

Additional and new lichen records from Cozia National Park, Romania

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Abstract — A list of 115 lichen taxa from Cozia National Park, including 8 new records for the mycota of Romania is reported together with 77 taxa new for Cozia.

Keywords — lichenized fungi, biodiversity, biota, checklist, Cozia Mount

Introduction

The present study based on lichen diversity in Cozia Mount, the main massive area of Cozia National Park, aims to contribute to the lichen biota of Romania. Being one of the most detailed lichenological surveys in recent years, it provides a total list of 115 taxa, 77 of which are new for Cozia National Park and Valcea County together with 8 new to Romania.

Lichens of Romania have been studied for over 150 years and the results are found in over 300 publications. For instance, Moruzi et al. (1967) presented a survey of all available mycological information. Following this practice, Ciurchea (1998, 2007a,b) made a comprehensive revision of the checklist of lichens and lichenicolous fungi for Romania, which is available online at: <http://www.bgbm.org/BGBM/STAFF/Wiss/Sipman/Zschackia/Rumania/index.htm>

Vondrák & Šoun (2008) and Crișan (2009) are recent mycological papers on Romanian lichens.

Referring to the study area, lichens of Cozia Mount were studied by Codoreanu & Ciurchea (1965), Ciurchea (1969, 1970), Bartók (1990), (Costache et al. 2007) and finally Çobanoğlu et al. (2009) .

Materials and methods

The lichen materials were collected in Cozia Mount located on the East side of Olt River in Cozia National Park, Valcea County, from 42 different sites. Detailed GPS data of the collecting sites is indicated in Table 1. Saxicolous samples were collected on siliceous rocks, sandstones and some calcareous rocks. Epiphytic samples were collected on bark of several tree taxa, such as *Acer*, *Alnus*, *Betula*, *Carpinus*, *Cerasus*, *Fagus*, *Fraxinus*, *Juniperus*, *Picea*, *Pinus*, *Quercus*, *Robinia pseudoacacia*, *Salix* while terricolous lichen samples on soil substrate together with the mosses. In the field, the geographic coordinates (GPS), elevations, date of collecting were recorded on the paper bags as well as the substrate types.

The collected samples were air dried before identification. Then the lichen materials were investigated microscopically (Olympus SZx40) and chemically by using spot tests (standard K, C, P and I) as mentioned in Purvis et al. (1992). The taxa were identified at the level of species (except two genera) with the aid of identification keys (Brodo et al. 2001, Purvis et al. 1992, Wirth 1995). After identification, the samples were placed in herbarium envelopes and stored at -20 °C to protect against insects and contamination for 3 days. The lichen specimens are preserved in the Herbarium of the Faculty of Science and Arts, Marmara University, Istanbul (MUFE) with numbers given by Gülşah Çobanoğlu, (G.Ç.ROM77 – G.Ç.ROM191) and duplicates have been stored in the Herbarium of the University of Craiova (Romania).

Cozia National Park is situated on the central-southern region of Romania, in Valcea County, inside the southern Carpathians. Cozia Mount (Ciuha Neamtului) is the highest peak, with its 1668 meter summit. It is intersected from North to South, by the mighty river of Romanians “Alutus”, the Olt River (615 km long, tributary to the Danube) (Figure 1).

The park covers three distinct mountains: The Cozia Massive on the East side of the Olt River, and Lotru and Capatanii Mountains on the West side of the river. It has a relatively homogeneous geological composition. In the North the crystalline formations are the ones that prevail, while in the South the sedimentary rocks are mostly to be found.

The climate is specific to mountain depressions without large temperature variations, with cool summers (about 20°C in July) and winters relatively

mild (between -5° and 0°C in January). The average annual temperature is 9°C with moderate precipitations (750-800 mm annually; Ploaie 2004).

Results

The lichen taxa identified, included 115 species with the levels of 2 subspecies, 9 varieties and 1 form, a total of 115 taxa in 61 genera, are alphabetically listed below. In the list, numbers of the collecting sites and types of the substrata are specified in abbreviation.

The nomenclature mainly follows Index Fungorum (www.indexfungorum.com) and the recent literature (Ahti & Hawksworth 2005, Blanco et al. 2004). The names of authors are abbreviated according to Brummitt & Powell (1992).

An asterisk (*) indicates a new record for Romania; 8 taxa are new to Romanian lichen mycota, and 77 taxa are newly recorded from Cozia Mount; each of which is indicated with a plus sign (+) in the list. Also 26 rare taxa for Romanian mycota according to Ciurchae (2007a,b) are indicated with a number sign (#).

Abbreviations for the substrate types are as follows; *Acer* sp.= Ac, *Acer campestre*= Ac-c, *Alnus* sp.= Al, *Betula* sp.= Be, *Carpinus* sp.= Ca, *Cerasus* sp.= Ce, *Fagus* sp.= Fa, *Fraxinus* sp.= Fr, *Juniperus* sp.= J, *Picea* sp.= P, *Pinus* sp.= Pi, *Pinus sylvestris*= Pi-s, *Robinia pseudoacacia*= Ro-p, *Quercus* sp.= Q, *Salix* sp.=Sa, Wood= W, Soil= S, Soil & Moss= S-M, Calcareous Rock= CR, Sandstone= Ss, Siliceous Rock= SiR, Wall= Wa

List of taxa

- + *Acarospora cervina* (Ach.) A.Massal. (3-CR)
- Acarospora fuscata* (Nyl.) Arnold (3, 5, 7, 8, 10, 17, 18, 32, 33, 36, 37, 39, 40, 41-SiR), (20-CR)
- + *Alectoria ochroleuca* (Hoffm.) A.Massal. (17, 18-S)
- # *Arthonia elegans* (Ach.) Almq. (20-Ac-c)
- # *Arthrorhaphis citrinella* (Ach.) Poelt (18-S), (7-SiR)
- + *Aspicilia caesiocinerea* (Nyl. ex Malbr.) Arnold (6, 7, 19, 39-CR), (36-SiR)
- Aspicilia cinerea* (L.) Körb. (3, 7, 17, 34-SiR), (19-CR)
- + *Bacidia polychroa* (Th.Fr.) Körb. (20-Ac-c)
- + *Bacidia rosella* (Pers.) De Not. (12-Fa)
- + *Bacidia rubella* (Hoffm.) A.Massal. (20-Fr)
- + *Baeomyces rufus* (Huds.) Rebert. (13, 25-Ss)
- + *Buellia disciformis* (Fr.) Mudd (9-Q), (19-Be), (23, 29-Fa)

- + # *Buellia erubescens* Arnold (12-Fa)
- * *Buellia griseovirens* (Turner & Borrer ex Sm.) Almb. (5-J), (7-P), (15-Pi-s), (19-Be)
- + # *Buellia ocellata* (Flörke) Körb. (7, 8, 17, 18, 33-SiR)
- + *Caloplaca cerina* var. *cerina* (Ehrh. ex Hedw.) Th.Fr. (16-Fr)
- + # *Caloplaca citrina* (Hoffm.) Th.Fr. (1-SiR)
- + *Caloplaca crenularia* (With.) J.R. Laundon (1, 8, 17-SiR)
- + *Caloplaca flavovirescens* (Wulfen) Dalla Torre & Sarnth. (22, 30-SiR)
- + # *Caloplaca grimmiae* (Nyl.) H.Olivier (8-C. *vitellina*)
- + *Caloplaca holocarpa* (Hoffm.) A.E. Wade (18-Wa), (8, 11, 19, 20, 29-CR), (38-Q)
- + *Candelariella aurella* (Hoffm.) Zahlbr. (18-Wa), (8, 11, 19, 29-CR)
- * *Candelariella coralliza* (Nyl.) H.Magn. (17, 18, 33, 36, 37, 41-SiR)
- Candelariella vitellina* (Ehrh.) Müll.Arg. (1, 3, 5, 6, 7, 8, , 17, 18, 31, 32, 33, 39, 36, 37, 41-SiR), (27-Wa), (20, 28-CR)
- + *Candelariella xanthostigma* (Pers.) Lettau (1-Ro-p), (12, 35, 42-Fa), (16-Fr), (26-W), (36-P)
- + # *Carbonea vitellinaria* (Nyl.) Hertel (8, 17, 18, 41-C. *vitellina*)
- + *Cetraria aculeata* (Schreb.) Fr. (17, 18-S)
- Chrysothrix candelaris* (L.) J.R. Laundon (19-Q)
- + *Chrysothrix chlorina* (Ach.) J.R. Laundon (22, 36, 37-SiR)
- + *Cladonia cervicornis* subsp. *verticillata* (Hoffm.) Ahti (17, 18-S)
- + # *Cladonia ciliata* var. *ciliata* Stirt. (17-S)
- + *Cladonia gracilis* (L.) Willd. (17, 18-S)
- * *Cladonia stellaris* (Opiz) Pouzar & Vězda (17-S)
- + *Collema flaccidum* (Ach.) Ach. (11-CR)
- + # *Collema subflaccidum* Degel. (5, 6-CR), (28-Fr), (6, 38-Q), (30-S)
- + # *Cornicularia normoerica* (Gunnerus) Du Rietz (17, 18, 36, 37-SiR)
- + *Dermatocarpon luridum* (Dill. ex With.) J.R. Laundon (28-CR)
- Dermatocarpon miniatum* var. *miniatum* (L.) W.Mann (5, 6, 11, 28-CR)
- Dimelaena oreina* (Ach.) Norman (8, 17, 32-SiR)
- + *Diploschistes muscorum* (Scop.) R.Sant. (18-S), (35-Fa)
- Diploschistes scruposus* (Schreb.) Norman (3, 5, 7, 17, 32, 36-SiR)
- + *Diplotomma alboatrum* (Hoffm.) Flot. (22-Wa), (7-SiR), (20-Fr)
- # *Elixia flexella* (Ach.) Coppins (1, 42-Fa)
- + # *Flavopunctelia flaventior* Stirt. (1-Ro-p)
- + *Gyalecta jenensis* (Batsch) Zahlbr. var. *jenensis* (22-Wa)
- + # *Immersaria athroocarpa* (Ach.) Rambold & Pietschm. (5, 7, 17, 18-SiR)
- # *Imshaugia aleurites* (Ach.) S.L.F. Mey. (5-Pi-s)
- + *Lasallia pustulata* (L.) Mérat (3, 32, 41-SiR)
- Lecanora albella* (Pers.) Ach. (20-Al), (36-P)

- Lecanora carpinea* (L.) Vain. (2, 29-Fa), (8-Be), (7-Pi), (15-Ac), (16-Fr), (19-Ca), (30-Q)
 # *Lecanora cenisia* Ach. (17, 18, 33, 36, 40, 41-SiR)
 * *Lecanora cinereofusca* H. Magn. (33-P)
 + *Lecanora dispersa* (Pers.) Röhl. (22, 27-Wa), (14-SiR), (8, 19-CR), (23-Fa)
 + # *Lecanora gangaleoides* Nyl. (17-SiR), (7-Be), (16-Fr), (23-Fa)
 + *Lecanora intricata* (Ach.) Ach. (7, 8, 17, 18, 33, 37, 39, 40-SiR)
 + *Lecanora intumescens* (Rebent.) Rabenh. (19-Ca), (23, 29, 35-Fa)
Lecanora polytropa (Ehrh.) Rabenh. (7, 8, 17, 18, 36, 39, 40-SiR), (20-CR)
Lecanora rupicola var. *rupicola* (L.) Zahlbr. (3, 7, 8, 17, 18, 32, 36, 37, 40, 41-SiR)
 + *Lecanora symmicta* (Ach.) Ach. (7, 36-P), (29-Q)
 + *Lecanora varia* (Hoffm.) Ach. (7-Pi), (30-Q)
 + *Lecidea lactea* Flörke ex Schaer. (8, 17, 18, 31, 40-SiR)
Lecidea lapicida (Ach.) Ach. (8, 17, 18, 29, 33, 36, 37, 40-SiR)
 + *Lecidella carpathica* Körb. (17-SiR)
 + *Lecidella stigmathea* (Ach.) Hertel & Leuckert (17, 39-SiR), (18-Wa)
 + *Lecidoma demissum* (Rutstr.) Gotth. Schneid. & Hertel (17-S)
 * *Leproloma cacuminum* (A.Massal.) Kümmerl. & Leuckert (3, 7, 8, 17, 39-S-M)
 + # *Melanelia hepaticum* (Ach.) A.Thell (17-S)
 + # *Melanelia stygia* (L.) Essl. (36, 37-SiR)
 + *Melanelixia subargentifera* (Nyl.) Essl. (7-Be)
Micarea lignaria var. *lignaria* (Ach.) Hedl. (17-Moss)
 + *Normandina pulchella* (Borrer) Nyl. (20-Fr)
 * *Ochrolechia inaequatula* (Nyl.) Zahlbr. (3-Ac), (3-Sa), (7-Be), (9-Q), (12-Fa), (19-Ca), (7-Pi), (36-P)
 + *Opegrapha varia* Pers. (9, 19, 29-Q)
 + *Opegrapha viridis* (Ach.) Nyl. (23-Fa)
 + *Opegrapha vulgata* (Ach.) Ach. (20-Fr)
Ophioparma ventosa (L.) Norman (17, 18-SiR)
Parmelia discordans Nyl. (37-SiR)
 + *Peltigera leucophlebia* (Nyl.) Gyeln. (24-S)
Pertusaria albescens var. *albescens* (Huds.) M.Choisy & Werner (4, 6, 19, 29, 37-Q), (8-Be), (7-Pi), (19-Ca), (20-Al), (23, 25, 35, 39-Fa), (42-Ce)
Pertusaria amara f. *amara* (Ach.) Nyl. (30, 37-Q)
 + *Pertusaria hemisphaerica* (Flörke) Erichsen (5-Q)
Pertusaria pertusa (L.) Tuck. (3-Ac), (20-Al), (20-Fr), (23-Fa)
 + *Physcia dubia* (Hoffm.) Lettau (6, 20-CR)
 + *Pleopsidium flavum* (Bellardi) Körb. (8, 17, 36-SiR)
 + *Porpidia cinereoatra* (Ach.) Hertel & Knoph (24, 25-SiR)

- + *Porpidia crustulata* (Ach.) Hertel & Knoph (5, 7, 8, 17, 18, 34, 37, 40-SiR), (22-Wa)
- + *Protoblastenia incrustans* (DC.) J.Steiner (30-SiR)
- + *Protoblastenia rupestris* (Scop.) J.Steiner (22-Wa), (19, 21, 22-CR)
- + *Protoparmelia badia* (Hoffm.) Hafellner (8, 17, 18, 36, 40-SiR)
- Protoparmeliopsis muralis* (Schreb.) M.Choisy (27-Wa), (1, 8, 34, 37-SiR), (6, 11-CR)
- + # *Pseudephebe pubescens* (L.) M.Choisy (17-S)
- Pyrenula* sp. (20-Ac-c), (29-Fa)
- + *Ramalina capitata* (Ach.) Nyl. (3, 17, 18, 31, 32-SiR), (27-Wa)
- Ramalina fastigiata* (Pers.) Ach. (35-Fa)
- + *Rhizocarpon geminatum* Körb. (5, 7, 8, 17, 18, 37, 39, 40, 41-SiR)
- + *Rhizocarpon geographicum* (L.) DC. (1, 3, 5, 7, 8, 17, 18, 31, 32, 33, 36, 37, 39, 40, 41-SiR), (20-CR)
- + # *Rhizocarpon lecanorinum* Anders (3, 17, 36-SiR)
- + # *Schaereria fuscocinerea* var. *fuscocinerea* (Nyl.) Clauzade & Cl.Roux (17-SiR)
- + # *Sphaerophorus fragilis* (L.) Pers. (17-SiR)
- Tephromela atra* var. *atra* (Huds.) Hafellner (17, 18, 36-SiR)
- + *Thamnomlia vermicularis* subsp. *vermicularis* (Sw.) Ach. ex Schaer. (17, 18-S)
- + *Trapelia coarctata* (Turner ex Sm.) M.Choisy (13-Ss)
- * *Trapelia involuta* (Taylor) Hertel (7-SiR)
- + *Trapeliopsis granulosa* (Hoffm.) Lumbsch (17-S)
- + # *Umbilicaria crustulosa* (Ach.) Frey (7, 8, 17, 18, 37-SiR)
- + *Umbilicaria cylindrica* (L.) Delise ex Duby (7, 8, 17, 18, 32, 33, 36, 37-SiR)
- + # *Umbilicaria deusta* (L.) Baumg. (17, 18-SiR)
- + # *Umbilicaria nylanderiana* (Zahlbr.) H.Magn. (7, 8, 17, 18, 36, 37, 39, 40-SiR)
- + # *Umbilicaria grisea* Hoffm. (17, 18, 32, 33, 41-SiR)
- * *Usnea silesiaca* Motyka (39, 40-Fa)
- Verrucaria* sp. (3, 13, 14, 29-Ss)
- + *Verrucaria muralis* Ach. (30-CR)
- + *Verrucaria nigrescens* Pers. (19, 20-CR)
- + *Xanthoparmelia pulla* (Ach.) O.Blanco, A.Crespo, Elix, D.Hawksw. & Lumbsch (3, 5, 7, 10, 30, 32, 37, 41-SiR), (11, 20-CR)
- + *Xanthoria elegans* (Link) Th.Fr. (17-SiR), (19-CR)

Discussion

A total of 115 lichenized fungal taxa are reported, 8 of which are new records for Romanian lichen mycota; *Buellia griseovirens*, *Candelariella coralliza*, *Cladonia stellaris*, *Lecanora cinereofusca*, *Leproloma cacuminum*, *Ochrolechia inaequatula*, *Trapelia involuta*, and *Usnea silesiaca*. Seventy-seven taxa are new to Cozia Mount. Additionally 26 are rare species in Romania (not as frequent as others according to the relevant literature; Ciurchea 2007a,b) such as *Cornicularia normoerica*, *Immersaria athroocarpa*, *Lecidella carpathica*, *Melanelia stygia*, *Ophioparma ventosa*, *Protoblastenia incrustans*, *Protoparmelia badia*, *Ramalina capitata*, *Rhizocarpon lecanorinum*, *Schaereria fuscocinerea*, *Sphaerophorus fragilis*, *Umbilicaria deusta*, *U. grisea* and *U. nylanderiana*.

The majority of the lichen taxa designated in the list are saxicolous (89 taxa) with a ratio of about 77% of the all. Of these saxicolous taxa, siliceous ones are dominant with 51 taxa, while calcareous ones include 27 taxa, and 11 taxa are reported on sandstone. Saxicolous lichens are more concentrated at the site numbers 37, 39, 40 and 41. A lower number of terricolous (14.78 % of the list) and epiphytic (32.17%) lichens are reported here since most of the lichens in forest ecosystems have been reported in earlier studies by Çobanoğlu et al. (2009). Two lichen taxa are lichenicolous (1.74%); *Caloplaca grimmiae* and *Carbonea vitellinaria* both on *Candelariella vitellina*.

The saxicolous lichen taxa widely distributed in the study area are: *Acarospora fuscata*, *Aspicilia cinerea*, *Buellia ocellata*, *Candelariella coralliza*, *C. vitellina*, *Carbonea vitellinaria*, *Diploschistes scruposus*, *Lecanora cenisia*, *L. intricata*, *L. polytropa*, *L. rupicola* var. *rupicola*, *Lecidea lapicida*, *Porpidia crustulata*, *Rhizocarpon geminatum*, *R. geographicum*, *Umbilicaria cylindrica*, *U. nylanderiana* and *Xanthoparmelia pulla*. About 570 ha of the area is composed of Cozia Gneiss and Brezoi Brezi as main rock types that the siliceous lichen species colonize.

The identified lichens are morphologically segregated by growth form; 81 taxa are crustose (70.43%), 20 taxa are foliose (17.39%), 9 taxa are fruticose (7.82%), 1 taxon is squamulose (0.86%) and 4 taxa are dimorphic *Cladonia* spp. (3.48%).

Dermatocarpon minutum var. *minutum* is growing commonly on highly calcareous rocks while *Protoparmeliopsis muralis*, *Rhizocarpon geographicum*, *Verrucaria muralis* and *V. nigrescens* are usually common on slightly calcareous rocks.

Those taxa are observed quite widespread on soil in the crevices of rocks or directly on earth: *Alectoria ochroleuca*, *Arthrorhaphis citrinella*, *Cetraria*

aculeata, *Cetraria islandica* subsp. *islandica*, *Cladonia coccifera*, *Cladonia furcata* subsp. *furcata*, *Cladonia gracilis*, *Pseudephebe pubescens* and *Thamnolia vermicularis* subsp. *vermicularis*. Members of the genera, *Cetraria*, *Cladonia*, *Nephroma* and *Peltigera* are usually growing on mossy soils.

The average altitude of the Park is 1360 m and the peak of Cozia Mount is 1668 m. The alpine zone includes species such as *Cetraria aculeata*, *C. islandica* subsp. *islandica*, *Cladonia coccifera*, *C. furcata* subsp. *furcata*, *C. gracilis*, *Ramalina capitata*, *Thamnolia vermicularis* subsp. *vermicularis*. Widely distributed crustose species on higher altitudes are *Candelariella coralliza*, *Lecanora intricata*, *L. polytropa*, *L. rupicola*, *Rhizocarpon geminatum*, and *R. geographicum*.

Some species are well-known bioindicators for clean air. The presence of the species, *Ramalina fraxinea*, *Anaptychia ciliaris*, *Lobaria pulmonaria*, *Physconia distorta*, *Parmelina pastillifera*, *Flavoparmelia caperata* and *Physcia leptalea* in Cozia National Park suggests that the park has low levels of pollution.

The present study is currently the most detailed lichenological survey in recent times for lichens of Romania, and provides valuable data for the lichen mycota.

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Table 1. List of the collecting sites

Site No	Coordinates ("N"=North, "E"=East)									Collecting Date	Altitude (m)
1.	45°	16'	35.13"	N	-	24°	20'	07.38"	E	08.VII.2007	405
2.	45°	17'	04.74"	N	-	24°	19'	54.00"	E	08.VII.2007	469
3.	45°	17'	42.40"	N	-	24°	19'	48.62"	E	09.VII.2007	559
4.	45°	17'	52.59"	N	-	24°	20'	01.45"	E	09.VII.2007	610
5.	45°	18'	03.70"	N	-	24°	19'	47.60"	E	09.VII.2007	693
6.	45°	17'	49.51"	N	-	24°	18'	25.63"	E	10.VII.2007	661
7.	45°	19'	02.85"	N	-	24°	20'	29.39"	E	11.VII.2007	1577
8.	45°	18'	52.54"	N	-	24°	20'	40.14"	E	11.VII.2007	1412
9.	45°	17'	56.47"	N	-	24°	19'	30.27"	E	12.VII.2007	758
10.	45°	16'	59.53"	N	-	24°	18'	51.59"	E	17.VII.2007	461
11.	45°	17'	18.84"	N	-	24°	18'	31.50"	E	17.VII.2007	337
12.	45°	17'	40.78"	N	-	24°	24'	30.80"	E	18.VII.2007	700
13.	45°	18'	02.20"	N	-	24°	23'	55.97"	E	18.VII.2007	783
14.	45°	18'	28.04"	N	-	24°	23'	32.59"	E	18.VII.2007	869
15.	45°	17'	21.19"	N	-	24°	20'	47.07"	E	19.VII.2007	604
16.	45°	17'	51.07"	N	-	24°	21'	35.22"	E	19.VII.2007	936
17.	45°	19'	13.61"	N	-	24°	20'	02.87"	E	23.VII.2007	1551
18.	45°	19'	18.82"	N	-	24°	20'	08.30"	E	25.VII.2007	1632
19.	45°	23'	03.98"	N	-	24°	18'	02.90"	E	27.VII.2007	337
20.	45°	22'	15.83"	N	-	24°	18'	26.11"	E	27.VII.2007	382
21.	45°	21'	44.68"	N	-	24°	19'	07.89"	E	27.VII.2007	443
22.	45°	21'	05.55"	N	-	24°	19'	21.28"	E	27.VII.2007	525
23.	45°	20'	05.26"	N	-	24°	17'	18.04"	E	29.VII.2007	412
24.	45°	19'	46.76"	N	-	24°	17'	41.84"	E	29.VII.2007	636
25.	45°	19'	37.02"	N	-	24°	18'	06.47"	E	29.VII.2007	973
26.	45°	20'	39.96"	N	-	24°	16'	47.86"	E	29.VII.2007	306
27.	45°	18'	07.26"	N	-	24°	20'	18.06"	E	30.VII.2007	733
28.	45°	18'	24.41"	N	-	24°	20'	06.86"	E	30.VII.2007	888
29.	45°	20'	55.65"	N	-	24°	16'	53.16"	E	08.VIII.2007	367
30.	45°	20'	31.63"	N	-	24°	17'	37.01"	E	08.VIII.2007	607
31.	45°	20'	16.10"	N	-	24°	18'	01.52"	E	08.VIII.2007	560
32.	45°	19'	30.61"	N	-	24°	18'	48.20"	E	09.VIII.2007	1284
33.	45°	19'	26.36"	N	-	24°	20'	33.51"	E	12.VIII.2007	1514
34.	45°	19'	38.12"	N	-	24°	21'	05.79"	E	12.VIII.2007	1474
35.	45°	19'	47.95"	N	-	24°	21'	19.02"	E	12.VIII.2007	1447
36.	45°	20'	01.03"	N	-	24°	21'	14.20"	E	13.VIII.2007	1367
37.	45°	18'	28.50"	N	-	24°	21'	22.95"	E	14.VIII.2007	1024
38.	45°	19'	13.83"	N	-	24°	22'	31.52"	E	22.VIII.2007	1175
39.	45°	20'	13.30"	N	-	24°	21'	25.70"	E	22.VIII.2007	1511
40.	45°	20'	30.86"	N	-	24°	22'	07.95"	E	22.VIII.2007	1456
41.	45°	20'	36.99"	N	-	24°	22'	58.95"	E	22.VIII.2007	1254
42.	45°	20'	55.71"	N	-	24°	23'	28.04"	E	22.VIII.2008	786

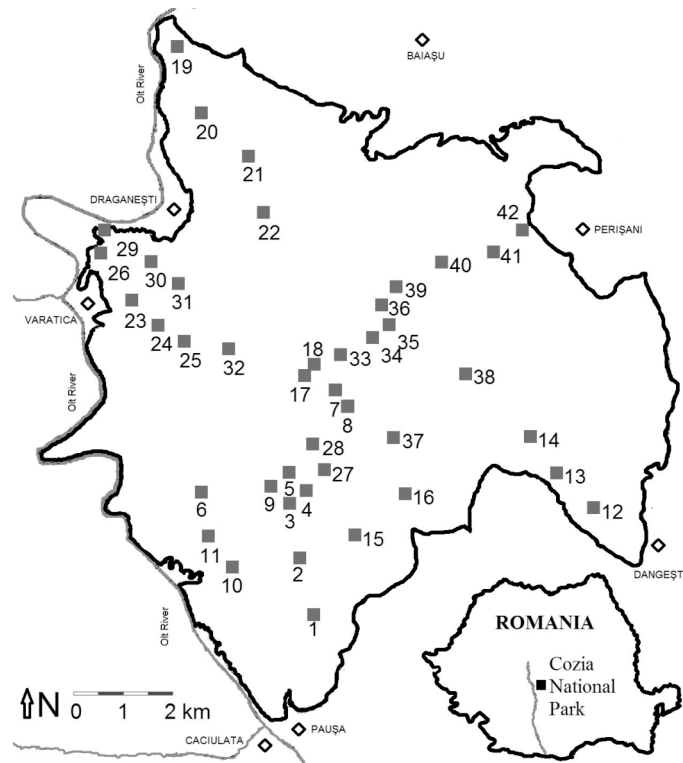


Figure 1. Map of the study area, Cozia Mount and surrounding villages, showing site numbers in Table 1.