</i>	-	+	+	-	-	II
<i>Hypeicum perforatum</i>	-	+	+	-	-	II
<i>Agrimonia eupatoria</i>	+	+	-	-	-	II
Artemisieta						
<i>Urtica dioica</i>	+	+	+	-	+	IV
<i>Ballota nigra</i>	-	+	+	-	-	II
<i>Erigeron annuus</i>	-	-	+	-	-	I
Chenopodieta						
<i>Lamium purpureum</i>	-	-	+	-	-	I
<i>Solanum nigrum</i>	-	+	-	-	+	II
<i>Veronica hederifolia</i>	-	+	-	-	-	I
Variae Syntaxa						
<i>Fragaria viridis</i>	+	+	+	+	+	V
<i>Rumex acetosella</i>	+	+	-	-	-	II
<i>Rorippa sylvestris</i>	-	+	+	+	+	IV
<i>Euphorbia cyparissias</i>	-	+	+	-	+	III

Place and data of relevés: Băița-Crăciunești Quarry, 18.V.2014

ANNEX 9

ECOLOGICAL RECONSTRUCTION



Fig. 1. The land before the experiment (Foto M. Niculescu)



Fig. 2. The vegetal material used (Foto M. Niculescu)



Fig. 3. Land preparation (Foto M. Niculescu)



Fig. 4. (Foto M. Niculescu)



Fig. 5. Support from those of CarpatCement Romania



Fig. 6. Founded plantation (Foto M. Niculescu)



Fig. 7.



Fig. 8. (Foto Lucian Pîrvu)



Fig. 9. The land can be rehabilitated with the same species (Foto M. Niculescu)



Fig. 10. Soil can be uncovered and used for the development of a new plantation (arboret)
(Foto M. Niculescu)



Fig. 11. The surface can be rehabilitated with the grasslands of *Festuca rubra* or *F. pratensis* (Foto M. Niculescu)



Fig. 12. Awareness and informing actions on mining quarries and their environment rehabilitation - World Environment Day, on June 5th, 2014 (Foto M. Niculescu)



UNIVERSITATEA DIN CRAIOVA
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Asociația Studențească Agro-Forest
organizează în parteneriat cu
PRIMĂRIA COMUNEI VÄIDENI, JUDEȚUL VÎLCEA

ZIUA MONDIALĂ A MEDIULUI

Coordonatori:

Conf. univ. Dr. Mariana Niculescu
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- Sesiune de comunicări științifice pe teme de biodiversitate și reabilitare a terenurilor degradate - Cariere miniere
- Activitate practică de identificare a elementelor de biodiversitate din Situl „Nordul Gorjului de Est”
- Acțiuni de ecologizare în Bazinul Luncavățului

Deschiderea oficială a evenimentului - Căminul Cultural
Väideeni „Todecii Vartolomeu”, 5 iunie 2014, ora 11.00



Fig. 13.

ANNEX 10

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